

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. 8,170,583

DECLARATION OF DR. KEVIN C. ALMEROOTH

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I, Kevin C. Almeroth, declare as follows:

I. INTRODUCTION

1. I have been retained by Samsung Electronics Co., Ltd. (“Petitioner”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“PTO”) against Broadphone LLC (“Patent Owner” or “PO”) regarding U.S. Patent No. 8,170,583 (“the ’583 patent”) (Ex-1001).¹ I have been asked to consider whether the prior art discloses or suggests the features recited in claims 1-10, 17-20, and 24-26 (“the challenged claims”) of the ’583 patent. My opinions are set forth below.

2. I am being compensated at my standard rate for my work in this proceeding. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other interest in this proceeding.

¹ Where appropriate, I refer to exhibits that I understand are to be attached to the petition for *Inter Partes* Review of the ’583 patent.

II. BACKGROUND AND QUALIFICATIONS

3. I am currently a Professor Emeritus in the Department of Computer Science at the University of California, Santa Barbara (UCSB). While at UCSB, I held faculty appointments and was a founding member of the Computer Engineering (CE) Program, Media Arts and Technology (MAT) Program, and the Technology Management Program (TMP). I also served as the Associate Director of the Center for Information Technology and Society (CITS) from 1999 to 2012. I have been a faculty member at UCSB since July 1997.

4. I hold three degrees from the Georgia Institute of Technology: (1) a Bachelor of Science degree in Information and Computer Science (with minors in Economics, Technical Communication, and American Literature) earned in June 1992; (2) a Master of Science degree in Computer Science (with specialization in Networking and Systems) earned in June 1994; and (3) a Doctor of Philosophy (Ph.D.) degree in Computer Science (Dissertation Title: Networking and System Support for the Efficient, Scalable Delivery of Services in Interactive Multimedia System, minor in Telecommunications Public Policy) earned in June 1997. During my education, I took a wide variety of courses as demonstrated by my minor. My undergraduate degree also included a number of courses more typical of a degree in

electrical engineering including digital logic, signal processing, and telecommunications theory.

5. One of the major concentrations of my research over the past 30+ years has been the delivery of multimedia content and data between computing devices, including through various network architectures. In my research, I have studied large-scale content delivery systems, and the use of servers located in a variety of geographic locations to provide scalable delivery to hundreds or thousands of users simultaneously. I have also studied smaller-scale content delivery systems in which content is exchanged between individual computers and portable devices. My work has emphasized the exchange of content more efficiently across computer networks, including the scalable delivery of content to many users, mobile computing, satellite networking, delivering content to mobile devices, and network support for data delivery in wireless networks.

6. In 1992, the initial focus of my research was on the provision of interactive functions (e.g., VCR-style functions like pause, rewind, and fast-forward) for near video-on-demand systems in cable systems; in particular, how to aggregate requests for movies at a cable head-end and then how to satisfy a multitude of requests using one audio/video stream broadcast to multiple receivers simultaneously. This research has continually evolved and resulted in the

development of techniques to scalably deliver on-demand content, including audio, video, web documents, and other types of data, through the Internet and over other types of networks, including over cable systems, broadband telephone lines, and satellite links.

7. An important component of my research has been investigating the challenges of communicating multimedia content, including video, between computers and across networks including the Internet. Although the early Internet was used mostly for text-based, non-real time applications, the interest in sharing multimedia content, such as video, quickly developed. Multimedia-based applications ranged from downloading content to a device to streaming multimedia content to be instantly used. One of the challenges was that multimedia content is typically larger than text-only content, but there are also opportunities to use different delivery techniques since multimedia content is more resilient to errors. I have worked on a variety of research problems and used a number of systems that were developed to deliver multimedia content to users. One content-delivery method I have researched is the one-to-many communication facility called “multicast,” first deployed as the Multicast Backbone, a virtual overlay network supporting one-to-many communication. Multicast is one technique that can be used on the Internet to provide streaming media support for complex applications like video-on-demand,

distance learning, distributed collaboration, distributed games, and large-scale wireless communication. The delivery of media through multicast often involves using Internet infrastructure, devices and protocols, including protocols for routing and TCP/IP.

8. Starting in 1997, I worked on a project to integrate the streaming media capabilities of the Internet together with the interactivity of the web. I developed a project called the Interactive Multimedia Jukebox (IMJ). Users would visit a web page and select content to view. The content would then be scheduled on one of a number of channels, including delivery to students in Georgia Tech dorms delivered via the campus cable plant. The content of each channel was delivered using multicast communication.

9. In the IMJ, the number of channels varied depending on the capabilities of the server including the available bandwidth of its connection to the Internet. If one of the channels was idle, the requesting user would be able to watch their selection immediately. If all channels were streaming previously selected content, the user's selection would be queued on the channel with the shortest wait time. In the meantime, the user would see what content was currently playing on other channels, and because of the use of multicast, would be able to join one of the

existing channels and watch the content at the point it was currently being transmitted.

10. The IMJ service combined the interactivity of the web with the streaming capabilities of the Internet to create a jukebox-like service. It supported true Video-on-Demand when capacity allowed, but scaled to any number of users based on queuing requested programs. As part of the project, we obtained permission from Turner Broadcasting to transmit cartoons and other short-subject content. We also connected the IMJ into the Georgia Tech campus cable television network so that students in their dorms could use the web to request content and then view that content on one of the campus's public access channels.

11. More recently, I have also studied issues concerning how users choose content, especially when considering the price of that content. My research has examined how dynamic content pricing can be used to control system load. By raising prices when systems start to become overloaded (*i.e.*, when all available resources are fully utilized) and reducing prices when system capacity is readily available, users' capacity to pay as well as their willingness can be used as factors in stabilizing the response time of a system. This capability is particularly useful in systems where content is downloaded or streamed on-demand to users.

12. As a parallel research theme, starting in 1997, I began researching issues related to wireless devices and sensors. In particular, I was interested in showing how to provide greater communication capability to “lightweight devices,” *i.e.*, small form-factor, resource-constrained (*e.g.*, CPU, memory, networking, and power) devices. Starting in 1998, I published several papers on my work to develop a flexible, lightweight, battery-aware network protocol stack. The lightweight protocols we envisioned were similar in nature to protocols like Bluetooth, Universal Plug and Play (UPnP) and Digital Living Network Alliance (DLNA).

13. From this initial work, I have made wireless networking—including ad hoc, mesh networks and wireless devices—one of the major themes of my research. My work in wireless networks spans the protocol stack from applications through to the encoding and exchange of data at the data link and physical layers.

14. At the application layer, even before the large-scale “app stores” were available, my research looked at building, installing, and using apps for a variety of purposes, from network monitoring to support for traditional computer-based applications (*e.g.*, content retrieval) to new applications enabled by ubiquitous, mobile devices. For example, my research has looked at developing applications for virally exchanging and tracking “coupons” through “opportunistic contact” among mobile wireless devices (*i.e.*, communication among devices moving into

communication range with each other). In many of the courses I have taught there is a project component. Through these projects I have supervised numerous efforts to develop new “apps” for download and use across a variety of mobile platforms.

15. Toward the middle of the protocol stack, my research has also looked to build wireless infrastructure support to enable communication among a set of mobile devices unaided by any other kind of network infrastructure. These kinds of networks are useful either in challenged network environments (e.g., when a natural disaster has destroyed existing infrastructure) or when suitable support for network communication never existed. The deployment of such networks (or even the use of traditional network support) are critical to support services like disaster relief, catastrophic event coordination, and emergency services deployment.

16. Yet another theme is monitoring wireless networks, in particular different variants of IEEE 802.11 compliant networks, to (1) understand the operation of the various protocols used in real-world deployments, (2) use these measurements to characterize use of the networks and identify protocol limitations and weaknesses, and (3) propose and evaluate solutions to these problems. I have successfully used monitoring techniques to study wireless data link layer protocol operation and to improve performance by enhancing the operation of such protocols.

For wireless protocols, this research includes functions like network acquisition and channel bonding.

17. One theme in my wireless network research has been cross-layer solutions and innovations. As mentioned above, with greater wireless device use and network support, we envisioned new application paradigms and services, for example, when mobile devices come into contact with each other. Instead of relying on existing infrastructure to relay communication, the devices are able to discover each other and communicate directly. Other examples include discovering and using location information to enhance users' experiences. Network support and novel applications span use a variety of network architectures supporting users on foot, in vehicles, and across varying terrains and environments. Finally, we studied how communication efficiency can be supported through intelligent handoffs as well as location and movement prediction.

18. Protecting networks, including their operation and content, has been an underlying theme of my research almost since the beginning of my research career. Starting in 2000, I have been involved in several projects that specifically address security, network protection, and firewalls. After significant background work, a team on which I was a member successfully submitted a \$4.3M grant proposal to the Army Research Office (ARO) at the Department of Defense to propose and develop

a high-speed intrusion detection system. Key aspects of the system included associating streams of packets and analyzing them for viruses and other malware. Once the grant was awarded, we spent several years developing and meeting the milestones of the project. A number of my students worked on related projects and published papers on topics ranging from intrusion detection to developing advanced techniques to be incorporated into firewalls. I have also used firewalls, including their associated malware detection features, in developing techniques for the classroom to ensure that students are not distracted by online content.

19. My recent work ties some of the various threads of my past research together. I have investigated content delivery in online social networks and proposed reputation management systems in large-scale social networks and marketplaces. On the content delivery side, I have looked at issues of caching and cache placement, especially when content being shared and the cache has geographical relevance. We were able to show that effective caching strategies can greatly improve performance and reduce deployment costs. Our work on reputation systems showed that reputations have economic value, and as such, creates a motivation to manipulate reputations. In response, we developed a variety of solutions to protect the integrity of reputations in online social networks. The techniques we developed for content delivery and reputation management were

particularly relevant in peer-to-peer communication and recommendations for downloadable “apps.”

20. As an important component of my research program, I have been involved in the development of academic research into available technology in the market place. One aspect of this work is my involvement in the Internet Engineering Task Force (IETF). The IETF is a large and open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. I have been involved in various IETF groups including many content delivery-related working groups like the Audio Video Transport (AVT) group, the MBone Deployment (MBONED) group, Source Specific Multicast (SSM) group, the Inter-Domain Multicast Routing (IDMR) group, the Reliable Multicast Transport (RMT) group, the Protocol Independent Multicast (PIM) group, etc. I have also served as a member of the Multicast Directorate (MADDOGS), which oversaw the standardization of all things related to multicast in the IETF. Finally, I was the Chair of the Internet2 Multicast Working Group for seven years.

21. My involvement in the research community extends to leadership positions for several academic journals and conferences. I am the co-chair of the Steering Committee for the ACM Network and System Support for Digital Audio

and Video (NOSSDAV) workshop and on the Steering Committees for the International Conference on Network Protocols (ICNP), ACM Sigcomm Workshop on Challenged Networks (CHANTS), and IEEE Global Internet (GI) Symposium. I have served or am serving on the Editorial Boards of IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Network, ACM Computers in Entertainment, AACE Journal of Interactive Learning Research (JILR), and ACM Computer Communications Review. I have co-chaired a number of conferences and workshops including the IEEE International Conference on Network Protocols (ICNP), IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), International Conference on Communication Systems and Networks (COMSNETS), IFIP/IEEE International Conference on Management of Multimedia Networks and Services (MMNS), the International Workshop On Wireless Network Measurement (WiNMee), ACM Sigcomm Workshop on Challenged Networks (CHANTS), the Network Group Communication (NGC) workshop, and the Global Internet Symposium, and I have served on the program committees for numerous conferences.

22. Furthermore, in the courses I taught at UCSB, a significant portion of my curriculum covered aspects of the Internet and network communication including the physical and data link layers of the Open System Interconnect (OSI)

protocol stack, and standardized protocols for communicating across a variety of physical media such as cable systems, telephone lines, wireless, and high-speed Local Area Networks (LANs). The courses I have taught also cover most major topics in Internet communication, including data communication, multimedia encoding, and mobile application design. My research and courses have covered a range of physical infrastructures for delivering content over networks, including cable, Integrated Services Digital Network (ISDN), Ethernet, Asynchronous Transfer Mode (ATM), fiber, and Digital Subscriber Line (DSL). For a complete list of courses I have taught, see my curriculum vitae (CV).

23. In addition, I co-founded a technology company called Santa Barbara Labs that was working under a sub-contract from the U.S. Air Force to develop very accurate emulation systems for the military's next generation internetwork. Santa Barbara Labs' focus was in developing an emulation platform to test the performance characteristics of the network architecture in the variety of environments in which it was expected to operate, and, in particular, for network services including IPv6, multicast, Quality of Service (QoS), satellite-based communication, and security. Applications for this emulation program included communication of a variety of multimedia-based services, including video conferencing and video-on-demand.

24. In addition to having co-founded a technology company myself, I have worked for, consulted with, and collaborated with companies for nearly 30 years. These companies range from well-established companies to start-ups and include IBM, Hitachi Telecom, Turner Broadcasting System (TBS), Bell South, Digital Fountain, RealNetworks, Intel Research, Cisco Systems, and Lockheed Martin.

25. Through my graduate education, leadership with CITS, involvement in TMP, role in the development of the Internet2 infrastructure, and consulting with ISPs, I have gained a strong understanding in the role of the Internet in our society and the challenges of deploying large-scale production networking infrastructure. CITS, since its inception, has looked at the role of the Internet in society, including how the evolution of technology have created communication opportunities and challenges, including, for example through disruptive technologies like P2P. TMP looks to focus on non-purely technical issues, including, for example, state-of-the-art business methods, and strategies for successful technology commercialization, new venture creation, and best practices for fostering innovation. Through my industry collaborations and Internet2 work, I have developed significant experience in the challenges of deploying, monitoring, managing, and scaling communication infrastructure to support evolving Internet services like streaming media, conferencing, content exchange, social networking, and e-commerce.

26. I am a Member of the Association of Computing Machinery (ACM) and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

27. Additional details about my employment history, fields of expertise, courses taught, and publications are further included in my CV (Ex-1003).

28. I am not an attorney and offer no legal opinions, but in the course of my work, I have had experience studying and analyzing patents and patent claims from the perspective of a person skilled in the art.

III. MATERIALS REVIEWED

29. The opinions in this declaration are based on the documents I reviewed, my knowledge and experience, and professional judgment. In forming my opinions expressed in this declaration, I have reviewed the following materials:

- Ex-1001 U.S. Patent No. 8,170,583 (“*Shkedi*”)
- Ex-1004 Prosecution History of U.S. Patent No. 8,170,583
- Ex-1005 U.S. Patent No. 6,269,246 (“*Rao-I*”)
- Ex-1006 U.S. Patent No. 8,477,731 (“*Nanda*”)
- Ex-1007 U.S. Patent Application Publication 2001/0022558 (“*Karr*”)
- Ex-1008 U.S. Patent No. 7,116,987 (“*Spain-II*”)
- Ex-1009 U.S. Patent No. 6,782,265 (“*Perez-Breva-II*”)
- Ex-1010 U.S. Patent No. 6,393,294 (“*Perez-Breva-I*”)
- Ex-1011 U.S. Patent No. 6,944,465 (“*Spain-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 (“*Phillips*”)
- Ex-1017 U.S. Patent No. 7,213,057 (“*Trethewey*”)
- Ex-1018 U.S. Patent Application Publication No. 2004/0203768 (“*Ylitalo*”)
- Ex-1019 U.S. Patent Application Publication No. 2009/0075651 (“*MacNaughton*”)
- Ex-1020 U.S. Patent Application Publication No. 2005/0185618 (“*Friday*”)
- Ex-1026 U.S. Patent No. 6,167,274 (“*Smith-I*”)
- Ex-1027 U.S. Patent Application Publication No. 2004/0152471 (“*MacDonald*”)
- Ex-1028 U.S. Patent No. 7,346,359 (“*Damarla*”)
- Ex-1029 U.S. Patent No. 6,052,598 (“*Rudrapatna*”)
- Ex-1032 U.S. Patent No. 7,397,424 (“*Houri*”)
- Ex-1033 U.S. Patent No. 7,305,244 (“*Blomqvist*”)
- Ex-1053 U.S. Patent Application Publication No. 2005/0159174 (“*Bar-On*”)
- Ex-1054 U.S. Patent No. 6,957,076 (“*Hunzinger*”)
- Ex-1055 U.S. Patent No. 7,263,441 (“*Janky*”)
- Ex-1056 U.S. Patent Application Publication No. 2005/0136845 (“*Masuoka*”)
- Ex-1057 U.S. Patent Application Publication No. 2004/0198386 (“*Dupray*”)

Ex-1058	U.S. Patent Application Publication No. 2005/0282557 ("Mikko")
Ex-1059	U.S. Patent No. 7,474,897 ("Morgan-I")
Ex-1060	U.S. Patent No. 6,714,865 ("Angwin")
Ex-1061	U.S. Patent No. 7,525,425 ("Diem")
Ex-1062	U.S. Patent No. 7,433,693 ("Sheynblat-I")
Ex-1063	U.S. Patent Application Publication No. 2007/0013584 ("Camp")
Ex-1064	U.S. Patent Application Publication No. 2008/0139219 ("Boeiro")
Ex-1065	U.S. Patent Application Publication No. 2006/0240841 ("Bhattacharya")
Ex-1066	U.S. Patent Application Publication No. 2006/0095349 ("Morgan-II")
Ex-1067	U.S. Patent No. 6,915,123 ("Daudelin")
Ex-1068	U.S. Patent Application Publication No. 2007/0010956 ("Nerguizian")
Ex-1069	U.S. Patent Application Publication No. 2005/0195761 ("Alicherry")
Ex-1070	U.S. Patent Application Publication No. 2007/0133487 ("Wang")
Ex-1071	U.S. Patent Application Publication No. 2006/0089153 ("Sheynblat-II")
Ex-1072	U.S. Patent Application Publication No. 2007/0249365 ("Jendbro")
Ex-1073	U.S. Patent No. 7,941,656 ("Hans")
Ex-1074	U.S. Patent No. 7,454,608 ("Gopalakrishnan")
Ex-1075	U.S. Patent No. 8,948,785 ("Grindeland")
Ex-1076	U.S. Patent No. 8,725,406 ("Kitajima")

and any other materials I refer to in this declaration in support of my opinions.

30. I base my opinions in this Declaration on the materials I reviewed, my experience, knowledge, and professional judgment. My opinions have also been guided by my appreciation of how a person of ordinary skill in the art would have understood the claims and the specification of the '583 patent at the time of the alleged invention, which I have been asked to consider as September 19, 2006. My opinions reflect how one of ordinary skill in the art would have understood the '583 patent, including the challenged claims, the prior art to the patent and those claims, and the state of the art known to a person of ordinary skill in the art at the time of the alleged invention.

IV. PERSON OF ORDINARY SKILL IN THE ART

31. Based on my knowledge and experience, I understand what a person of ordinary skill in the art would have known at the time of the alleged invention, which I discussed above as being around September 19, 2006. My opinions herein are, where appropriate, based on my understandings as to a person of ordinary skill in the art at that time. In my opinion, based on the materials and information I have reviewed, and based on my experience in the technical areas relevant to the '583 patent, a person of ordinary skill in the art as of the identified effective date of the '583 patent would have had at least a Bachelor's of Science degree in computer science, electrical engineering, or a similar discipline, and two or more years of experience with location-based systems and/or processes or related technologies, such as for example systems/processes for determining mobile device location(s). More education can supplement practical experience and vice versa. I apply this understanding in my analysis herein.

32. All of my opinions in this declaration are from the perspective of one of ordinary skill in the art, during the relevant timeframe (*e.g.*, the time of the alleged invention), which I discussed above as being around September 19, 2006. (*See also my discussions below in Sections V-IX.*)

V. TECHNICAL BACKGROUND

33. As I discuss further below, it is my opinion that the features recited in the challenged claims of the '583 patent are disclosed or suggested in the prior art. Many of the claimed features relate to technologies/techniques that were conventional and known to persons of ordinary skill in the art at the time before the time of the alleged invention of the '583 patent.

34. Below, I present an overview of technologies, techniques, and concepts that were known to a person of ordinary skill in the art prior to and at the time of the alleged invention of the '583 patent. The features, functionalities, and concepts I describe in this technical background section reflect the knowledge of the state of the art that a person of ordinary skill in the art would have had and understood prior to and at the time of the alleged invention of the '583 patent. I rely on, and incorporate as applicable (even if not expressly mentioned below in §IX), the following disclosures and opinions to support my opinions in this Declaration concerning the knowledge, skills, experience, and understanding of technologies, techniques, concepts, etc. in the state of art of a person of ordinary skill in the art near and at the time of the alleged invention (September 19, 2006), including those opinions relating to such a skilled person's understanding as to how the prior art discloses and/or suggests the features/limitations recited in the challenged claims of

the '583 patent and how and why a person of ordinary skill in the art would have been motivated to consider and combine the disclosures and suggestions from one or more prior art references as I explain below in Section IX. In my opinion, the concepts/technologies/techniques discussed below (and where I discuss elsewhere in Section IX) would have been within the knowledge and mindset of a person of ordinary skill in the art at the time.

A. Mobile Device Location Systems/Methods

35. Before the alleged time of invention, information pertaining to the location of a mobile device (cell phones, PDAs, etc.) was desired for a variety of applications. For instance, in the late 90s, the U.S. Federal Communication Commission proposed requirements for cellular telephone carriers to implement wireless telephone location services to assist locating efforts related to 911 calls. (Ex-1056, ¶¶0006, ¶¶0019; *see also* ¶¶0010-18.) And various related emergency and military location services were being developed for mobile devices. For example, U.S. Patent Application Publication No. 2004/0152471 to *MacDonald* (Ex-1027) describes:

The MSC 220 can be configured to perform an A/B number analysis to determine whether a location function is to be performed. For example, the MSC 220 can initiate the location function each time a mobile telephone dials 911. In addition, the

mobile telephone system provider can offer this location function as a service to its customers. In this situation, if the user of the mobile telephone 120 dials a certain number, the MSC 220 can initiate the location function and the location of the mobile telephone could be communicated to the mobile telephone user.

(Ex-1027, FIG. 17, ¶0049.) Also,

For example, if the location function was initiated because of a 911 call from the mobile telephone 120, the MLM 230 will route the location information to the appropriate public service provider. If the location function was initiated because the MSC determined that the cellular telephone number belonged to a fleet company, the location information would be sent to the appropriate fleet company. Further, the location information could be communicated to the mobile telephone 120 itself if the request for location information came from the user of the mobile telephone 120.

(*Id.*, ¶0090.) (*See also id.*, ¶¶0004, 0091-0101, 0106-0108, 0115, FIGS. 3, 11-15).

Additionally, U.S. Patent Application Publication No. 2004/0198386 to *Dupray* (Ex-1057) explained that:

[L]ocation requesting applications that require relatively precise location information are emergency rescue, and certain military related applications (e.g., battlefield data fusion, battlefield

maneuvers and/or military command, control and communication (C3).

(Ex-1057, ¶0023; *see also id.*, Abstract, ¶¶0084, 0115, 0161, 0268.)

36. Beyond location applications for emergency services, a person of ordinary skill in the art would have been aware of other mobile phone location-based applications and features. For example, U.S. Patent Application Publication No. 2005/0282557 to *Mikko* (Ex-1058), confirmed such a skilled person's knowledge of

“[a]pplication programs [that] have been developed that allow a request for the current location of a mobile terminal by another computing device.

(*See, e.g.*, Ex-1058, ¶0007.) *Mikko* also explained that,

Application programs have also been developed that allow a mobile terminal to request its current location. These applications may, for example, request accurate, real-time positioning of the mobile terminal itself in order to connect the terminal user to nearby points of interest, to advise them of current traffic or weather conditions, or to provide routing information.

(*Id.*) (*See also id.*, Abstract, FIGS. 2-4, ¶¶0008-0009, 0015, 0020, 0031, 0033, 0036, 0038, 0040.)

37. U.S. Patent No. 7,848,765 to *Phillips* (Ex-1016) confirmed a person of ordinary skill in the art's understanding and knowledge of:

methods and systems relating to location-based services such as *social networking*, providing *demographic information*, *tracking* mobile devices, providing *business information*, providing an *adaptable user interface*, remotely *effecting a change on a portable electronic device*, providing a *geofence*, *outputting location-based information* on a mobile device, *varying transmissions* to and from a mobile device, providing *location-based alerts*, *verifying transactions* and *tailoring information to the behavior of a user*.

(Ex-1016, Abstract.)² (*See also id.*, FIGS. 1-4, 6, 7, 27A-27C, 28-42B, 1:18-5:10, 6:30-7:3, 10:1-12:32, 14:38-44 (user may define a geofence via portable device), 16:41-67, 17:39-20:46, 21:34-22:21, 23:50-25:18, 26:38-27:23.)

