

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

BROADPHONE LLC
Patent Owner

Patent No. 8,594,698

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,594,698**

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Ex-1007	U.S. Patent Application Publication 2001/0022558 (“ <i>Karr</i> ”)
Ex-1008	U.S. Patent No. 7,116,987 (“ <i>Spain-II</i> ”)
Ex-1009	U.S. Patent No. 6,782,265 (“ <i>Perez-Breva-II</i> ”)
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Ex-1011	U.S. Patent No. 6,944,465 (“ <i>Spain-I</i> ”)
Ex-1012	T Suzuki, et al., The Moving-body Position Detection Method; JP Patent Application (shown as 63-195800), August 1988
Ex-1013	M. Hellebrandt, et al., Estimating Position and Velocity of Mobiles in a Cellular Radio Network, IEEE Trans. On Vehicular Technology, Vol. 46, No. 1, pp. 65-71
Ex-1014	I Gaspard, et al., Position Assignment in Digital Cellular Mobile Radio Networks (e.g., GSM) Derived from Measurements at the Protocol Interface, IEEE Journal, pp. 592-596, March 1997
Ex-1015	J. Jimenez et al., Mobile Location Using Coverage Information: Theoretical Analysis and Results, COST 259 TD (98), April 1999
Ex-1016	U.S. Patent No. 7,848,765 (“ <i>Phillips</i> ”)
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Ex-1018	U.S. Patent Application Publication No. 2004/0203768 (“ <i>Ylitalo</i> ”)
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Ex-1047	U.S. Patent No. 7,312,752 (“ <i>Smith-IP</i> ”)
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Ex-1053	U.S. Patent Application Publication No. 2005/0159174 (“ <i>Bar-On</i> ”)
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Ex-1055	U.S. Patent No. 7,263,441 (“ <i>Janky</i> ”)
Ex-1056	U.S. Patent Application Publication No. 2005/0136845 (“ <i>Masuoka</i> ”)
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Ex-1058	U.S. Patent Application Publication No. 2005/0282557 (“ <i>Mikko</i> ”)
Ex-1059	U.S. Patent No. 7,474,897 (“ <i>Morgan-I</i> ”)
Ex-1060	U.S. Patent No. 6,714,865 (“ <i>Angwin</i> ”)
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Ex-1062	U.S. Patent No. 7,433,693 (“ <i>Sheynblat-I</i> ”)
Ex-1063	U.S. Patent Application Publication No. 2007/0013584 (“ <i>Camp</i> ”)
Ex-1064	U.S. Patent Application Publication No. 2008/0139219 (“ <i>Boeiro</i> ”)
Ex-1065	U.S. Patent Application Publication No. 2006/0240841 (“ <i>Bhattacharya</i> ”)
Ex-1066	U.S. Patent Application Publication No. 2006/0095349 (“ <i>Morgan-IP</i> ”)
Ex-1067	U.S. Patent No. 6,915,123 (“ <i>Daudelin</i> ”)
Ex-1068	U.S. Patent Application Publication No. 2007/0010956 (“ <i>Nerguizian</i> ”)

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Ex-1069	U.S. Patent Application Publication No. 2005/0195761 (“ <i>Alicherry</i> ”)
Ex-1070	U.S. Patent Application Publication No. 2007/0133487 (“ <i>Wang</i> ”)
Ex-1071	U.S. Patent Application Publication No. 2006/0089153 (“ <i>Sheynblat-IP</i> ”)
Ex-1072	U.S. Patent Application Publication No. 2007/0249365 (“ <i>Jendbro</i> ”)
Ex-1073	U.S. Patent No. 7,941,656 (“ <i>Hans</i> ”)
Ex-1074	U.S. Patent No. 7,454,608 (“ <i>Gopalakrishnan</i> ”)
Ex-1075	U.S. Patent No. 8,948,785 (“ <i>Grindeland</i> ”)
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Exs-1077-1099	RESERVED
Ex-1100	Prosecution History of U.S. Patent No. 8,170,583
Ex-1101	U.S. Patent No. 7,792,547 (“ <i>Smith-III</i> ”)
Ex-1102	U.S. Patent No. 6,937,869 (“ <i>Rayburn</i> ”)
Ex-1103	U.S. Patent Application Publication No. 2002/0142773 (“ <i>Rudrapatna IP</i> ”)
Ex-1104	U.S. Patent No. 6,140,964 (“ <i>Sugiura</i> ”)
Ex-1105	U.S. Patent Application Publication No. 2005/0272447 (“ <i>Eckel</i> ”)
Ex-1106-1107	RESERVED
Ex-1108	U.S. Patent No. 6,522,890 (“ <i>Drane</i> ”)

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Ex-1109	U.S. Patent Application Publication No. 2007/0087763 (“ <i>Budampati</i> ”)
Ex-1110	U.S. Patent No. 6,195,556 (“ <i>Reudink</i> ”)
Ex-1111	Request for <i>Ex Parte</i> Reexamination of U.S. Patent 8,594,698, 90/019,209 (May 12, 2023)
Ex-1112	Order Granting Request for <i>Ex Parte</i> Reexamination, 90/019,209 (Jun. 2, 2023)
Ex-1113	Non-Final Office Action, 90/019,209 (Nov. 1, 2023)

I. INTRODUCTION

Samsung Electronics Co., Ltd. (“Petitioner”) requests *inter partes* review of claims 1-7, 9-13, 15, 16, and 21 (“challenged claims”) of U.S. Patent No. 8,594,698 (“the ’698 patent”) (Ex-1001) assigned to Broadphone LLC (“PO”). As explained below, each challenged claim should be canceled as unpatentable.

II. MANDATORY NOTICES

Real Parties-in-Interest: Petitioner identifies the following as the real parties-in-interest: Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc.

Related Matters: The ’698 patent is at issue in the following matter(s): *Broadphone LLC v. Samsung Elecs. Co., Ltd.*, No. 23-cv-00001 (E.D. Tex.) (asserting the ’698 patent and also U.S Patent Nos. 8,170,583 and 10,341,811) (“Texas Litigation”).

Petitioner has concurrently submitted petitions for *inter partes* review for challenging claims of U.S Patent Nos. 8,179,583 and 10,341,811.

The ’698 patent is also subject of a pending ex parte reexamination (“EPR”) (Control No. 90/019,209), filed by third party Unified Patents, LLC (“Unified”). (Ex-1111), presenting SNQs based on different combinations of prior art as the grounds here (*id.*, 41; *infra* §§IV, IX.) Petitioner had no involvement in the preparation or filing of the Unified EPR. Because the request raised substantial new

questions of patentability, reexamination was ordered in June 2023. (Ex-1112.) Just before the filing of this petition, the Office issued a non-final office action on November 1, 2023 in that proceeding, where the examiner confirmed claims 1-23 (Ex-1113, 29-37), and raised new rejections against claims 24-32 (not challenged in this petition) based on prior art combinations not identified in the as-filed request for EPR (*id.*, 20-28).

Counsel and Service Information: Lead counsel: Joseph E. Palys (Reg. No. 46,508), and Backup counsel are (1) Naveen Modi (Reg. No. 46,224) and (2) Kevin Stewart (Reg. No. 78,581). Service information is Paul Hastings LLP, 2050 M St., Washington, D.C., 20036, Tel.: 202.551.1700, Fax: 202.551.1705, email: PH-Samsung-Broadphone-IPR@paulhastings.com. Petitioner consents to electronic service.

III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-2613.

IV. GROUNDS FOR STANDING

Petitioner certifies the '698 patent is available for review and Petitioner is not barred or estopped from requesting review on the identified grounds.

V. PRECISE RELIEF REQUESTED AND GROUNDS

The challenged claims should be canceled as unpatentable based on the following grounds under pre-AIA 35 U.S.C. § 103:

Ground	Claim(s)	References
1	1-7, 9-10, 12-13, 21	<i>Spain-I</i> in view of <i>Hunzinger</i> and <i>Nanda</i>
2	4, 6-7	<i>Spain-I</i> in view of <i>Hunzinger</i> , <i>Nanda</i> , and <i>Damarla</i>
3	11	<i>Spain-I</i> in view of <i>Hunzinger</i> , <i>Nanda</i> , and <i>Budampati</i>
4	15-16	<i>Spain-I</i> in view of <i>Hunzinger</i> , <i>Nanda</i> , and <i>Blomqvist</i>

The '698 patent issued from an application filed on 9/19/2006, which Petitioner assumes (without conceding such entitlement) is the effective date of the '698 patent.

Spain-I was filed 11/18/2002,¹ *Hunzinger* was filed 11/15/2001, *Nanda* was filed 2/15/2006, *Damarla* was filed 7/29/2004, *Budampati* was filed 10/18/2005, and *Blomqvist* was filed 1/21/2004, and thus each qualifies as prior art at least under 35 U.S.C. § 102(e).

¹ *Spain-I* (Ex-1011) is a CIP of Exhibits 1005, 1009-1010 (Ex-1011, Cover) and incorporates by reference each of those patents (*id.*, 1:5-14) and the disclosures in Exhibits 1012-1015 (*id.*, 15:1-16).

These references were not substantively considered during prosecution of the '698 patent. (Ex-1004; §X.)

VI. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art as of the effective date of the '698 patent ("POSITA") would have had at least a BS degree in computer science, electrical engineering, or similar discipline, and two or more years of experience with location determining-based systems and/or processes, such as for example systems/processes for determining mobile device location(s). (Ex-1002, ¶¶31-32.)² More education can supplement practical experience and vice versa. (*Id.*)

VII. THE '698 PATENT

The '698 patent describes systems/methods for determining a location for a portable device, where, *e.g.*, the device compares current location signal strengths with desired location signal strengths. (Ex-1001, Abstract, 5:57-6:32, 11:18-12:39, 17:35-50, 18:3-19:27, 21:18-46.) If the signal strengths match, the "cell phone is determined to have returned to the desired location (i.e., current location=desired location)." (*Id.*, 19:4-15.)

² Petitioner submits the declaration of Kevin Almeroth, Ph.D (Ex-1002), an expert in the field of the '698 patent. (Ex-1002, ¶¶1-30; Ex-1003.)

During prosecution, the applicant indicated the claims focus on “determining whether a mobile device is or is not at a specified location (‘am I there’),” as opposed to “determining where a mobile device is (‘where am I’)” (Ex-1004, 167), and that the “subject matter of this application [’698 patent] is a *modest broadening* of the subject allowed in...U.S. Patent 8,170,583[.]” (*id.*, 126).³ (*Supra* §II.)⁴

However, the use of fingerprints/signal characteristics to determine whether a device is “at a particular location or not” (*e.g.*, “am I there”) and other related features was known. (Ex-1002, ¶¶33-58, 61-91; Ex-1011, 4:23-25; Exs-1008, 1018, 1057-1060, 1064-1076; §IX.)

VIII. CLAIM CONSTRUCTION

For purposes of this proceeding, no special constructions are necessary to assess whether the challenged claims are unpatentable over the asserted prior art, and thus Petitioner applies their plain meanings—including in context of

³ Such broadening highlights obviousness of the challenged claims here given the examiner allowed the now-issued claims in the ’583 patent only after amendments added “threshold” features, which were removed from the ’698 claims. (*Compare* Ex-1100, 20-27, 42, 45 *with* Ex-1004, 165-167 (removing “threshold”).)

⁴ Emphasis added unless stated otherwise.

specification and file history.⁵ *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper No. 11 at 16 (Aug. 14, 2015). (Ex-1002, ¶¶59-60; *infra* §IX.)

For example, Petitioner demonstrates how the claimed “at least one number based on” (limitation 1(b)(ii)) is met under its plain meaning in context of representations during prosecution. (Ex-1004, 166 (“the ‘number based on...’ is intended to refer to the output of any ‘formula,’” such as “difference formula,...or ‘determinations...based on derivatives, integrals, statistical metrics, mathematical normalizations, correction functions, [or] heuristic convolution functions.’”).) (Ex-1002, ¶¶60.)

IX. DETAILED EXPLANATION OF GROUNDS⁶

A. Ground 1: Claims 1-7, 9-10, 12-13, and 21 are obvious over *Spain-I* in view of *Hunzinger* and *Nanda*

1. Claim 1

1[pre] A location-determining method, operable by a first portable RF communications device, the method

⁵ Petitioner reserves all rights to raise claim construction and other arguments (§112, etc.) in other proceedings. *See, e.g., Target Corp. v. Proxicom Wireless, LLC*, IPR2020-00904, Paper 11 at 11-13 (Nov. 10, 2020).

⁶ References to prior art other than asserted in each ground demonstrate the state of art.

comprising:

To the extent limiting, *Spain-I*⁷ (including as modified below) discloses/suggests these limitations. (Ex-1002, ¶¶92-96; §§IX.A.1(a)-(b).)

Spain-I discloses a mobile unit (MU) that is operable to perform location-determining process(es). (Ex-1011, 3:35-41, FIGS. 1-2 (annotated below), 9-10, 1:18-49, 3:5-4:63, 5:20-6:34, 7:58-8:44, 9:25-14:37, 15:19-35; Ex-1005, FIGS. 1-2, 4-5, Abstract, 1:26-3:9, 3:29-61, 4:59-63, 5:40-56; Ex-1010, FIGS. 1-2, 5-10, 1:10-60, 2:23-5:41, 7:1-54, 8:42-11:29; Ex-1009, Abstract, FIGS 1-2, 9-10, 1:14-64, 2:25-6:50, 7:4-11:17; Ex-1002, ¶¶61-67, 95.)

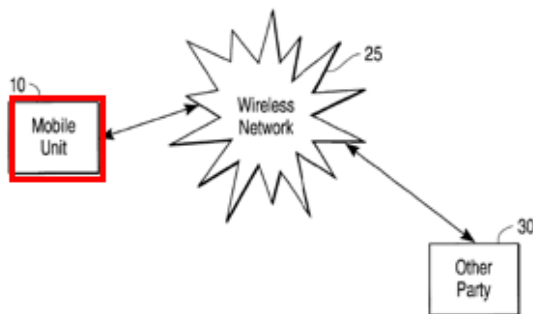


FIG. 1

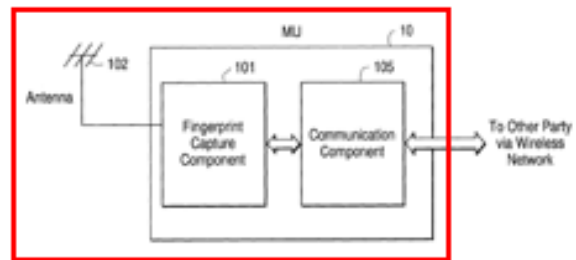


FIG. 2

At selected location(s), the MU collects/measures information (*e.g.*, station ID/signal strengths) for signals received from surrounding antenna stations and generates/stores fingerprint(s) based on that information. (Ex-1011, FIG. 9, 1:25-28,

⁷ See *supra* n.1.

3:42-4:63, 5:20-6:8, 7:58-8:8, 10:35-65, 13:16-14:37; Ex-1005, FIG. 4, 3:29-61, 4:16-5:9, 5:40-6:12, 6:34-51.) (Ex-1002, ¶96.)

Likewise, “[w]hen a location estimate of the MU is desired” at a current location, the MU captures information from signals from surrounding antenna stations and creates a fingerprint. (Ex-1011, 4:42-46, 5:20-6:8, 7:64-8:44, 9:25-10:27; Ex-1005, 3:29-4:24.) The fingerprint may use “*many different parameters, either individually or in combination,*” including signal strength and station ID. (Ex-1011, FIG. 9, 4:55-63, 3:55-58 (MU equipped to determine signal strength), 5:20-32, FIG. 9; Ex-1005, 3:40-4:18; Ex-1002, ¶96.)

The MU compares the monitored and stored location fingerprint information to determine whether it is “at a particular location or not.” (Ex-1011, 4:23-47; Ex-1005, 3:10 18.) Upon a match (or close match), the MU determines the MU is in proximity of the matching fingerprint location. (Ex-1011, FIGS. 9-10, 5:61-6:8, 7:58-67, 8:1-13:15, 14:10-37, 17:15-19; Ex-1005, 3:29-4:37, 4:65-6:51, FIGS. 4-5; Ex-1002, ¶96.)

a) (a) the first portable RF communications device monitoring its location by

(i) receiving communications signals from a first plurality of fixed-location service-area antenna stations capable of RF communication with the first portable RF communications device wherein the antenna stations are substantially continuously operating,

- (ii) **identifying at least one ID within at least one of the received communications signals, and**
- (iii) **measuring a varying signal characteristic other than ID, which signal characteristic is associated with a received communications signal from each of the first plurality of antenna stations; and**

Spain-I (including as modified herein) discloses/suggests these limitations. (Ex-1002, ¶¶97-108.) The MU monitors its location by receiving signals from antenna stations, identifying at least one ID within at least one received signal (*e.g.*, station ID), and measuring signal strengths (varying signal characteristic) associated with a received signal from each of a first plurality of stations (*e.g.*, stations in communication range with the MU when the current location fingerprint information is collected/generated). (§IX.A.1(pre); §IX.A.1(b)⁸; Ex-1002, ¶¶97, 103.)