38. A person of ordinary skill in the art understood and appreciated that the location of a mobile device was often used to trigger various mobile device functions. U.S. Patent Application Publication No. 2009/0075651 to *MacNaughton* (Ex-1019) confirmed a person of ordinary skill in the art's understanding and knowledge of location determining techniques and technologies that allowed a user

² Emphasis is added in this declaration unless I state otherwise.

to choose zones from which selected tasks may be performed when it is determined mobile device is moved outside or inside a particular zone. (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 (user designated zones where tasks are performed when it is determined mobile device is moved outside or inside zone).) Likewise, location-based reminder applications were well-known. (*E.g.*, U.S. Patent No. 6,957,076 to *Hunzinger*, 1054, Abstract; U.S. Patent No. 7,305,244 to *Blomqvist*, Ex-1033, 3:44-64, 5:10-37.) It was also known to inform and/or activate software applications and device profiles based on location.

Other functions to be mentioned in this context that can be activated on the basis of the location are starting of a program, changing the settings of a device, for example changing the user profile in a mobile station, re-configuration, or a security function. . . . By means of the method according to the invention 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. Further examples of such applications that can be mentioned are call set-up, sending a text message to indicate for example that the user has arrived to a certain location, activating a map application, etc.

(Ex-1033, 8:52-62; *see also id.*, 5:45-50.)

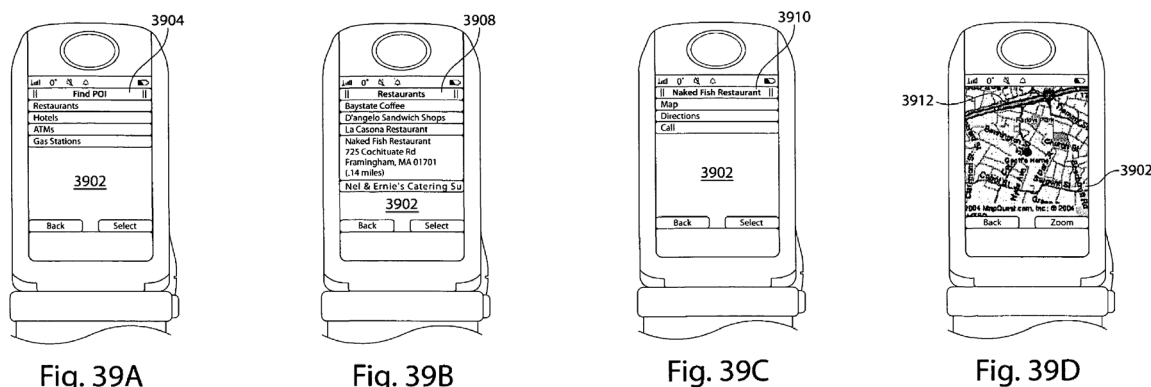
39. Other state of art reference describe similar features that confirm what would have been known, appreciated, and understood by a person of ordinary skill in the art at the time. (See e.g.; U.S. Patent No. 7,525,425 to *Diem*, Ex-1061, FIG. 13c, 1:61-2:8, 8:54-9:10, 21:4-13; U.S. Patent No. 7,305,244 to *Blomqvist*, Ex-1033, 1:43-59, 5:46-6:38; U.S. Patent No. 7,346,359 to *Damarla*, Ex-1028, Abstract, FIGS. 4-8, 1:10-4:14, 5:10-16 (MU taken to planned locations where RF samples are taken/record), 5:16-63, 7:23-8:28; U.S. Patent No. 6,052,598 to *Rudrapatna*, Ex-1029, FIGS. 6A-6E ¶¶0033-0034, 0045, 0063, 0071, 0074-0075; U.S. Patent Application Publication No. 2005/0185618 to *Friday*, Ex-1020, Abstract, ¶¶0013, 0029, 0048-0059; U.S. Patent No. 7,213,057 to *Threthewey*, Ex-1017, Abstract (“A method for configuring a mobile computer based on location.”), FIG. 1A-1B, 3, 5, 2:46-3:8, 3:13-4:7, 6:23-8:38; U.S. Patent No. 6,167,274 to *Smith-I*, Ex-1026, Abstract, 3:58-4:56; U.S. Patent Application Publication No. 2004/0152471 to *MacDonald*, Ex-1027, Abstract, ¶¶0012-0023, 0096-0099

40. U.S. Patent Application Publication No. 2004/0203768 to *Ylitalo* (Ex-1018) described a “system, apparatus, and method for automatically or interactively updating a wireless/mobile device's active settings or profile, based on the location of the mobile device.” (Ex-1018, Abstract; see *id.*, FIGS. 1, 5, 6, 7, 8, ¶¶0002-0006, 0071-0081.) U.S. Patent Application Publication No. 2007/0249365 to *Jendbro* (Ex-

1072) also described “position determined by means of the received positioning information relating to a current position, and the application requested by the user of the mobile device, are used in combination by control unit 150 to select a profile which is position-dependent, and to load and execute the selected application using parameters determined in the selected profile.” (Ex-1072, ¶0065; *see also id.*, FIGS. 1-2, ¶¶0060-0073; U.S. Patent No. 7,941,656 to *Hans*, Ex-1073, 19:48-54 (“if the mobile device changes its location, a localized set of application identifiers may be allotted to the mobile device. The change of location may also trigger loading one or more of the newly allotted applications.”), 20:40-23:48, FIG. 6; U.S. Patent No. 7,454,608 to *Gopalakrishna*, Ex-1074, 5:33-57 (“At step 240, the appropriate applications are determined and launched according to user's preferences for the location classification.”), FIG. 1, 5:32-6:43; U.S. Patent No. 8,948,785 to *Grindelan*, Ex-1075, 1:12-29 (“[T]here is an increasing interest in developing location-based applications, i.e., applications that make use of mobile station location information. These location-based applications may simply track or monitor the locations of mobile stations, or they may provide information or services to mobile stations based on their locations.”), Abstract, 2:36-58, 5:10-6:60, 7:38-9:22.)

41. Map/direction and geofencing applications were also popular for determining when a user/mobile device arrived at a location, providing directions,

sending coupons based on location, etc. before the alleged time of invention. (*E.g.*, U.S. Patent No. 6,714,865 to *Angwi*, Ex-1060, 6:41-63 (“[A]n application (305), such as a route finder application....”), FIGS. 1A-1C, 3, 5, 1:10-3:21; Ex-1076, 1:7-12 (“The present invention relates to a mobile communication (or communications) terminal such as a cellular (or mobile) phone for showing map data in accordance with position data, and relates to a map display system including the mobile communication terminal and a server for storing map data.”), Abstract, FIGS. 5-8, 7:52-11:50; Ex-1016, 24:5-14 (“the location of the portable electronic facility 300 with respect to the geofence 900 may result in the transmission of information 1702 to the portable electronic facility 300. The information may relate to a coupon, the weather or traffic conditions.”))



(Ex-1016, FIGS. 39A-D.)

42. Thus, before the alleged time of invention, a person of ordinary skill in the art would have appreciated that “[l]ocation-based services [were] an emerging

area of mobile applications that leverage[ed] the ability of new devices to calculate their current geographic position and report that to a user or to a service.” (U.S. Patent No. 7,474,897 to *Morgan-I*, Ex-1059, 1:66-2:12; *see also id.*, FIGS. 1-3, 1:50-4:35.)

43. A person of ordinary skill in the art would have appreciated the benefits, needs, and different ways mobile device location features/services were applied. (See, e.g., U.S. Patent No. 6,714,865 to *Angwin*, Ex-1060, 3:12-20 (“There is a need for a technique whereby an application running on a device (such as a route finder application) can determine the device’s position by using a familiar co-ordinate system, irrespective of the technology providing the position information. More specifically, there is a need for a client side service that is available for applications such as browser services.”), FIGS. 1A-1C, 3, 5, 1:10-3:21; U.S. Patent No. 6,957,076 to *Hunzinger*, Ex-1054, 1:57-2:49, 3:44-6:30.) In fact, *Morgan-I* (Ex-1059) informed a person of ordinary skill in the art that:

Mobile email, walkie-talkie services, multi-player gaming and call following are examples of how new applications are emerging on mobile devices. In addition, users are beginning to demand/seek applications that not only utilize their current location but also share that location information with others. Parents wish to keep track of their children, supervisors need to

track the location of the company's delivery vehicles, and a business traveler looks to find the nearest pharmacy to pick up a prescription. All of these examples require the individual to know their own current location or that of someone else.

(Ex-1059, 1:50-65.)

44. The known approaches for determining whether a mobile device was at a particular location included the familiar and then-used global positioning system (“GPS”) operated by the U.S. Government that leveraged dozens of satellites as reference points for location services. (Ex-1059, 1:65-2:27.) A person of ordinary skill in the art would have understood and appreciated that mobile devices at the time were known to be configured with GPS technologies and processes to use GPS information for location services/applications. (Ex-1061, 1:47-57 (“[M]obile devices have been equipped with GPS receivers, which enable the users to know where they are located at any given time.”), 1:61-2:8, 8:54-9:10, 21:4-13, FIG. 13c; Ex-1011, 1:20-49.)

45. Cell phone signal information was also known to be used to locate mobile devices. In what was understood as location fingerprint techniques, “[t]ypically, the position of a mobile station [was] determined by comparing a RF data sample collected by the mobile station to fingerprint data in the database. The

mobile station's position [was] determined to lie in the area corresponding to a fingerprint data point of highest correlation to the RF data sample.” (U.S. Patent No. 7,433,693 to *Sheynblat-I*, Ex-1062, 1:25-34, FIGS. 1-6, Abstract, 1:11-2:10, 2:29-4:65, 4:65-5:64.) “Cell tower triangulation [was] another method used by wireless and cellular carriers to determine a user or device's location.” (Ex-1059, 2:28-38.) “These various known location techniques...include[d] collecting ranging measurements such as, for example, a time of arrival (TOA), a time difference of arrival (TDOA), an observed time difference (OTD), or the like.” (U.S. Patent Application Publication No. 2007/0013584 to *Camp*, Ex-1063, ¶0007; *see also id.*, ¶0003, 0009-10.)

46. Various hybrid approaches to mobile device location techniques that involved both the use of GPS information and cell phone signal information were also known to those of ordinary skill in the art at the time. (U.S. Patent Application Publication No. 2008/0139219 to *Boeiro*, Ex-1064, ¶0002 (“Hybrid location methods are known to exploit different localization techniques, such as satellite measures (using e.g. the GPS-Global Positioning System--navigation system) and cellular measures (e.g. based on the measure of the electromagnetic field). These known methods use suitable algorithms that, based upon two or more pluralities of measures acquired by the terminal, are intended to globally improve the performance

of the positioning, in terms of accuracy, availability, and so on.”), Abstract, FIGS. 1-2, ¶0030; U.S. Patent No. 7,397,424 to *Houri*, Ex-1032 5:1-14 (“Specifically, when the GPS device 12 receives an accurate positioning signal, switch 16 would allow this GPS signal to be directed to the computing device 10 so that the computing device would consider its position that determined by the GPS signal. On the other hand, when the GPS device 12 is unable to provide an accurate GPS signal, switch 16 would allow a positioning signal derived from the wireless positioning system 14, and based on input from the computing device 10 at that time, to be directed to the computing device 10 and the computing device 10 would consider its position that indicated by this positioning signal.”), 4:59-67, 5:59-6:50, 7:52-8:3, 16:23-63.)

47. Location determining systems were known to be configured to determine when a user or mobile device arrived at or left a given/selected location. (E.g., Ex-1016, FIGS. 6, 27A-27C, 28-42B, 14:17-16:9, 19:4-42, 21:34-22:21, 23:50-25:18, 26:38-27:23; Ex-1033, 3:44-64 (“The position data can also contain information for example on the radius, wherein when the user arrives in the area determined by the coordinates and the radius, a predetermined function is performed.”), 6:9-17 (“Thus, the person carries a device 1 according to a preferred embodiment of the present invention in which the position conditions of the location-based functions are monitored in the manner presented in this description. When said

person arrives to a certain location or leaves a predetermined location or area, information thereon is transmitted from the device of the person to the monitoring device.”); Ex-1054, 4:21-41, 5:13-22, 5:51-62 (“For example, the user may select that the reminder be triggered only when exiting the region, entering the region or in both cases 425.”); Ex-1062, 1:26-33 (“The mobile station’s position is determined to lie in the area corresponding to a fingerprint data point of highest correlation to the RF data sample.”); Ex-1028, 12:55-13:18 (discussing fingerprint location techniques to determine whether a user has entered or exited a given area).)

48. With respect to user interfaces, a person of ordinary skill in the art was aware of and understood that in many mobile device location systems, users were able to use a device to mark locations in advance that could later be detected when the user or their device arrived at or left the chosen location. *Hunzinger* (Ex-1054) described examples of user-friendly interfaces that enabled a user to select locations and actions to be performed corresponding to those locations.

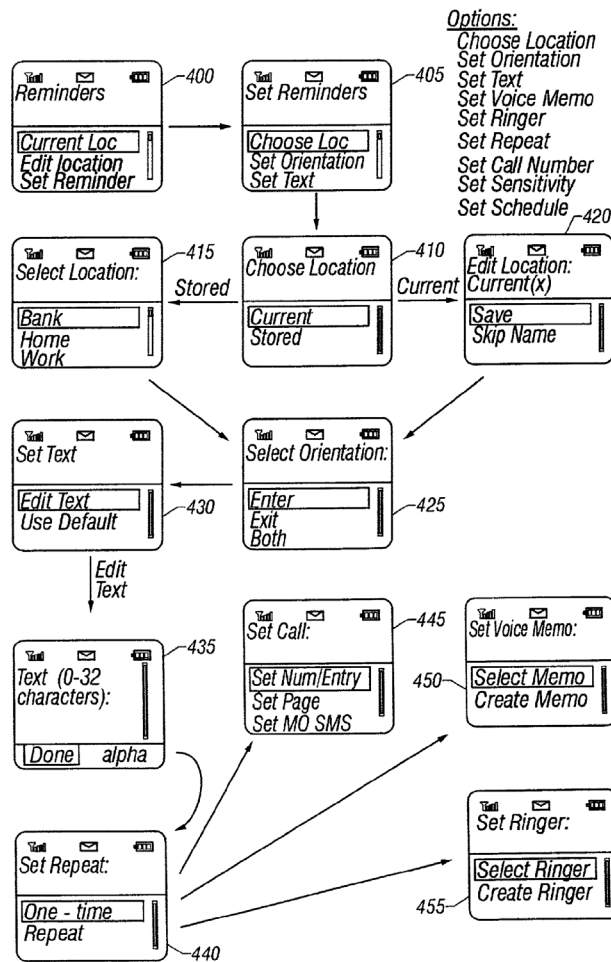
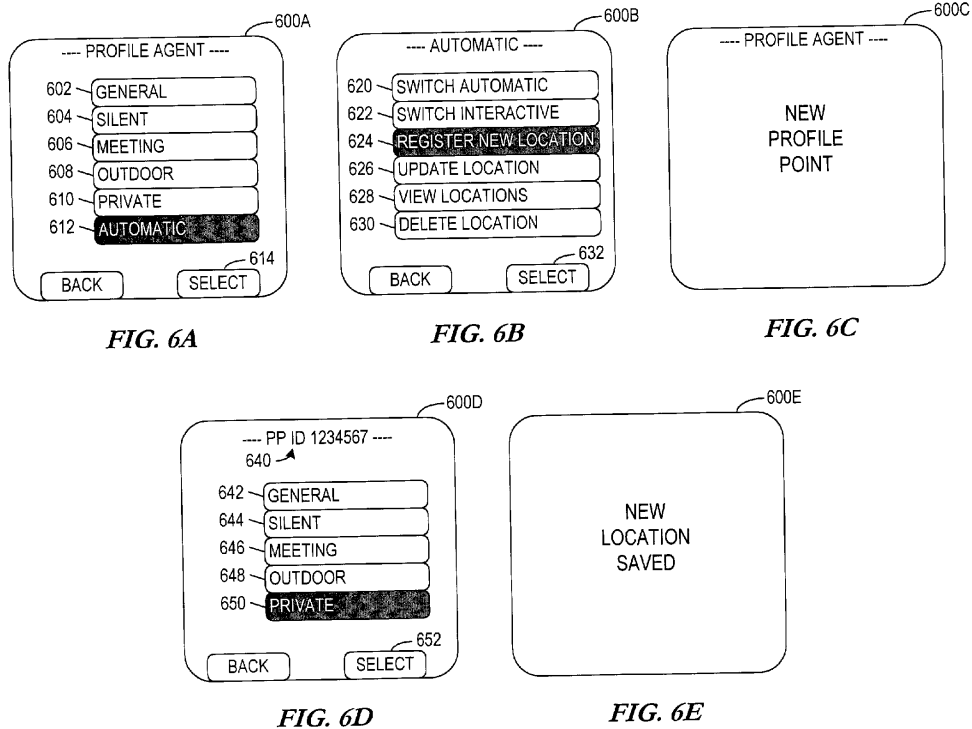


FIG. 4

(Ex-1054, FIG. 4; *see also id.*, FIG. 2, 1:38-2:6, 2:10-44, 3:4-67, 4:1-46, 5:22-6:22.)

U.S. Patent Application Publication No. 2004/0203768 to *Ylitalo* (Ex-1018) described similar features where profiles were associated with designated locations from which a user could assign using user-friendly interface mechanisms.



(Ex-1018, FIG. 6; *see also id.*, FIGS. 1, 5, 7, 8, Abstract, ¶¶0002-0006, 0071-0081.)

B. Using Radio Frequency Fingerprints/Signatures to Detect/Determine Location

49. As I mentioned above, the use of radio frequency (RF) fingerprints and associated comparisons was known for detecting mobile device location. The basic concept behind RF fingerprinting for location determination was known. For example, U.S. Patent Application Publication No. 2006/0240841 to *Bhattacharya* (Ex-1065) confirmed a person of ordinary skill in the art's understanding that at a given location.

the values of the traits that vary with the location of wireless terminal...[may] represent a 'fingerprint' or 'signature' for that

location.... For example, suppose that under normal conditions the traits have a first set of values when wireless terminal...is at a first location, and a second set of values when wireless terminal...is at a second location. Then when wireless terminal...is at an unknown location and the traits at that unknown location match the second set of values, it is more likely that wireless terminal...is at the second location.

(Ex-1065, ¶0074.) Similar to the unique characteristics of a human fingerprint, it was understood that “[e]very radio device and associated surrounding environment produces a unique signal fingerprint” at a given location. (U.S. Patent Application Publication No. 2006/0095349 to *Morgan-II*, Ex-1066, ¶0050.)

50. It was also known that various signal information could be monitored to generate a unique RF fingerprint for a given location. U.S. Patent No. 6,915,123 to *Daudelin* (Ex-1067) explained that,

A fingerprint refers to a snapshot of the signal characteristics of a receive signal 107. The signal characteristics may include one or more of the following: propagational delay, antenna identifier, and signal quality indicator (e.g., signal-to-noise ratio or a short-term average of signal strength).

(Ex-1067, 5:16-27; *see also id.*, Abstract, FIG. 2, 5:40-51, 8:66-9:43; U.S. Patent Application Publication No. 2007/0010956 to *Nerguizian*, Ex-1068, ¶0008 (“To

constitute a ‘signature’ pattern or a fingerprint, several types of information can be used such as, received signal strength (RSS), received angular power profile (APP) and received power delay profile (PDP) or channel impulse response (CIR).”), ¶¶0007-17.)

51. The use of signal strength measurements for fingerprint-based location services was understood and known years before the alleged time of invention. U.S. Patent Application Publication No. 2005/0195761 to *Alicherry* (Ex-1069) explained, “[f]or example, RADAR (see, P. Bahl et al., ‘RADAR: An In-Building RF-Based User Location and Tracking System’, IEEE Info Com, March 2000...[was] a [then] well-known technique for tracking indoor environments where a single fingerprint of an entire region is constructed and the location of a particular node is determined based on the signal strength observed at its location.” (Ex-1069, ¶0006.) Signal strength information (*e.g.*, the measured power level of a received signal from wireless signal sources, such as base stations, etc.) was commonly used with location fingerprints at the relevant time. (*E.g.*, Exs. 1006, 1008-1011; Ex-1026, Abstract, FIGS. 1-3, 5, 2:13-3:12, 3:30-4:49; Ex-1028; Ex-1070, Abstract, FIGs. 4-5, ¶¶0010-13, 0036-0038; Ex-1071, FIGS. 2-6.)

52. It was also known at the time various ways for using fingerprint information to determine whether a mobile device was at or near a particular

location. For example, a person of ordinary skill in the art was aware and was able to develop systems/processes that compared RF fingerprint information for a currently monitored device location to previously saved fingerprint information that was collected/generated for given locations. (*E.g.*, Ex-1071, ¶0004 (“Typically, the position of a mobile station is determined by comparing a RF data sample collected by the mobile station to fingerprint data in the database.”).) If currently monitored information matches or was close to a reference fingerprint, proximity to a location was determined. (*E.g.*, Ex-1028, 6:34-37 (“The MU RF fingerprint is compared or matched to the reference RF fingerprints 3000 produced in the survey process.”); Ex-1068, ¶0007 (“The first phase consists of recording a set of fingerprints as a function of the user's location, covering the entire zone of interest. During the second phase, a fingerprint is measured by a receiver and compared with the recorded fingerprints of the database. A pattern matching algorithm (positioning algorithm) is then used to identify the closest recorded fingerprint to the measured one and hence to infer the corresponding user's location.”).) A person of ordinary skill in the art would have been aware of and capable of developing, programming, and/or implementing various algorithms for performing fingerprint comparisons/analysis. (*See e.g.*, Ex-1068, ¶0013 (“Several geolocation systems, using fingerprinting techniques, have been deployed in both indoor and outdoor environments. The main

differences between these systems are the types of fingerprint information and the types of pattern matching algorithms.”)

53. It was also known and appreciated by a person of ordinary skill in the art that reference fingerprints used for location determination were often stored in some form of a database, including in memories in a mobile device or in a server or other remote system/device. (Ex-1028, 16:43-45 (“Reference RF fingerprints must be stored in some form of database. They are most likely stored in the infrastructure, but could be stored on the MUs themselves.”).)

54. In sum, a person of ordinary skill in the art would have been aware of, experienced with, and capable of configuring, modifying, programming, etc. systems and processes that provided the conventional features I mentioned above, including those associated with the then-conventional approach of using RF fingerprint snapshots and corresponding comparisons to determine whether a mobile device was currently at, near, or left a previously selected location. (*E.g.*, Exs. 1006, 1008-11, 1026, 1028, 1070, 1071.) Such fingerprint-based location processes (among others) were often considered in applications where GPS location determinations may not have been possible or practical and because such location determining processes would leveraged existing mechanism, components, network infrastructures, and software programming skills to implement. (*E.g.*, Ex-1011,

3:34-46, 15:19-29.) At the same time, a person of ordinary skill in the art would have been aware and capable of developing, configuring, and/or implementing location determining systems that leveraged GPS technologies to collect geographical information for purposes of maintaining/building a fingerprint database. (*See e.g.*, Ex-1032, Ex-1032, Abstract, 1:15-31, 3:23-4:26, 4:59-67, 5:59-6:39.)

VI. OVERVIEW OF THE '583 PATENT

55. I understand from my review that the '583 patent issued on May 1, 2012, from U.S. Patent Application No. 12/720,362 filed March 9, 2010. (Ex-1001, cover.)

56. The Abstract of the '583 patent describes:

At least one portable RF communications device in conjunction with at least two fixed-location service-area antenna stations respectively capable of RF communication with the at least one device performs the steps of: (I) using a portable device at a selected location to measure RF communications signals from the plurality of local fixed-location service-area antenna stations and electronically storing at least two of the respective reception signal strength measurements; and (II) monitoring a portable device location by causing the device to measure reception signal strength associated with local fixed-location service-area antenna stations signals, and to electronically compare these measurements with the stored at least two measurements.

(Ex-1001, Abstract; *see also id.*, 6:18-31, 18:3-55, 24:13-42.)

57. The '583 patent indicates that

When it is described according embodiments of the instant invention that a cell phone measures a signal-strength from a surrounding cell, it means that the cell phone measures the

strength of the signal sent by that cell's base station antenna.

These measurements are from the perspective of the location of the reception device (the cellular telephone, ubiquitous computer, etc.) and substantially form an instance of an antenna space reception fingerprint[.]....

(*Id.*, 17:41-49.) “Once the cell phone records the signal strengths measured by the cell phone from surrounding cells at a desired location, the combination of the *recorded signal strengths from surrounding cells are used as the coordinates of the desired location.*” (*Id.*, 18:48-52.) The signal strengths are respectively stored in unique radio frequency snapshots referred to as “fingerprints.” (*Id.*, 16:40-48.) “The user will stand in the location where he would like something to take place every time he reaches that place (a desired location)” and “[u]sing his cell phone he will choose the action that he wants to take place.” (*Id.*, 18:17-20.)