When at a current/monitored location, the MU “capture[s]” information from the received antenna station signals and determines “the strength of the received signal” and collects/extracts station identifier information. (Ex-1011, 3:5-16, 3:55-4:6, 4:42-54, 5:20-32, 6:9-30 (MU capturing fingerprint of “current location”); Ex-1005, FIGS. 1-3, 1:40-54, 2:5-3:39, 3:57-61, 4:16-18, 4:38-6:11; Ex-1010, 3:4-21,

⁸ To the extent PO argues, or it is determined, *Spain-I* does not disclose limitation 1(a), such features would have been obvious for reasons discussed in §IX.A.1(b).

4:32-44.) The MU creates a fingerprint using that information (station IDs and signal strengths). (*Id.*; §IX.A.1(pre); Ex-1011, 4:55-63 (fingerprint may use different parameters (“individually or in combination”) (*e.g.*, signal strengths and station ID)), 5:20-32, 5:33-6:8, 7:64-8:44, 9:25-10:27, 13:16-33; Ex-1005, FIG. 4, 3:29-4:24, 5:40-6:12.) (Ex-1002, ¶¶98-102.)

400	Fingerprint Structure					
401	Time of Capture:					
403	Station ID:	I1	I2	I3	...	In
405	Frequency:	F1	F2	F3	...	Fn
407	Tuning Parameters:	P1	P2	P3	...	Pn
409	Transmitter Location:	L1	L2	L3	...	Ln
411	Signal Strength 1:	S11	S12	S13	...	S1n
413	Signal Strength 2:	S21	S22	S23	...	S2n
415	...	...	...	...	...	...
417	Signal Strength m:	Sm1	Sm2	Sm3	...	Smn

Fig. 9

(Ex-1011, FIG. 9 (station ID (blue) and measured signal strengths (yellow)); *id.*, 3:42-54, 4:33-36, 7:58-8:8, 13:51-44 (sampling multiple times), FIG. 10; Ex-1005, 2:40-52, 3:57-61, 4:59-5:9.) (Ex-1002, ¶¶100-102.)

The “station(s)” communicating with the MU are substantially continuously operating fixed-location service-area antenna stations, given they communicate RF communication signals within respective service areas with the MU having an antenna, consistent with known wireless network infrastructures. (Ex-1002, ¶104; Ex-1011, FIG. 2, 1:18-48, 3:42-4:61, 5:33-54, 7:58-67, 13:27-31, FIG. 9, 6:31-39

(“base station signal strengths”); Ex-1005, 1:10-34, 2:40-3:9, 3:50-61, FIGS. 2, 4, 4:59-63, 5:51-56; Ex-1010, 1:31-41, 3:22-36, 4:1-7, 5:46-49, 7:1-18, 9:21-49; Ex-1007, FIGS. 3-4, ¶¶0009-0020, 0183-0185 (“standard high traffic, fixed location base stations...”), 0193, 0236-0237 (fixed BS 122); Ex-1001, 1:49-5:13.) *Spain-I* discusses coverages areas served by identified antenna stations. (Ex-1011, FIG. 14 (below), 10:29-13:15.) (Ex-1002, ¶104; §§IX.A.1(a)-(b).)

FIG. 11

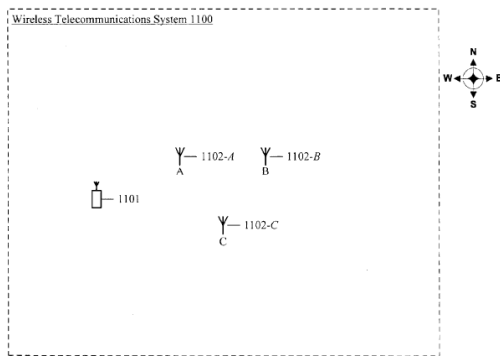
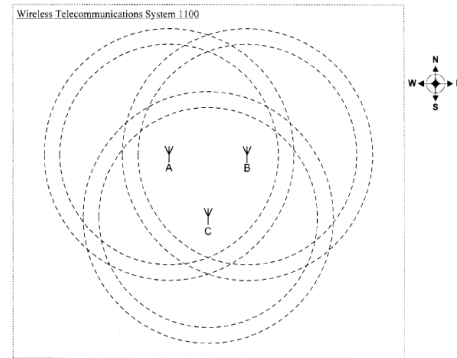


FIG. 14



Thus, a POSITA would have understood that *Spain-I*’s antenna stations are **substantially continuously operating** stations as claimed. (Ex-1002, ¶¶105-106; Ex-1011, 8:1-8, 9:64-67, 10:64-67, 13:16-55, 14:1-3.)

To the extent PO argues such features are not disclosed, a POSITA would have found it obvious to configure *Spain-I*’s system/processes to operate with such stations, consistent with known wireless infrastructures as contemplated by *Spain-I*. (Ex-1002, ¶107; Ex-1011, 1:16-50, 3:8-4:22, 5:33-51, 10:34-11:26; Ex-1005, 1:8-37, 2:53-3:3, 3:62-4:12, 5:28-33; Ex-1007 (*supra*); Ex-1027, FIGS. 1-2, 16, ¶¶0002-0021, 0042-0045, 0102-0103.) Such features would have been a foreseeable and

obvious implementation of known technologies within the skills of a POSITA, who thus would have had a reasonable expectation of success in implementing. (Ex-1002, ¶107.) Such features would have been further obvious for reasons in §IX.A.1(b)(ii)(4).

- b) (b) the first portable RF communications device determining if a first monitored location, monitored in accordance with part (a), is within proximity of a location chosen by a user of the first portable RF communications device, as a result of electronically comparing
 - (i) the at least one ID at the first monitored location with at least one ID at the location chosen by the user and**
 - (ii) at least one number based on the varying signal characteristic of the communications signals from each of the first plurality of antenna stations at the first monitored location with at least one number based on corresponding varying signal characteristics of the communications signals from each of the first plurality of antenna stations at the location chosen by the user.****

Spain-I in view of *Hunzinger* and *Nanda* discloses/suggests these limitations.

(Ex-1002, ¶¶109-181.)

Spain-I's MU determines whether it is currently “at a particular location or not.” (Ex-1011, 4:23-25, 4:43-47⁹; Ex-1005, 3:10-18; §§IX.A.1(pre)-1(a).) The MU

⁹ The MU can initiate the location estimate processes. (Ex-1011, 4:43-47.)

electronically compares fingerprint information (including signal strengths (*e.g.*, number(s)) and station ID(s)) for the MU's current location with stored fingerprint information (similar parameters) for particular location(s) to determine a "closest" match. (§IX.A.1(a); §IX.A.1(b)(ii)(2).) Upon a "match," the "corresponding location in the database is then chosen as the location of the mobile unit." (Ex-1011, 5:61-6:4, 8:1-26; §§IX.A.1(pre)-1(a); Ex-1002, ¶110.) *Spain-I* also discloses various ways to build the database, determine closeness, and refine the analysis. (Ex-1011, FIGS. 1-3, 9-10, 5:61-6:8, 7:58-67, 8:1-13:15, 14:10-31, 17:15-19; Ex-1005, 3:29-4:37, 4:65-6:51, FIGS. 4-5; Exs-1009-1010; Ex-1002, ¶¶110-111.)

Spain-I discloses and/or suggests features/functionalities attributable to claim 1, but lacks certain details for particular claimed features. Petitioner demonstrates below how such features would have been obvious in view of the teachings/suggestions of *Hunzinger-Nanda*.¹⁰ (§§IX.A.1(b)(ii)(1)-(4); Ex-1002, ¶113.)

¹⁰ The obviousness positions do not rely on bodily-incorporation of components/processes from one reference to another, but rather references to "combined" prior art or the like is short-hand for the resulting modified/configured system/process in light of the teachings/suggestions in the prior art. (Ex-1002,

(1) Determining if a First Monitored Location is Within Proximity of a Location Chosen by a User

Spain-I in view of *Hunzinger* and *Nanda* discloses and/or suggests the above-claimed proximity and user chosen location determining features of limitation 1(b) in context of the plain claim language, specification, and file history. (See §§VII-VIII; Ex-1002, ¶¶114-115; Ex-1001, 18:56-19:60; Ex-1004, 167.)

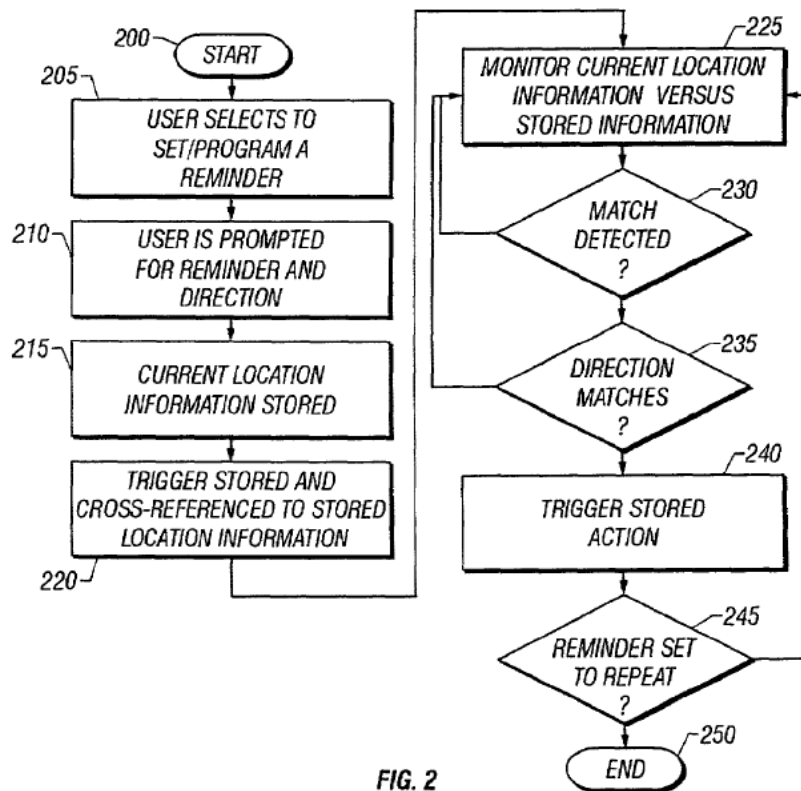
Spain-I describes generating/storing in a database fingerprints corresponding to selected location(s) that is compared to monitored fingerprint information to determine whether the MU's monitored location is "at a particular location or not." (Ex-1011, 4:23-25, 4:43-47, FIG. 9, 3:42-4:23, 5:20-6:31, 7:58-8:26, 13:16-14:37; Ex-1005, 2:40 -6:56; §§IX.A.1(pre)-(b)(ii).) *Spain-I* also discloses configurations where a user can initiate a request that causes "the MU [to] capture[] the fingerprint of its current location." (Ex-1011, FIG. 3, 6:9-30, 6:43-47; Ex-1005, 6:43-47.) While such teachings relate to location server 30 maintaining/using the fingerprint database, they also suggested to a POSITA that the MU is configurable to receive user requests to measure/collect other fingerprint locations. (Ex-1002, ¶¶116-119.) Such suggestions, with the understanding that there were various ways and reasons

¶113.) *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007); *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1343 (Fed. Cir. 2020).

for implementing user chosen location features including for building a database, would have motivated a POSITA to consider teachings in the art when considering *Spain-I*. Upon doing so, a POSITA would have been persuaded by *Hunzinger*'s and *Nanda*'s teachings, and thus found it obvious to configure *Spain-I*'s system/processes to determine if the MU's current location was in proximity of a user chosen location, consistent with that claimed (and discussed in the '698 patent and during prosecution (*e.g.*, am I there)). (Ex-1002, ¶120; §IX.A.1(b)(ii)(2).)

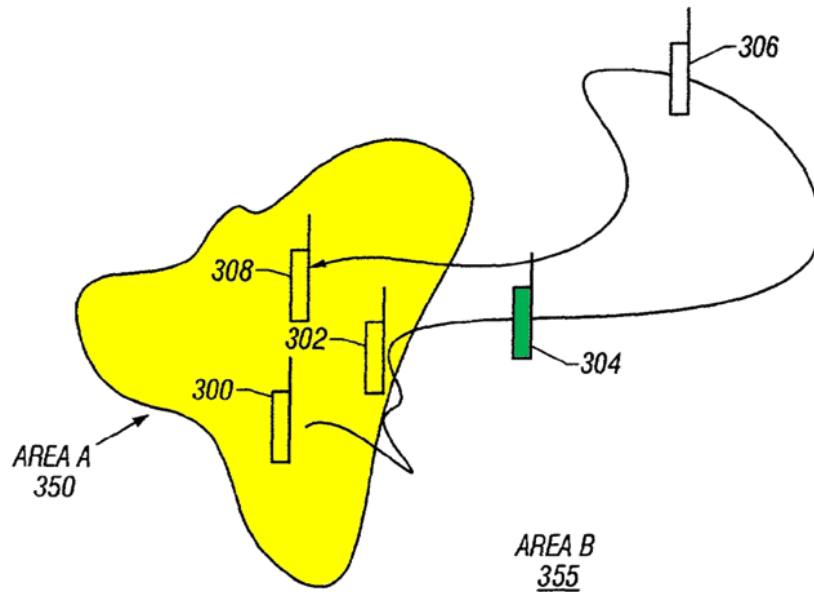
Like *Spain-I*, *Hunzinger* is in the same technical field as the '698 patent and discloses features reasonably pertinent to particular problem(s) the '698 patent (and a POSITA) looked to solve, and thus would have been consulted by a POSITA. (Ex-1054, 1:13-2:49, 3:44-4:59, 6:37-8:44 (and below); §IX.A.1(pre)-(a); Ex-1001, Abstract, 1:23-10:25, 3:26-35, 5:14-56; Ex-1002, ¶¶86-91, 126.)

Hunzinger discloses a location determining system/process where a mobile device (with "position location technology") is configured to allow a user to choose locations and related actions that are performed when the device is determined to be at such chosen locations. (Ex-1054, Abstract, FIGS. 1A-4, 1:38-2:6, 2:10-44, 3:4-67, FIG. 2 (below).) (Ex-1002, ¶121.)

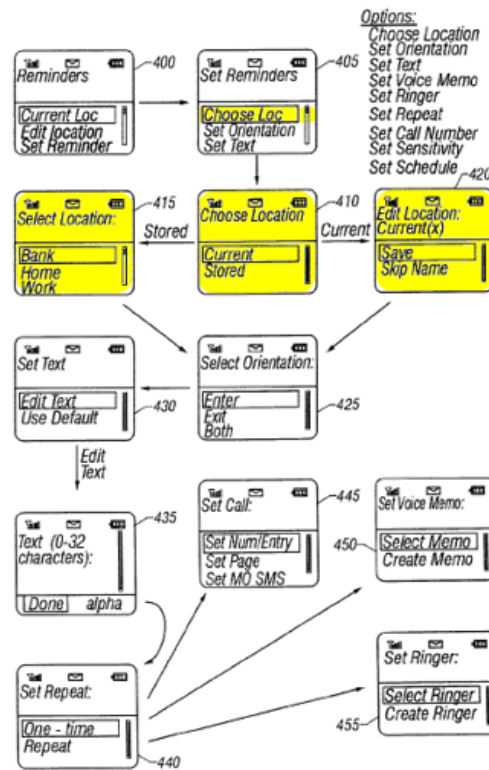


Position-monitoring functions “compare[] one or more ‘remembered’ locations with current location information.” (Ex-1054, 3:56-60.) Location information (e.g., “station ID,” “signal conditions,” “signal strength,” etc.) is stored that “allow[s] the terminal to *recognize whether or not it has left or returned to the same location.*” (*Id.*, 4:1-12, 6:37-49, 7:9-22; *infra* §IX.A.1(b)(ii)(2).) Such information can include a “set area [that] may be defined several ways” (e.g., point/radius, geographic geometric shape, etc.). (Ex-1054, 4:12-18.) “The *location area characteristics may be settable by the user....*” (*Id.*, 4:18-20.) (Ex-1002, ¶122.)

The device stores location trigger/action information and monitors “the current location until it is outside of the ‘set’ location area.” (Ex-1054, 4:21-24.) “[T]he mobile may *detect it has transitioned out of the area* described by the stored location information *or that the current location matches* the stored location information 230....” (*Id.*, 4:24-31; 4:31-38 (monitoring until location information matches), 4:44-5:22, FIG. 3 (below).) (Ex-1002, ¶123.)