58. “After the cell phone records the desired location coordinates (the combination of signal strengths from surrounding cells), the cell phone will check its location as reflected by the signal strengths from surrounding cells....” (*Id.*, 18:56-59.)

If the current location's surrounding cell IDs are different from the desired location's surrounding cell IDs then the cell phone does not need to continue the comparison, the current location is

clearly not the desired location. *When the signal strengths* from the cells surrounding the current location *are identical* to the signal strengths measured by the cell phone from the exact same cells (same cell IDs) at the desired location *then the cell phone is determined to have returned to the desired location (i.e. current location=desired location)* and the location based application which is pending the return of the cell phone to the desired location will be activated.

(*Id.*, 19:4-15.) The '583 patent explains that “when comparing the current location with the desired location, depending on the location based application, a threshold could be defined based on how close the current location should be to the desired location in order to activate the desired application.” (*Id.*, 19:16-20.)

If the difference between the measured signal strength at the current location and the measured signal strength from the same cell at the desired location for each of the surrounding cells is less than the threshold then the cell phone's current position will be considered the same as the desired location or within reasonable range and the location based application which is pending the return of the cell phone to the desired location or to its area will be activated.

(*Id.*, 19:27-34.)

VII. CLAIM CONSTRUCTION

59. I understand that claim terms are typically given their ordinary and customary meanings, as would have been understood by a person of ordinary skill in the art at the time of the alleged invention. For purposes of this declaration, I have been asked to apply the plain and ordinary meaning of the terms in the challenged claims (although I may address other interpretations that I have been asked to consider below in my analysis of those claims in Section IX). My opinions concerning the interpretation of the challenged claim terms is based on the time of the alleged invention I have been asked to consider (*e.g.*, September 19, 2006). I understand that in considering the plain meaning of the claims, one must consider the language of the claims, the specification, and the prosecution history of record. I have done so to support my opinions in this declaration where appropriate.

60. For example, I have been asked to and have considered and applied the plain meaning of the claimed “*determining if a monitored location is within proximity of a location chosen by a user*” recited in claim limitation 1(b) under its plain claim language and also with the understanding that such plain meaning at least encompasses how the ’583 patent specification describes such features and also consistent with representations that I understand were made in the file history for the ’583 patent.

61. For instance, the '583 patent specification states:

Now, illustrative enabling embodiments of a Signal-Comparison Based Location-Determining Method of the instant invention—according to a simplified aspect—substantially relate to a method for determining a cell phone (or a ubiquitous computer) location comprising: (A) at a desired location—Causing a cell phone (or a ubiquitous computer) to measure signal strengths from surrounding cells and to record the signal strengths measured by the cell phone (or the ubiquitous computer) from the surrounding cells; (B) at a current location—Causing a cell phone (or a ubiquitous computer) to measure the signal strengths from surrounding cells; and (C) **Causing the Cell phone (or ubiquitous computer) to compare the measured signal strengths from surrounding cells at the current location with the recorded signal strengths from surrounding cells at the desired location in order to determine whether the cell phone or the ubiquitous computer of the present location is also at the desired location.**

(Ex-1001, 7:10-26.) Also, the specification of the '583 patent states:

Simply stated, **if a mobile telephone (at a user selected location) measures a plurality of service antenna signals and stores these with their respective service antenna identifications, then that mobile telephone (or an equivalent unit) upon observing an identical list of service antennas with**

substantially identical respective signal strengths—can reasonably conclude that it is within a predetermined proximity of the original user selected location. We will call the coordinate of the user selected location a “fingerprint”—because we believe that each such location has (associated with it) a substantially unique combination of service antenna identifications with respective distance equivalent measurements (e.g. service antenna signal strength as measured at the mobile device, arrival times or phases of signals arriving from surrounding cells as measured by the mobile device, or the likes).

(Ex-1001, 8:62-9:10.) Further, the specification of the '583 patent states:

When the signal strengths from the cells surrounding the current location **are identical** to the signal strengths measured by the cell phone from the exact same cells (same cell IDs) at the desired location **then the cell phone is determined to have returned to the desired location (i.e. current location=desired location)** and the location based application which is pending the return of the cell phone to the desired location will be activated.

(Ex-1001, 19:8-16.)

62. I also understand from the file history for the '583 patent (Ex-1004) that statements were made during prosecution that appear to equate the claimed “determining if the monitored location is within proximity to the chosen location”

limitation to “[—*or in other words,*] *determining if the user has reached the desired location or has left the desired location.*” (Ex-1004, 100.) I was asked to consider such statements and address them below in §IX.A.1(b).

VIII. OVERVIEW OF THE PRIOR ART

A. *Spain-I* (Ex-1011)

63. I understand that *Spain-I* is an issued United States patent. (Ex-1011, Cover.) My understanding is that *Spain-I* was filed November 18, 2002, and issued September 13, 2005. (*Id.*) For purposes of my analysis, I have been asked to assume *Spain-I* (and its incorporated disclosures) is prior art.

64. I also understand that *Spain-I* is a continuation-in-part (CIP) of *Perez-Breva-II* (Ex-1009), *Perez-Breva-I* (Ex-1010), and *Rao-I* (Ex-1005). (Ex-1011, Cover.) *Spain-I* incorporates by reference each of those patents (*id.*, 1:5-14) and the disclosures in Exhibits 1012-1015 (*id.*, 15:1-16). Thus, I understand and have been asked to assume that the disclosures of Exhibits 1005, 1009-1010, and 1012-1015 are considered part of the disclosure of *Spain-I*. While I reference *Spain-I* to support my opinions regarding the challenged claims, I also refer to disclosures in the incorporated prior art references of *Perez-Breva-II* (Ex-1009), *Perez-Breva-I* (Ex-1010), and *Rao-I* (Ex-1005).³

³ My opinions regarding how the prior art disclose or suggests the limitations of the challenged claims in §IX below would not change if the disclosures in Exhibits 1005, 1009-1010, and 1012-1015 were not considered part of *Spain-I*.

65. *Spain-I* discloses a “method for determining the location of MU 10 which (a) works in areas where GPS coverage is not typically available, and (b) does not require any infrastructural modifications.” (Ex-1011, 3:35-41.) A mobile unit (“MU”) (red below) is operable to perform location-determining processes based on comparisons operations, where the MU works in conjunction and communicates with a plurality of antenna stations that are capable of RF communication with the MU. (Ex-1011, FIGS. 1-2 (annotated below), 9-10, 1:18-49, 3:5-34, 3:41-4:63, 5:20-6:34, 7:58-8:44, 9:25-13:15, 13:16-14:37, 15:19-35; *see also* Ex-1005, FIGS. 1-2, FIGS. 4-5, Abstract, 1:26-34, 1:40-57, 2:8-11, 2:33-36, 2:30-3:9, 3:29-61, 4:59-63, 5:40-56; Ex-1010, Abstract, 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, 7:4-8:14, 8:46-11:17; *see my below analysis in §§IX.A.1(a)-(b).*)

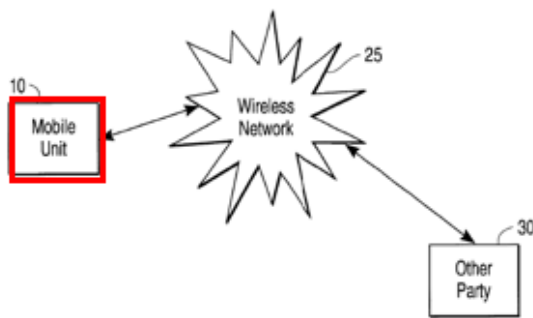


FIG. 1

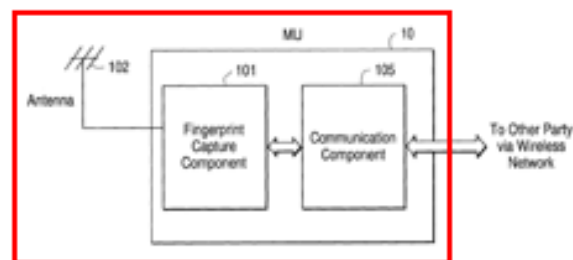


FIG. 2

66. *Spain-I* explains that the MU communicates with base stations during operation. (*E.g.*, Ex-1011, 4:7-22, 1:25-28, 10:35-41, 11:57-65.) And at selected

location(s), the MU collects identifier information (*e.g.*, station ID) and measures signal strengths associated with communication signals received from stations in range of the MU capable of RF communications with the mobile device at those location(s). (Ex-1011, 3:42-4:63, 5:20-6:8, 7:58-8:8, 10:43-46, 11:41-46, 13:16-14:37; Ex-1005, 4:16-37, 5:40-56, 6:34-51; Ex-1010, 3:4-4:9, 4:32-44, 4:63-5:24, 7:1-18, 10:4-32; Ex-1009, 2:61-5:21, 7:40-57, 9:15-10:37.)

67. The MU creates/stores fingerprints including station identifier information and measured signal strengths corresponding to the received communication signals from the stations when the MU is certain locations. (Ex-1011, FIG. 9, 3:41-4:6, 4:5:20-6:30, 7:58-8:8, 10:48-11:26, 11:41-46, 13:16-55; Ex-1005, FIG. 4, 3:29-61, 4:23-27, 4:59-5:9, 5:40-6:12, FIG. 4, Ex-1009, FIG. 9, 5:1-21, 7:4-21, 9:15-54; Ex-1010, FIG. 9, 5:5-57, 7:1-36, 9:10-49.) Collections of fingerprints are stored in a database used for the disclosed location-determination processes. (Ex-1011, FIG. 10, 10:48-11:27, 13:56-14:37, Ex-1005, FIG. 5, 6:13-61; Ex-1009, 9:55-10:47; Ex-1010, FIG. 10, 9:50-10:32.)

68. “When a location estimate of the MU is desired (either by itself or by the Other Party), it [MU] activates component 101 (FIG. 2), which captures predetermined information from a predetermined portion of the RF spectrum.” (Ex-1011, 4:42-46; Ex-1005, 3:29-39; Ex-1009, 3:60-63; Ex-1010, 3:56-60.) The MU

creates a fingerprint associated with a current monitored location by measuring *e.g.*, signal strengths received from identified service stations. (Ex-1011, 5:20-6:8, 7:64-8:44, 9:25-10:27, Ex-1005, 3:29-4:24; Ex-1009, 3:63-4:44, 5:7-21; Ex-1010, 3:60-4:44, 5:5-19.) The fingerprint may be generated “using *many different parameters*, either *individually or in combination*.” (Ex-1011, 4:55-56; Ex-1005, 3:40-42; Ex-1009, 4:4-5; Ex-1010, 4:1-2.) This includes *signal strengths* of received signals and “the identity of the signal source (*e.g.*, channel number of *station code*)” (Ex-1011, FIG. 4, 4:56-63; Ex-1005, 3:42-49; Ex-1009, 4:6-11, Ex-1010, 4:3-8.) Indeed, the MU is “equipped with appropriate circuitry to determine the strength of the received signal” and the “location of the transmitter is broadcast in the signal and is extracted in the MU” (Ex-1011, 5:28-32, 3:55-58, 5:20-28 (MU captures signals and their parameters); Ex-1005, 3:57-61, 4:16-18; Ex-1009, 3:7-24, 4:34-44; Ex-1010, 3:4-21, 4:32-44.)

69. The MU performs processes to determine whether the MU is currently “at a particular location or not” (Ex-1011, 4:23-25⁴; Ex-1005, 3:10 18.) For

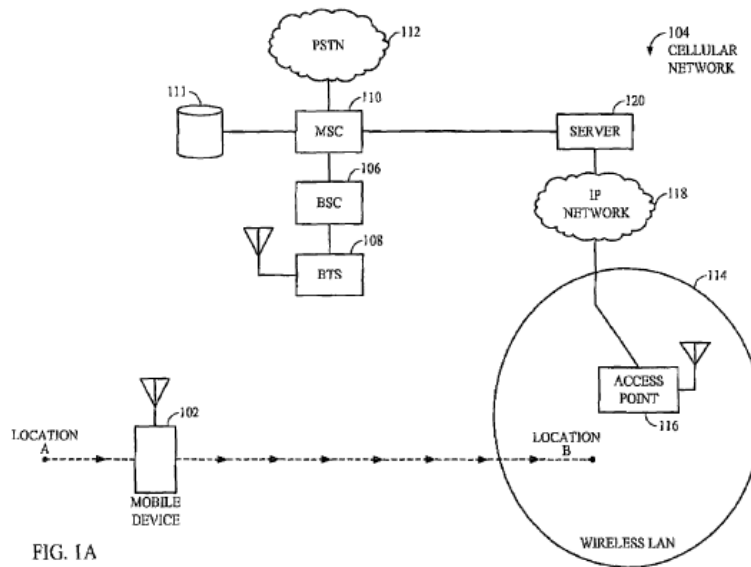
⁴ *Spain-I* explains elsewhere that the MU can initiate the location estimate processes (Ex-1011, 4:43–47 (“location estimate of the [MU] is desired (either by the [MU] itself or by the location server)”).)

instance, the MU compares fingerprint information for a current monitored location with previously generated/stored fingerprint information relating to other locations to determine a “closest” match. If the relevant compared information matches (or is close), the MU determines the MU is at or in proximity of the location associated with the matching fingerprint in the database. (Ex-1011, 5:61-6:8.) *Spain-I* discloses various processes for determining closeness between compared fingerprint information and for making such analysis more efficient. (Ex-1011, FIGS. 9-10, 5:61-6:8, 7:58-67, 8:1-26 (closest matching fingerprint), 8:27-10:27, 10:29-13:15 (reducing set of fingerprint information for comparison), 14:10-37 (measuring signal characteristics at predetermined locations and interpolating fingerprints between “sampled locations”), 17:15-19; Ex-1005, 3:29-4:37, 4:65-5:9, 5:10-40, FIGS. 4-5, 5:40-6:47, 6:48-61; Ex-1009, 3:40-4:46, 5:1-21, 7:4-9:14, *see also id.*, 5:44-7:3; Ex-1010, 3:37-4:44, 4:64-5:19, 7:1-9:10.)

B. Nanda (Ex-1006)

70. I understand that *Nanda* is an issued United States patent. (Ex-1006, Cover.) My understanding is that *Nanda* was filed February 15, 2006, and issued July 2, 2013. (*Id.*) For purposes of my analysis, I have been asked to assume *Nanda* is prior art.

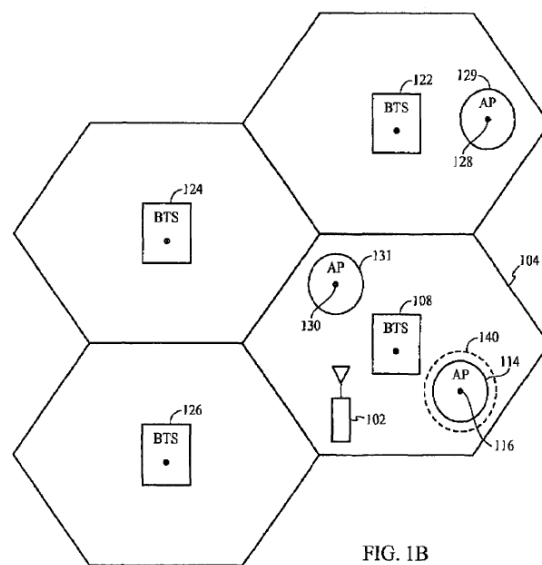
71. *Nanda* describes systems/processes similar to *Spain-I*, which determine whether a mobile device is “in the vicinity of” a location by comparing fingerprint information. (*Id.*, 2:16-59, 5:50-7:28.) In particular, *Nanda* describes a mobile device 102 that moves through a wireless network (WAN 104) including plurality of BTSs 108 (base stations), and one or more wireless LANs 114, each including an access point 116. (*Id.*, FIG. 1A (below), 3:48-4:14, 5:9-14.)



72. As exemplified in connection with FIG. 1A, mobile device 102 searches for beacon signals transmitted from access point 116 as it moves through WAN 104 from location A to B. (*Id.*, 4:24-64.)

73. In the event device 102 cannot detect a beacon or receives a probe request (*e.g.*, when at location A above), the device “attempts to access the WAN

104” when it is determined it is close to WLAN 114 by acquiring a pilot signal from BTS 108. (*Id.*, 4:38-48.) At that point, a radio connection may be established between device 102 and BTS 108 “by means well known in the art,” which the device may use with the BTS 108 to register with a mobile switching center (MSC) 110. (*Id.*, 4:48-52.) FIG. 1B below shows a larger WAN having multiple BTSs 108, 122, 124, 126 in coverage area cells, and multiple LANs 129, 131, 114 with respective access points 128, 130, 116. (*Id.*, 5:15-18), including a coverage area for access point 116 and LAN 114 (140). (*Id.*, 5:41-49.)



74. *Nanda* discloses features that limit searching for signals from access points only when mobile device 102 is determined to be within a LAN/access point coverage area. (Ex-1006, 5:41-49.) Device 102 monitors beacon and pilot signals from the base stations of WAN to measure primary and neighbor signal strengths.

(*Id.*, 5:50-57.) Device 102 can observe up to n base stations with measurable signal strengths (characterized as vectors $X_1 \dots, X_n$) originating from a particular identified base station. (*Id.*, 5:57-67, 5:67-6:3 (“neighbors base stations may be identified by frequency channel or other ***base station identifier and a signal strength associated with each base station***”).) The vectors can include information that “identifies a source and at least one characteristic of the reference signal, *e.g.*, pilot or paging signal.” (*Id.*, 6:3-11; *id.*, 6:12-34 (signal strength and base station identifier).)

75. Such information may be used to provide a fingerprint of a location of mobile device 102. (*Id.*, 6:52-58 (“[i]f locations within the area 140 have a certain known fingerprint, then the ***mobile 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.***”).) Other attributes, and combinations thereof, may be used as a fingerprint (*id.*, 6:58-66) given “a fingerprint is a collection of attributes of a first communication network that changes based on location and can be used by the mobile device to determine the proximity of a second communication network” and can include characteristics of the transmitters of the second networks (*e.g.*, MAC ID, band, channel, access point RSSI information (*e.g.*, signal strength)) (*id.*, 7:6-14). Such attributes may be calculated in different ways, such as instant signal strength measurements or multiple measurements may be averaged together or

otherwise combined in some statically significant manner in order to generate the fingerprint. (*Id.*, 7:19-28.)

76. *Nanda* explains with reference to Figure 3A (below),

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 such as those wireless LANs that the user normally subscribes to or connects.

(Ex-1006, 9:61-10:7.)

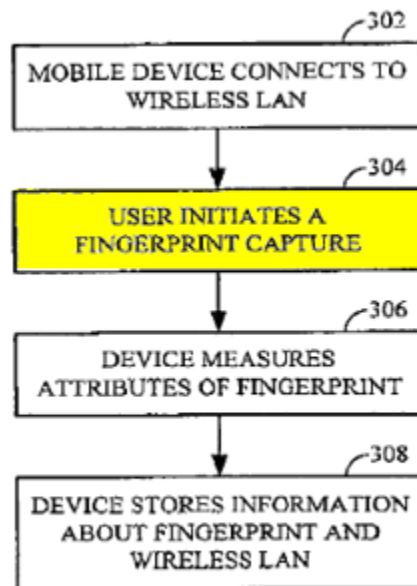


FIG. 3A

C. *Damarla* (Ex-1028)

77. I understand that *Damarla* is an issued United States patent. (Ex-1028, Cover.) My understanding is that *Damarla* was filed July 29, 2004, and issued March 18, 2008. (*Id.*) For purposes of my analysis, I have been asked to assume *Damarla* is prior art.

78. *Damarla* discloses various techniques that were applicable to location determination systems for mobile units. (*Id.*, Abstract (“The invention provides a novel method for preparing a wireless environment for location determination of a wireless mobile unit, and for location determination of a wireless mobile unit.”).) *Damarla* also discloses RF fingerprinting techniques, similar to *Spain-I*’s and *Nanda*’s RF fingerprinting systems. (*Id.*, FIG. 4.) For instance, *Damarla* discloses.

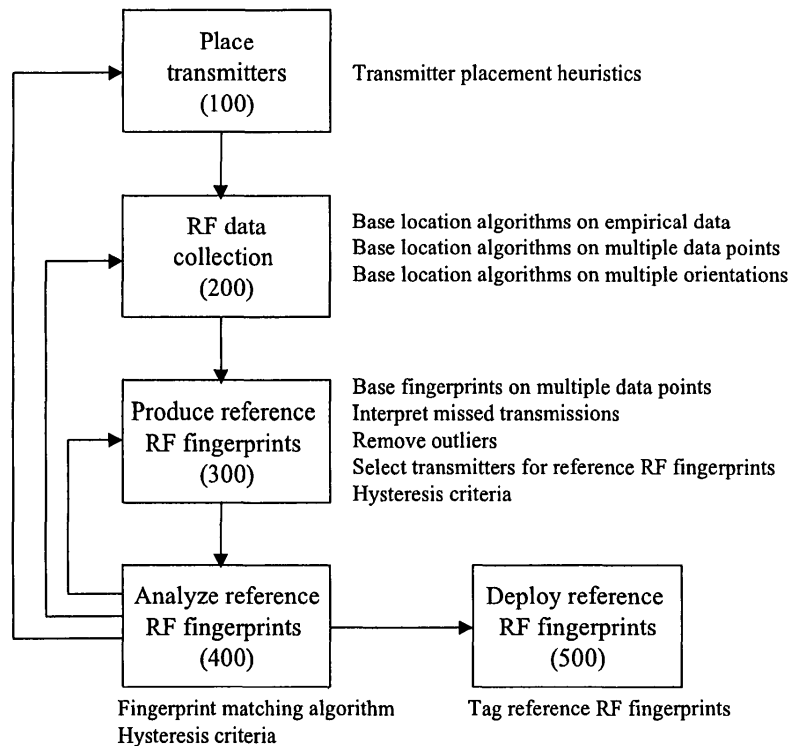


Figure 4

(*Id.*, FIG. 4.)

79. *Damarla* discloses updating signal strengths of reference RF fingerprints to address known problems with changing RF environments. For example, *Damarla* discloses that “if a permanent environment change affecting RF propagation were made (*e.g.*, taking down a wall or moving a large metal shelf),” for example, an “RF data collection step should be repeated.” (*Id.*, 5:63-6:1.) When an RF data collection step is repeated to addresses changes in an environment and improve the accuracy of a location system, *Damarla* discloses that “[a] MU [mobile unit] is taken to various planned locations in the environment.” (*Id.*, 5:10-16.) “At each location” for this process, “RF samples are taken and recorded. Each sample

records information about the RF environment (*e.g.*, signal strength of transmissions from various sources) and is associated with a timestamp and location.” (*Id.*, 5:10-16.) Figure 4 (above) illustrates the collection of updated RF data and production of updated reference RF fingerprints in steps 200 and 300. (*Id.*, FIG. 4.)

80. After a single mobile unit collects the fingerprint information, *Damarla* discloses that updated “reference RF fingerprints are deployed 500” to mobile units that are able to determine their location based on the fingerprint information. (Ex-1028, 5:57-62 (“[T]he reference RF fingerprints are deployed 500 to the computing infrastructure used to support location determination in the environment. This infrastructure could be a server that delivers reference RF fingerprint information to MUs, or it could be the MUs themselves.”), 16:57-58 (“Fingerprint matching could be performed by a MU or infrastructure”), 5:10-6:1.) The updated RF fingerprints include signal strength information from various transmission sources that a mobile unit monitored. (*Id.*, 5:10-62, 14:22-23 (“transmitter signal strengths are the information in each RF fingerprint”).) The mobile units can then determine their location by “compar[ing]” current fingerprint and corresponding signal strength information to the reference fingerprints. (*Id.*, 6:13-49, 16:23-63.)

D. *Houri* (Ex-1032)

81. I understand that *Houri* is an issued United States patent. (Ex-1032, Cover.) My understanding is that *Houri* was filed June 29, 2005, and issued July 8, 2008. (*Id.*) For purposes of my analysis, I have been asked to assume *Houri* is prior art.

82. *Houri* discloses location determining processes/systems that includes obtaining signal strength and GPS measurements to build a database. (Ex-1032, Abstract, 1:15-31, 3:23-4:26, 4:59-67, 5:59-6:13.) A mobile device may include a scanner 18 that can be “equipped” with a GPS device that obtains readings regarding the position of the scanner and also measures the signal strength of beacon signal(s) received at this position. (*Id.*, 4:53-59, 5:59-64.) The scanner may be a PDA or cell phone with software for analyzing the signal received from every beacon at different positions and estimating a geographic location thereof. (*Id.*, 5:64-6:4, 6:38-39.) The readings reflect data sets “designated (X_i , Y_i , S_i) where X_i and Y_i are the latitude and longitude, respectively of the position of the scanner 18 and S_i is the strength of a signal received at this position from wireless beacon 28.” (*Id.*, 6:5-14, FIG. 3.) The readings “may be stored in the scanner’s memory.” (*Id.*, 6:14-17.) At each scanner position, multiple readings can be obtained, one for each beacon 28 in reception range of the scanner 18,” which “can be stored with an identification of

the beacon 28 so that readings can later be combined with other readings from the same beacon...to determine the location of the beacon 28.” (*Id.*, 6:23-29.) (*See id.*, 3:59-67, 4:59-67, FIG. 2.)

E. *Blomqvist* (Ex-1033)

83. I understand that *Blomqvist* is an issued United States patent. (Ex-1033, Cover.) My understanding is that *Blomqvist* was filed January 21, 2004, and issued December 4, 2007. (*Id.*) For purposes of my analysis, I have been asked to assume *Blomqvist* is prior art.

84. *Blomqvist* discloses methods for efficiently detecting the location of a mobile device. (*Id.*, Abstract, 1:43-2:16, 2:63-3:12.) *Blomqvist* also discloses a device 1 (mobile phone) similar to the mobile devices disclosed by *Spain-I* and *Nanda*. (*Id.*, FIG. 2, 5:10-60.) The device can automatically trigger a function when a specified location is detected. (*Id.*, FIG. 2, 5:10-60.)

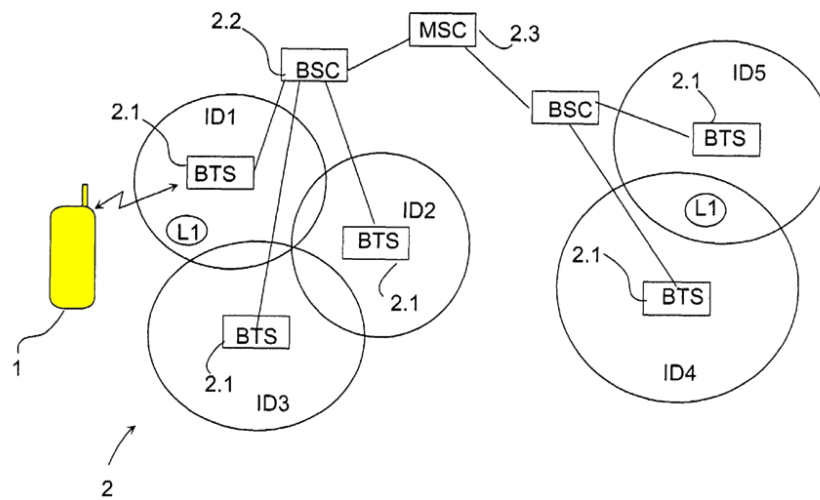


Fig. 2

(*Id.*, FIG. 2 (annotated).)

85. *Blomqvist* describes processes that aim to reduce the need to perform positioning processes, which reduces loading of the processor of the mobile device and possible loading of the network the device operates in. (*Id.*, 2:63-3:12.) For instance, *Blomqvist* discloses monitoring processes in which location positioning only starts taking place when the mobile device detects that it switched to a new cell base station. (*Id.*, 4:35-45 (“[A]t least one property of the wireless communication network and changes in the same are monitored. In the following, cell identifiers and changes in them are used”). *Blomqvist* explains that,

FIG. 1b shows another example situation in which the method according to a preferred embodiment of the invention is applied. Also in this situation, position data is determined in the location-based function. Advantageously at least this position data is

transmitted to the communication network 2, in which it is determined (for example in a network centre 2.3) in the area of which cell or cells this location is situated. *Information on the identifiers of such a cell or cells is transmitted to the device 1, in which the information is stored into the memory 1.1* for example into the information of said location-based function. In the device 1, the *changing of the cell identifier is monitored as disclosed hereinabove* in connection with the description of the method according to the first embodiment of the invention. At that stage *when the serving base station changes, i.e. the cell identifier changes, the device 1 examines the information on the location-based functions on the basis of the new cell identifier*. If *one or several cell identifiers* that have been determined for a location-based function *match with the cell identifier of the new serving base station, i.e. the device 1 is probably in the vicinity of such a location in which the execution of a location-based function is determined, positioning is conducted*. At that stage when the positioning shows that the device 1 is in the area determined for said location-based function, said location-based function is conducted.

(*Id.*, 6:46-64; *see id.*, FIG. 1b (below), 7:19-26 (“the cell identifier is also compared with the stored cell identifiers”).)

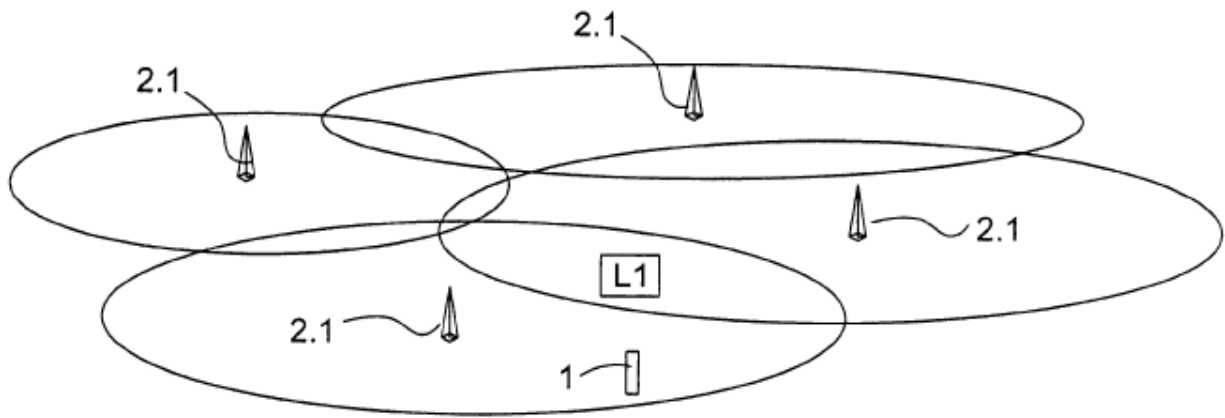


Fig. 1b

86. *Blomqvist* thus discloses that location determination does not need to occur at all times and instead can occur less frequently at appropriate locations based on cell ID information. (*Id.*, 2:20-3:19.)

87. *Blomqvist* also discloses an application for a device 1 (mobile phone) that utilizes a reminder service. (*Id.*, FIG. 1, 5:10-37.) After the location of the device has been determined and “[w]hen the 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 also discloses that “[o]ther functions to be mentioned in this context that can be activated on the basis of the location are starting of a program.” (*Id.*, 5:46-60.) Thus, the mobile device 1 is configured to start a program or perform another function when a mobile device is a specified location. (*Id.*, FIG. 1, 5:10-60.)

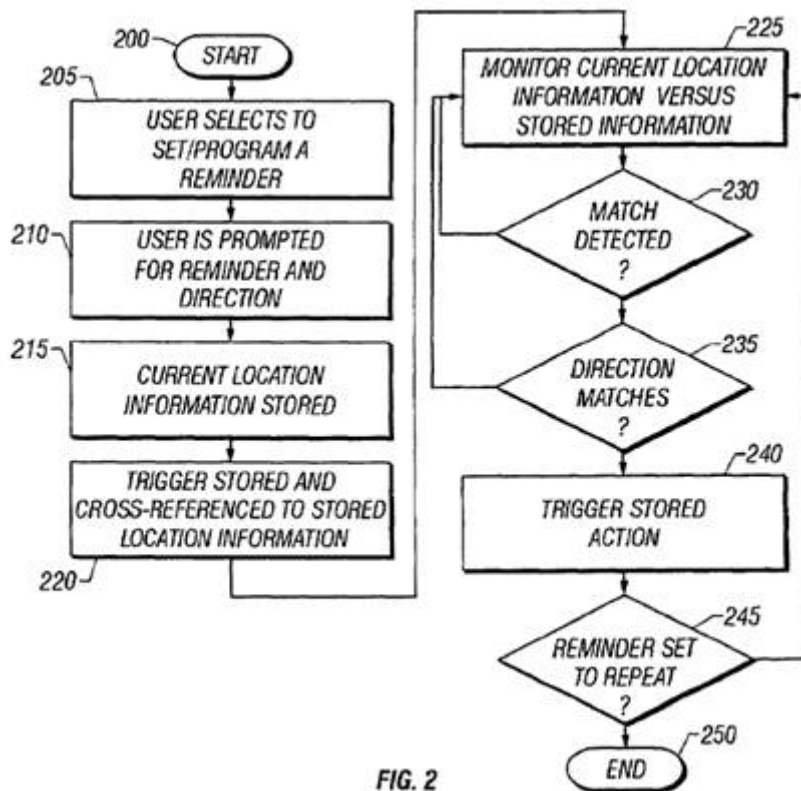
F. *Hunzinger* (Ex-1054)

88. I understand that *Hunzinger* is an issued United States patent. (Ex-1054, Cover.) My understanding is that *Hunzinger* was filed November 15, 2001, and issued October 18, 2005. (*Id.*) For purposes of my analysis, I have been asked to assume *Hunzinger* is prior art.

89. *Hunzinger* discloses a location determining system/process where a user of a mobile device may set actions/alerts/reminders, etc. that are performed based on a determined location of the device.

A system allows users of wireless mobile terminals to set reminders, alerts, or other actions to be triggered based on location or dynamics. Such location information may include, but is not limited to, a specific location description such as latitude, longitude and a radius describing a generally circular region in which the terminal is located. The system monitors the location information until the programmed conditions are satisfied. Once the location condition is satisfied the system of the present invention triggers the programmed reminder.

(Ex-1054, Abstract; *see also id.*, FIGS. 1A-4, 1:38-2:6, 2:10-44, 3:4-67.) Figure 2 (which I show below) exemplifies a process for location reminder programming, monitoring and triggering procedures, executed on the mobile device that can have “position location technology.” (*Id.*, FIG. 2, 3:49-55.)



90. Location related information (“‘remembered’ locations”) and trigger or action information is stored in the mobile device, which also has position-monitoring functions that “compares one or more ‘remembered’ locations with current location information.” (*Id.*, 2:56-60.) The user may use a stored or current location, and the device can use location information such as “station ID...other signal conditions...or

other location identifying information” where it is “only necessary that information allow the terminal to *recognize whether or not it has left or returned to the same location.*” (*Id.*, 4:1-12.) Location information can include a “set area [that] may be defined several ways: a point with a radius, network parameters, a geographic geopmetric shape, etc.” but “it is not necessary that the mobile [device] knows the exact location...as long as it can store and recognize it.” (*Id.*, 4:12-18.) “The *location area characteristics may be settable by the user* or be adapted according to the precision, accuracy or availability of location information.” (*Id.*, 4:18-20.)

91. The mobile device “stores the location trigger and action information and a reference to the current location 220” so that it can monitor “the current location until it is outside of the ‘set’ location area.” (*Id.*, 4:21-24.) For instance the 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.) Thus, where the mobile device “exit[s] the location, it may not trigger the stored action but rather return[s] to continue monitoring...until the current location again matches or is similar to the stored location.” (*Id.*, 4:21-38, 4:44-46 (triggering stored action when detecting device has “reentered the vicinity of the stored-location, i.e., entering the location described by the stored location information”).) (*See also id.*, 4:51-5:22.)

92. Figure 4 (which is annotated below) depicts exemplary user interface features associated with a user controlled options for programming location actions to be executed when a programmed reminder is triggered based on a corresponding location. (*Id.*, 5:22-40.)

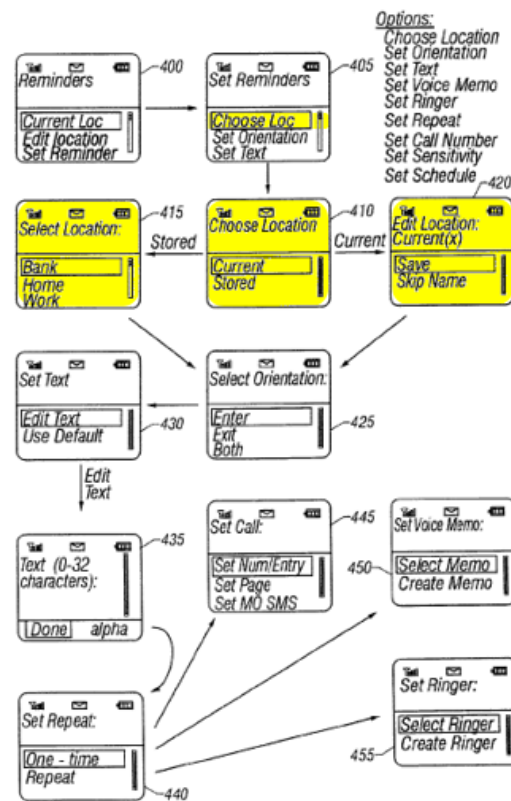


FIG. 4

93. As highlighted above, the “user may select the current location and provide a text name to be associated with it 420.” (*Id.*, FIG. 4, 5:51-52.) The “user may also selected to be reminded only upon leaving an area or entering an area independently or exclusively.” (*Id.*, 5:53-61.) The reminder action can take many

forms, including displaying a text message, voice memo play-back, call to a number, playing a ringer, download information/content, etc. (*Id.*, 5:62-6:7.) *Hunzinger* also discloses that location precision and accuracy can be improved “through multiple measurements or through refinement of the measurements” including “averaging multiple measurements or fixes [as] is *well known in the art.*” (*Id.*, 6:8-22.)

IX. THE PRIOR ART DISCLOSES OR SUGGESTS ALL RECITED FEATURES OF CLAIMS 1-10, 17-20, AND 24-26 OF THE '583 PATENT

94. Below I provide a summary of the prior art combinations that I address in more detail below.

- *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests the features of claims 1-10 and 26;
- *Spain-I* in view of *Hunzinger*, *Nanda*, and *Damarla* discloses and/or suggests the features of claims 3, 5, and 6;
- *Spain-I* in view of *Hunzinger*, *Nanda*, and *Houri* discloses and/or suggests the features of claims 7-10; and
- *Spain-I* in view of *Hunzinger*, *Nanda*, and *Blomqvist* discloses and/or suggests the features of claims 17-20 and 24-25.

A. *Spain-I* in View of *Hunzinger* and *Nanda* Discloses and/or Suggests the Features of Claims 1-10 and 26

95. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests all of the features recited in claims 1-10 and 26 of the '583 patent.

1. Claim 1

[pre] A signal-comparison based location-determining method, operable by a first portable RF communications device in conjunction with a 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, the method
comprising:**

96. I have been asked to assume that the preamble of claim 1 is limiting. Under that assumption, it is my opinion that *Spain-I* (including its incorporated disclosures)⁵ discloses these limitations (including as modified as discussed below). (See my below analysis in §§IX.A.1(a)-(b) and above in §VIII.A.)

97. *Spain-I* discloses a “method for determining the location of MU 10 which (a) works in areas where GPS coverage is not typically available, and (b) does not require any infrastructural modifications.” (Ex-1011, 3:35-41.) A mobile unit (“MU”) (*e.g.*, “a first portable RF communications device”) that is operable to perform location-determining processes based on signal comparisons (*e.g.*, “signal-comparison based location-determining method”) where the MU works in conjunction and communicates with a plurality of fixed-location service-area antenna stations substantially continuously operating and capable of RF communication with the MU. (Ex-1011, FIGS. 1-2 (annotated below), 9-10, 1:18-49, 3:5-34, 3:35-41 (“new method for determining the location of MU 10 which (a)

⁵ See my above analysis in §VIII.A (discussing how the disclosures of Exhibits 1005, 1009–1010, 1012–1015 are part of the disclosure of *Spain*).

works in areas where GPS coverage is not typically available, and (b) does not require any infrastructural modifications”), 3:41-4:63, 5:20-6:34, 7:58-8:44, 9:25-13:15, 13:16-14:37, 15:19-35; *see also* Ex-1005 (*Rao*), FIGS. 1-2, FIGS. 4-5, Abstract, 1:26-34, 1:40-57, 2:8-11, 2:33-36, 2:30-3:9, 3:29-61, 4:59-63, 5:40-56; Ex-1010 (*Perez-Breva-I*), Abstract, FIGS. 1-2, 5-10, 1:10-60, 2:23-5:41, 7:1-54, 8:42-11:29; Ex-1009 (*Perez-Breva-II*), Abstract, FIGS. 1-2, 9-10, 1:14-64, 2:25-6:50, 7:4-8:14, 8:46-11:17; *see my below analysis in §IX.A.1(a)-(b).*)

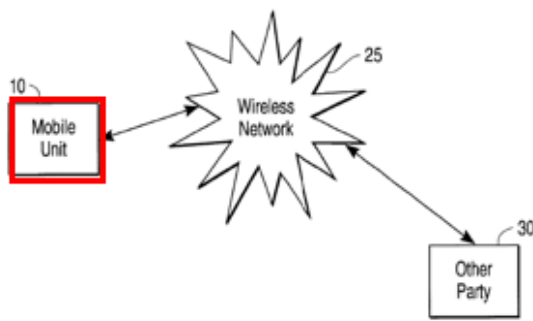


FIG. 1

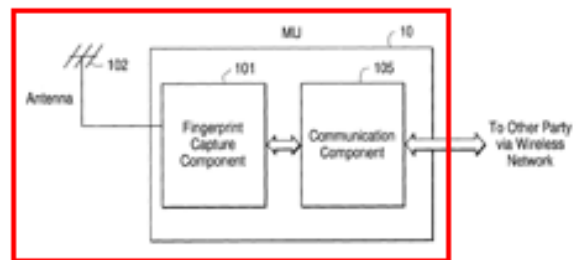


FIG. 2

(Ex-1011, FIGS. 1-2 (annotated to exemplify a MU in red (where in FIG. 2 the antenna 102 is as an example included with such a RF portable communications device)).

98. *Spain-I* explains that:

- The MU communicates with base stations during operation. (Ex-1011, FIGS. 1-2, 3:9-4:6, 7-22 (“the communication link between the mobile

unit and location server is through the base stations and base station controllers of the cellular network”), 1:25-28 (“cell from which the mobile unit is communicating”), 10:35-41 (“cell sites, Cell Site A, Cell Site B, and Cell Site C, that are responsible for providing service to the mobile units”), 11:57-65 (“Cell A is the serving cell (*i.e.*, the cell currently handling the communications traffic to and from the mobile)”).)

- When at selected location(s), the MU performs processes that collects identifier information (*e.g.*, station ID(s)) and measures signal strengths associated with communication signals received from antenna stations in range of the MU capable of RF communications with the mobile device while at those location(s). (*Id.*, 3:42-4:63, 5:20-6:8, 7:58-8:8, 10:43-46, 11:41-46, 13:16-14:37; Ex-1005, 4:16-37, 5:40-56, 6:34-51; Ex-1010, 3:4-4:9, 4:32-44, 4:63-5:24, 7:1-18, 10:4-32; Ex-1009, 2:61-5:21, 7:40-57, 9:15-10:37.)
- The MU creates and stores fingerprints based on the collected/measured information, including station identifier information and measured signal strengths corresponding to the

received communication signals from the stations. (Ex-1011, FIG. 4 (station IDs, signal strengths), 3:41-4:6, 4:5:20-6:30, 7:58-8:8, 10:48-11:26, 11:41-46, 13:16-55; Ex-1005, 3:29-61, 4:23-27, 4:59-5:9, 5:40-6:12, FIG. 4, Ex-1009, FIG. 9 (station ID and signal strengths), 5:1-21, 7:4-21, 9:15-54; Ex-1010, FIG. 9, 5:5-57, 7:1-36, 9:10-49.) A collection of the fingerprint structures may be stored in a fingerprint database used for subsequent location-determination processes, where the database may be stored locally on the MU or remotely. (Ex-1011, FIG. 10, 5:61-66, 6:9-32, FIG. 3, 10:48-11:27, 13:56-14:37, Ex-1005, FIG. 5, 6:13-61; Ex-1009, 9:55-10:47; Ex-1010, FIG. 9, 9:50-10:32.)

- “When a location estimate of the MU is desired (either by itself or by the Other Party), it [MU] activates component 101 (FIG. 2), which captures predetermined information from a predetermined portion of the RF spectrum.” (Ex-1011, 4:42-46; Ex-1005, 3:29-39; Ex-1009, 3:60-63; Ex-1010, 3:56-60.) The MU creates a fingerprint associated with a current monitored location by measuring *e.g.*, signal strengths received from identified service stations. (Ex-1011, 5:20-6:8, 7:64-8:44, 9:25-10:27, Ex-1005, 3:29-4:24; Ex-1009, 3:63-4:44, 5:7-21; Ex-

1010, 3:60-4:44, 5:5-19.) The fingerprint may be generated “using *many different parameters*, either *individually or in combination*.”

(Ex-1011, 4:55-56; Ex-1005, 3:40-42; Ex-1009, 4:4-5; Ex-1010, 4:1-

2.) This includes *signal strengths* of received signals and “the identity of the signal source (*e.g.*, channel number of *station code*)” (Ex-1011, FIG. 4, 4:56-63; Ex-1005, 3:42-49; Ex-1009, 4:6-11, Ex-1010, 4:3-8.)

Indeed, the MU is “equipped with appropriate circuitry to determine the strength of the received signal” and the “location of the transmitter is broadcast in the signal and is extracted in the MU” (Ex-1011, 5:28-32, 3:55-58, 5:20-28 (MU captures signals and their parameters); Ex-1005, 3:57-61, 4:16-18; Ex-1009, 3:7-24, 4:34-44; Ex-1010, 3:4-21, 4:32-44.)

- The MU performs processes to determine whether the MU is currently “at a particular location or not” (Ex-1011, 4:23-25⁶; Ex-1005, 3:10 18.)

To do so, the MU compares the fingerprint information for the current

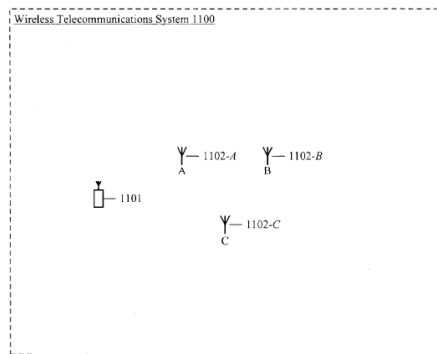
⁶ *Spain-I* discloses that the MU can initiate the location estimate processes (Ex-1011, 4:43–47 (“location estimate of the [MU] is desired (either by the [MU] itself or by the location server)”).)

monitored location with the previously generated/stored fingerprint information to determine a “closest” match. If the compared information matches (or is close), the MU determines the MU is at or near the location associated with the matching fingerprint in the database. *Spain-I* discloses various processes for determining closeness between compared fingerprint information (*e.g.*, signal strengths corresponding to associated station IDs, etc.) and for making such analysis more efficient. (Ex-1011, FIGS. 9-10, 5:61-6:8, 7:58-67 (signal strength parameters and dynamic changes for fingerprints), 8:1-26 (processes for determining closest matching fingerprint), 8:27-10:27, 10:29-13:15 (processes for reducing set of fingerprint information for comparison), 14:10-37 (measuring signal characteristics at predetermined locations and interpolating fingerprints between “sampled locations”), 17:15-19; Ex-1005, 3:29-4:37, 4:65-5:9, 5:10-40, FIGS. 4-5, 5:40-6:47, 6:48-61; Ex-1009, 3:40-4:46, 5:1-21, 7:4-9:14, *see also id.*, 5:44-7:3; Ex-1010, 3:37-4:44, 4:64-5:19, 7:1-9:10.)