The device is configured to allow the user to easily choose locations and corresponding actions/reminders to be executed based on chosen location(s). (Ex-1054, 5:22-40, 5:51-52 (“user may select the current location...”), FIG. 4 (below).) (Ex-1002, ¶¶124-125.)



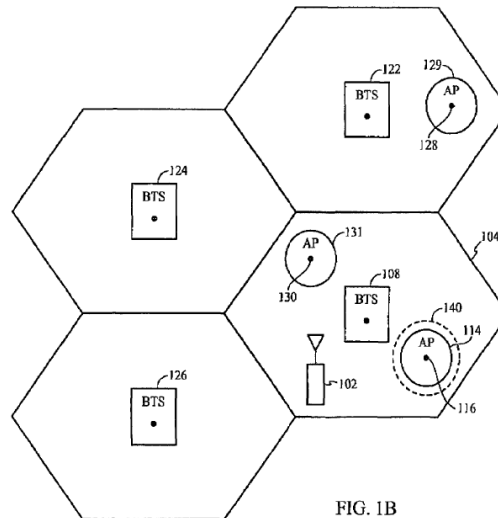
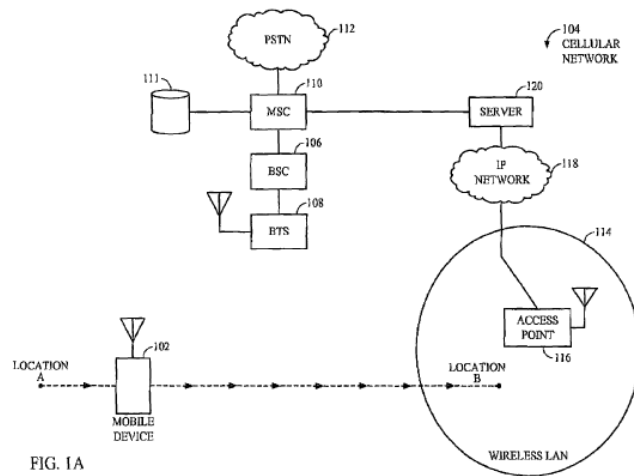
The user may chose trigger conditions for such actions/reminders, such as when exiting or entering a region, or both. (Ex-1054, 5:52-61.) Reminder actions can take many forms. (*Id.*, 5:62-6:7; *id.*, 6:8-22; Ex-1002, ¶¶124-125.)

Hunzinger's teachings were consistent with technologies/techniques known at the time. (Ex-1002, ¶127; Ex-1016, Abstract, FIGS. 1:18-4:63, 6:30-7:3, 14:38-44 (geofence), 16:41-67, 17:39-20:46; Ex-1019, ¶¶0008-0081, 0164-0171, 0177-0185, 0217-0240; Ex-1055, 1:49, 2:20-3:3, 3:49-4:22, 6:12-7:41 (zones/tasks); Ex-1061, FIG. 13c, 1:61-2:8, 8:54-9:10, 21:4-13.) Indeed, a POSITA would have

likewise found *Nanda*'s teachings beneficial in considering ways to allow a user to choose locations from which fingerprint data is collected.¹¹ (Ex-1002, ¶127.)

Nanda discloses describes systems/processes that determine whether a mobile device is “in the vicinity of” a location by comparing fingerprint information. (Ex-1006, FIGS. 1A-1B (below), 2:16-59, 3:48-4:14, 5:50-7:28.)

¹¹ A POSITA would have been motivated to consider *Nanda* for reasons explained below (§IX.A.1(b)(ii)(2)-(4)). (Ex-1002, ¶¶128-145.) Thus, *Nanda*'s teachings here (and below) would have contributed to the rationale for configuring *Spain-I* as discussed in view of *Hunzinger*. Indeed, an invention is likely obvious where it merely combines familiar elements according to known methods and yields only predictable results. *KSR*, 550 U.S. at 416. Here, Petitioner's evidence of multiple references teaching known features (*e.g.*, user chosen location, ID/signal strength comparisons, etc., *see* §IX.A.1(b)(ii)(2)) bolsters obviousness, rather than detracts from it. *See, e.g., Bayer Pharma AG v. Watson Laboratories, Inc.*, 874 F.3d 1316, 1321-24 (Fed. Cir. 2017) (finding motivation “plainly evident from the face of multiple prior art references”); *Chanel, Inc. v. Molo Design, Ltd.*, IPR2022-00544, Paper 44 at 28, 33 (P.T.A.B. Aug. 9, 2023).



(See also *id.*, 4:64-6:3 (“base station identifier and a signal strength”), 6:4-7:28 (MAC ID/RSSI fingerprint information “used by the mobile device to determine the proximity of a second communication network”), 6:52-58 (device “can determine its current fingerprint and compare it to the known fingerprint to determine whether the mobile device is located within the area 140”).) (Ex-1002, ¶¶68-74, 130-132.)

Thus, like *Hunzinger-Spain-I*, *Nanda* discloses features in the same technical field and addresses problems similar to that as the '698 patent, and thus would have been consulted by a POSITA for reasons above and those below (§IX.A.1(b)(ii)(2)-(4)). (Ex-1002, ¶129.) Relevant here, and consistent with the state of art (Ex-1053, ¶¶0007-0013) *Nanda* describes features that allow a mobile device user to select when to create a fingerprint (resulting in strength/ID data collection/measurement). (Ex-1006, 8:29-36 (keypad 212 used “to create a current fingerprint and store that fingerprint in memory 211”), FIG. 2 (below).) (Ex-1002, ¶¶133-134.)

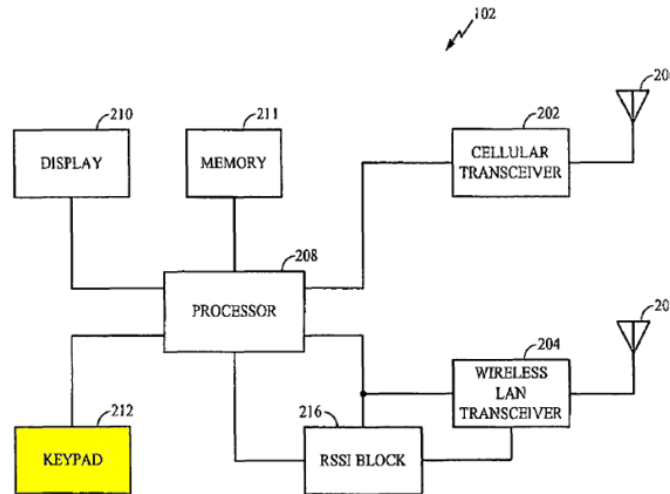


FIG. 2

“Once the mobile device has connected with the access point, *the user may, in step 304, signal to the device to capture the current fingerprint.* This step may typically be *user-initiated because the user may want only certain* wireless LANs

to be stored in the fingerprint database....” (Ex-1006, 9:61-10:7, FIG. 3A (below).)
(Ex-1002, ¶133.)

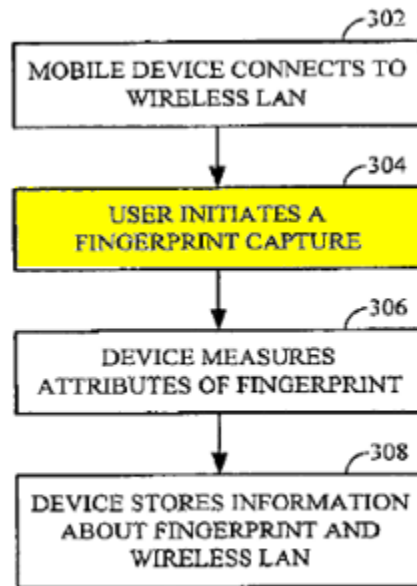


FIG. 3A

In light of *Hunzinger* and *Nanda*¹² a POSITA would have been motivated, and found obvious, to configure the MU in the *Spain-I* system/process with mechanisms/features consistent with user chosen location and location-based action features like that taught/suggested by *Hunzinger* (and *Nanda*). (Ex-1002, ¶¶134-143.) A POSITA would have appreciated *Spain-I*’s above-noted teachings (Ex-1011, 5:61-6:30) and the advantages/benefits/teachings associated with *Hunzinger*’s

¹² While *Hunzinger* alone supports obviousness here, *Nanda* further bolsters the motivation/reasons for configuring *Spain-I* as explained. (See n.11.)

mechanisms for enabling a MU user to choose location(s) from which location information is collected/compared with current location information to determine whether the MU is at, entered, or left the chosen location in order to trigger corresponding selected actions. (Ex-1002, ¶¶139-141.)

Configuring the MU with user-friendly interface mechanisms (*e.g.*, menus (*Hunzinger*), key-based (*Nanda*)) and related functionalities that enabled a user to easily choose locations/actions would have enhanced *Spain-I*'s features, thus expanding its potential applications. (*Id.*, ¶¶136-143.) For instance, a POSITA would have discovered from *Hunzinger* benefits in allowing the user to both choose locations and corresponding action(s) to be performed upon determining the MU is within proximity of a chosen location (*e.g.*, “am I there”). (*Id.*; Ex-1054, FIGS. 1A-4, 1:38-2:44, 3:4-67, 4:1-5:22; §IX.A.1(b).) Such features would have beneficially expanded the capabilities/functionalities of the *Spain-I* system/process with improved features, resulting in a more marketable, desirable, and/or user-friendly and feature-based location determining system, thus expanding application options, consistent with *Hunzinger-Nanda* (*e.g.*, Ex-1054, 2:10-44, 5:29-6:30), a POSITA's state of art knowledge (Ex-1016, 14:16-16:8; Ex-1055, 2:29-3:3, 7:8-41; Ex-1061, 1:53-2:52, 17:1-20:4; Ex-1019, ¶¶0164-0171), and features contemplated by *Spain-I* (Ex-1011, 3:5-16). (Ex-1002, ¶¶134, 139-143.)

Thus, in some applications, such modification(s) would have predictably resulted in the *Spain-I* database maintaining fingerprints corresponding to locations of interest to the user so that later, depending on how programmed/user-configured, when the MU is determined to be in proximity of such a location (*e.g.*, retailer, service provider/vendor, etc.), relevant personalized services can be provided by, *e.g.*, the MU, server (30), consistent with *Spain-I*'s and *Hunzinger*'s teachings and that known in the art. (Ex-1011, 3:5-16, 4:23-33; Ex-1002, ¶¶139-140; Ex-1033, 1:43-59, 5:46-6:38; Ex-1016, 1:18-4:63, 6:30-7:3, 16:41-67; Ex-1028, Abstract, FIGS. 4-8, 1:10-4:14, 5:10-16, 5:16-63, 7:23-8:28; Ex-1029, FIGS. 6A-6E ¶¶0033-0034, 0045, 0063, 0071, 0074-0075.)

Given the familiar features/technologies taught by *Spain-I-Hunzinger* (and *Nanda*) (*see supra*), and state of art (*e.g.*, Ex-1011, 3:34-40, 15:19-35; Ex-1062, 1:26-33; Ex-1028, 12:55-13:18), a POSITA would had the skills/knowledge/rationale to consider/implement such modifications with a reasonable expectation of success. (Ex-1002, ¶¶143-145.)

There were various ways to configure/implement such features. For example, it would have been obvious to configure the modified *Spain-I* system/processes such that the MU included interface mechanisms/features and related functionalities (similar to those described by *Hunzinger*) to allow the MU user to choose location(s) (where ID/signal strength data was collected/measured for building the fingerprint

database as discussed in §IX.A.1(b)). (Ex-1002, ¶¶143-145.) Likewise, a POSITA would have found it obvious to configure the MU to perform features that performed user-selected actions/operations upon determining that the MU is at, has entered, or is no longer in a user chosen location. (Ex-1054, 4:1-5:22; Ex-1011, 4:23-26; Ex-1006, 2:16-59; *infra* §IX.A.1(b)(ii)(2); Ex-1002, ¶¶143-145.)

(2) Comparing ID and Signal Characteristic Number(s) Features

The claimed “varying signal characteristic” encompasses at least signal strength. (Ex-1001, 26:33-35 (claim 2).) Also under the plain language of claim 1, the “at least one *number*...” encompasses signal strength measurement(s), which is a number (*e.g.*, value), consistent with that described in the ’698 patent (Ex-1001, 6:37-40 (“the majority of the description relates to direct measurements of signal strengths and direct comparisons of those measurements”), 7:1-4 (“device simply performs such reception measurements and compares these measurements with the remembered signal strength combinations”)) and known in the art.¹³ (Ex-1002, ¶¶146-147.)

¹³ The prior art discloses/suggests these features in context of the file history statements regarding the claimed “number(s)” for reason below. (§§VIII, IX.A.1(b)(ii)(3).)

Spain-I describes measuring signal strengths represented by strength value(s) (dBm), which are “number(s)” based on the “varying characteristic of the” signals received from the antenna stations like that claimed. (§IX.A.1(pre)-IX.A.1(a); Ex-1011, 12:11-14 (“-11 dBm”), FIG. 9 (SS values).) Thus, the signal strengths (SS) in each fingerprint (for monitored and stored/chosen location(s)) includes “at least one number” (value(s) based on the varying signal characteristic of the communications signals (signal strength) from each of the first plurality of antenna stations). (§IX.A.1(a)-1(b)(ii)(1); §IX.A.1(b)(ii)(3); Ex-1002, ¶148.)

Spain-I discloses comparing the “generated fingerprint” with “the fingerprints in the database” and choosing the MU location as the one corresponding to the “closest” matching fingerprint in the database. (Ex-1011, 5:66-6:14, 4:55-63 (station ID/signal strength); Ex-1005, 4:22-36.) “There are many choices...to determine the closest matching fingerprint, as can be appreciated by one skilled in the art,” including “smallest mathematical distance between itself and the captured fingerprint.” (Ex-1011, 8:8-21; Ex-1005, 5:10-33.) (Ex-1002, ¶¶149-150.)

While *Spain-I* discloses such fingerprint comparison features, *Spain-I* lacks details as to how such comparisons are performed, including in context of underlying parameters (comparing monitored and user chosen location station ID/signal strength number(s) (**limitation 1(b)**)). (Ex-1002, ¶151.) However, a POSITA would have understood there were various ways for analyzing fingerprints/signal

characteristics to determine location proximity, and thus would have been motivated to consider teachings in the art. (*Id.*, ¶152; Ex-1019, Abstract, ¶¶0012-0078, 0176-0177, 0333; Ex-1020, Abstract, ¶¶0013, 0029, 0048-0059; Ex-1017, Abstract, 3:64-4:7, 6:23-8:38; Ex-1026, Abstract, 3:58-4:56; Ex-1027, Abstract, ¶¶0012-0023, 0096-0099; Ex-1028, Abstract, FIGS. 4-8, 1:10-4:14, 5:10-16, 5:16-63.) Upon doing so, including for reasons above (§IX.A.1(b)(ii)(1)), a POSITA would have been motivated by the collective teachings of *Hunzinger* and *Nanda* (*see* n.11), and found it obvious, to configure the MU in the above modified *Spain-I* system/processes to determine if the MU's first monitored location (monitored in accordance with §IX.A.1(a)) is in proximity of a user chosen location (**limitation 1(b)**) by electronically comparing at least one station ID and at least one number based on the varying signal strengths of the communication signals (*e.g.*, signal strength values) from each of the first plurality of antenna stations at the first monitored location with the at least one ID and the at least one number based on signal strengths of the communication signals from each of the first plurality of antenna stations at the location chosen by the user, as claimed in **limitation 1(b)**. (Ex-1002, ¶152.)

Hunzinger further discloses the mobile device monitors its current location, and “compares” remembered location information with current location information to determine whether the device has left or entered a remembered location to execute

particular actions. (Ex-1054, 3:49-60, 4:21-57; §IX.A.1(b)(ii)(1).) Location information can include “station ID” and “signal conditions” (Ex-1054, 4:3-8), such as base station IDs and signal strength values that are compared to determine whether the device is at, entered, or left a remembered location (*id.*, 6:37-49 (claim 1 (comparison between current terminal *location information* and first set of *location information*)), 7:9-22 (*e.g.*, claim 8 (“said *location information* consists of at least one of...*base station identifier, pilot signal strength...*”)), 7:29-42, 8:25-38; §IX.A.1(b)(ii)(1) (*Hunzinger*).) (Ex-1002, ¶¶153-154.)

FIG. 3 (below) illustrates a monitoring/triggering action where the device “monitors the current location information *compared* to the stored reminder *location information*.” (Ex-1054, 4:60-5:22 (reminder triggered when device is at location 300; transitions based on base station ID, pilot.), 4:1-12, 6:37-49, 7:9-22, 7:29-42, 8:25-38; Ex-1002, ¶155.)

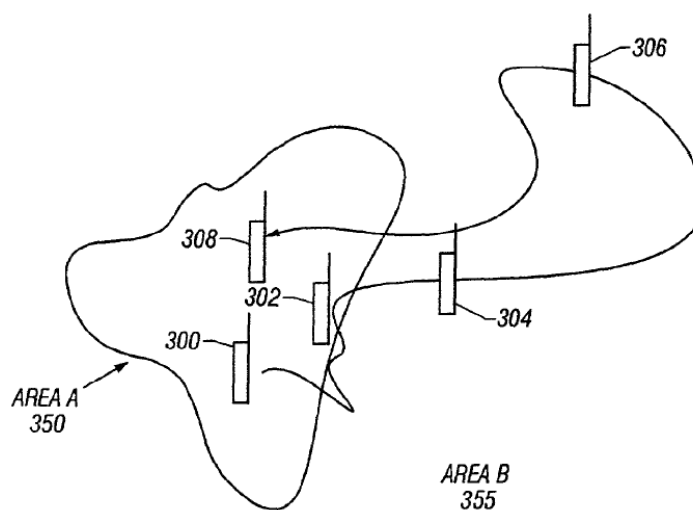


FIG. 3

Hunzinger's teachings were consistent with known technologies/techniques. (*Supra* (state-of-art); Ex-1002, ¶156.) For example, in consulting *Nanda* for reasons above (and below) (§IX.A.1(b)(ii)(1), (3)-(4)) a POSITA would have discovered teachings of comparing signal strength and station ID data for current and stored fingerprints when determining if a device is in proximity of a location. (Ex-1006, FIGS. 3A-3B, 2:43-51, 6:12-66, 7:6-13, 8:29-55.) (Ex-1002, ¶157.) Previously monitored location information (IDs/signal strength) may be stored like in the table below.

WAN ID	WLAN SSID	WLAN BSS ID	Signal Strength	Phase
A	I1	A ₁	s ₁ (A ₁) . . . s _n (A ₁)	p ₁ (A ₁) . . . p _n (A ₁)
		A ₂	s ₁ (A ₂) . . . s _n (A ₂)	p ₁ (A ₂) . . . p _n (A ₂)
		A ₃	s ₁ (A ₃) . . . s _n (A ₃)	p ₁ (A ₃) . . . p _n (A ₃)
B	I1	B ₁	S ₁ (B ₁) . . . s _n (B ₁)	
	I2	B ₂	S ₁ (B ₂) . . . s _n (B ₂)	

(Ex-1006, 8:29-55, 9:31-10:13; 8:56-9:13; Ex-1002, ¶157.) The device may “calculate a fingerprint for its current location and compare it” to the stored information. (Ex-1006, 9:17-20, 10:14-25; *id.* 10:36-51 (“deviation amount” to “help control the [matching] determination”); Ex-1002, ¶¶157-158.)

Nanda describes capturing a current location fingerprint (including signal strengths). (Ex-1006, FIG. 3B (below), 3:18-19, 10:51-56.) (Ex-1002, ¶¶159-162.)

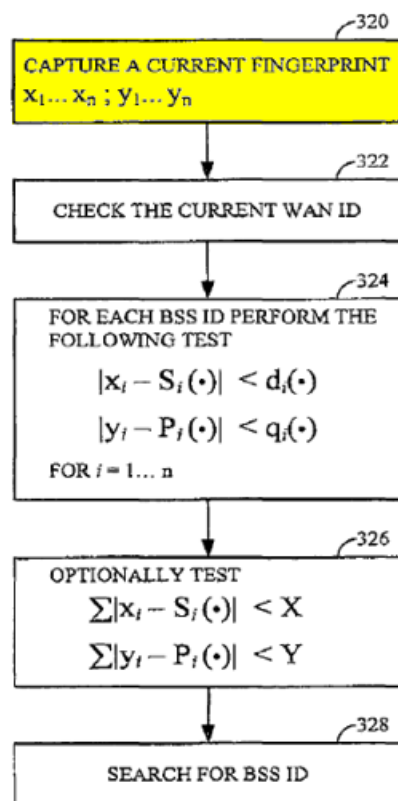


FIG. 3B

The current WAN ID is checked and identified access point information is determined for the current location. (Ex-1006, 10:58-60, 9:31-52 (BSS ID is access point), 10:60-61.) (Ex-1002, ¶160.)

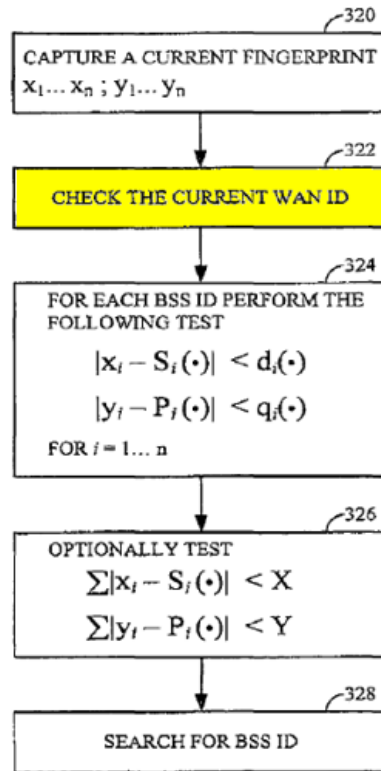


FIG. 3B

The signal strength(s) of fingerprint(s) for each BSS ID (access point) within an identified WAN ID (A or B) are compared to the current fingerprint strengths to determine if the difference is below a predetermined threshold. (Ex-1002, ¶161.)

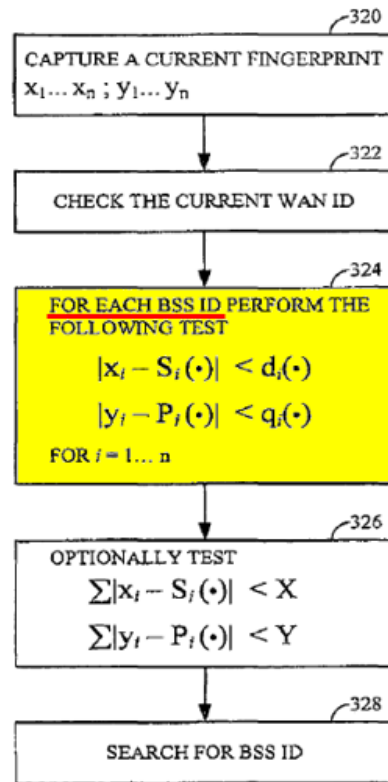


FIG. 3B

For $i = 1$ to n :
determine if $|x_i - s_i(\cdot)| < d_i(\cdot)$
determine if $|y_i - p_i(\cdot)| < q_i(\cdot)$

(Ex-1006, 10:62-11:10.) A “match” is determined when the difference between a stored and current measured signal strengths (x-s) is less than (<) a predetermined threshold (d). (*Id.*)

Nanda’s comparisons performed for each WAN ID (322) and “each BSS ID” (324) indicates a comparison of respective station IDs since the stored number(s) (“ S_i ”) and current number(s) (“ X_i ”) are compared for the same BSS ID and associated WAN ID. (Ex-1002, ¶162; Ex-1006, 10:60-61 (“[f]urther search

refinements are possible by **searching the database for identifiers of the observable pilots**”).) Thus, before signal strength comparisons (step 324), the system compares monitored station identifiers to identifiers stored in the database (Ex-1002, ¶¶162-165; Ex-1006, 10:58-66, 11:33-12:13.)

In light of *Hunzinger-Nanda*, a POSITA would have been motivated, and found obvious, to configure the above-modified *Spain-I* system/processes (§IX.A.1(a)-(b)(ii)(1)) such that the MU’s location determining processes include comparing at least one station ID and at least one number based on the signal strengths (*e.g.*, SS value(s)) for the monitored location with at least one station ID and at least one number based on the signal strengths (*e.g.*, SS value(s)) for the user chosen location in the database (§IX.A.1(b)(ii)(1)). (Ex-1002, ¶166.) Comparing IDs would have predictable resulted in the MU using signal strengths (characteristics) corresponding to signals received from the same antenna stations when performing location determining processes. (*Id.*)

A POSITA would have appreciated *Spain-I*’s teachings/suggestions (§§IX.A.1(pre)-1(b)(ii)(2)) in context of *Hunzinger-Nanda* and thus been motivated to employ similar features in the above-discussed *Spain-I* system/processes (§IX.A.1(b)(ii)(1)). Such modifications would have enhanced the MU’s processes by using relevant signal characteristics in determining whether the MU’s monitored location is in proximity of a user selected location, promoted accuracy, and

conserved resources, consistent with features in *Spain-I-Hunzinger-Nanda*. (Ex-1006, FIG. 3B, 8:43-30, 10:49-11:19; §§IX.A.1(pre)-IX.A.1(b)(ii)(1); Ex-1002, ¶167; Ex-1054, 3:49-60, 4:3-5:22, 6:37-49, 7:9-22.) For example, ID comparisons (like that taught by *Hunzinger/Nanda*) would have beneficially reduced possible locations being assessed, as contemplated by *Spain-I*. (Ex-1011, 10:20-27; Ex-1002, ¶¶167-169.)

Consequently, in light of *Hunzinger* and *Nanda* (and a POSITA's knowledge) in context of *Spain-I*, a POSITA would have appreciated the benefits of comparing monitored/user chosen location ID and number(s) based on signal characteristic data (e.g., signal strength) in determining whether the MU's monitored location (§IX.A.1(a)) is proximate to a user chosen location (§IX.A.1(b)(ii)(1)) to ensure relevant fingerprints are available for comparison (e.g., via ID comparisons) to allow appropriate actions to be performed by the *Spain-I* modified system in view of *Hunzinger* and *Nanda* as explained above. (Ex-1002, ¶¶167-169; §IX.A.1(b)(ii)(1); Ex-1006, 2:15-24; Ex-1011, 3:8-16, 4:23-35; Ex-1054, 3:49-60, 4:3-5:22, 6:37-49, 7:9-22.)

A POSITA would have leveraged their experience/skills, and teachings of *Spain-I/Hunzinger/Nanda* to, for example, program/configure the MU to implement the above-discussed ID/signal characteristic number(s) comparison like that claimed, which would have predictably resulted in conserved processing/memory

resources by, *e.g.*, avoiding comparison operations (and other subsequent location determining operations) if no station IDs matched. (Ex-1002, ¶¶167-169.) A POSITA would have considered known tradeoffs—balancing costs, processing resources, benefits resulting from such modification, and the like—to ultimately design/configure the modified *Spain-I* system/processes with such comparison features in a successful manner relevant for a given application, consistent with *Spain-I* (Ex-1011, 1:50-2:20, 3:5-16, 3:34-40, 6:31-7:57, 8:27-13:35; Ex-1002, ¶¶143, 167-169.)

Given the modifications would have involved use of known technologies/techniques (as demonstrated by *Spain-I-Hunzinger-Nanda*), a POSITA would have had a reasonable expectation of success in implementing such modifications. (Ex-1002, ¶170.)

(3) At Least One Number Features in Context of Prosecution History Statements

To the extent “at least one number based on...” is interpreted consistent with file history representations (*supra* §VIII), it would have been obvious to configure the *Spain-I-Hunzinger-Nanda* system/processes to execute a formula or similar mathematical algorithm/function to the signal characteristic data (*e.g.*, signal strengths) measured for each identified station for the monitored location and also correspondingly for the user selected location(s), from which the comparison is

made to determine whether the MU is in proximity of the user selected location (e.g., “am I there”), as discussed above. (Ex-1002, ¶171; §IX.A.1(b)(ii)(1).)

Spain-I discloses that signal strength may be “sampled multiple times for each frequency in order to smooth out any variations,” thereby suggesting some calculation to process and/or generate fingerprint signal strength value(s). (Ex-1011, 13:51-55; §§IX.A.1(a)-(b); Ex-1002, ¶172.) *Nanda* further discloses generating a fingerprint based on calculated average strength values. (Ex-1006, FIG. 3B (324-326), 8:29-36, 7:19-28 (measurements “averaged together or otherwise combined in some statistically significant manner in order to generate the fingerprint”), 11:11-18, 6:19-25; Ex-1002, ¶172.) *Hunzinger* also teaches/suggests “averaging multiple measurements...is well known in the art.” (Ex-1054, 6:17-19). Such an averaging techniques were applicable to fingerprints for stored/chosen and monitored locations. (Ex-1054, FIG. 4, 1:13-2:49, 3:44-4:59, 6:37-8:44; Ex-1006, FIG. 3B, 8:29-36, 7:19-28, 11:11-18, 6:19-25; Ex-1002, ¶172.) Moreover, a POSITA was aware of techniques for performing calculations via a formula or similar mathematical operation to measured signal characteristic data. (Ex-1002, ¶173; e.g., Ex-1029, 2:18-29 (“Power averaged over a certain duration can be estimated to smooth temporary localized fading and other types of multipath fading caused by obstructions, such as buildings and mountains....[P]ower averaging can be achieved by using a ‘rolling window’ of signal strength values to determine the averaged

signal strength values.”); Ex-1030, ¶0087 (“signal strengths, preferably smoothed (*e.g.*, averaged)”).)

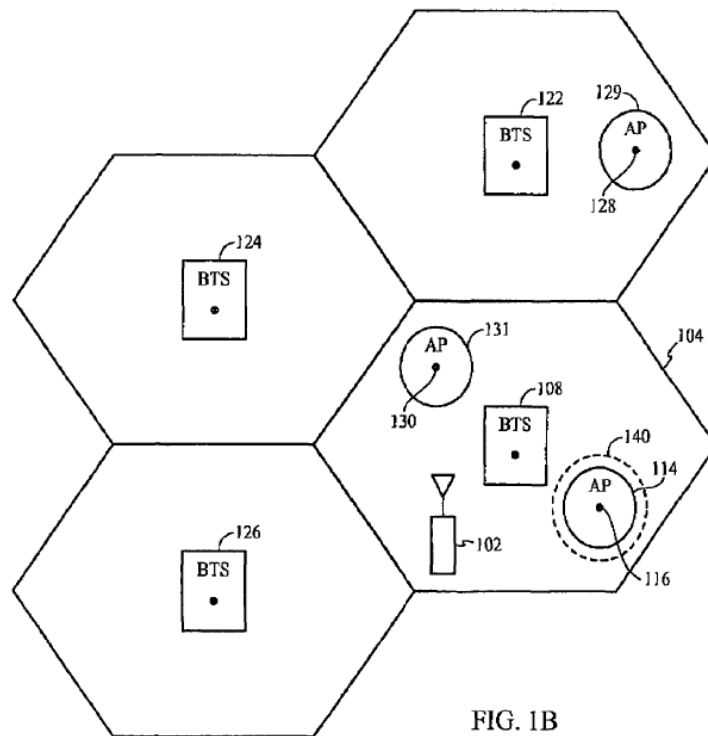
Thus, *Nanda-Hunzinger*’s teachings in context of *Spain-I* and knowledge in the art would have motivated a POSITA to configure the modified *Spain-I-Hunzinger-Nanda* system/process such that the MU performed processes that applied a formula or similar mathematical operation to refine the signal characteristic data (*e.g.*, signal strengths) to provide adjusted values that compensate for, *e.g.*, outlier data (*e.g.*, extreme high or low readings/measurements), adjust for “environment variability” (Ex-1006, 7:19-28), etc. to increase the accuracy or confidence in the location proximity determinations performed by the modified system/process, consistent with that discussed above (§IX.A.1(b)(1)). (Ex-1002, ¶174.) A POSITA would have appreciated that using such formula-based calculations to smooth or average the collected signal characteristic data (*e.g.*, signal strengths) as contemplated by *Spain-I* and *Nanda* would have been an obvious and predictable combination of known techniques/technologies that would have foreseeably resulted in the MU using derived/refined signal characteristic number(s) for the above-discussed comparison technique/features used to determine whether the MU monitored location is within proximity of a chosen location, like that claimed. (Ex-1002, ¶174.) *See KSR*, 550 U.S. at 416. Accordingly, such modifications would have involved use of technologies/techniques within the

capabilities/knowledge of a POSITA (as demonstrated by *Spain-I-Hunzinger-Nanda* and state-of-art teachings above), that would have led a POSITA to have a reasonable expectation of success in implementing them. (Ex-1002, ¶174.)

(4) Substantially Continuously Operating Fixed-Location Service Area Antenna Stations

To the extent PO argues or it is determined that *Spain-I* does not disclose (or by itself support obviousness of) *substantially continuously operating fixed-location service area antenna stations* as claimed, it would have been obvious to implement them in light of *Nanda* and *Hunzinger*. (Ex-1002, ¶¶175-176.)

Upon considering *Nanda-Hunzinger* for reasons above (§§IX.A.1(b)(ii)(1)-(3)), a POSITA would have recognized that *Nanda* discloses the well-known use of “*fixed base transceiver station[s] (BTS)*” within cell coverage regions that “communicates with mobile users.” (Ex-1006, 1:49-53, 1:29-49; *see also id.*, FIG. 1B (below), 5:15-49.) (Ex-1002, ¶¶176-177.)