99. A person of ordinary skill in the art would have understood in the context of *Spain-I* that the “station(s)” providing the communication signals received by the MU are substantially continuously operating fixed-location service-area antenna stations, like that claimed since that they include base stations that communicate with the MU using RF communication signals within respective service areas, consistent with known wireless network infrastructures. For example, such a skilled person would have understood that *Spain-I* recognizes that any location has a unique RF spectral fingerprint, and the MU includes an antenna that is configured to receive RF signals from signal sources (stations) in a wireless communication network consistent with that known in the art. (Ex-1011, FIG. 2, 4:7-22 (MU antenna 102 and communication link between MU and location server is “though the base stations...of the cellular network”); *id.*, 3:42-4:6, 1:18-48 (discussing conventional cellular “base stations”), 3:55-4:6 and 7:58-67 (television/radio broadcast stations), 5:33-54 (television signals having “better coverage of the cell than other signals”), 4:59-61 (station code identifying signal source), 13:27-31 (“Station ID field 403 indicates the ***unique identifying code of a broadcasting station*** from which the signal emanated”), FIG. 9, 6:31-39 (“base station signal strengths”); Ex-1005, 1:10-19, 1:26-34, 2:40-3:3, 3:4-9, 3:50-61, FIGS. 2, 4, 4:59-63, 5:51-56; Ex-1009, 3:25-39, 4:9-10, 5:44-51, 7:4-21, 9:26-54;

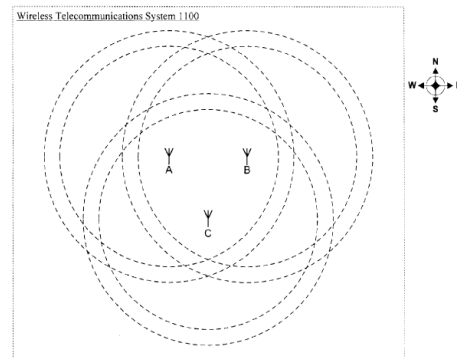
Ex-1010, 1:31-41, 3:22-36, 4:1-7, 5:46-49, 7:1-18, 9:21-49.) Such a skilled person would have understood, by the MU having an antenna to receive the communication signals, that the source of such signals (*e.g.*, stations) would likewise have antennas to transmit the RF signals from which the MU collects ID information and measures corresponding signal strengths. Indeed, *Spain-I* discusses coverage areas served by antenna base stations (with identity codes) that communicate RF signals with a MU in the context of processes for reducing fingerprint samples for comparison. (Ex-1011, FIGS. 11, 14 (below), 12-13, 15-19, 10:29-13:15.)

FIG. 11



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FIG. 14



100. A person of ordinary skill in the art would have recognized such discussions of antenna base station coverage areas are applicable to the features relating to the location-determination processes performed by the MU in terms of the signal sources (*e.g.*, antenna stations) as discussed above (and below) regarding *Spain-I*. (See also my below analysis in §§IX.A.1(a)-(b).) Such communication-related operations were consistent with known wireless network

infrastructures similar to those described by *Spain-I*. (Ex-1007, ¶¶0185 (describing wireless cell sites including base stations 122 that are “(“standard high traffic, fixed location base stations used for voice and data communications with a plurality of MSs 140” (mobile stations (*id.*, ¶0183))), 0237 (described a based station as a fixed BS 122).)) Consistent with such understandings, it is my opinion that a person of ordinary skill in the art would have understood the “station(s)” in *Spain-I* to be fixed and serve particular areas using an antenna to facilitate wireless communications with the MU when in the coverage/service area for that station, consistent with conventional wireless network infrastructures. (Ex-1007, ¶¶0009-0020, 0032, 0053, 0193, FIG. 3, 236, 250.) Accordingly, a person of ordinary skill in the art would have understood the stations described by *Spain-I* are fixed-based service area antenna stations like those claimed.

101. For similar reasons, a person of ordinary skill in the art would have understood the fixed-location antenna “stations” described by *Spain-I* would have been **substantially continuously operating** in order for wireless communications and related signal strength measurement processes to take place as described by *Spain-I*, consistent with the operation/functions of such conventional networks and associated equipment/components in order to provide the wireless communications used to facilitate the location-determining processes as described by *Spain-I*. The

system operates in, or works with, a conventional wireless network with base stations, and without such substantially continuous operation, the location-determining processes disclosed by *Spain-I* would not perform as disclosed. For example, without the stations operating substantially continuously operating, RF communications would not be performed as known in such wireless systems, and thus, for example, measured signal strengths may become stale, which may compromise the integrity of the location determining process described by *Spain-I*. *Spain-I* looks to provide accurate location determinations based on the signal parameters (*e.g.*, station IDs and signal strengths). (*See my discussions of Spain-I above; e.g., Ex-1011, 8:1-8, 9:64-67, 10:64-67, 13:16-55, 14:1-3.*) As such, *Spain-I* discloses substantially continuously operating fixed-location service-area antenna stations that communicate RF signals with the MU and are “substantially continuously operating,” as claimed.

102. Nonetheless, I have also been asked to assume a scenario wherein *Spain-I* does not disclose such features. As to that scenario, it is my opinion that a person of ordinary skill in the art would have been motivated to configure *Spain-I*’s MU system and related processes to operate in conjunction with “substantially continuously operating” “fixed-location service-area antenna stations” that communicate RF signals with the MU consistent with conventional wireless network

infrastructures like those described by *Spain-I*. Such a skilled person would have understood from the disclosures in *Spain-I*, and based on their knowledge/experience in the art, that the infrastructure in which the MU operates includes conventional wireless networking technologies/techniques. (Ex-1011, 1:16-50, 3:8-54, 10:34-11:26; Ex-1007, FIG. 3, ¶¶0009-0020, 0032, 0053, 0193, 236, 250; Ex-1027, FIGS. 1-2, 16, ¶¶0002-0021, 0042-0045, 0102-0103.) *Spain-I* discusses conventional mobile communications technologies that include wireless cells (Ex-1011, 1:18-49; Ex-1005, 1:8-37), operations in portions of the RF spectrum including television and radio transmission signals (Ex-1011, 3:55-4:6; Ex-1005, 2:53-3:3) and cellular communication networks (Ex-1011, 4:7-22, 5:33-51, Ex-1005, 3:62-4:12, 5:28-33), all known to operate with substantially continuously operating antenna stations providing wireless communications to mobile devices. Accordingly, for the scenario where *Spain-I* does not teach such antenna station features, a person of ordinary skill in the art would have understood such features were suggested and a skilled person would have been motivated to configure *Spain-I*'s processes and system(s) to operate in conjunction with such fixed-location service-area antenna stations from which communication signals were received by the MU and processed in accordance with *Spain-I*'s disclosed processes. Such a skilled person would have had the knowledge and skills to configure, and a

reasonable expectation of success in implementing, such features to facilitate wireless communications like those discussed by *Spain-I*, especially where such configuration/implementation would have involved known technologies and techniques within the skills and knowledge of a person of ordinary skill in the art. (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; *see also* Ex-1007, FIG. 3, ¶¶0009-0020, 0032, 0053, 0193, 236, 250; Ex-1027, FIGS. 1-2, 16, ¶¶0002-0021, 0042-0045, 0102-0103.) A person of ordinary skill in the art was thus well aware of such antenna stations and would have been motivated to configure *Spain-I*'s MU to operate in conjunction with similar continuously operating antenna stations (like those claimed). Indeed, such a skilled person would have understood there was a narrow spectrum of design choices in terms of network antenna stations (in terms of operating substantially continuously). As such, such a person would have not only understood how to implement such features in the *Spain-I* system/processes, but would have understood the advantages and disadvantages associated with various options, and considered them when deciding to configure the system/process with such antenna stations like those claimed.

103. Moreover, it is my opinion that a person of ordinary skill in the art would have been motivated to implement such features for reasons that I explained below in §IX.A.1(b)(ii)(3).

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

(i) receiving communications signals from a first plurality of the antenna stations,

(ii) identifying at least one ID within at least one of the received communications signals, and

(iii) measuring the signal strengths associated with a received communications signal from the first plurality of antenna stations; and

104. It is my opinion that *Spain-I* (including as modified as discussed below) discloses or suggests these limitations. (*See also* my analysis above in §§VIII.A, IX.A.1(pre).) As I explained, the MU is configured to perform processes for monitoring its location by receiving signals from a plurality of stations (“fixed-location service-area antenna stations”) (as disclosed or modified as I discuss in §§IX.A.1(pre) and/or IX.A.1(b)(ii)(3)), determining at least one ID within at least one received signal, (*e.g.*, station ID), and measure signal strengths associated with a received signal from the plurality of stations.

105. *Spain-I* discloses that “[w]hen a location estimate of the MU is desired (either by itself or by the Other Party), [the MU] activates component 101 (FIG. 2),

which captures predetermined information from a predetermined portion of the RF spectrum.” (Ex-1011, 4:42-46; Ex-1005, 3:29-39; Ex-1009, 3:60-63; Ex-1010, 3:56-60.) The MU creates a fingerprint associated with a current monitored location by measuring *e.g.*, signal strengths received from identified service stations. (Ex-1011, 5:20-6:8, 7:64-8:44, 9:25-10:27, Ex-1005, 3:29-4:24; Ex-1009, 3:63-4:44, 5:7-21; Ex-1010, 3:60-4:44, 5:5-19.) The fingerprint may be generated “using *many different parameters*, either *individually or in combination*.” (Ex-1011, 4:55-56; Ex-1005, 3:40-42; Ex-1009, 4:4-5; Ex-1010, 4:1-2.) This includes *signal strengths* of received signals and “the identity of the signal source (*e.g.*, channel number of *station code*)” (Ex-1011, FIG. 4, 4:56-63; Ex-1005, 3:42-49; Ex-1009, 4:6-11, Ex-1010, 4:3-8.) The MU obtains “multiple pieces of information or from multiple portions of the [RF] spectrum” from the communication signals received from surrounding stations in range. (Ex-1011, 3:55-58, 4:43-54, 5:20-22; Ex-1005, 3:29-37, 3:4-9.) The MU is “equipped with appropriate circuitry to determine the strength of the received signal” and the “location of the transmitter is broadcast in the signal and is extracted in the MU.” (Ex-1011, 5:28-32, 3:55-58, 5:20-28 (MU captures signals and their parameters); Ex-1005, 3:57-61, 4:16-18; Ex-1009, 3:7-24, 4:34-44; Ex-1010, 3:4-21, 4:32-44.) The MU creates a fingerprint associated with a current monitored location by extracting station ID information and measuring *e.g.*, signal

strengths received from identified service stations. (Ex-1011, 5:20-6:8, 7:64-8:44, 9:25-10:27, Ex-1005, 3:29-4:24; Ex-1009, 3:63-4:44, 5:7-21; Ex-1010, 3:60-4:44, 5:5-19.)

106. The MU obtains “multiple pieces of information or from multiple portions of the [RF] spectrum” from communication signals from a source (*e.g.*, station). (Ex-1011, 3:55-58, 4:43-54, 5:20-22; Ex-1005, 3:29-37, 3:4-9.) The MU is capable of capturing information from the received signals and is “equipped with appropriate circuitry to determine the strength of the received signal.” (Ex-1011, 5:28-32, Ex-1005, 3:57-61.)

107. As I discussed above for limitation 1(pre), when at a current monitored location (*e.g.*, a location from where the MU initiates a location determination process), the MU captures information from the RF spectrum to create fingerprint information based on *parameters (individually or in combination)*, such as *signal* strength measurements and the identity of the signal source from which the signals emanated (*station code*). (Ex-1011, 3:55-4:6, 4:42-63; 5:20-32, 5:54-60, 13:28-31, Ex-1005, 3:29-61, 5:51-56; Ex-1009, 4:4-11; Ex-1010, 4:1-8.) Figure 9 (below) exemplifies a fingerprint structure, which is generated by “identifying at least one ID within at least one of the received communications signals” (blue below) and

measuring “the signal strengths associated with a received communications signal from the first plurality of antenna stations” (yellow), like that claimed.

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, 13:16-28; Ex-1005, FIG. 4, 4:13-23, 5:40-6:11; Ex-1009, FIG. 9; Ex-1010, FIG. 9.) “Each column in FIG. 9 is information pertaining to a particular frequency or carrier. A *Station ID field 403 indicates the unique identifying code of a broadcasting station from which the signal emanated*” and may be “filled by the MU using information received in the signal.” (Ex-1011, 5:20-32, 5:55-60, 13:27-33 (MU extracts parameter information from signal and determines strength of received signal for generating fingerprint); Ex-1005, 3:57-61, 4:16-21, 5:51-64.)

108. Figure 9 exemplifies the results of how the MU obtains station ID information and measures signal strengths for the signals received from surrounding antenna stations when the MU is at a current location (and also does similar operations when at selected location as I discuss below in §IX.A.1(b)). For instance, a person of ordinary skill in the art would have understood that each fingerprint structure can include multiple signal strength figure(s) (SS1-SSm) which were measured by the MU from signals received from respective stations that have recognized and collected station IDs. Such a skilled person would have understood that signal strengths may vary, as known in the art. (Ex-1011, 3:42-54 (signal characteristics vary across RF spectrum but for any given location, preselected signal parameters may be measured unique to that location), 7:58-8:8, (capturing fingerprints at different times to minimize interference with other stations), 13:51-44 (signal strength sampled multiple times for each frequency/carrier and filled in by MU); Ex-1005, 2:40-52, 4:59-5:9, 6:7-12; Ex-1006, Abstract, 7:19-28 (signal

strength “vary because of environmental variability”), 10:19-22;⁷ Ex-1001, 20:37-54.)

109. A person of ordinary skill in the art would have thus understood, in context of *Spain-I*’s disclosures that the signals received from the first antenna stations in range of the MU at a current monitored location include an ID for respective transmitting stations, which is extracted from the received signals. (See my above analysis regarding *Spain-I* (and incorporated disclosures) and in §VIII, IX.A.1(pre).) Indeed, the MU can fill in the station ID “***using information received in the signal.***” (Ex-1011, 9:31-33; Ex-1005, 5:52-64.) Further, *Spain-I* explains the fingerprint may include transmitter location information that may be used if the MU wants to “capture the signal emanating from a particular transmitter.” (Ex-1011, 9:45-47, 4:33-36, FIG. 9; Ex-1005, FIG. 4, 3:57-61, 6:2-7, FIG.4, 3:57-61.)

110. Accordingly, for reasons above and below *Spain-I* discloses the MU monitoring its location by (for example):

⁷ Ex-1006 (*Nanda*) is referenced here to demonstrate a person of ordinary skill in the art’s state-of-art knowledge at the time. *Nanda* is also relied upon below as an asserted reference for other claim features. (See my below analysis in §IX.A.1(b).)

- “receiving communication signals from a first plurality of antenna stations currently in range of the MU when location determination is desired/initiated” (see my above analysis; *e.g.*, Ex-1011, FIGS. 1-3, 9-10, 6:9-30 (MU capturing fingerprint of its “current location”), 3:5-16, 3:42-4:62, 5:55-6:8; Ex-1005, FIGS. 1-4, 1:40-54, 2:5-16, 2:32-3:5, 3:29-4:22, 4:38-50; *see* my above analysis in §§VIII.A, IX.A.1(pre).)
- “identifying at least one ID” (*e.g.*, station ID/source identifying information) “within at least one of the received communications signals” (*e.g.*, extracted and stored as part of fingerprint) (see my above analysis; *e.g.*, Ex-1011, FIG. 9 (Station ID), 4:55-62 (station code—identity of signal source), 5:54-60 (MU extracts parameters from the “appropriate signals”), 13:29-49; Ex-1005, FIG. 4, 3:40-47, 3:57-60, 4:16-21, 5:51-58, 6:2-7; *see* my above analysis in §§VIII.A, IX.A.1(pre).)
- “measuring the signal strengths associated with a received communications signal from the first plurality of antenna stations” (see my above analysis; *e.g.*, Ex-1011, FIG. 9 (S11-Smn), 3:42-4:63, 5:20-32, 13:49-55 (signal strength sampled multiple times); Ex-1005, 2:40-

3:3; 3:57-61, 4:16-21, 4:65-9, 6:7-11; *see* my above analysis in
§§VIII.A, IX.A.1(pre).)

(*See* also my below analysis in §IX.A.1(b).)⁸

**b) the first portable RF communication device
determining if a monitored location is within proximity
of a location chosen by a user of the first portable RF
communication device, as a result of**

**(i) electronically comparing the at least one ID
and at least one figure based on the signal
strengths of the first plurality of antenna stations
at the monitored location with the at least one ID
and the at least one figure based on signal
strengths of the first plurality of antenna stations
at the location chosen by the user, and**

**(ii) determining if the difference between the
signal strengths measured at the monitored
location and the signal strengths at the location
chosen by the user is less than a predetermined
threshold.**

⁸ Even if *Spain-I* were interpreted to not disclose all the features in limitation 1(a), it is my opinion that a person of ordinary skill in the art would have been motivated to implement them in view of *Nanda* for reasons similar to those I discuss below for limitation 1(b) (§IX.A.1(b)).

111. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests these limitations.

112. As I explained, *Spain-I* discloses that the MU performs processes to determine whether the MU is currently “at a particular location or not.” (Ex-1011, 4:23-25, 4:43-47 (location estimate of the [MU] is desired (either by the [MU] itself or by the location server)”)⁹; Ex-1005, 3:10-18; §§IX.A.1(pre)-1(a).) To do so, the MU electronically compares fingerprint information for the MU’s current monitored location (*e.g.*, where the MU is located when location determination/monitoring is initiated/performed) with previously generated/stored fingerprint information (*e.g.*, generated/collected at particular location(s) of the MU and stored in a fingerprint database) to determine a “closest” match. (*See* §§IX.A.1(a), IX.A.1(b)(ii).) As I noted, fingerprint information can include station identifier information and signal strength measurement values for communication signals communicated from signal sources surrounding and in range of the MU when the fingerprint information is collected/generated. If the comparison results in a match (or close match as I discuss

⁹ *Spain-I* explains elsewhere that the MU can initiate the location estimate processes (Ex-1011, 4:43–47 (location estimate of the [MU] is desired (either by the [MU] itself or by the location server)”).)

further below), the MU determines that the MU is at, and/or otherwise within the proximity of, the location corresponding to the matching fingerprint information in the database. (Ex-1011, 5:55-6:4 (“corresponding location in the database is then chosen as the location of the mobile unit”); 8:1-26; *see also* my discussions above in §IX.A.1(pre)-1(a).)

113. The MU is configured to perform various processes for determining closeness between compared fingerprint information and making such analyses more efficient. (Ex-1011, FIGS. 1-3, 9-10, 5:61-6:8, 7:58-67 (signal strength parameters and dynamic changes for fingerprints), 8:1-26 (determining closest matching fingerprint), 8:27-10:27, 10:29-13:15 (discussing features where a location server aids in the reduction of sample fingerprints to be considered in comparison), 14:10-22 (building fingerprint database built via off-line snapshots at locations), 14:23-31 (building database by taking measurements at predetermined locations and interpolating fingerprints at all locations between *sampled locations*), 17:15-19; Ex-1005, 3:29-4:37, 4:65-5:9, 5:10-40, FIGS. 4-5, 5:40-6:47, 6:34-36, 6:48-51; Ex-1009, 3:40-4:46, 5:1-21, 5:44-9:14; Ex-1010, 3:37-4:44, 4:64-5:19, 7:1-9:10.)

114. A person of ordinary skill in the art would have recognized that *Spain-I* discloses features and processes like those recited in claim 1, including those of limitation 1(b) (*e.g.*, determining whether the MU is at a particular location based

on comparing fingerprint information associated with a current monitored location (see e.g., limitation 1(a)) with stored fingerprint information corresponding to locations where the MU was at when such information was obtained, etc.) Such suggestions in *Spain-I* would have led a person of ordinary skill in the art to consider teachings in the art when considering the design, configuration and implementation of *Spain-I*'s system/process for desired applications. As I discuss further below, is my opinion that a person of ordinary skill in the art would have been motivated to configure the *Spain-I* system/processes to implement such features in view of the teachings and suggestions in *Hunzinger* and *Nanda* and a person of ordinary skill in the art's knowledge and experience at the time regarding the state of art. (See my below analysis in §§IX.A.1(b)(ii)(1)-(4); and above in §§IX.A.1(pre-(a)), VIII.B.)

115. It is my opinion that the teachings/suggestions from *Spain-I*, *Hunzinger*, and *Nanda* (and the other prior art I discuss below in other sections) in context of a person of ordinary skill in the art's state-of-art knowledge/skills, etc. at the time, would have guided such a skilled person to design/configure/implement/modify the *Spain-I* system/processes in such a manner that would have predictably led to a system/process that disclose or suggest features like those recited in the challenged claims I address in this Declaration. Therefore, where I make references to any combination or combined system/process involving

such prior art (*e.g.*, “combined” *Spain-I-Hunzinger-Nanda* system/process or “combination” or similar language involving any of the prior art I discuss below—including in other sections), that does not mean or suggest that it is my opinion a person of ordinary skill in the art would have bodily incorporated discussed features from one prior art reference into the other. Rather, I use such language as short-hand for the resulting modified *Spain-I* system/process in light of such teachings/suggestions in the prior art from which such a skilled person would have been motivated and guided as I explain in this declaration.

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

116. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests the claimed “determining if a monitored location is within proximity of a location chosen by a user of the first portable RF communications device” as claimed in limitation 1(b), in context of its plain language and related descriptions in the specification (Ex-1001) and in the prosecution file history (Ex-1004).

117. As I mentioned above in §VII, I have been asked to and have considered and applied the plain meaning of the claimed “*determining if a monitored location is within proximity of a location chosen by a user*” features recited in claim limitation 1(b) under its plain claim language and also with the understanding that

such plain meaning at least encompasses how the '583 patent specification describes such features and also consistent with representations that I understand were made in the file history for the '583 patent. (*See* my citations and discussions above in §VII; *e.g.*, Ex-1001, 7:10-26, 8:62-9:10, 19:8-16 (“When the signal strengths from the cells surrounding the current location are identical to the signal strengths measured by the cell phone from the exact same cells (same cell IDs) at the desired location then the cell phone is determined to have returned to the desired location (i.e. current location=desired location)”); Ex-1004, 100 (where statements made equated the claimed “determining if the monitored location is within proximity to the chosen location” limitation to “[—or in other words,] *determining if the user has reached the desired location or has left the desired location.*”).)

118. As I discussed above, a person of ordinary skill in the art would have understood that *Spain-I* describes that the fingerprints generated and stored in the fingerprint database correspond to location(s) that were selected or predetermined. (*See* my above analysis in §IX.A.1(pre)-(b)(ii); Ex-1011, FIG. 9, 3:42-4:63, 5:20-32, 13:49-55 (signal strength sampled multiple times); Ex-1005, 2:40-3:3; 3:57-61, 4:16-21, 4:65-9, 6:7-11.) The user of an MU can generate a request for the position of the MU (*e.g.*, whether or not it is at (or near) the same location corresponding to a previously generated fingerprint in the fingerprint database). (*See* my above

analysis in §§IX.A.1(pre)-1(b)(ii); Ex-1011, 5:61-6:30 (describing in connection with FIG. 3 configurations that the “request [for position of the mobile unit] may be generated by the user carrying the mobile unit” and upon receipt of such request, “the mobile unit captures the fingerprint of its “current location”); Ex-1005, 4:43-47 (“When a location estimate of the mobile unit is desired (either by the mobile unit itself or by the location server), it activates component 101 (FIG. 2), which captures predetermined from a predetermined portion of the RF spectrum.”).)

119. As I explained, *Spain-I* discloses processes to determine if “MU 10 is at a particular location or not.” (§IX.A.1(pre)-1(b)(ii); Ex-1011, 4:23-25; Ex-1005, 3:10-11.) *Spain-I* explains that the desire for obtaining a location estimate can originate from the MU or the location server. (Ex-1011, 4:43-47; Ex-1005, 3:29-31.) To do so, the MU collects fingerprint information (*e.g.*, station IDs) and measures signal strength(s) associated with the signal(s) received from the plurality of stations corresponding to those IDs in order to build the fingerprint database. (Ex-1011, 5:20-6:31, 7:58-8:26, 13:16-14:37; Ex-1005, 3:23-6:56.) Fingerprints can be generated (and associated signal parameters measured/collected) based on signals received at predetermined/chosen locations. (Ex-1011, 4:42-63, 13:27-33, 14:23-31, Ex-1005, 6:48-51.) A person of ordinary skill in the art would have understood that *Spain-I* at least suggests features where generating fingerprints and building the

fingerprint database stems from signal characteristic (*e.g.*, signal strength) measurements and related information collected when the MU was carried by a user to specific locations of the MU.

120. For example, *Spain-I* describes features where a user can request the location of the MU, *albeit* in context of the FIG. 3 embodiment, which uses the location server to store the fingerprint database. (Ex-1011, 6:9-21; Ex-1005, 6:43-46.) “On receipt of the request, the MU captures the fingerprint of its current location,” which is processed and eventually sent to the location server for storage and use in context of the FIG. 3 procedures. (Ex-1011, 6:20-30; Ex-1005, 6:46-47, FIG. 3 (below).)

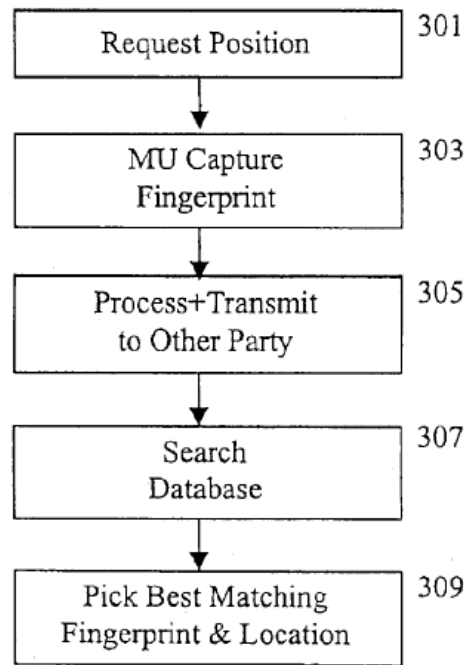


Fig. 3

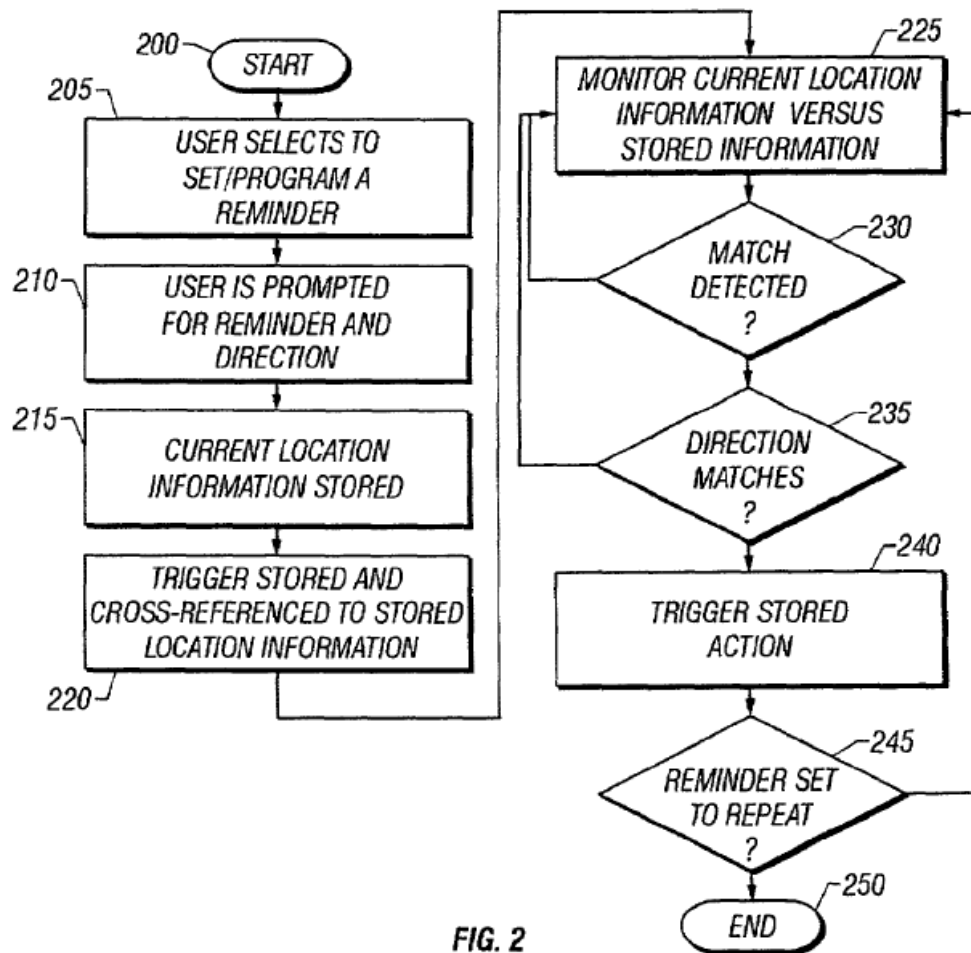
121. While such teachings relate to a remotely stored fingerprint database and performing fingerprint matching processes, they also would have suggested to a person of ordinary skill in the art that the MU may be (or is) configured to receive a user request to measure/collect signal information for generating a fingerprint. *Spain-I* thus suggests the concept generally of user-initiated location-based fingerprint data collection generally and would have taught a person of ordinary skill in the art the context of such features, and thus led such a skilled person to consider

the various ways how to provide for user chosen locations corresponding to fingerprints in the database. A person of ordinary skill in the art would have understood there were numerous ways and reasons for doing so, and thus would have been motivated to consider teachings in the art when considering the teachings of *Spain-I*.

122. For example, the teachings and suggestions in *Spain-I* would have led a person of ordinary skill in the art who was considering/designing/implementing the *Spain-I* system/processes for various applications to consider available ways and options to configure such a system to provide user friendly controls for designating areas/locations and triggering services/actions when the MU enters, is at, or leaves a designated area/location. (See my discussions above in §V.) It is my opinion that such a skilled person would have been motivated to use their state-of-art knowledge and experience, and teachings from the art, when designing, considering, and configuring such a system/processes. In doing so, a person of ordinary skill in the art would have found *Hunzinger* and *Nanda* to be relevant sources of such teachings and guidance. Consequently, such a skilled person would have considered and have been motivated by the teachings of *Hunzinger* (Ex-1054) and those of *Nanda* (Ex-1006) to consider, develop, and configure the *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 with how described in the '583 patent and discussed during prosecution as I noted above), including providing mechanisms for allowing the user to choose location(s) from which the fingerprint information was collected/measured used to build the database and subsequently used for comparison with the current monitored location fingerprint information (as I discussed above and further below in §IX.A.1(b)(2)), and to perform location-based actions/operations selectable by the user, similar to features described by *Hunzinger* and *Nanda*.

123. *Hunzinger* (discussed also above in §VIII.F) discloses a location determining system/process where a user of a mobile device may set actions/alerts/reminders, etc. that are performed based on a determined location of the device. (Ex-1054, Abstract, FIGS. 1A-4, 1:38-2:6, 2:10-44, 3:4-67; *see also* my discussions above in §VIII.F.) Figure 2 (below) exemplifies a process for location reminder programming, monitoring and triggering procedures, executed on the mobile device that can have “position location technology.” (*Id.*, FIG. 2, 3:49-55.)

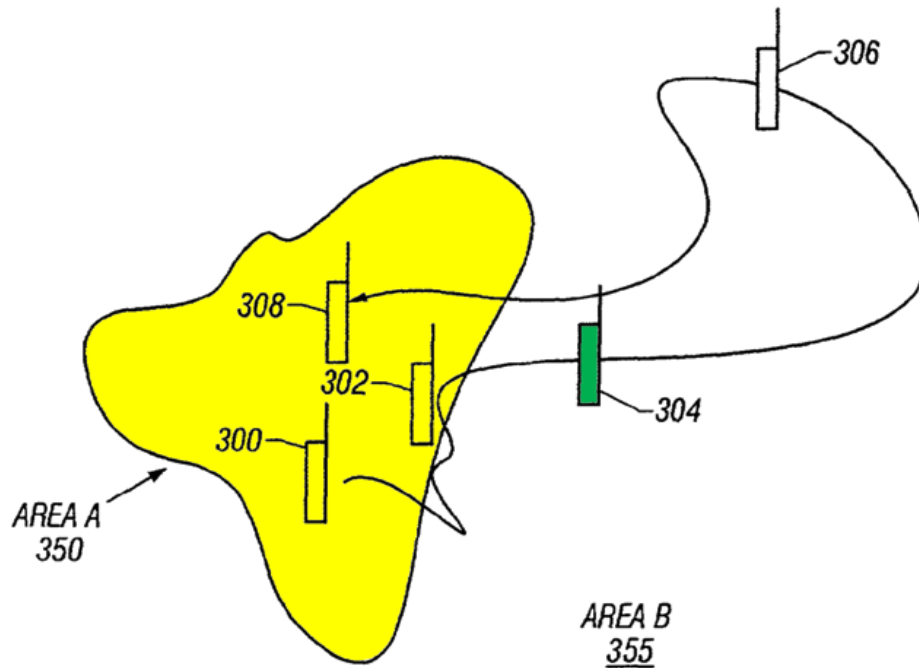


124. *Hunzinger* explains that location related information (“‘remembered’ locations”) and trigger or action information is stored in the mobile device, which also has position-monitoring functions that “compares one or more ‘remembered’ locations with current location information.” (*Id.*, 2:56-60.) The user may use a stored or current location, and the device can use location information such as “station ID...other signal conditions...or other location identifying information” where it is “only necessary that information allow the terminal to *recognize whether*

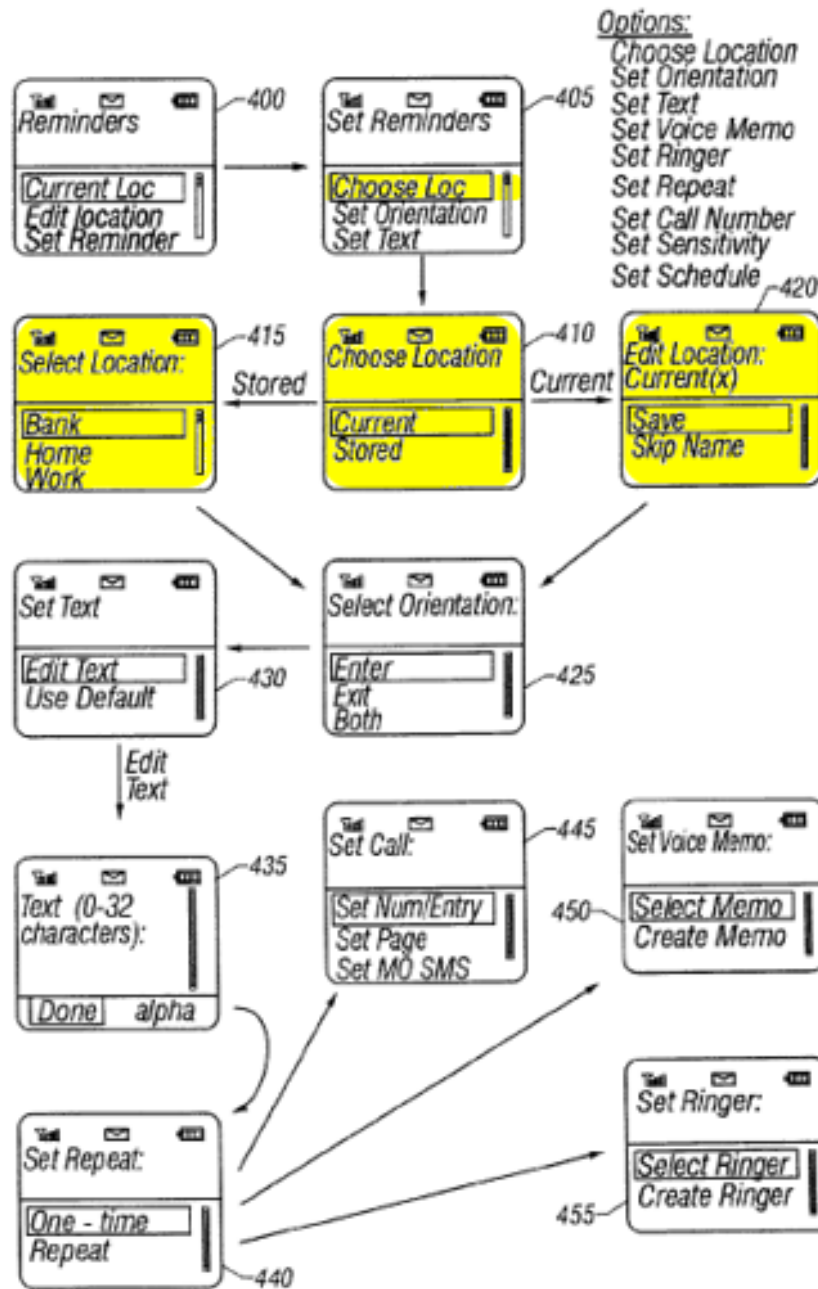
or not it has left or returned to the same location.” (Id., 4:1-12.) Location information can include a “set area [that] may be defined several ways: a point with a radius, network parameters, a geographic geometric shape, etc.” but “it is not necessary that the mobile [device] knows the exact location...as long as it can store and recognize it.” (*Id.*, 4:12-18.) “The *location area characteristics may be settable by the user* or be adapted according to the precision, accuracy or availability of location information.” (*Id.*, 4:18-20.)

125. The mobile device “stores the location trigger and action information and a reference to the current location 220” so that it can monitor “the current location until it is outside of the ‘set’ location area.” (*Id.*, 4:21-24.) For instance, “the 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.) Thus, where the mobile device “exit[s] the location, it may not trigger the stored action but rather return[s] to continue monitoring...until the current location again matches or is similar to the stored location.” (*Id.*, 4:21-38, 4:44-46 (triggering stored action when detecting device has “reentered the vicinity of the stored-location, i.e., entering the location described by the stored location information”).) (*See also id.*, 4:51-5:22.) As an example, *Hunzinger* explains that the mobile terminal can trigger an action (*e.g.*, a reminder)

upon detecting that it “exited Area A 350” and “reached location 304.” (Ex-1054, 4:60-5:22, FIG. 3 (annotated below illustrating example when *Hunzinger* system/process detects that mobile phone exited area 350 (yellow) and reached location 304 (green).)



126. Figure 4 (annotated below) depicts exemplary user interface features associated with a user controlled options for programming location actions to be executed when a programmed reminder is triggered based on a corresponding location. (*Id.*, 5:22-40.)



127. As highlighted above, the “user may select the current location and provide a text name to be associated with it 420.” (*Id.*, FIG. 4, 5:51-52.) The “user

may also select to be reminded only upon leaving an area or entering an area independently or exclusively.” (*Id.*, 5:53-61.) The reminder action can take many forms, including displaying a text message, voice memo play-back, call to a number, playing a ringer, download information/content, etc. (*Id.*, 5:62-6:7.) *Hunzinger* also discloses that location precision and accuracy can be improved “through multiple measurements or through refinement of the measurements” including “averaging multiple measurements or fixes [as] is *well known in the art.*” (*Id.*, 6:8-22.)

128. Accordingly, *Hunzinger* discloses device location determination technologies/techniques, and similar to *Spain-I*, is in the same technical field as the ’583 patent. (See my discussions above in this section §IX.A.1(b)(ii); *see also* my above citations/discussions regarding *Hunzinger* and those above in §IX.A.1(pre)-1(b)(ii) regarding *Spain-I*; Ex-1001, Abstract, 1:23-10:25.) Also, a person of ordinary skill in the art would have understood that similar to *Spain-I*, *Hunzinger* discloses features that would have been pertinent to particular problem(s) that the ’583 patent looked to address (and those a person of ordinary skill in the art was trying to address). (See *e.g.*, my citations and discussions above and those in §IX.A.1(b)(ii)(1); *see also e.g.*, Ex-1001, 1:23-10:25, 3:26-35, 5:14-37, 5:54-56; Ex-1011, 1:16-54, 3:18-40, 15:19-29; Ex-1054, 1:13-2:49, 3:44-4:59.) In my opinion, and as I noted above, a person of ordinary skill in the art would have consulted such

teachings and suggestions when considering, designing, and implementing a location-determining process/system, like that described by *Spain-I*.

129. A person of ordinary skill in the art would have recognized and appreciated that *Hunzinger*'s teachings were consistent with technologies and techniques that were known to a person of ordinary skill in the art at the time. (See my discussions above in §V; *see also e.g.*, Ex-1016, Abstract, FIGS. 1:18-4:63, 6:30-7:3, 14:38-44 (discussing well known user defined geofence techniques/technologies), 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 (user designated zones/tasks); Ex-1061, FIG. 13c, 1:61-2:8, 8:54-9:10, 21:4-13.) Consistent with such knowledge, and the teachings of *Hunzinger*, a person of ordinary skill in the art would have found *Nanda*'s teachings beneficial in considering ways to allow fingerprint data to be collected by a mobile device for use in a fingerprint database. A person of ordinary skill in the art would have been motivated to consider *Nanda* for the additional reasons I discuss below and those I explain for the claimed threshold limitation (*see my analysis below in §IX.A.1(b)(ii)(2)*).

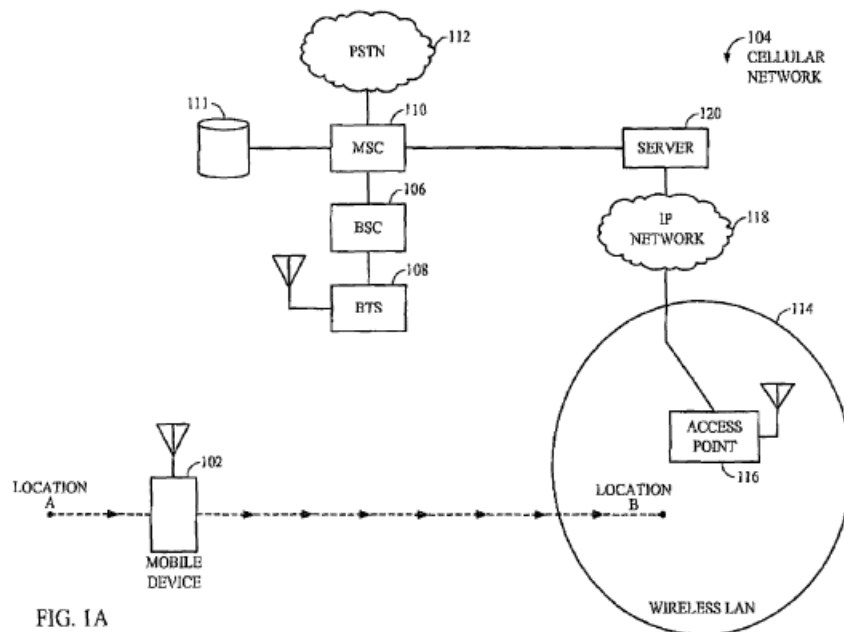
130. In my opinion, a person of ordinary skill in the art would have found *Nanda*'s teachings to further support, and were consistent with, such a person's

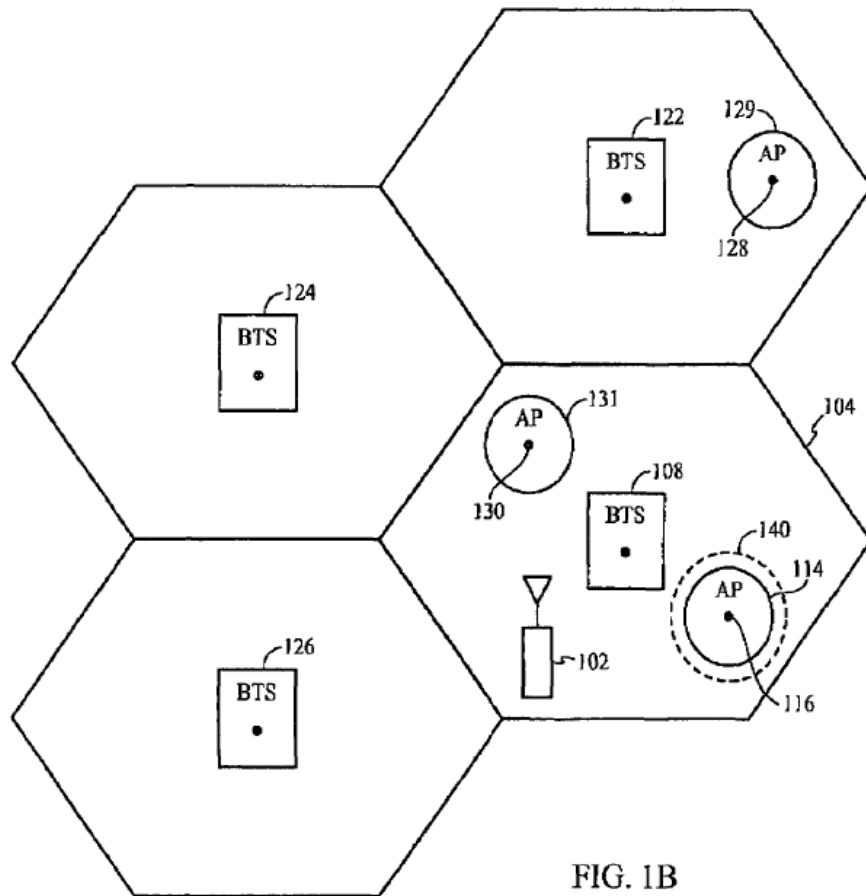
rationale for considering various ways to configure the *Spain-I* system/process to facilitate the collection of fingerprint information in a manner consistent with the suggestions I discussed above. Therefore, in my opinion, *Nanda*'s teachings of similar technologies and techniques known to a person of ordinary skill in the art would have contributed to the motivation and reasons for configuring *Spain-I* as I explain here, including in light of the teachings of *Hunzinger*.

131. I discuss *Nanda* above in §VIII.B. In my opinion, similar to *Hunzinger*, *Nanda* discloses features in the same technical field and address problems similar to those of the '583 patent, and thus would have been consulted by a POSITA for reasons above and those below (§IX.A.1(b)(ii)(2)-(3)). It is my opinion that *Nanda* discloses device location determination technologies/techniques in the same technical field as the '583 patent, similar to *Hunzinger* and *Spain-I*. (See my discussions above in §IX.A.1(pre)-(b)(ii) regarding *Spain-I* and *Hunzinger*; §VIII.A-B, VIII.F; Ex-1001, Abstract, 1:23-10:25.) Also, similar to *Spain-I* and *Hunzinger*, *Nanda* discloses features that were related to problem(s) the '583 patent aimed to address and those a person of ordinary skill in the art were looking to address. (E.g., Ex-1001, 1:23-10:25 (see e.g., 3:26-35, 5:14-37, 5:54-56); Ex-1011, 1:16-54, 3:18-40, 15:19-29; Ex-1005, 1:19-36, 1:43-54, 2:25-39, 6:63-7:4; Ex-1006, 1:21-3:2, 6:12-7:27, 8:14-11:32, 12:14-31.) It is my opinion that such teachings in *Nanda*

would have been consulted when designing/implementing a location-determining process/system, like that described in *Spain-I*

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





133. *Nanda* also explains that device 102 can observe up to n base stations with measurable signal strengths (characterized as vectors $X_1, \dots, X_n$) originating from a particular identified base station. (*Id.*, 5:57-67, 5:67-6:3 (“neighbors base stations may be identified by frequency channel or other **base station identifier and a signal strength associated with each base station**”).) The vectors can include information that “identifies a source and at least one characteristic of the reference

signal, *e.g.*, pilot or paging signal.” (*Id.*, 6:3-11; *id.*, 6:12-34 (signal strength and base station identifier).)

134. Such information may be used to provide a fingerprint of a location of mobile device 102. (*Id.*, 6:52-58 (“[i]f locations within the area 140 have a certain known fingerprint, then the ***mobile 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.***”).) Other attributes, and combinations thereof, may be used as a fingerprint (*id.*, 6:58-66) given “a fingerprint is a collection of attributes of a first communication network that changes based on location and can be used by the mobile device to determine the proximity of a second communication network” and can include characteristics of the transmitters of the second networks (*e.g.*, MAC ID, band, channel, access point RSSI information (*e.g.*, signal strength)) (*id.*, 7:6-14). Such attributes may be calculated in different ways, such as instant signal strength measurements or multiple measurements may be averaged together or otherwise combined in some statically significant manner in order to generate the fingerprint. (*Id.*, 7:19-28.)

135. Further, *Nanda* describes processes where the mobile device 102 includes algorithms for creating multiple fingerprints for subsequent comparison for determining whether the device is at or near a particular user chosen location. *Nanda*

explains “[f]or example, using the keypad 212, *a user of the mobile device 102 may select a key that causes the mobile device 102 to create a current fingerprint and store that fingerprint in memory 211.*” (Ex-1006, 8:29-36; *id.*, FIG. 2 (below).)

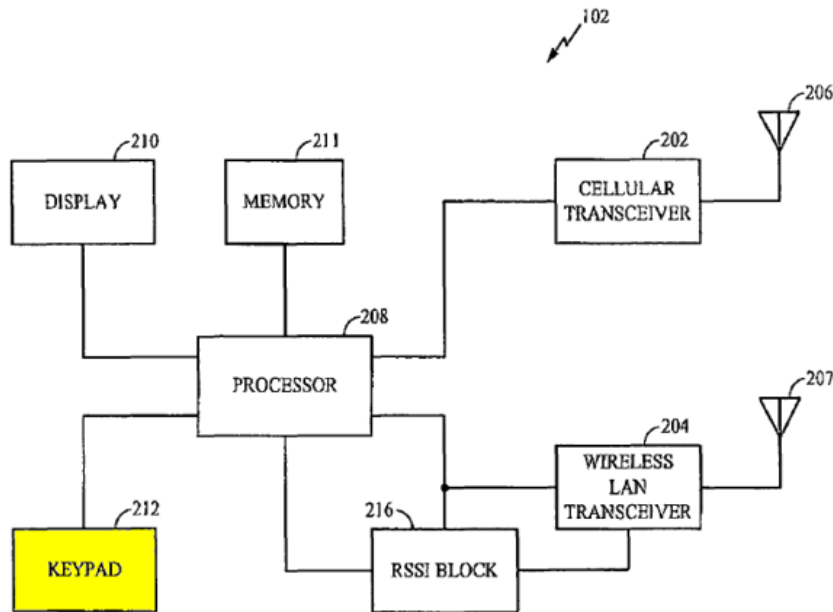


FIG. 2

In discussing Figure 3A, *Nanda* also states that “[o]nce the mobile device has connected with the access point, *the user may, in step 304, signal to the device to capture the current fingerprint*” and that “[t]his step may typically be *user-initiated because the user may want only certain* wireless LANs to be stored in the fingerprint database such as those wireless LANs that the user normally subscribes to or connects.” (Ex-1006, 9:61-10:7.)