The BTSs and access points exemplify substantially continuously operating fixed-location service area antenna stations given they are in fixed locations and continuously provide signals that facilitate communications with mobile device 102 within a coverage area. (Ex-1002, ¶¶177-179.) *Hunzinger* also discloses use of known base stations (Ex-1054, FIG. 1A (below), 1:21-54, 5:6-12, 7:9-14.)

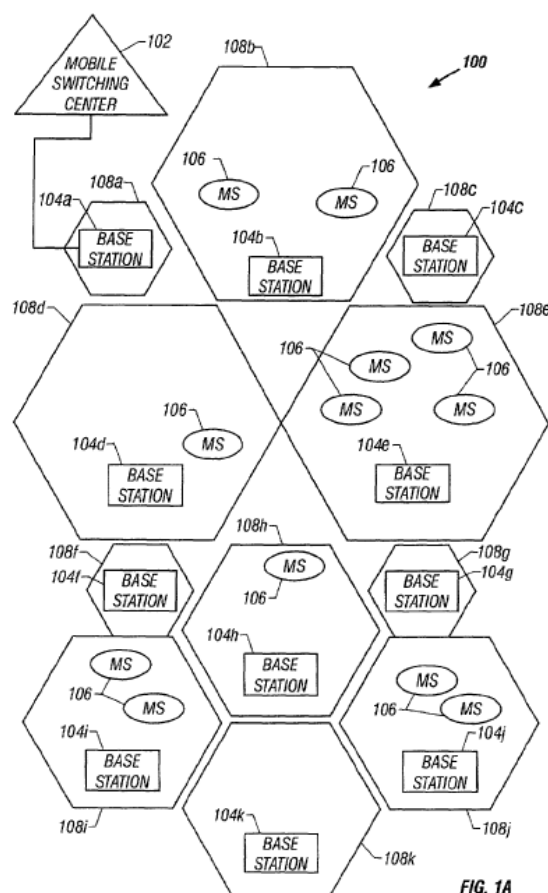


FIG. 1A

A POSITA would have appreciated that implementing fixed antenna stations, similar to how those operate in the systems described by *Nanda* and *Hunzinger* (and known in the art), would have promoted use of *Spain-I*'s MU in known wireless network infrastructures, which involve wireless communications used to facilitate location-determination processes similar to *Hunzinger* and *Nanda*. (§IX.A.1(b); Ex-1002, ¶180.) Such disclosures/suggestions would have motivated a POSITA to configure/implement the MU in the above modified *Spain-I-Hunzinger-Nanda* system/process to work in a wireless network including such substantially continuously operating fixed antenna stations so that signals are substantially

continuously provided to the MU so that location determining operations like those discussed above can be performed. (§§IX.A.1(pre)-IX.A.1(b)(ii)(1)-(3).) (Ex-1002, ¶180.) Such modification would have involved known technologies/techniques and thus a POSITA would have had the skills/rationale and reasonable expectation of success to consider/configure/implement such features in the above-described modified *Spain-I* system/processes. (*Id.*, ¶181.)

2. Claim 2

- a) **The method of claim 1 wherein the characteristic is the communications signal's strength, which varies over a range of an antenna station.**

Spain-I-Hunzinger-Nanda discloses/suggests these limitations for reasons above. (Ex-1002, ¶182; §IX.A.1 (explaining how *Spain-I* (including as modified) uses signal strengths as a signal characteristic as claimed); §§IX.A.1(b)(ii)(2)-(3) (number(s)); Ex-1011, 3:42-54, 7:58-8:8.) A POSITA would have understood that the strength of the signals received by the MU in the modified *Spain-I* system would vary depending on the range of each station, consistent with *Spain-I* and *Nanda*, and that known in the art. (Ex-1002, ¶182; Ex-1101, 1:16-29 (“Each base station transceiver has a limited range.”), 3:49-54 (signal characteristics vary); Ex-1006, Abstract (“characteristics or attributes...that vary according to physical location within...[the] network”), 7:23-28 (attributes vary), 10:19-20 (“attributes that make up the fingerprint may have values that vary (even for the same location)”); Ex-1102,

1:59-2:6 (size/shape of each cell is defined by range of a base station); Ex-1103, ¶10006 (“signal strength...varies based upon the mobile device’s location in the cell and velocity”); Ex-1104, 2:16-24 (“a radio wave strength (an electric field strength) level at reception varies in accordance with the distance from a base station.”).)

3. Claim 3

- a) **The method of claim 2 wherein the chosen location signal strengths were measured by the first portable RF communication device.**

The *Spain-I-Hunzinger-Nanda* combination discussed above discloses/suggests claim 3 for the same reasons explained for claims 1-2 (demonstrating MU measures signal strengths—including for the user “chosen location”). (Ex-1002, ¶183; §§IX.A.1(pre)-IX.A.1(b)(ii); IX.A.2; Ex-1011, 3:55-58, 5:20-32, 13:49-55; Ex-1006, 9:61-11:9.)

4. Claim 4

- a) **The method of claim 2 wherein the chosen location signal strengths were measured by a second portable RF communication device.**¹⁴

¹⁴ The ’698 patent once describes a “different mobile telephone” may use the “same data” measured/transferred by a first device (Ex-1001, 10:18-25), which does not describe the “different” device measuring signal strengths of a user chosen location as claimed. (*Generally* Ex-1001; 1002, ¶¶183-184.)

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶184-190; §§IX.A.1-2.)

Spain-I explains MU communicates with location server 30 through a wireless infrastructure (Ex-1011, 3:8-12, 4:7-22) and describes configurations where the fingerprint database may be stored at server 30. (§§IX.A.1(pre)-(b); Ex-1011, FIG. 3, 6:9-14, 6:15-30; Ex-1005, FIG. 3, 4:28-58; Ex-1009, 5:22-42; Ex-1010, 5:20-41.) *Nanda* teaches/suggests similar features where a mobile device creates/sends fingerprint(s) to a remote database (Ex-1006, 12:14-31) where the remote database “receiv[es] fingerprints from multiple mobiles devices” to allow for a “much larger database of available access points than would be found in a single mobile device.” (*Id.*) (Ex-1002, ¶185.)

In light of such teachings/suggestions in context of the rationale/teachings/suggestions above (§IX.A.1(b)), a POSITA would have been motivated, and found obvious, to configure the modified *Spain-I* system/processes such that multiple MUs (including a second MU) measures/collects signal strengths from signals received when at the user chosen location (§IX.A.1(b)(ii)(1)) to generate respective fingerprints used for building a robust fingerprint database stored at a remote server, consistent with features contemplated by *Spain-I* and *Nanda*. (*Supra*; Ex-1002, ¶186.) Such modifications would have resulted in the modified *Spain-I* system/processes (§IX.A.1) using, in some instances, fingerprint

information (station IDs/signal strengths) obtained/measured from a second MU (e.g., operated by a different or same user of the first MU) and stored in a remote database for subsequent location determining use as explained above. (§IX.A.1(b); Ex-1002, ¶186.)

Such modifications would have allowed the modified *Spain-I* system/processes (§IX.A.1) to create/maintain a robust database of fingerprint information using measurements from multiple MUs, as suggested by *Nanda* (Ex-1006, 12:26-29), thus beneficially expanding applications of the above-modified *Spain-I* system/processes. (Ex-1002, ¶187.) A POSITA would have had similar rationale for considering such features from *Nanda* (and *Spain-I*) as that explained for claim 1 (§IX.A.1(b)), and had similar capabilities/knowledge and expectation of success, which would have led to such modifications here. (Ex-1002, ¶¶187-188; Ex-1011, 3:34-40 (designs to complement/augment existing technologies); §IX.A.1(b); *see also* §IX.A.6 (rationale regarding remote database features).)

A POSITA would have been motivated to implement such features regardless of the source of the fingerprints (e.g., whether measurements originated from a second MU or other MUs) because it would have resulted in a fingerprint database built from signal characteristics obtained from multiple MUs, thus enhancing the accuracy of the database. (§IX.A.1(b)(ii); Ex-1002, ¶189.) *See KSR*, 550 U.S. at 416. Indeed, as it was known that users may own/use multiple mobile devices, in

one example, a POSITA would have been motivated to configure/design the modified *Spain-I* system/processes to operate in scenarios where the first MU user operated a different/second mobile device to measure signal strengths at a user chosen location and provide such information to a remote server (*e.g.*, location server 30) for building the database. (Ex-1002, ¶189.) Alternatively, or in addition to, the different/second MU operated by a different user would measure signal strengths at the user chosen location for building the database, while other MUs to likewise provide additional measurements for refining the database. (Ex-1002, ¶189.) Such features would have leveraged use of a remote database and multiple MU measurement sharing (as contemplated by *Spain-I* and *Nanda*), while still providing for the first MU to perform location determining processes consistent with that discussed in §IX.A.1(b). (Ex-1002, ¶189.)

A POSITA would have had the skills/rationale and reasonable expectation of success to consider/configure/implement such features in the above-described modified *Spain-I* system/processes for reasons above and in §IX.A.1(b). (Ex-1002, ¶190.)

5. Claim 5

- a) **The method of claim 2 wherein the chosen location signal strengths and the at least one ID originated from a database of geographic locations and corresponding signal strengths and IDs.**

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶191-193; §§IX.A.1-2.)

Spain-I's MU builds a fingerprint “database” including fingerprints (red), which includes signal strengths/IDs (yellow/blue) corresponding to geographic locations (purple).

400

Fingerprint Structure					
401 Time of Capture:					
403 Station ID:	I1	I2	I3	...	In
405 Frequency:	F1	F2	F3	...	Fn
407 Tuning Parameters:	P1	P2	P3	...	Pn
409 Transmitter Location:	L1	L2	L3	...	Ln
411 Signal Strength 1:	S11	S12	S13	...	S1n
413 Signal Strength 2:	S21	S22	S23	...	S2n
415 ...	...	...	...	...	...
417 Signal Strength m:	Sm1	Sm2	Sm3	...	Smn

Fig. 9

501

Fingerprint Database					
No.	Lat.	Long.	Time	Fingerprint	Description
1					
2					
3					
4					
5					
6					
...					
L					

Fig. 10

(Ex-1011, FIGS. 9-10 (annotated), 13:16-14:37, 13:62-64 (“Lat and Long fields indicate the latitude and longitude of the location to which *the fingerprint corresponds*”), 13:64-14:14; Ex-1005, FIGS. 4-5, 5:40-6:61; Ex-1009, FIGS. 9-10, 9:15-10:37; Ex-1010, FIGS. 9-10, 9:10-10:31; Ex-1002, ¶191.)

Given such teachings and the rationale for modifying *Spain-I*'s system/processes in §IX.A.1(b)(ii), a POSITA would have been motivated, and found obvious, to configure the above discussed *Spain-I-Hunzinger-Nanda* system/process such that the chosen location signal strength number(s) and at least

one ID (§§IX.A.1(b)(ii)(2)-(3), IX.A.2) originated from a database of geographic locations and corresponding signal strengths and IDs, complementing the features/goals contemplated by *Spain-I*. (Ex-1002, ¶¶192-193; §IX.A.1(b).) *KSR*, 550 U.S. at 416.

6. Claim 6

- a) The method of claim 5 wherein the database is stored remotely from the first portable RF communications device.**

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶194-201; §§IX.A.1-2, IX.A.4-5.) *Spain-I* describes configurations where the fingerprint database is stored at a remote location server. (*Supra* §§IX.A.1, IX.A.4; Ex-1011, FIG. 3, 6:9-14, 6:15-30; Ex-1005, FIG. 3, 4:28-58; Ex-1009, 5:22-42; Ex-1010, 5:20-41.) *Nanda* teaches/suggests similar features. (Ex-1006, 12:14-31.) (Ex-1002, ¶194.)

Such teachings in context of the rationale/teachings/suggestions for claims 1 and 4-5 (§§IX.A.1, IX.A.4-5) would have motivated a POSITA to configure the modified *Spain-I-Hunzinger-Nanda* system/processes such that the MU operates in conjunction with a remote fingerprint database as claimed here. (Ex-1002, ¶195.)

A POSITA would have been motivated to consider/implement such features to allow the modified system to work with a remote database that receives fingerprint data from multiple MUs, like that suggested by *Nanda* (Ex-1006, 12:26-29) and

discussed for claim 4, thus beneficially expanding the applications of the modified *Spain-I* system/process as discussed above. (Ex-1002, ¶196; §IX.A.4.) A POSITA would have found such modifications obvious for reasons above, and thus had similar, capabilities, expectation of success, and state-of-art knowledge, as explained above for claims 1 and 4-5 (§§IX.A.1(b), IX.A.4-IX.A.5), that would have led to configuring the modified *Spain-I* system/processes as discussed and recited in claim 6. (Ex-1002, ¶197.)

A POSITA would have been motivated and found benefit in allowing the MU to perform the determination processes as discussed above for claims 1 and 4-5 using signal strength/ID information stored at a remote database, consistent with that known in the art to conserve memory/processing resources in the MU that would have otherwise been used to maintain the fingerprint database locally. (Ex-1002, ¶¶198-199; §IX.A.1(b), IX.A.4-IX.A.5; Ex-1028, 5:1-62, 6:34-37, 16:42-63; Ex-1032, 1:15-31, 2:48-52, 3:59-4:7.) A POSITA would have considered design tradeoffs (*e.g.*, system/process constraints, cost, application, resource usage, etc.) to find ultimately find such a modification would have beneficially enhanced the modified *Spain-I* system for reasons above and discussed for claim 4. (*Id.*) Similarly, given such a modification would have involved known technologies/techniques within the capabilities/skills of a POSITA, it would have

been achieved with a reasonable expectation of success. (Ex-1002, ¶¶200-201; Ex-1011, 3:34-40, 15:19-29.) *KSR*, 550 U.S. at 416.

7. Claim 7

a) The method of claim 5 wherein the database is built by a service provider.

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶202-206; §IX.A.1-2, 5.) The analysis for claim 6 explains how/why it was obvious to configure the modified *Spain-I-Hunzinger-Nanda* system/processes such that the MU operates in conjunction with a remote fingerprint database maintained by a server (*e.g.*, location server 30). (§IX.A.6; Ex-1011, FIG. 3, 6:9-30; Ex-1006, 12:14-31; Ex-1002, ¶203.)

A POSITA would have had similar rationale for considering such features from *Nanda* and *Spain-I*, as explained above for claim 6 (*id.*; *see also* §IX.A.1(b)), as well as similar capabilities, expectation of success, and state-of-art knowledge, that would have led to configuring the modified *Spain-I* system/processes with a database built remotely by a service provider (*e.g.*, location server 30 operating as a service provider), as claimed. (Ex-1002, ¶¶204-205.) Indeed, *Spain-I* discloses that location server 30 may be interested in the MU location for “personalized services” (Ex-1011, 3:12-16)—consistent with a “service provider” and *Nanda* teaches configurations where base station controllers or mobile switching center maintain the fingerprint database (Ex-1006, 12:14-31)—understood to be related to a service

provider (e.g., wireless communication services for MUs) (*id.*, 3:58-7:17). (Ex-1002, ¶206.) Thus, a POSITA would have been motivated, and found obvious, (and had the skills and reasonable expectation of success) to configure the *Spain-I-Hunzinger-Nanda* system/process (discussed for claims 1, 5-6) such that the remote fingerprint database was built by a “service provider” (e.g., a location server 30 providing service(s) for the MU/user), consistent with that contemplated by *Spain-I, Nanda*, and known in the art. (Ex-1002, ¶206; Ex-1011, 3:9-19, 3:34-40, 15:19-29.)

8. Claim 9

a) The method of claim 1 wherein the at least one ID is a cell ID.

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶207-208; §IX.A.1.) For instance, *Spain-I* discloses that the mobile unit (e.g., a cell phone) monitors the “identity of the (wireless communication network) cell.” (Ex-1011, 5:33-50, 15:23-24; *see also id.*, 4:42-46, 5:28-32; §IX.A.1.b; Ex-1002, ¶207.) Further, *Spain-I* states the station ID field 403 in the fingerprints “indicates the unique identifying code of a broadcasting station from which the signal emanated.” (Ex-1011, 13:27-36, FIG. 9.) Also configurations where “the communication link between the mobile unit and location server is through the base stations and base station controllers of the cellular network” (*id.*, 4:7-22) and discloses the known use of cell ID in location determining processes (*id.*, 1:21-42)

(“cell ID information”). (*See also id.*, 15:19-25 (*Spain-I*’s features can be implemented with minor software changes in a MU (“typically a cellular phone”)), FIG. 12 (“cellular network”), 15:6-14; Exs-1013-1014; Ex-1054, 4:5-4:60; Ex-1018, ¶0063; Ex-1033, 4:35-5:11 (“cell identifier” for location purposes); Ex-1002, ¶207.)

In light of such teachings/suggestions, in context of the *Spain-I-Hunzinger-Nanda* combination discussed (§IX.A.1), a POSITA would have found it obvious to configure the modified *Spain-I* system/processes to use cell IDs as the station ID information in the fingerprints used to determine the MU’s location consistent with that discussed above for claim 1. (*Id.*; Ex-1002, ¶208.) A POSITA would have had the knowledge, skills, and rationale in light of the teachings/suggestions of *Spain-I-Hunzinger-Nanda*, and a POSITA’s state-of-art knowledge, to configure the modified system/process to use cell IDs in a cellular network environment, which would operate consistent with that explained above for claim 1, and done so with a reasonable expectation of success in achieving such features. (*Id.*) Indeed, such modification would have predictably resulted in applying known technologies/techniques (*e.g.*, use of signal source identifier information and known use of cell IDs as described by *Spain-I* and cellular network infrastructures) for use in the fingerprint structures used to determine whether the MU is in the proximity of a user chosen location, as discussed above for claim 1. (*Id.*)

9. Claim 10

- a) The method of claim 1 wherein the first portable RF communications device is a mobile phone.**

Spain-I-Hunzinger-Nanda discloses/suggests this limitation for the same reasons explained for claim 1. (Ex-1002, ¶209; §IX.A.1.) *Spain-I* describes the MU as being a mobile phone. (§IX.A.1; Ex-1011, 15:23-24 (“mobile unit (typically a cellular phone)”); *id.*, 4:16-22 (SMS communications).)

10. Claim 12

- a) The method of claim 1 wherein the signal characteristic is the signal’s phase.**

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶210-217; §IX.A.1.)

As explained, the *Spain-I-Hunzinger-Nanda* system/process compares fingerprint information (including parameters reflecting signal characteristics such as signal strength) for monitored and chosen locations to determine whether the MU is in proximity of the chosen location. (§IX.A.1(b); Ex-1011, 5:20-32, 13:49-55; Ex-1006, FIG. 3B, 10:51-11:32, 5:43-46.) However, the above-discussed *Spain-I-Hunzinger-Nanda* system/process was not limited to configurations for determining location based solely on signal strength comparisons. (Ex-1002, ¶211.) Indeed, *Spain-I* discloses that the fingerprints used in its processes can be generated from a variety of different RF characteristics (alone or in combination). (Ex-1011, 4:55-56

(“[T]he spectral fingerprint may be generated using *many different parameters*, either *individually or in combination*”), 3:57-64 (signal strength, **phase**, signal identity, signal source identity) 3:55-58, 5:20-22.) *Nanda* also contemplated/suggests the use of other types of signal characteristics, such as phase. (Ex-1006, 6:12-25, 6:52-59, 7:19-28, 8:43-10:8 (describing phase/signal strength fingerprint data and different “possible information [] may be used to characterize a fingerprint...”), 10:53-11:19.)

WAN ID	WLAN SSID	WLAN BSS ID	Signal Strength	Phase
A	I1	A ₁	s ₁ (A ₁) . . . s _n (A ₁)	p ₁ (A ₁) . . . p _n (A ₁)
		A ₂	s ₁ (A ₂) . . . s _n (A ₂)	p ₁ (A ₂) . . . p _n (A ₂)
	I2	A ₃	s ₁ (A ₃) . . . s _n (A ₃)	p ₁ (A ₃) . . . p _n (A ₃)
B	I1	B ₁	S ₁ (B ₁) . . . s _n (B ₁)	
	I2	B ₂	S ₁ (B ₂) . . . s _n (B ₂)	

(*Id.*, 8:43-55.)

Thus, *Spain-I* (and *Nanda*) contemplates/suggests the use of different types of signal characteristics (including those relating to phase) as signal characteristics for the fingerprints used in the location determining processes. (Ex-1002, ¶212.)

In light of such teachings/suggestions, a POSITA would have understood there were different ways and reasons for using various parameters for building fingerprints used in the location-determining applications contemplated by the *Spain-I-Hunzinger-Nanda* system/process, and thus would have been motivated to

configure the modified system such that the fingerprints were generated using phase information, consistent with *Spain-I* and *Nanda*. (Ex-1002, ¶213.)

The configuration would have predictably resulted in the MU measuring/obtaining phase characteristic values (*e.g.*, number(s)) for each signal received from the antenna stations, and using that information, in addition to or in lieu of signal strengths, as the fingerprint parameter(s) subsequently compared when determining whether the MU monitored location is in proximity of the user chosen location like that discussed above for limitation 1(b) and consistent with features described by *Spain-I* and *Nanda*. (Ex-1002, ¶214; §IX.A.1(b).) Consequently, the *Spain-I-Hunzinger-Nanda* system/process would have performed such location determining by electronically comparing at least one number based on phase information for the signal(s) received from the first antenna stations at the first monitored location with at least one number based on corresponding phase of the signals received from each of the antenna stations at the user chosen location. (Ex-1002, ¶214.)

The resulting modified *Spain-I-Hunzinger-Nanda* system/process discloses/suggests the “number(s)” features recited in limitation 1(b) in context of claim 12 for the same reasons explained above in §IX.A.1(b)(ii)(2) (*e.g.*, whether the “number(s)” reflect the obtained phase values (like with signal strength measurement values discussed in §IX.A.1(b)(ii)(2))) and the reasons in

§IX.A.1(b)(ii)(3) in view of *Nanda* (*e.g.*, whether the “number(s)” are a result of a formula applied to such collected/measured phase information (*e.g.*, calculated averages, other mathematical operations, etc.) like with the calculated signal strength number(s) as discussed in §IX.A.1(b)(ii)(3)). (Ex-1002, ¶215.)

A POSITA would have been motivated to consider and use phase signal characteristics as noted above since such information was a known signal parameter used with fingerprint location determining systems as demonstrated by *Spain-I* and *Nanda* (*See supra*; Ex-1002, ¶216.) *Spain-I*’s contemplated use of different signal parameters (not limited to RSSI, and including phase etc.) and *Nanda*’s similar teachings/suggestions of fingerprint comparison/matching processes using phase data, would have led a POSITA to modify the system/process as noted above. (Ex-1002, ¶216.)

Given such teachings/suggestions, a POSITA would have appreciated that configuring the *Spain-I-Hunzinger-Nanda* system/process to use phase signal characteristics as noted above would have been an obvious/predictable implementation of known technologies/techniques and/or simple substitution of one known signal characteristic for another that would have been used in similar ways (fingerprint parameter comparisons) as contemplated by *Spain-I* in context of *Hunzinger-Nanda*. (Ex-1002, ¶217.) Indeed, in light of familiar features/technologies taught by *Spain-I-Hunzinger-Nanda*, and state of art

knowledge, a POSITA would have the skills/knowledge/rationale to consider/implement such modifications with a reasonable expectation of success.

(Ex-1002, ¶217.) *See KSR*, 550 U.S. at 416.

11. Claim 13

- a) The method of claim 1 wherein part (a) is performed iteratively, with a predetermined time delay between successive iterations.

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶218-223; §IX.A.1.) As discussed, the *Spain-I-Hunzinger-Nanda* system/processes would have been configured such that the MU monitors/measures/collects signal characteristic numbers (*e.g.*, signal strengths) and station ID information. (Ex-1002, ¶218; §IX.A.1.) *Spain-I* also discloses constructing the database by capturing fingerprints at different times since “signal characteristics” to cover different patterns in transmitted signals. (Ex-1011, 8:1-8; *see also id.*, 6:62-65 (fingerprint database may be generated using models using parameters that “depend on the...time of the day”), 7:51-54 (measurements taken at different times to produce different databases).) *Spain-I*’s teachings and suggestions regarding time-based fingerprint collection would have led a POSITA to consider teachings in the art concerning other ways to perform temporal-based fingerprint collection/building as part of its location monitoring operations. (Ex-1002, ¶219.) In doing so (including for reasons above (§IX.A.1(b))), a POSITA would have been

motivated by the teachings of *Hunzinger* and *Nanda* to configure *Spain-I* modified system/process such that the monitoring of the MU's current location was performed iteratively, with a predetermined time delay between successive iterations, like that claimed. (Ex-1002, ¶219.)

As evidenced by *Hunzinger* and *Nanda*, and understood in the art, periodic fingerprint monitoring was known. (Ex-1002, ¶220.) *Hunzinger* explains the “mobile may monitor the current location periodically....” (Ex-1054, 4:39-40.) Further, *Nanda* discloses that “when the mobile device 102 periodically awakes...it may also determine its location.” (Ex-1006, 5:41-49, 10:49-57.) *Nanda* also teaches that its location determining process entails taking a fingerprint, which encompasses features where it would have been “recorded automatically on a periodic basis.” (*Id.*, 8:30-42, 10:49-11:11, FIG. 3B; §IX.A.1(b); Ex-1002, ¶220.) Such teachings/suggestions were consistent with a POSITA's understanding that periodic generation/recording of fingerprint information would have entailed a predetermined time delay between successive iterations (*e.g.*, every X seconds, Y minutes, etc.) for a given application, consistent with that known in the art. (Ex-1002, ¶220; Ex-1029, 4:24-41; Ex-1019, ¶0214; Ex-1047, FIG. 7, 13:63-14:1.)

In light of such teachings/suggestions/knowledge, a POSITA would have been motivated and found obvious to configure the *Spain-I-Hunzinger-Nanda* system/process to iteratively perform the monitoring step (as discussed above in

§IX.A.1), with a periodic, predetermined time delay between successive iterations. (Ex-1002, ¶221.) A POSITA would have appreciated the benefits/advantages of implementing such features in context of the modified *Spain-I* system/processes above. (*Id.*) For example, a POSITA would have understood in one application, programming/configuring the MU to periodically monitor its location (§IX.A.1) would have enhanced/complemented the location-based action features employed in modified system (in view of *Hunzinger*) by ensuring the MU's location was monitored at proper intervals to ensure a user chosen location was timely identified so that appropriate actions/operations can be executed, as discussed in §IX.A.1(b)(ii)(1). (Ex-1002, ¶¶221-222.) In other configurations/applications, a POSITA would have recognized advantages in extending the time frame between iterative monitoring operations to conserve power/processing resources of the MU, depending on the application of the modified system. (*Id.*; Ex-1006, 5:41-49.) Indeed, in such configurations, a POSITA would have appreciated that such a conventional, periodic delay may be “determined in real time based on factors including...maximum estimated or average velocity of the mobile unit in network traffic” and other considerations for a given application/design. (Ex-1002, ¶¶221-222; Ex-1029, 3:24-41.)

A POSITA would have had the skills/knowledge/rationale/capabilities to configure and implement such modifications, with a reasonable expectation of

success, especially given they would have predictably involved employing known techniques/technologies consistent with those known in the art and contemplated by *Spain-I* and *Nanda* and known in the art. (Ex-1002, ¶223; Ex-1006, 8:30-42, 10:49-11:11; Ex-1029, 3:24-41; Ex-1019, ¶0214; Ex-1047, FIG. 7, 13:63-14:1.) *See KSR*, 550 U.S. at 416.

12. Claim 21

- a) **The method of claim 1 wherein the at least one number based on the signal characteristic of the communications signals from each of the first plurality of antenna stations is more than one number, each of which number is based on the signal characteristic of the communications signal from only one of the first plurality of the antenna stations.**

Spain-I-Hunzinger-Nanda discloses/suggests this limitation. (Ex-1002, ¶¶224-229; §IX.A.1.) As discussed for claim 1, the *Spain-I-Hunzinger-Nanda* combination discloses/suggests comparing numbers based on the signal characteristic (e.g., signal strengths) of respective signals received from respective stations for monitored and user chosen locations. (§IX.A.1(b); Ex-1002, ¶¶224-225; Ex-1011, 4:42-63, 5:61-6:4; Ex-1006, FIG. 3B, 8:29-36.) Indeed, *Spain-I* describes measuring multiple signals strengths for the signal received from a single respective station in range of the MU (e.g., Station I1 (SS1-Sm1) (yellow below), Station I2 (S12-Sm2) (blue), etc.). (§IX.A.1; Ex-1011, FIG. 9 (below).) Such operations occur when the MU is at the current monitored location and at a previously stored location

when building the database. (§IX.A.1.) As explained, the signal strengths in the database are compared to the monitored signal strengths. (*Id.*; Ex-1011, 4:42-63, 5:61-6:4.)

400	Fingerprint Structure					
401	Time of Capture:					
403	Station ID:	I1	I2	I3	...	In
405	Frequency:	F1	F2	F3	...	Fn
407	Tuning Parameters:	P1	P2	P3	...	Pn
409	Transmitter Location:	L1	L2	L3	...	Ln
411	Signal Strength 1:	S11	S12	S13	...	S1n
413	Signal Strength 2:	S21	S22	S23	...	S2n
415	...	...	...	...	...	...
417	Signal Strength m:	Sm1	Sm2	Sm3	...	Smn

Fig. 9

Nanda also discloses collecting signal characteristic data (numbers based on signal strength) for the signal received from respective stations, and comparing the multiple strength values for each respective station. (Ex-1006, FIG. 3B (below), 6:12-25, 8:29-9:15, 10:49-11:19; §IX.A.1(b); Ex-1002, ¶¶225-226.)

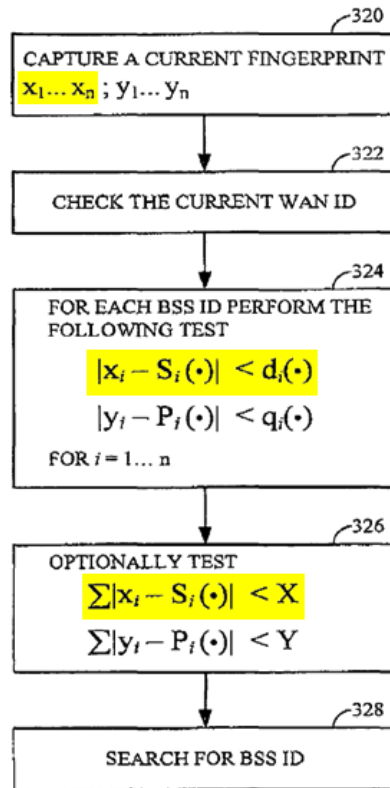


FIG. 3B

For reasons explained (§IX.A.1(b)), the modified *Spain-I* system/process would have been configured to perform comparison and determination operations as discussed above for claim 1, where multiple “number(s)” based on responsive signal strengths were used for the monitored location (§IX.A.1(a)) and the stored location to build the database and resulting comparison processes like that claimed (§IX.A.1(b)). (Ex-1002, ¶225.)

In light of such teachings and suggestions, and for reasons similar to those explained above for claim 1, a POSITA would have found it obvious to configure the *Spain-I-Hunzinger-Nanda* such that the location determining operations

performed by the modified *Spain-I* system/processes (§IX.A.1(b)) included comparing multiple signal strengths numbers, such that the “at least one number based on the signal characteristic of the communications signals from each of the first plurality of antenna stations is more than one number,” where each of which number is based on the signal characteristic of the communications signal from only one of the first plurality of the antenna stations, as recited in claim 21. (§IX.A.1; Ex-1011, 4:42-63, 5:61-6:4; Ex-1006, FIG. 3B, 6:12-25, 8:29-9:15, 10:49-11:19; Ex-1002, ¶227.) Indeed, as explained, the signal strength for each base station in *Spain-I* and *Nanda* is monitored (and similarly compared via fingerprint comparison operations) and similar features would have been implemented in to the *Spain-I-Hunzinger-Nanda* system/process when determining if the MU is in proximity of the user chosen location as discussed for limitation 1(b). (§IX.A.1(b); §§IX.A.1(pre)-IX.A.1(a); Ex-1011, 4:42-63, 5:61-6:4; Ex-1006, FIG. 3B, 6:12-25, 8:29-9:15, 10:49-11:19; Ex-1002, ¶227.)

A POSITA would have had similar reasons/knowledge/skills and expectation of success to configure/implement such features as recited in claim 21 for reasons consistent with those explained for claim 1. (§IX.A.1(b); Ex-1002, ¶228.) Thus, the modified *Spain-I-Hunzinger-Nanda* system/process discloses/suggests the “number(s)” features recited in limitation 1(b) in context of claim 21 for the same reasons explained above in §IX.A.1(b)(ii)(2) (*e.g.*, whether the “number(s)” reflect

the signal strength measurement values as discussed in §IX.A.1(b)(ii)(2)) and the reasons in §IX.A.1(b)(ii)(3) in view of *Nanda* (e.g., whether the “number(s)” are a result of a formula applied to such collected/measured strength information (e.g., calculated averages, other mathematical operations, etc.) like that discussed in §IX.A.1(b)(ii)(3)). (Ex-1002, ¶228.)