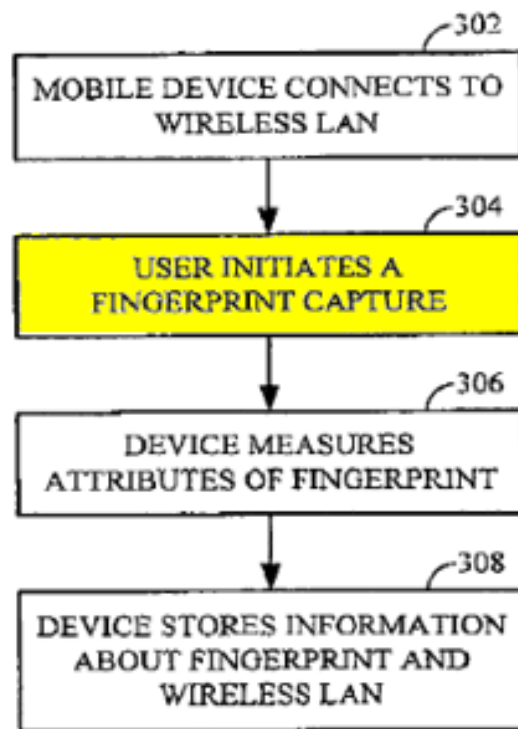


FIG. 3A

136. A person of ordinary skill in the art would have understood that *Nanda* describes features where a user of a mobile device can select when the device will create a current fingerprint while the device is at a particular location and stores that information in memory. When that occurs, the mobile device measures/collects and generates fingerprint information at a location chosen by the user (*e.g.*, a user with the mobile device may be standing a location A when selecting to initiate measurements and fingerprint generation, and thus location A is a location chosen by the mobile device user). The generated and stored fingerprint information

contains signal strengths associated with the signals received from the antenna base stations by the mobile device while the device is at a location chosen by the user, which are compared with fingerprint information of the mobile device's current location to aid in determining whether the device is in the vicinity of such a previously selected/tracked location. (See my below analysis in §IX.A.1(b)(ii)(2).) *Nanda's* disclosures are consistent with those of *Hunzinger* (Ex-1054) and the state of art knowledge at the time. (See *e.g.*, Ex-1054, 3:29-5:22 and Ex-1053, Abstract, FIG. 1, ¶¶0007-0008, 0013¹⁰)

137. A person of ordinary skill in the art would have thus appreciated how *Spain-I* teaches processes that determine if the MU “is at a particular location or not” (Ex-1011, 4:23-25; *id.*, 4:43-47, 5:54-6:8) and that *Nanda* also discloses location determining processes that determine whether a mobile device is “in the vicinity of” a location by comparing fingerprint information, which includes allowing a user to select location(s) where fingerprint-type information is collected/generated and stored (Ex-1006, 2:16-59, 5:50-7:28, 8:29-36, 9:65-10:7; see my discussions above

¹⁰ Consistent with other references I may refer to outside the prior art I identify for discussed combinations, I refer to *Bar-On* (Ex-1053) to demonstrate state of art knowledge of a person of ordinary skill in the art at the time.

in §§IX.A.1(b)(ii)(1)-(2)). Such teachings and suggestions (in addition to the other teachings and suggestions that I referenced and discussed above/below) would have led a person of ordinary skill in the art who was considering/designing/implementing the *Spain-I* system/processes for various applications to consider available ways and options to configure such a system to provide controls for designating areas/locations and triggering services/actions when the MU enters, is at, or leaves a designated area/location. (See my discussions above in §V.) In view of such teachings and suggestions of *Nanda* and *Hunzinger*, and knowledge in the art, in context of *Spain-I*, it is my opinion that a person of ordinary skill in the art would have been motivated to configure *Spain-I*'s system/processes such that the MU includes mechanisms and associated functionalities/features (consistent/similar to that described by *Hunzinger* and *Nanda*) that would have allowed the MU user to choose specific location(s) from which fingerprint information is collected/measured/generated and stored to build the fingerprint database information.

138. For instance, such a skilled person would have recognized *Spain-I*'s suggestions of providing configurations that allow a user to select locations (even in context of its FIG. 3 embodiment) and found *Hunzinger*'s and *Nanda*'s teachings relevant and persuasive in considering ways for the system/process to select

locations from which such fingerprint information was collected for subsequent use as references against the current monitored location fingerprint information, as I discussed above. For example, as I noted, *Spain-I* discloses features where the user of MU can generate a request for the position of the MU (*e.g.*, whether or not it is at (or near) the same location corresponding to a previously generated fingerprint in the fingerprint database). (See my above analysis in §§IX.A.1(pre)-1(b)(ii); Ex-1011, 5:61-6:30 (describing in connection with FIG. 3 configurations that the “request [for position of the mobile unit] may be generated by the user carrying the mobile unit” and upon receipt of such request, “the mobile unit captures the fingerprint of its “current location”); Ex-1005, 4:43-47 (“When a location estimate of the mobile unit is desired (either by the mobile unit itself or by the location server), it activates component 101 (FIG. 2), which captures predetermined from a predetermined portion of the RF spectrum.”).) Such disclosures would have suggested to a person of ordinary skill in the art user selectable location features, and would have led such a person to consider teachings in the art (like *Hunzinger* and *Nanda*) relating to similar features.

139. Thus, *Spain-I*, *Hunzinger*, and *Nanda* describe features that would have led such a skilled person to consider providing user-selectable location functionalities that facilitated the determination as to whether an MU was within

proximity of a chosen location like that recited in limitation 1(b). Such a skilled person would have been motivated for considering and implement such user chosen location features especially given *Hunzinger*'s additional details and options for providing user selectable location features, which described mechanisms for providing user-friendly interface capabilities on a mobile device, such as a menu-driven interface that enabled a user to select locations to be attributed to particular actions to be performed upon determination the mobile device is at, entering, or has left such a user-selected location (including those defined by a radius or geofence-type location(s)). (Ex-1054, FIGS. 1A-4, 1:38-2:44, 3:4-67, 4:1-5:22.)

140. A person of ordinary skill in the art would have appreciated that *Hunzinger*'s teachings were consistent with location determining technologies/techniques known to such a skilled person at the time, including those relating to geofencing and other user controlled configurations where specific/designated actions may be performed based on a location determined to be within or outside designated locations. (See my discussions above in §V; see also Ex-1016, Abstract, FIGS. 1:18-4:63, 6:30-7:3, 14:38-44 (user may define a geofence via portable device), 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 (user

designated zones where tasks are performed when it is determined mobile device is moved outside or inside zone); Ex-1061, FIG. 13c, 1:61-2:8, 8:54-9:10, 21:4-13.)

141. In my opinion, such functionalities and features (coupled with the teachings of *Nanda*) would have been in the mind of a person of ordinary skill in the art when considering *Spain-I* (see my discussions of *Spain-Nanda* for claim 1 in §IX.A.1). Such a skilled person would have found benefits in configuring the modified *Spain-I-Hunzinger-Nanda* system/processes such that the MU was programmed/configured with similar user interface capabilities and associated location-based features to allow the MU user to choose the location(s) (used in the fingerprint database) and associate service(s)/actions/tasks, etc. with such location(s), which are performed by the MU upon determining when the current location fingerprint information (*e.g.*, station ID/signal strengths) matches or otherwise within (below) a predetermined threshold of the user selected location information, in a manner like that recited in limitation 1(b) and I discuss here and below.

142. Given the teachings and suggestions of *Hunzinger*, a person of ordinary skill in the art would have appreciated the advantages/benefits of programming/configuring the modified *Spain-I* system/processes to perform location determining processes such that determining whether the MU's current

location is within proximity of the user chosen location included determining whether the MU/user is at, has entered, or has left a user chosen location and executing user selected actions based on such determination, consistent with that taught by *Hunzinger*. (See my above analysis regarding *Hunzinger*.) For example, such a skilled person would have appreciated potential advantages obtained from such modifications, such as expanding the applications of the modified *Spain-I*-system/processes so that particular (and user selected) actions can be triggered depending on how the user decides to configure such location-based functionalities using a user friendly interface on the MU (e.g., launching programs, receiving alerts, reminders, etc. based on a determination that the MU/user is at or has entered a user specified location, or has left such a location). *Hunzinger's* guidance as to the benefits of such applications (e.g., Ex-1054, 2:10-44, 5:29-6:30) were consistent with such a skilled person's understanding of similar features in the art at the time, such as position tracking, security, communication or information management, service-related and other features, etc. (See my discussions above in §V; see also e.g., 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.) A person of ordinary skill in the art would have understood that such features would have complemented the service-oriented features contemplated by *Spain-I*, which also would have motivated such a skilled

person to consider the teachings and suggestions of *Hunzinger* (and *Nanda*). (Ex-1011, 3:5-16.)

143. For example, *Spain-I* discloses:

The location of the mobile unit is of interest to the location server for several reasons such as provisioning of prompt and efficient personalized services, dispatching emergency assistance personnel, tracking the movements of the mobile unit, etc.

(Ex-1011, 3:8-16.) Also that:

In many instances, ***location server 30 is interested in only determining if mobile unit 10 is at a particular location or not.*** The resolution of knowing the mobile unit's location is not high (e.g., several meters), but much coarser, such as of the order of several tens of meters. For example, ***location server 30 may be interested in knowing if mobile unit 10 is inside a particular building, or a campus or a block.*** In such cases it is not necessary to provide very high-resolution information to location server 30.

(*Id.*, 4:23-33.) Accordingly, such a skilled person also would have been aware of similar features in location determining system applications, as suggested by *Spain-I* and known in the art (Ex-1033, 1:43-59, 5:46-6:38; Ex-1016, 1:18-4:63, 6:30-7:3, 16:41-67.)

144. A person of ordinary skill in the art would have thus appreciated benefits in allowing the user to select locations that he/she desires to be checked/tracked (*e.g.*, allow the MU user to select locations that may be of interest to them so that later the MU can inform the user or perform certain functions when the MU/user is later determined to be within the vicinity of the chosen location (*e.g.*, particular retailer, service vendor, home, office, etc.) Such action-based features/functionalities, coupled with the use of interface mechanisms to facilitate user chosen location functionalities (as I discussed above), 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 the application options considered by a person of ordinary skill in the art designing/implementing *Spain-I*'s system/process, consistent with *Hunzinger* (*e.g.*, Ex-1054, 2:10-44, 5:29-6:30), *Nanda* (*see* my discussions above), such a person's state of art knowledge (*see* my discussions above in §V; *see also e.g.*, 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).

145. A person of ordinary skill in the art would have considered known tradeoffs, such as balancing costs, processing and other computing resources,

beneficial features and expanded applications provided, and the like, in considering the modification. Consequently, in my opinion, in light of such collective teachings/suggestions from *Spain-I*, *Hunzinger*, and *Nanda* in context of a person of ordinary skill in the art's state of art knowledge, a person of ordinary skill in the art would have been motivated to configure the modified *Spain-I* system/processes where the MU performed processes to determine if a monitored location is within proximity of a location chosen by a user of the MU (*e.g.*, MU/user monitored location is at, has entered, or left a user chosen location), like that claimed (including as considered in context of the specification and statements made in the prosecution file history as I mentioned above (Ex-1004, 100)). A person of ordinary skill in the art would have leveraged their skills and knowledge to configure the resulting system/processes to include, among other things, modified software and possibly related components in the MU that worked in conjunction with the signals communicated from the antenna stations in a manner consistent with the *Spain-I-Hunzinger-Nanda* system/processes that I discussed above and features similar to those described by *Hunzinger* and *Nanda* (modified to be compatible and operational in the *Spain-I* modified MU system/processes). (Ex-1054, 4:1-5:22; Ex-1011, 4:23-26; Ex-1006, 2:16-59.)

146. A person of ordinary skill in the art would have thus understood that such modifications would have involved use of known technologies and techniques within their knowledge and capabilities. Thus, such a skilled person thus would have been capable of considering, designing, and configuring such modifications, and done so with a reasonable expectation of success in achieving them. In fact, *Hunzinger* discusses use of station ID and signal conditions (including signal strength) for location information for determining whether a device has returned to a previously identified location (Ex-1054, 4:1-20, 6:37-49, 7:9-22, 7:29-42, 8:25-38 (*see my discussions below in §IX.A.1(b)(ii)(2))*) similar to *Spain-I*'s configurations that allowed a user to select when (and thus where) MU location determination is to be initiated (*e.g.*, Ex-1011, 6:9-21) and use of station ID and associated signal characteristic information (*id.*, 13:16-14:31), and the state of art (Ex-1062, 1:26-33 ("The mobile station's position is determined to lie in the area corresponding to a fingerprint data point of highest correlation to the RF data sample."); Ex-1028, 12:55-13:18 (discussing fingerprint location techniques to determine whether a user has entered or exited a given area)). (*See also* Ex-1011, 3:34-40, 15:19-35.)

147. Thus, it is my opinion that the collective teachings/suggestions of *Spain-I-Nanda-Hunzinger* and a person of ordinary skill in the art's state of art knowledge, would have motivated such a skilled person to configure/modify the

Spain-I system/processes with beneficial features like those discussed above (e.g., MU interface mechanisms/functionalities allowing a user to choose location(s) from which fingerprint data is collected for building the user chosen locations in the database, and configurations that perform user selected actions to be executed/performed depending on user-selected proximity trigger conditions (at, entering, left location(s), etc.)). Accordingly, the *Spain-I-Hunzinger-Nanda* combination (including as complemented by the teachings of *Nanda* for reasons mentioned below in §IX.A.1(b)(ii)(2)) discloses/suggests the “determining if a monitored location is within proximity of a location chosen by a user of the first portable RF communication device” (MU) features of limitation 1(b), including where such proximity features encompasses the monitored location being at the user chosen location, and where they include determining that the MU/user has entered or left such location, consistent with that discussed in the specification and/or the prosecution file history of the ’583 patent (as I discussed above).

**(2) Comparing ID and Signal Strengths Figure(s)
and Difference/Predetermined Threshold
Features**

148. In my opinion, the *Spain-I-Hunzinger-Nanda* combination discloses and/or suggests the comparison and difference/threshold features recited in limitations 1(b)(i)-1(b)(ii).

149. As I explained above, *Spain-I* discloses comparing fingerprint information associated with a current monitored location with stored fingerprint information associated with previously tracked/selected locations. (See my above analysis in §§VIII.A, IX.A.1(pre)-1(b)(ii)(1).) As I explained, such locations corresponding to the fingerprint data in the fingerprint database would have been selected by a user of the MU in the modified *Spain-I* system/processes for reasons explained above (see my discussions and analysis above in §IX.A.1(b)(ii)(1)). Each fingerprint can be generated based on at least one station ID and measured signal strengths of the communication signal(s) from respective antenna station(s) when the MU is at a respective chosen location. (§§IX.A1(pre)-1(b)(ii)(1).)

150. I understand that the '583 patent associates signal strength measurements as “figure[s]” like that claimed in claim 1. (See e.g., Ex-1001, 27:41–43 (claim 22 (“The method of claim 1 wherein *the ‘at least one figure* based on the signal strengths’ *is the signal strengths* for both the monitored location and the chosen location”).) Thus, *Spain-I*’s signal strength measurements are examples of such claimed “figure(s).”

151. In addition to that I discussed above, *Spain-I* discloses various ways to determine whether fingerprint information matches or is “close” to each other. *Spain-I* explains:

The generated fingerprint is compared with the fingerprints in the database and the fingerprint in the database that is closest to the generated fingerprint is selected as the match. *The corresponding location in the database is then chosen as the location of the MU.* In one embodiment of the invention, the search algorithm takes more than one fingerprint from the database that are closest to the generated fingerprint and interpolates the most plausible location for the MU from the locations of the chosen fingerprint. (Ex-1011, 5:66-6:8; Ex-1005, 4:22-36.)

“There are many choices for the search algorithm that is required to determine the closest matching fingerprint, as can be appreciated by one skilled in the art of statistical pattern matching,” including choosing “the fingerprint from the database that has the smallest mathematical distance between itself and the captured fingerprint” (e.g., “norm between the two data sets” and “average squared difference between the two fingerprints”). (Ex-1011, 8:8-21; Ex-1005, 5:10-33).

152. A person of ordinary skill in the art would have understood that while *Spain-I* discloses features such as comparing fingerprints and using difference/distance processes to evaluate the closeness of a match between such fingerprint comparisons, *Spain-I* does not expressly provide details as to how the fingerprint data is assessed or how such comparisons are performed, including in

context of the fingerprints' underlying parameters (*e.g.*, associated with features like comparing monitored and user chosen location station ID/signal strengths (**limitation 1(b)(i)**). Nor does *Spain-I* expressly provide details regarding determining whether a difference between compared signal strengths measured at the monitored location and signal strengths measured at the user chosen location (*see* my discussions above regarding user chosen location features in §IX.A.1(b)(ii)(1)) is less than a predetermined threshold like that recited in **limitation 1(b)(ii)**.

153. However, a person of ordinary skill in the art would have understood at the time that there were numerous ways for analyzing fingerprints/signal characteristics to determine location proximity (as *Spain-I* suggests). Therefore, such a skilled person would have had reasons to consider teachings and guidance from the art, and thus would have been motivated to consider such disclosures when considering *Spain-I* (including in context of the modifications I discussed above relating to *Hunzinger* and *Nanda*). (*See* my discussions above in §IX.A.1(b)(ii)(1) and in §V; *see also e.g.*, 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.) Accordingly, such a skilled person would have been motivated by the collective teachings of *Hunzinger* and

Nanda to configure the MU in the above modified *Spain-I* system/processes (§IX.A.1(b)(ii)(1)) to determine if the MU's monitored location is in proximity of a user chosen location (**limitation 1(b)**) by electronically comparing at least one station ID and at least one figure based on the signal strengths of the first plurality of antenna stations at the monitored location with the at least one ID and the at least one figure based on signal strength figure(s) of the first plurality of antenna stations at the location chosen by the user, like that claimed in **limitation 1(b)(i)** and based on such comparisons, determine if a difference between the measured signal strengths for the monitored and user chosen locations was below a predetermined threshold like that claimed in **limitation 1(b)(ii)**.

154. For example, as I discussed above in §IX.A.1(b)(ii)(1)), *Hunzinger* discloses features where a mobile device includes position location technology and memory to store remembered location information, monitors the mobile device's current location, and compares remembered locations with current location information to determine whether the device has left or entered a remembered location to execute particular actions.

FIG. 2 is a flow chart illustrating location reminder programming, monitoring and triggering procedures according to one embodiment of the present invention. *The procedure is executed on a mobile terminal with or without position location*

technology. The mobile terminal has some type of user-interface that is capable of allowing selecting or programming reminders alerts, or actions. The mobile terminal also includes memory for storing location related information (“remembered” locations) and trigger or action information. ***The terminal also includes a position-monitoring function that compares one or more “remembered” locations with current location information.***

(Ex-1054, 3:49-60.) (See also *id.*, 4:21-57.)

155. *Hunzinger* explains that **location information** can include “station ID” and “signal conditions” (*id.*, 4:3-8). In particular, location information can include base station IDs and signal strength data, which are compared to determine whether the mobile device is at, entered, or left a remembered location. *Hunzinger* discusses location information in its claims:

1. A method of providing a terminal with location-based actions in a communications network comprising:

storing at least a ***first set of location information;***

associating a terminal action with said first set of location information; and

executing the associated terminal action when a ***current terminal location information is within a specified range of the first set of location information;***

applying to a ***comparison between the current terminal location information and the first set of location information*** a step selected from the group consisting of hysteresis, delay, proximity threshold, distance threshold, signal condition change threshold.

8. The method of claim 1, wherein said ***location information consists of at least one*** of the elements selected from the group consisting of ***base station identifier, pilot signal strength***, pilot signal pseudo noise offset, multi-path profile, signal conditions, location identification, location name and area name.

(*Id.*, 6:37-49, 7:9-22.) (See also *id.*, 7:29-42, 8:25-38.)

156. *Hunzinger* also describes with reference to FIG. 3 (below) an exemplary monitoring/triggering action where the device “monitors the current location information *compared* to the stored reminder *location information*,” and the compared location information may include base station ID and pilot signal strength information (*Id.*, 4:60-5:22 (describing reminder triggered when device is at location 300; transitions based on base station ID, pilot, etc.), 4:1-12, 6:37-49, 7:9-22, 7:29-42, 8:25-38.)

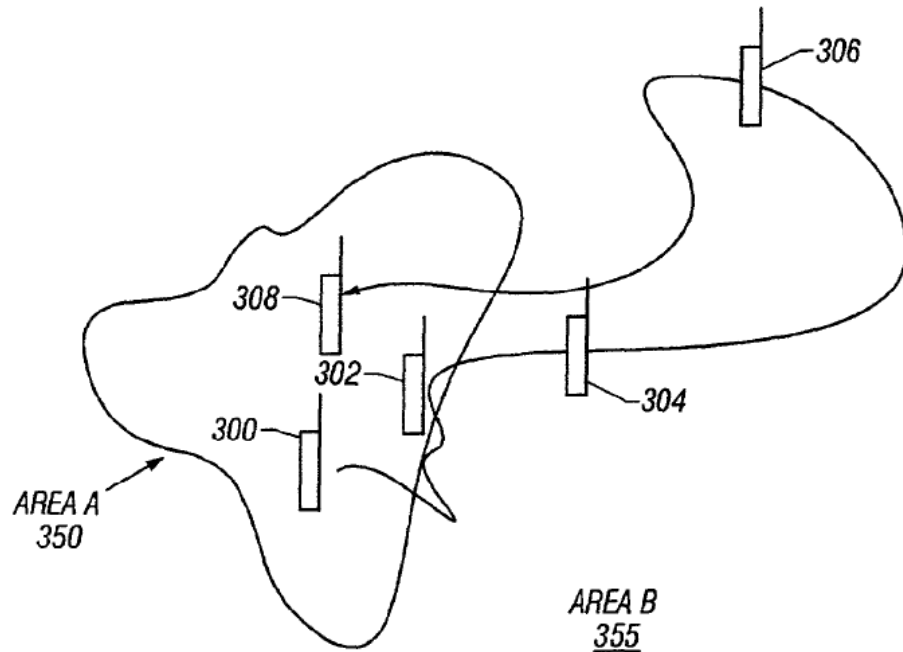


FIG. 3

(*Id.*, FIG. 3; *see also* my discussions of *Hunzinger* above in §IX.A.1(b)(ii)(1).)

157. A person of ordinary skill in the art would have appreciated and understood that *Hunzinger*'s teachings were consistent with technologies and techniques known to such a person at the time. (*See* my discussions above in §IX.A.1(b)(ii)(1) and in §V; *see also e.g.*, 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.)

158. For example, in considering the teachings of *Nanda* for reasons I discussed above (§IX.A.1(b)(ii)(1)), a person of ordinary skill in the art would have also found and considered teachings relating to comparing signal strength and station ID data fingerprint data in location determining systems that perform processes for determining if a mobile device is in proximity of a location. For example, *Nanda* discloses collecting signal information to generate fingerprints associated with specified locations, which are stored and used to be compared with a current location fingerprint to determine whether the mobile device is located within the proximity of a location associated with a matching fingerprint. (See my above discussions regarding *Nanda*, including those in §VIII.B; Ex-1006, FIGS. 3A-3B, 2:43-51, 6:12-66, 7:6-13.) *Nanda* describes configurations where a mobile device 102 executes an algorithm for creating fingerprints and “comparing different fingerprints to one another” and that a fingerprint may be associated with connected wireless LAN access point(s). (Ex-1006, 8:29-55.) Such processes results in stored information—exemplified in the table below—including antenna station identifiers and corresponding signal strengths.

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.*, 8:29-55, 9:31-10:13; *id.*, 8:56-9:7 (“particular base stations in the WAN may be identified by ... pilot signal strengths” and access points A₁-A₃ and B₁-B₂ are within coverage of base stations A and B, respectively).)