Consequently, and in one non-limiting example using *Spain-I*’s FIG. 9 (annotated above) as an example, the modified *Spain-I* system/process would have been configured such that the “at least one number...is more than one number...” (e.g., whether a signal strength value (§IX.A.1(b)(2))) or a value derived from signal strengths (§IX.A.1(b)(3)) as claimed. (Ex-1002, ¶229.) For example, for reasons explained, a POSITA would have been motivated to configure the modified system in one application such that multiple signal strengths (S11-Sm1) for a signal received from station ID1 (yellow) were averaged/smoothed, etc. (*Nanda*) to generate a number (e.g., a signal strength metric) for only that antenna station (ID1), and also the signal strengths (S12-Sm2) for a signal received from a different station ID2 (blue) were averaged/smoothed, etc. to generate a second number (e.g., a second signal strength metric) (“more than one number”) for only that different antenna station (ID2), consistent with the teachings in *Spain-I* and *Nanda*, such that a number/signal-strength metric includes more than one number like that claimed. (Ex-1002, ¶229; *supra* here and §IX.A.1(b).) Such features would have been

employed to the monitored MU location (“of each of the first plurality of communications signals from the first plurality of antenna stations” (§IX.A.1(a))). (Ex-1002, ¶229.) Such features would have been consistent with those of claim 21 as claimed and with those discussed during prosecution (Ex-1004, 166). (Ex-1002, ¶229.)

B. Ground 2: Claims 4 and 6-7 are obvious over *Spain-I* in view of *Hunzinger, Nanda, and Damarla*

1. Claim 4

To the extent *Spain-I-Hunzinger-Nanda* does not disclose/suggest claim 4 (§IX.A.4), such features would have been obvious in further view of *Damarla*. (Ex-1002, ¶¶230-239.) While *Spain-I*’s teachings (MU user initiating location estimation) in view of *Nanda* would have motivated configuring the modified system/process to including second MU measurements (as discussed in §IX.A.4), a POSITA would have been further motivated to provide updated accurate measurements for the database in view of *Damarla*. (Ex-1002, ¶232.)

Damarla discloses RF fingerprinting technologies/techniques (Ex-1028, Abstract, FIG. 4 (below)) and is in the same technical field as the ’698 patent and *Spain-I-Hunzinger-Nanda* and pertinent to problem(s) addressed by the ’698 patent (and a POSITA). (§IX.A.1(pre)-(b); Ex-1001, 1:23-10:25, 3:26-35, 5:14-56; Ex-1028, 1:10-4:20), and thus would have been consulted in context of *Spain-I-Hunzinger-Nanda*. (Ex-1002, ¶¶75-78, 233-234.)

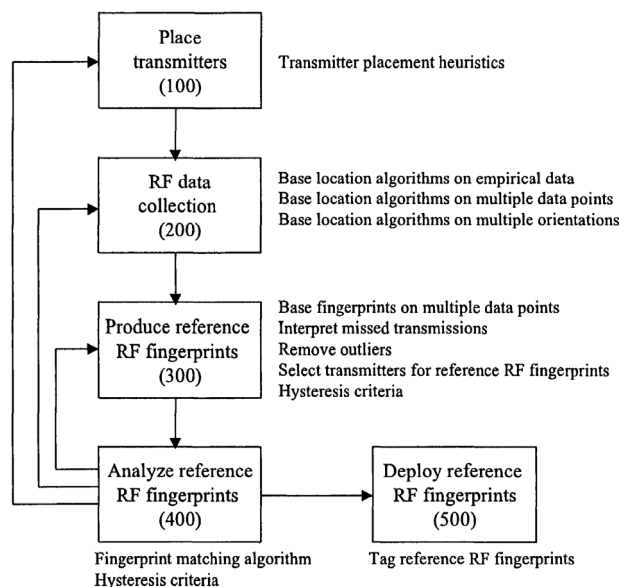


Figure 4

As a part of a fingerprint update process, *Damarla* discloses repeating an RF data collection step wherein “[a]n MU [mobile unit] is taken to various planned locations.” (Ex-1028, FIG. 4, 5:10-16, 5:63-6:1; Ex-1002, ¶235.) The MU samples/records “the RF environment (*e.g.*, signal strength of transmissions from various sources)” at each location. (Ex-1028, 5:10-16.) Thereafter, updated reference fingerprints are deployed to the MUs for location determinations. (*Id.*, 5:10-62, 6:13-37, 11:52-12:13, 14:22-23, 16:57-58; Ex-1002, ¶235.) Thus, a first MU can use fingerprint matching to determine location based on database information updated by signal strength measurements taken by a second MU. (*Id.*)

In light of the additional guidance by *Damarla*, a POSITA would have found obvious to configure the *Spain-I-Hunzinger-Nanda* system/processes such that chosen location signal strengths (§IX.A.1(b)(ii)(1)) were updated in the fingerprint

database based on signal strength measurements taken by a second device. (§IX.A.1(b); Ex-1002, ¶236; Ex-1011, FIGS. 9-10; Ex-1028, 5:10-6:1.) A POSITA would configured such modifications based on the desired application of the above-discussed *Spain-I-Hunzinger-Nanda* system/processes. (Ex-1002, ¶237; §IX.A.1(b), IX.A.4.) For example, in one configuration, the *Spain-I-Hunzinger-Nanda-Damarla* modified system/processes would have been designed to allow the first MU to maintain a fingerprint database and allow a second MU to share with the first MU measured strength information for user chosen locations (as discussed) so that the first MU's fingerprint database is updated with additional fingerprint information corresponding to such chosen location(s), consistent with *Damarla's* teachings. (Ex-1002, ¶¶237-238.) Alternatively, configurations that use a remote shared database would have provided enhanced benefits would have been contemplated/implemented for reasons in §IX.B.2 (claim 6). (*Id.*)

Such modification(s) would have beneficially improved the accuracy/confidence/versatility of determined locations (wider set of fingerprints from different MUs) and promoted updating due to changing RF propagation environments, as suggested by *Damarla*. (Ex-1028, 1:62-2:13, 5:63-6:1; Ex-1002, ¶¶237-239.) Moreover, in some applications contemplated by a POSITA, such modification(s) would conserve resources (*e.g.*, otherwise used by first MU

processes/memory for strength measurements). (Ex-1028, 5:10-6:1; §IX.B.2; Ex-1002, ¶¶237-239.)

For reasons above, and in §IX.A.4, a POSITA would have had the skills/rationale/knowledge to configure/implement such modifications (involving known technologies/techniques), with a reasonable expectation of success. (Ex-1002, ¶239; §IX.A.1(b); IX.A.4; IX.B.2.) *KSR*, 550 U.S. at 416.

2. Claims 6-7

Damarla further discloses configurations where “a server that hosts the” fingerprint database “could send the appropriate reference RF fingerprints to a MU” “for use at run-time.” (Ex-1028, 16:42-57, 5:57-62), consistent with those from *Spain* and *Nanda*. (Ex-1002, ¶¶240-243; Ex-1011, 4:43-46).

The additional teachings of *Damarla* would have complemented the rationale for modifying/configuring *Spain-I-Hunzinger-Nanda* system/processes as discussed in §§IX.A.1, IX.A.6-IX.A.7. (Ex-1002, ¶¶240-243.) Thus, *Spain-I-Hunzinger-Nanda-Damarla* discloses/suggests claims 6-7 for reasons in §§IX.A.1, IX.A.6-7, IX.B.1. (*Id.*, ¶¶240-243.) A POSITA would have had similar rationale/skills/knowledge and expectation of success as respectively discussed above for claims 6-7 (§§IX.A.6-7) (and in §IX.B.1) to configure/implement features like those in claims 6-7 in light of *Damarla*, *Spain-I*, *Hunzinger*, and *Nanda*. (Ex-1002, ¶¶240-243.)

C. Ground 3: Claim 11 is obvious over *Spain-I* in view of *Hunzinger*, *Nanda*, and *Budampati*

1. Claim 11

a) The method of claim 1 wherein the signal characteristic is the signal's arrival time.

Spain-I in view of *Hunzinger*, *Nanda*, and *Budampati* discloses and/or suggests this limitation. (Ex-1002, ¶¶245-255; §IX.A.1.) As discussed for claim 1, the *Spain-I-Hunzinger-Nanda* system/process compares fingerprint information (including parameters reflecting signal characteristics such as signal strength) for monitored and chosen locations to determine whether the MU is in proximity of the chosen location. (§IX.A.1(b); Ex-1011, 5:20-32, 13:49-55; Ex-1006, FIG. 3B, 10:51-11:32, 5:43-46.) But the *Spain-I-Hunzinger-Nanda* system/process was not limited to configurations for determining location based solely on signal strength comparisons. (Ex-1002, ¶245.) Indeed, *Spain-I* discloses that the fingerprints used in its processes can be generated from a variety of different RF characteristics (alone or in combination). (Ex-1011, 4:55-56 (“[T]he spectral fingerprint may be generated using *many different parameters*, either *individually or in combination*”), 3:57-64 (signal strength, phase, signal identity, signal source identity) 3:55-58, 5:20-22.) *Spain-I* also discloses using fingerprint capture times. (*Id.*, 8:4-8 (“The time at which a fingerprint was captured is also stored along with its location identity.”), 13:19-20, 14:1-3, FIGS. 9-10 (below).)

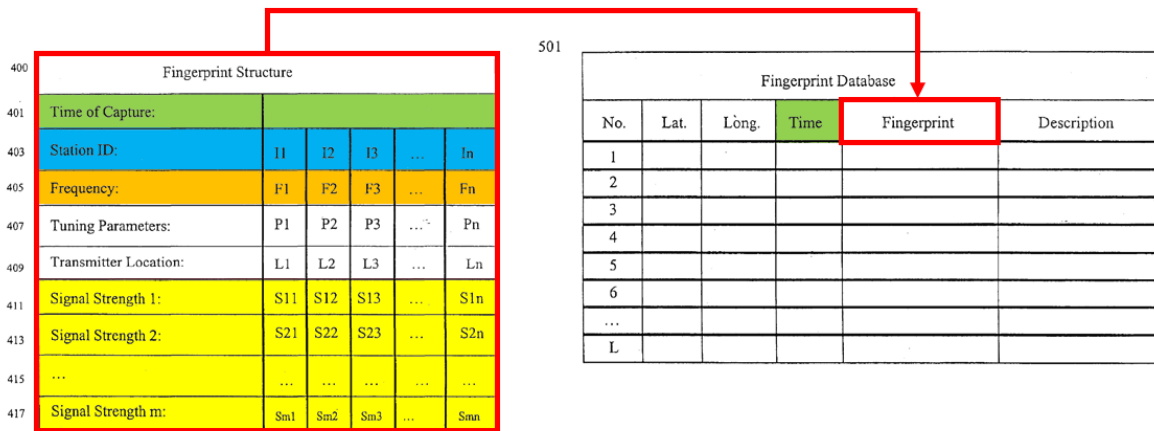


Fig. 9

The specific time that a fingerprint is captured may be compared to previous fingerprint capture times because “not all fingerprints in the database are valid for all times in the day” and “[k]nowing the time at which [a] request is received, the database engine limits the search to the appropriate fingerprints.” (Ex-1010, 9:5-10.)¹⁵ *Spain-I* also recognized the conventional methods of “monitor[ing] the time of arrival of signals” to determine mobile unit locations as “well known to one skilled in the art.” (Ex-1011, 3:17-26.) *Nanda* also contemplated/suggests the use of other types of signal characteristics, such as signal strength and phase. (Ex-1006, 7:19-28, 8:45-10:8 (describing phase/signal strength fingerprint data and different “possible information [] may be used to characterize a fingerprint...”).) Thus, *Spain-I* (and *Nanda*) contemplates/suggests the use of different types of signal

¹⁵ See n.1 (Ex-1010, incorporated by reference (Ex-1011, 1:8-15).)

characteristics (including those relating to time) as parameters to generate the fingerprints used in the location determining processes. (Ex-1002, ¶246.)

Consistent with such suggestions/teachings, a POSITA would have understood that there were various approaches and reasons for using different parameters when constructing fingerprints for location-determining applications. Thus, a POSITA would have been motivated to consider teachings in the art concerning use of different types of signal parameters for fingerprint matching/comparison operations like those discussed for claim 1. (§IX.A.1(b).) (Ex-1002, ¶247.) Upon doing so, a POSITA would have found *Budampati*'s teachings relevant and persuasive, and thus found it obvious to configure the modified *Spain-I*'s system/processes to use time of arrival signal characteristic information in the *Spain-I-Hunzinger-Nanda* system/process discussed above for claim 1. (*Id.*)

A POSITA would have understood (and was aware of) the use of signal arrival time (or time of arrival (TOA)) was a common signal characteristic used to assist systems in determining location(s) for mobile devices. (Ex-1002, ¶248; *e.g.*, Ex-1105, ¶0089 (mobile phone configured to determine its position using techniques such as TOA); Ex-1063, ¶0007 (“various known location techniques may include collecting ranging measurements such as, for example, a time of arrival (TOA)”); Ex-1056, ¶0019 (“[t]ime of arrival and signal strength [were] often combined to

estimate range”); Ex-1108, Abstract, 1:53-65 (describing TOA-based comparison location processes).)

Consistent with such knowledge, and with the suggestions of *Spain-I* and *Nanda, Budampati* discloses a location determining system/process where wireless network access is controlled based on “the location of the wireless device.” (Ex-1109, ¶¶0003, 0016-0020.) Time of arrival information is used to assist in location determinations. (*Id.*, ¶¶0054-0055.) Among other features, *Budampati* describes fingerprint matching/comparisons process using time of arrival signal characteristics. (Ex-1002, ¶¶79-80, 249-250.) Similar to *Spain-I*’s fingerprint comparison/matching processes, *Budampati* recognized the possibility to conduct measurement campaigns to determine RSS and TOA observed from different base stations for different locations, which “led to the development of a class of location fingerprinting techniques” where for a “[g]iven fingerprint, *e.g.*, a set of **measured RSS, TOA, and/or** AOA, the algorithm searches a database of location fingerprints for the closest match” where “[t]he algorithm then returns the location of that closest match as the location of the transmitter.” (Ex-1109, ¶0061.) The location fingerprint database is populated by recorded fingerprints generated by “analyzing the received signal patterns corresponding to each [service-area] cell.” (*Id.*)

Budampati is in the same technical field as the ’698 patent (and *Spain-I-Hunzinger-Nanda*) and discloses features reasonably pertinent to particular

problem(s) the '698 patent (and a POSITA) looked to solve, and thus would have been consulted by a POSITA contemplating *Spain-I-Hunzinger-Nanda*. (§IX.A.1(b)(ii); *see* above regarding *Budampati*; § Ex-1001, Abstract, 1:23-10:25, 3:26-35, 5:14-56; Ex-1002, ¶251.)

In light of the teachings/suggestions of *Budampati* in context of the suggestions/teachings of *Spain-I* (and *Nanda*), and a POSITA's knowledge of TOA data for location determining applications, it would have been obvious to configure the modified *Spain-I* system/process to measure/store/use signal arrival time as the signal characteristics for the fingerprints generated and used in the *Spain-I-Hunzinger-Nanda* system/process discussed for claim 1. (Ex-1002, ¶252; §IX.A.1(b).) The configuration would have predictably resulted in the MU measuring/obtaining time of arrival for each signal received from the antenna stations, and using that information, in addition to or in lieu of signal strengths, as the fingerprint parameter(s) subsequently compared when determining whether the MU monitored location is in proximity of the user chosen location like that discussed above for limitation 1(b). (Ex-1002, ¶252; §IX.A.1(b).) Consequently, the *Spain-I-Hunzinger-Nanda-Budampati* system/process would have performed such location determining by electronically comparing at least one number based on arrival times of the signals received from the first antenna stations at the first monitored location

with at least one number based on corresponding arrival times of the signals received from each of the antenna stations at the user chosen location. (Ex-1002, ¶252.)

The *Spain-I-Hunzinger-Nanda-Budampati* system/process discloses/suggests the “number(s)” features recited in limitation 1(b) in context of claim 11 for the same reasons explained above in §IX.A.1(b)(ii)(2) (*e.g.*, whether the “number(s)” reflect the obtained TOA values (like with signal strength measurement values discussed in §IX.A.1(b)(ii)(2))) and the reasons in §IX.A.1(b)(ii)(3) in view of *Nanda* (*e.g.*, whether the “number(s)” are a result of a formula applied to such collected/measured TOA information (*e.g.*, calculated averages, other mathematical operations, etc.) like with the calculated signal strength number(s) as discussed in §IX.A.1(b)(ii)(3)). (Ex-1002, ¶253.)

A POSITA would have been motivated to consider and use TOA signal characteristics as noted above since TOA information was a known signal parameter known to be used for accuracy in “position measurement.” (Ex-1108, 1:53-65; Ex-1002, ¶254.) Moreover, in certain applications of such a modification, a POSITA would have appreciated the potential benefits in using TOA-based fingerprint comparison matching as a way of verifying/confirming the accuracy of other fingerprint parameter-based determinations (such as via signal strengths). (Ex-1002, ¶254; Ex-1110, 11:26-35 (describing the use of a second location determination method to confirm the result of a first determination method).) Such knowledge,

coupled with *Spain-I*'s contemplated use of different signal parameters (not limited to RSSI, etc.) and *Budampati*'s similar teachings/suggestions of fingerprint comparison/matching algorithms, where fingerprints may be based on one or more different parameters (including TOA and/or RSSI), would have led a POSITA to modify the system/process as noted above. (Ex-1002, ¶254.)

Given the teachings/suggestions of *Spain-I*, *Nanda*, and *Budampati*, a POSITA would have appreciated that configuring the *Spain-I-Hunzinger-Nanda* system/process to use signal arrival time as noted above would have been an obvious/predictable implementation of known technologies/techniques and/or simple substitution of one known signal characteristic for another that would have been used in similar ways (fingerprint parameter comparisons) as contemplated by *Spain-I* in context of *Hunzinger-Nanda-Budampati*. (Ex-1002, ¶255.) Indeed, in light of familiar features/technologies taught by *Spain-I-Hunzinger-Nanda-Budampati*, and state of art knowledge (supra; e.g., Ex-1105, ¶0090; Ex-1063, ¶0007; Ex-1056, ¶0019), a POSITA would had the skills/knowledge/rationale to consider/implement such modifications with a reasonable expectation of success. (Ex-1002, ¶255.) See *KSR*, 550 U.S. at 416.

D. Ground 4: Claims 15 and 16 are obvious over *Spain-I* in view of *Hunzinger*, *Nanda*, and *Blomqvist*

1. Claim 15

a) The method of claim 1 further comprising passing an

indicia to a computer program application running on the first portable RF communications device indicating that the device is one of: (i) at the chosen location, or (ii) no longer at the chosen location.

2. Claim 16

- a) The method of claim 1 further comprising launching a computer program application on the first portable RF communications device when the device is at the chosen location.**

Spain-I in view of *Hunzinger*, *Nanda*, and *Blomqvist* discloses and/or suggests the limitations of claims 15-16. (Ex-1002, ¶¶257-270; §IX.A.1.) As discussed, the *Spain-I-Hunzinger-Nanda* combination discloses/suggests determining if the monitored location is within proximity of a location chosen by the user of the first MU, as claimed. (Ex-1002, ¶257; §IX.A.1(b).) *Spain-I*'s teachings/suggestions relating to location-based service features (Ex-1011, 3:8-16 ("personalized services")), among others, would have led a POSITA to consider teachings in the art regarding MU-based features/applications that would leverage location information, known at the time. Indeed, based on *Hunzinger* and *Blomqvist* a POSITA would have been motivated, and found obvious, to configure the *Spain-I-Hunzinger-Nanda* system/process such that the above-discussed location determining processes (§IX.A.1) further includes providing an indicia to a computer program application running on the first MU indicating that the MU is at the chosen location and

launching the application on the MU when the MU is at the chosen location, as recited in claims 15-16. (Ex-1002, ¶258.)

Hunzinger discloses a mobile device performing selected actions based on a determination whether the MU current location is at, entering, or left a user chosen location assigned to such action(s) (Ex-1054, FIGS. 1A-4, 1:38-2:44, 3:4-67, 4:1-6:22, 6:37-49, 7:9-22), and based on such teachings (among others), the modified *Spain-I-Hunzinger-Nanda* system/processes would have implemented similar features in relation to user chosen locations. (*See* §§IX.A.1(b).) (Ex-1002, ¶259.)

Blomqvist discloses systems/processes relating to location services for mobile devices. (Ex-1033, Abstract, 1:43-2:16, 2:63-3:12; Ex-1002, ¶260.) *Blomqvist* describes automatically activating a location-based function when it is determined that a mobile device is at or within vicinity of a specified location. (*Id.*, FIG. 2 (below), 1:14-39, 2:20-62, 5:10-60.) (Ex-1002, ¶¶81-85, 261-263.)

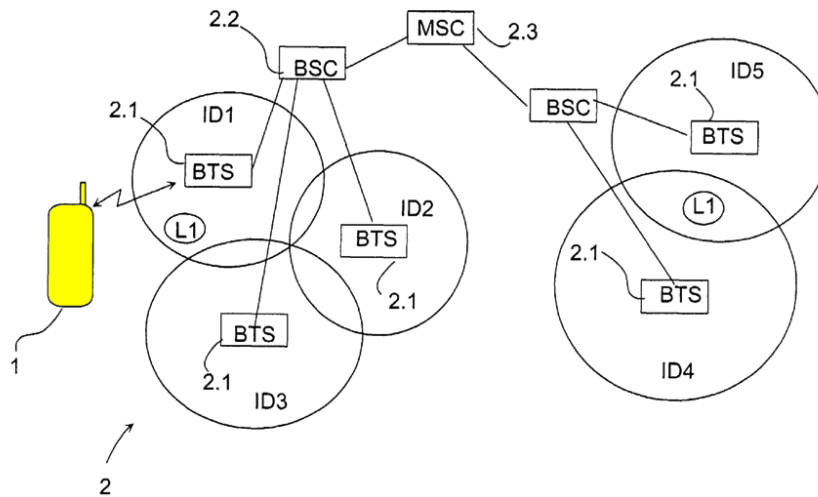


Fig. 2

Among other features (Ex-1033, 2:23-3:12 (condition-based operation performance), 4:35-60, 6:39-64, 7:19-26, 7:43-8:5), *Blomqvist* describes then-conventional mobile device features of activating a location-based function (a reminder, picture/text/sound message, application, etc.) when the device is at or within vicinity of a specified location (*id.*, FIGS. 1a-2, 1:14-39, 2:20-62, 3:44-64, 5:10-6:36, 8:52-62). (Ex-1002, ¶¶264-266.) For example, when an “*application has received information on the arrival in the determined location*, the application implements the determined function, for example presents a message in text format.” (*Id.*, FIG. 1, 5:10-37.) *Blomqvist* further discloses or suggests that such an application is configured to run on the mobile device to, for example, issue a reminder to a user via a phone display. (*Id.*, 5:10-37, 8:33-36, 8:52-62, FIG. 3.) Furthermore, “it is obvious that [*Blomqvist*’s] invention can also be applied for activating and performing other functions” such that “it is for example possible to

activate an application (program) installed in the device 1 at that stage when the device 1 is positioned close to a predetermined location” for indicating “that the user has arrived to a certain location, activating a map application, etc.” (*Id.*, 8:52-62; *see also id.*, 3:44-50, 5:46-50 (“starting of a program”).) (Ex-1002, ¶266.)

Upon considering *Blomqvist* in context of *Spain-I-Hunzinger-Nanda* (§IX.A.1), a POSITA it would have been motivated and found obvious to configure the MU in the modified *Spain-I* system/process (§IX.A.1) to include a location-based software program application, such as applications like those suggested/taught by *Blomqvist*, that receives indicia indicating that the MU is at the user chosen location (§IX.A.1(b)) and launches the application to perform a location-based function upon such determination, consistent with the teachings of *Hunzinger-Blomqvist* and claims 15-16. (Ex-1002, ¶267.) Providing such applications on a mobile device like that taught by *Spain-I* would have been an obvious implementation of known features, given mobile devices at the time were known to offer applications to assist the user with various tasks, events, and the like based on location (as taught/suggested by *Blomqvist* and *Hunzinger*). (*Id.*)

A POSITA would have been motivated to include such features in the *Spain-I-Hunzinger-Nanda* system/processes in order to enhance user convenience and assistance regarding certain tasks, such as providing reminders, to-do lists, or provide location-based application when they/MU is determined to be at a

given/chosen location, similar to the teachings/guidance offered by *Blomqvist* and *Hunzinger*. (Ex-1033, 1:43-58, 5:10-37; Ex-1054, Abstract; Ex-1002, ¶268.) A POSITA also would have appreciated the benefits of such a modification as it would have enhanced/complemented the features offered by the MU in the *Spain-I-Hunzinger-Nanda* system/processes, including providing user-friendly service-based operations that complemented the service-based features contemplated by *Spain-I*. (Ex-1002, ¶268; Ex-1011, 3:8-16.)

A POSITA would have had the skills/knowledge/rationale to configure/implement the above modifications, with a reasonable expectation of success, especially since they would have involved implementation of known techniques/technologies (*e.g.*, programming/modifying MU software), consistent with *Spain-I-Hunzinger-Nanda-Blomqvist*. (Ex-1011, 15:19-29; Ex-1054, 3:49-5:22; Ex-1033, 8:33-62.) (Ex-1002, ¶270.) The collective teachings/suggestions of *Spain-I-Hunzinger-Nanda-Blomqvist* would have predictably led a POSITA to configure the configure the location determining processes performed by the modified system (§IX.A.1) to further include providing an indicia that informed a location-based software program application running on the MU that the MU is at the location chosen by the user and launching that applications to perform location-based functions, as recited in claims 15-16. (Ex-1002, ¶269.) *See KSR*, 550 U.S. at 416.

X. DISCRETIONARY DENIAL IS NOT APPROPRIATE

Discretionary denial under §325(d) is not appropriate here given this petition does not present the same or substantially the same prior art or arguments previously presented to the Office during prosecution. (Ex-1004; Ex-1001, Cover.) *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 at 8 (P.T.A.B. Feb. 13, 2020) (precedential). Moreover, there are material differences between the art/arguments here with those during prosecution (Ex-1004, 66, 75, 142, 150, 184, 190), including features believed to be missing (*id.*, 19-20, 53-55, 100, 127, 167). (*Supra* §IX; *e.g.*, §IX.A.1(b)).¹⁶ *Becton, Dickinson & Co., v. Braun Melsungen AG*, IPR2017-01586, Paper 8 (P.T.A.B. Dec. 15, 2017) (precedential as to § III.C.5, first paragraph) (*Becton, Dickinson* factors (a), (b), and (d)). And even if PO argues to the contrary, the Office erred in a material manner by allowing the claims despite such features being known. *Advanced Bionics*, Paper 6 at 10-11; *Becton, Dickinson*, Paper 8. (§IX.A.1(b).)

Discretionary denial is not warranted in view of the pending Unified EPR. (Ex-1111). (§II.) First, Petitioner had no involvement with the EPR, and Petitioner

¹⁶ Petitioner reserves the right to respond to any discretionary denial arguments that PO may later raise to avoid institution.

developed the present petition independently of Unified and the recently issued office action in that EPR (“EPR-OA”).¹⁷ (Ex-1113; §II.) .

Second, this petition and the EPR are based on materially different grounds and positions. The EPR request relied on prior art to *DeClerq* in combination with other prior not asserted in the grounds here. (Ex-1111, v, 41, 57; *supra* §§IV, IX.) Although the EPR request relied on *Perez-Breva* (2005/0037776 (“*Perez-Breva-776*”)) (a related application to *Spain-I*)¹⁸, it did so only to address dependent claim 12 (phase). This Petition, unlike the EPR, relies on, *inter alia*, *Spain-I-Nanda* for such conventional features. (§IX.A.10.) While in the EPR-OA, the examiner newly applied *Perez-Breva-776* against different claims than those challenged here (Ex-

¹⁷ Petitioner was in the final stages of filing this petition when the EPR-OA issued on November 1, and thus addresses it here. The prior art/grounds presented in this petition were independently identified/developed by Petitioner, and thus Petitioner did not use the EPR-OA as a roadmap for its substantive positions. This is evident given the different claims/grounds that now are at issue in the EPR and the close proximity between when the EPR-OA issued and the filing of this petition (which took significant time and effort to prepare).

¹⁸ *Spain-I* is a **continuation-in-part** of *Perez-Breva-I* (Ex-1009). *Perez-Breva-776* in the EPR (not cited/relied upon in this petition) is a continuation of Ex.1009.

1113, 20-28), the examiner asserted that *Perez-Breva-776* does not disclose certain claimed ID and signal strength comparison and user chosen location features, and thus relied on a different secondary reference (Sheynblat) (*id.*, 21, 34) and did not address the proximity or “number” features in context of the file history. In contrast, the grounds here rely on the combination of *Spain-I-Hunzinger-Nanda* for such features (including in context of the file history). (*Supra* §§VII-VIII, IX.A.1(b)(1)-(3).) Thus, there is no substantial overlap between the grounds here and those remaining in the pending EPR.

Third, the pending claims of the EPR and the challenged claims in this IPR are no longer coextensive. (§II; Ex-1113, 29-37 (confirming claims 1-23 in light of different art).)

Fourth, Unified has not been accused of infringement, but Samsung has. Denying institution here in view of a third-party EPR would prejudice the entity (Samsung) accused of infringement of the challenged claims, especially given the statutory deadline attached to Petitioner due to PO’s complaint and the non-overlapping claims at-issue in the EPR.

Fifth, despite the EPR-OA, the EPR remains at an early stage, which counsels against discretionary denial. *See Mueller Sys., LLC v. Rein Tech, Inc.*, IPR2020-00100, Paper 9 at 13 (P.T.A.B. May 12, 2020).

Accordingly, discretionary denial is not warranted in view of the EPR. *See Pfizer Inc. v. Hoffman-LA Roche Inc.*, IPR2018-01219, Paper 12 at 5-10 (P.T.A.B. Dec. 18, 2018) (instituting where IPR cited prior art combination to address overlapping claim features for not-at-issue claims in a pending EPR).

The *Fintiv* factors also do not justify denying institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential).

The **first factor** (stay) is neutral because Samsung has not yet moved for a stay. *See Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (P.T.A.B. May 19, 2021).

The **second factor** (proximity) is weighs in favor of institution. The median time from filing to trial in the Eastern District of Texas last year was 24.5 months (Ex-1023, 35.),¹⁹ where the court has scheduled jury selection for February 10, 2025 (Ex-1024, 1.) With this petition filed in early November 2023, a FWD may be expected by May/June 2025, not long after the trial date (assuming no delays in the EDTX schedule). (Ex-1022, 9.)

Moreover, the Board has relied on various justifications, such as diligence, a stipulation, minimal investment in litigation, and strong merits of invalidity, which are present here. *Verizon Business Network Services, Inc. v. Huawei Techs. Co.*,

¹⁹ The 2023 statistics (16.7 mos.) is only to June 30, 2023.

IPR2020-01141, Paper 12 (Jan. 14, 2021). This petition was diligently filed in advance of the one-year bar date and just over one month after PO served its infringement contentions. (Exs-1021; 1024, 5; 1025.) Fact discovery is not anticipated to close until September 2024 and expert discovery has not begun (Ex-1024, 3), and the *Markman* hearing will occur August 1, 2024 (*id.*).

The **third factor** (investment) also weighs against denial. The district court case is in early stages—claim construction does not begin until mid-2024 (*see second factor*; Ex-1024, 3-4) and there have been no substantive orders.

The **fourth factor** (overlap) also weighs against denial. Petitioner hereby stipulates that, if IPR is instituted, Petitioner will not pursue the IPR grounds in the district court litigation. Thus, “[i]nstituting trial here serves overall system efficiency and integrity goals by not duplicating efforts and by resolving materially different patentability issues.” *Apple, Inc. v. SEVEN Networks, LLC*, IPR2020-00156, Paper 10 at 19 (P.T.A.B. June 15, 2020); *Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 12 (P.T.A.B. June 16, 2020). Moreover, this petition challenges claims 9-10 and 21, which are not asserted against Petitioner. So the Texas Litigation will not resolve all disputed validity issues. (§IX.A.8-9, 12.)

Petitioner and PO are the same parties as in district court (**fifth factor**), but based on a “holistic view,” the factors favor institution. *Samsung Elecs. Co. Ltd. v.*

Dynamics Inc., IPR2020-00505, Paper 11 at 15 (P.T.A.B. Aug. 12, 2020). Likewise, this petition presents compelling merits as to unpatentability, which outweigh any factors that may be determined to lean against institution (**sixth factor**). See *Commscope Tech. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 4-5 (P.T.A.B. Feb. 27, 2023) (precedential).

XI. CONCLUSION

Accordingly, Petitioner requests institution of IPR for the challenged claims.

Respectfully submitted,

Dated: November 9, 2023

By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing petition for *Inter Partes* Review of U.S. Patent No. 8,594,698 contains, as measured by the word-processing system used to prepare this paper, 13,936 words. This word count does not include the items excluded by 37 C.F.R. § 42.24 as not counting towards the word limit.

Respectfully submitted,

Dated: November 9, 2023

By: /Joseph E. Palys/
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Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on November 9, 2023, I caused a true and correct copy of the foregoing petition for *Inter Partes* Review of U.S. Patent No. 8,594,698 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on Patent Center:

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