159. *Nanda* explains that the last two columns of the above table “include the values that comprise the fingerprint itself,” where “the fingerprints for the access points B₁ and B₂ comprise only signal strength information.” (Ex-1006, 9:8-13.) The mobile device may “calculate a fingerprint for its current location and compare it to the information in columns 4 and 5 in the table,” and may limit its fingerprint match to entries corresponding to the WAN ID with which its registered (*e.g.*, “when registered with WAN ID A [or B], only fingerprints associated with WAN ID A [or B] in the table are used for matching”). (*Id.*, 9:17-20.) “[C]omparison of a current fingerprint to a stored fingerprint can be performed in a variety of ways.” (*Id.*, 10:14-16.) Because fingerprints have attributes that may vary (even for the same location), *Nanda* describes a comparison process that does not rely on “exact duplicity” for a match. (*Id.*, 10:22-25.) Thus, *Nanda* defines a “deviation amount” to “help control

the determination of whether a finger matches a stored fingerprint” (*id.*, 10:36-38), which is shown in the table below as “d” for signal strength deviation.

WAN ID	WLAN BSS ID	Signal Strength	Strength Deviation	Phase	Phase Deviation
A	A ₁	$s_1(A_1) \dots s_n(A_1)$	$d_1(A_1) \dots d_n(A_1)$	$p_1(A_1) \dots p_n(A_1)$	$q_1(A_1) \dots q_n(A_1)$
	A ₂	$s_1(A_2) \dots s_n(A_2)$	$d_1(A_2) \dots d_n(A_2)$	$p_1(A_2) \dots p_n(A_2)$	$q_1(A_2) \dots q_n(A_2)$
	A ₃	$s_1(A_3) \dots s_n(A_3)$	$d_1(A_3) \dots d_n(A_3)$	$p_1(A_3) \dots p_n(A_3)$	$q_1(A_3) \dots q_n(A_3)$

(*Id.*, 10:39-51.) The above table shows identified antenna stations (*e.g.*, A₁, A₂, A₃) respectively associated with signal strength figure(s) (*e.g.*, $S_1\{A_1\} \dots S_n\{A_1\}$) and deviations (*e.g.*, $(d_1\{A_1} \dots d_n\{A_1\})$).

160. Regarding FIG. 3B (“method to compare fingerprints of different locations”) (Ex-1006, 3:18-19), when the MU is controlled to capture a current location fingerprint, a signal strength vector is collected (“ $X_i \dots X_n$ ”). (*Id.*, 10:51-56, FIG. 3B (320) (below).)

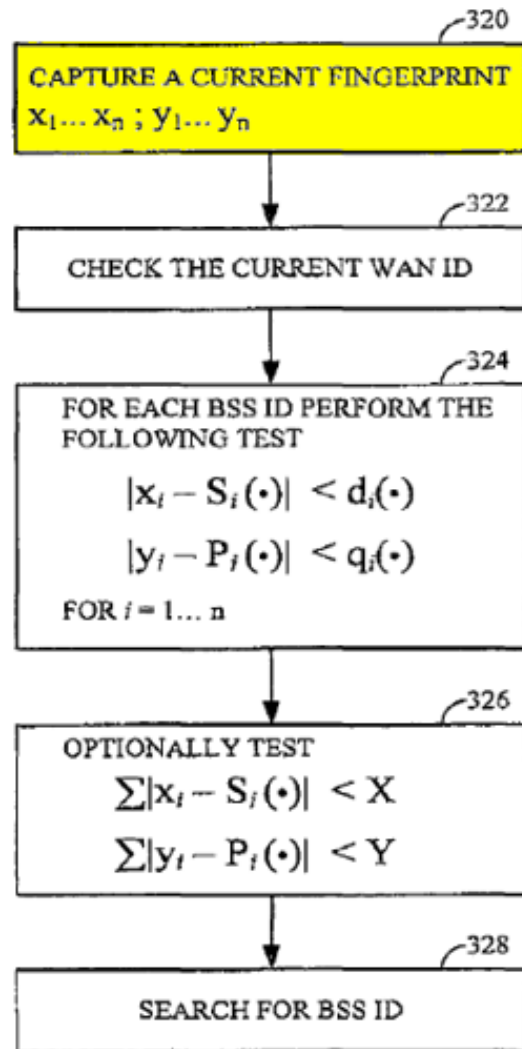
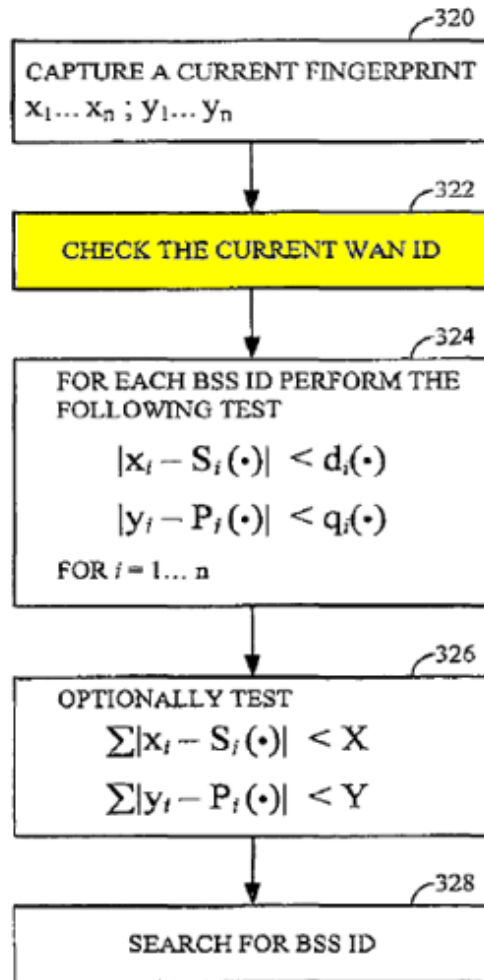


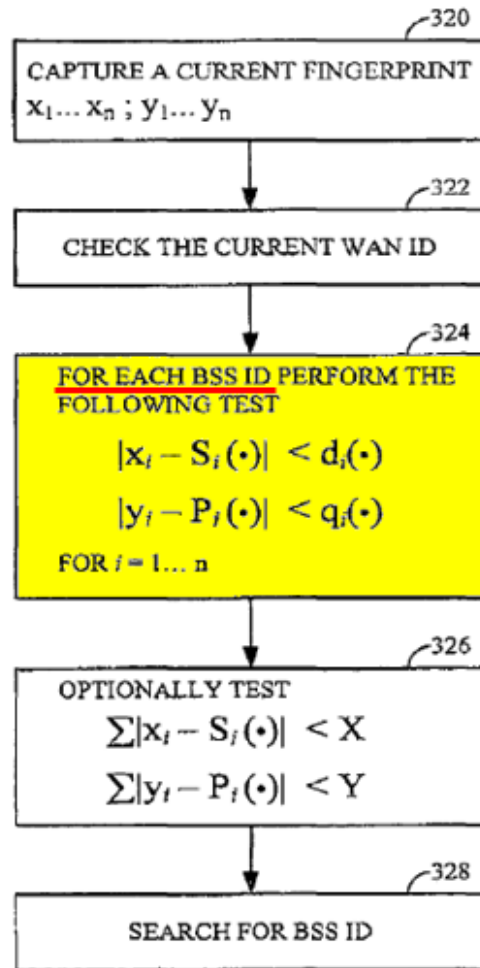
FIG. 3B

161. At step 322, the current WAN ID is checked and identified access point information is determined for the current location (*Id.*, 10:58-60; *id.*, 9:31-38 (discussing information stored in the table of column 8 may vary, including the “combinations of WAN IDs versus access point IDs”), *id.*, 9:38-52 (“... store

information about the corresponding access point (*i.e.*, the BSS ID’), 10:60-61 (“searching database for identifiers of the observable pilots [signals]”).)



162. At step 324, the signal strengths of fingerprint(s) for each BSS ID (access point) within an identified WAN ID (*e.g.*, A or B) is compared to the current fingerprint signal strengths to determine if the difference is below a predetermined threshold.



163. Algorithmically, the process may be performed by:

```
For i = 1 to n:
    determine if | xi - si(•) | < di(•)
    determine if | yi - pi(•) | < qi(•)
```

where d = deviation value (e.g., a threshold), x_i = signal strength of current signal i , and s_i = stored signal strength. (Ex-1006, 10:62-11:10.) A “match” is determined

when the difference is less than ($<$) a predetermined threshold (d). (*Id.*) *Nanda's* comparisons performed for the WAN IDs (322) and “each BSS ID” (324) indicates a comparison of antenna station IDs since the stored figure(s) (“Si”) and current figure(s) (“Xi”) are compared for the same BSS ID and associated WAN ID, and thus a person of ordinary skill in the art would have understood *Nanda* to disclose or suggest comparing station identifier information to ensure relevant strength value information are compared (*e.g.*, figure(s) corresponding to the same access points and/or WAN base stations (FIG. 3B, Steps 322-324). *Nanda* states that in step 322 “[f]urther search refinements are possible by **searching the database for identifiers of the observable pilots.**” (Ex-1006, 10:60-61.) That is, before the signal strength comparison takes place in step 324, the system compares monitored base station identifiers to identifiers stored in the database. (*Id.*) Moreover, in describing how the fingerprint entries can be refined, *Nanda* discloses how the BSS ID of a received communication signal at a current monitored location is checked against the BSS IDs in the fingerprint database. (Ex-1006, 11:33-41.) If no entry exists for that BSS ID (antenna station), “a current fingerprint can be generated (see FIG. 3A) and then stored.” (*Id.*, 11:42-43.) If a fingerprint entry exists for the access point, then the current fingerprint may be used to refine the stored fingerprint. (*Id.*, 11:43-46.) Refinement can include be made “with reference to the signal strength parameter. .

. or any other attributed that used to create the fingerprint.” (*Id.*, 11:47-56; *see id.*, 11:56-12:13 (strength/deviation values adjusted).

164. A person of ordinary skill in the art would have understood that based on this searching/comparison, the system would then proceed with the signal strength comparisons in step 324 to determine if there is a fingerprint match. (Ex-1006, 10:58-66.) Such signal source identifier comparison features like that disclosed by *Nanda* were well-understood to reduce processing requirements by ensuring a mobile device is generally close to a previously marked location before performing more demanding location processing. (*See* my discussions above in §V; *see also e.g.*, Ex-1033, 2:63-3:19.)

165. *Nanda* discloses an “optional” test (Step 326) that compares the sum of all differences to a “threshold” X to refine whether a “match” is made. (*Id.*, FIG. 3B (step 328 (below), 11:11-18.))

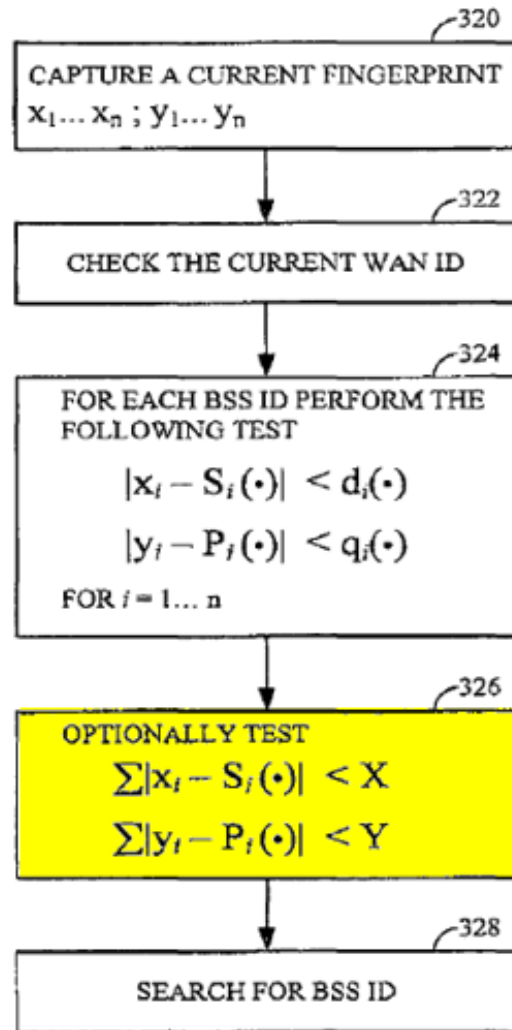


FIG. 3B

166. Thus, *Nanda* discloses and/or suggests a mobile device performing processes that compares stored signal strength figure(s) and a corresponding antenna station ID with the current signal strength figure(s) and corresponding antenna station ID in order to determine whether the difference between the compared signal

value(s) are below a predetermined threshold (*e.g.*, *d*), similar to the features recited in claim limitations 1(b)(i)-(b)(ii).

167. Based on the teachings and suggestions of *Hunzinger* and *Nanda*, in context of their state-of-art knowledge and *Spain-I*, a person of ordinary skill in the art would have been motivated to modify/configure the *Spain-I* system/processes (as modified above (§IX.A.1(b)(ii)(1))) in such a way that the MU performs location determining processes that include comparing at least one station ID and at least one figure based on the signal strengths (*e.g.*, SS value(s)) for the signals that are received from the first antenna stations (*e.g.*, stations in range of the MU when generating fingerprints for the database) for a currently monitored location with at least one station ID and at least one figure based on the signal strengths (*e.g.*, SS value(s)) stored in the fingerprint database (relating to user chosen location(s)) (*see* §IX.A.1(b)(ii)(1)). Comparing the station ID information in such a manner would have allowed the MU in the modified *Spain-I* system/processes to use signal strengths corresponding to signals received from the same antenna stations when performing location determining processes (*e.g.*, determining whether the MU is at, entering, or has left, a user chosen location). A person of ordinary skill in the art would have appreciated that signal strength comparisons between signals communicated from the same identified base stations were needed for appropriate

determinations as to whether the mobile device was at or near a user chosen location associated with fingerprints stored in the database so that appropriate action(s)/operations could be triggered, consistent with the features discussed above and by *Hunzinger* (§IX.A.1(b)(ii)(1)).

168. Similarly, the collective teachings and suggestions of *Nanda* and *Hunzinger* in context of *Spain-I* would have led a person of ordinary skill in the art to configure the MU to determine if its monitored location is within proximity of a user chosen location based on whether a difference between compared signal strengths for the monitored and user selected location(s) is below a predetermined threshold like that claimed and suggested by *Nanda* and *Hunzinger*.

169. A person of ordinary skill in the art would have appreciated *Spain-I*'s teachings and suggestions (*see* my above analysis in §§IX.A.1(pre)-1(b)(ii)(1) and above here in this section) in context of the location determining processes disclosed by *Hunzinger* (describing comparing current location information (*e.g.*, base station ID and signal strengths) with remembered location information (*e.g.*, base station ID and signal strengths)) and those by *Nanda*, which describes processes that compares signal strength figure(s) for a current location (*e.g.*, $x_i \dots x_n$) with signal strength figure(s) for previous selected locations (*e.g.*, $s_1 \dots s_n$) for each BSS ID and/or corresponding WAN ID, which ensures the strengths analyzed are associated with

the same antenna station (Ex-1006, FIG. 3B, 8:43-30, 10:49-11:19, 10:60-61 (the database is “search[ed]. . . for identifiers of the observable pilots”).)

170. Guided by such teachings/suggestions, a person of ordinary skill in the art would have been led to modify *Spain-I*'s system/processes (e.g., the MU) to perform processes that electronically compares antenna station IDs and signal strength figure(s) for the current monitored location of the MU with those for the user chosen location(s) stored in the fingerprint database (as I explained above) in order to determine whether the MU is within the proximity of the user chosen location as I discussed above. Implementing such features would have enhanced accuracy in determining whether the MU is within proximity of a user selected location, as it would provide for analysis of signal strengths of signals received from the same identified antenna stations within communication range of the MU at the respective locations, consistent with the features taught, suggested, and/or contemplated by *Spain-I* and *Hunzinger* and *Nanda*. (See my discussions below and my above analysis in §§IX.A.1(pre)-1(b)(ii)(1).)

171. For reasons similar to those I explained above, it is my opinion that a person of ordinary skill in the art would have been motivated to configure the modified *Spain-I* system/processes to determine if a monitored location is within proximity of a user chosen location based on whether a difference between the

compared signal strengths for the monitored and user selected locations is below a predetermined threshold, similar to processes/techniques that were taught/suggested by *Nanda*. Providing such features would have benefited *Spain-I*'s modified system/processes by providing a determinable range of acceptable signal strength difference(s) (below a predetermined threshold) to ascertain whether such strengths are close enough to determine whether or not the MU is currently within an acceptable proximity of a previously user chosen location corresponding to information stored in the fingerprint database of the *Spain-I-Hunzinger-Nanda* system/process.

172. A person of ordinary skill in the art would have appreciated that *Spain-I* contemplates different “ways to define ‘closeness’ between two fingerprints” (Ex-1011, 8:19-22), including processes that assess a “difference” between data sets of the fingerprints (*e.g.*, average squared difference, smallest mathematical distance, etc.) (*id.*, 8:9-26). A person of ordinary skill in the art would have been motivated to implement the above-noted predetermined threshold features (like that recited in limitation 1(b)(ii) given *Spain-I*'s teachings/suggestions and those of *Hunzinger* in context of *Nanda*'s teachings/suggestions, which describe the use of a predetermined threshold to aid in location determination processes similar to those of *Spain-I*. (Ex-1006, FIG. 3B, 10:36-11:32.) Such teachings/suggestions would have led such a

skilled person to consider various ways to determine whether signal strength value(s) for a monitored location match or are close to signal strength values of previously selected location(s) in the fingerprint database, including those taught by *Nanda*. (Ex-1011, 3:34-40.) As a result, in context of the guidance provided by *Nanda* (and a person of ordinary skill in the art's knowledge in the art at the time) and those of *Spain-I* and *Hunzinger*, it is my opinion that such a skilled person would have appreciated the benefit of using a predetermined threshold as a mechanism to aid in determining when compared signal strengths are close enough to result in a determination that the MU is at or acceptably near a user selected location. (Ex-1006, 2:15-24; Ex-1011, 3:8-16, 4:23-35.) The resulting modified system/processes would have involved the MU determining if the difference between the signal strengths measured at the monitored location and the signal strengths at the location chosen by the user (as I discussed above) is less than a predetermined threshold similar to that recited in limitation 1(b).

173. A person of ordinary skill in the art would have leveraged their experience and skills, and the teachings of *Spain-I-Hunzinger-Nanda* to, for example, program software (or configure such software and possibly related components) executed/used by the MU to compare station ID information to ensure that the corresponding fingerprint information was available, for facilitating signal

strength comparisons, with the current location fingerprint information. This would have predictably resulted in ensuring that the algorithms/software employed to determine whether the MU is in the vicinity of a previously selected location is based on the comparison of signal strength values associated with signals received from the same antenna stations when the MU is at the current monitored location and previously selected location(s). Doing so would have conserved processing resources by avoiding comparison operations if no station IDs matched (such as when the MU has received signals from antenna station(s) that have no corresponding fingerprint information in the fingerprint database.

174. In similar fashion, a person of ordinary skill in the art would have leveraged their experience and skills and teachings of *Spain-I-Hunzinger-Nanda* in order to program/configure the modified system/processes to use a predetermined threshold (like that discussed above) designed to promote accuracy and versatility in determining whether the MU was in proximity of a previously user selected location, depending on design parameters and/or criteria for a given application of the modified *Spain-I-Hunzinger-Nanda* system/processes. Such a skilled person would have been motivated to develop and implement a modified system that operates according to a particular application of such system (*e.g.*, a larger variance in signal strength differences (*e.g.*, higher threshold) may be acceptable for

determining location for one application, but not acceptable for another). Thus, such a skilled person also would have considered known tradeoffs—balancing costs, processing resources, and the like—to program/configure the modified system/processes with a predetermined threshold acceptable for a given application.

175. Implementation of such comparison and threshold features would have been consistent with teachings/suggestions in *Spain-I*, which discuss computationally-efficient techniques for determining the MU's location (*see* Ex-1011, 1:50-2:20, 6:31-7:57, 8:27-13:15) and processes designed to complement existing location determining technologies and augments their performance (*id.*, 3:34-40), and also with those of *Nanda* (Ex-1006, FIG. 3B, 10:62-11:18) and *Hunzinger* (Ex-1054, 3:49-60, 4:3-5:22, 6:37-49, 7:9-22). *Spain-I* also contemplates various applications for its system/processes (Ex-1011, 3:5-16, 13:19-35.) Thus, a person of ordinary skill in the art would have had reasons to consider providing comparison operations (comparing IDs and signal strengths of a monitored and user chosen location) to determine whether a difference between such relevant strength measurements were below a predetermined threshold, which are adjustable to accommodate different applications. When programmed (or adjusted) and subsequently executed, such a threshold would have been predetermined.

176. A person of ordinary skill in the art would have had the skills and rationale in light of the teachings/suggestions of *Spain-I-Hunzinger-Nanda*, and such a skilled person's state-of-art knowledge, to implement the above-modifications with a reasonable expectation of success. For instance, such a skilled person would have understood that such modifications would have involved known technologies/techniques (*e.g.*, programming and use of known computing/electronic components and wireless communication/networking technologies, etc.). The combined teachings of *Spain-I*, *Hunzinger*, and *Nanda* would have thus predictably resulted in the modified system (*e.g.*, MU) being configured to compare station IDs for a monitored location and a user selected location (stored in the database) to ensure signal characteristics from the same stations are analyzed (*e.g.*, which would have included comparing signal strength figure(s) for the identified monitored and user selected locations) according to a predetermined threshold designed to facilitate accurate location determination according to the application of the modified *Spain-I* system/process. Consequently, the modified system/process would have determined whether or not a MU is at, or has reached, a particular location like of that claimed. (*See my discussions above in §IX.A.1(b)(ii)(1).*)

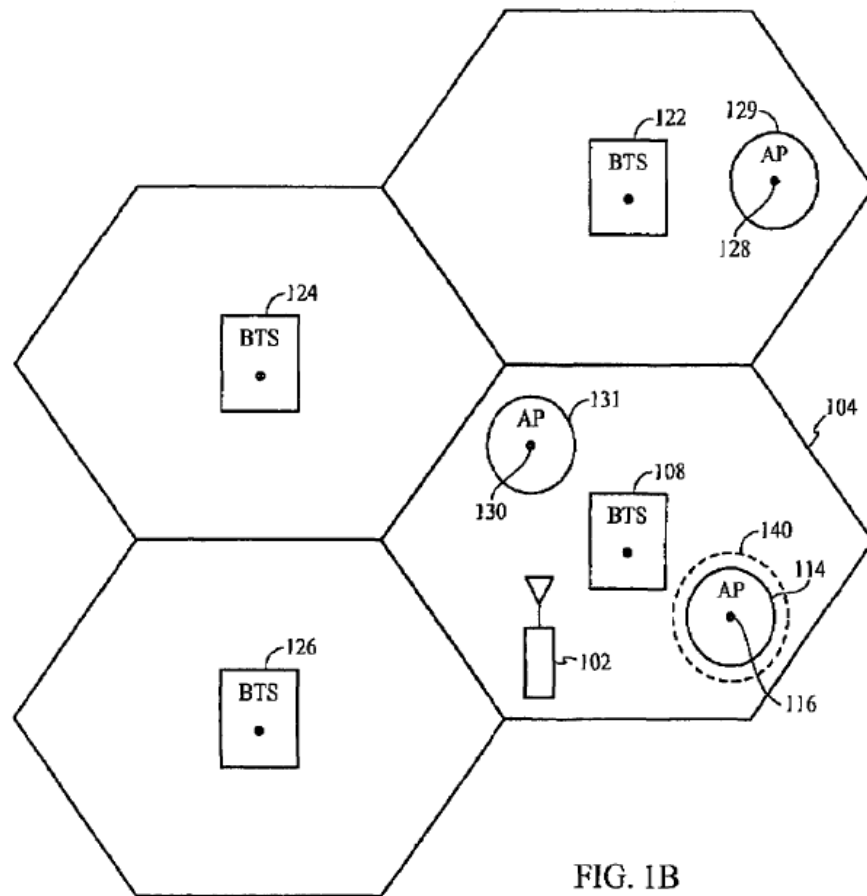
**(3) Substantially Continuously Operating
Fixed-Location Service-Area Antenna Stations**

177. As I explained for limitation 1(pre), *Spain-I* discloses or suggests that the MU is working in conjunction with the ***continuously operating fixed-location service-area antenna stations*** as claimed. (See my discussions above in §IX.A.1(pre).) However, I have also been asked to assume a scenario wherein *Spain-I* does not disclose or does not, by itself, suggest such claimed features. As to that scenario, it is my opinion that a person of ordinary skill in the art would have been motivated to implement them in the above modified *Spain-I* system/processes in view of the teachings of *Nanda* and *Hunzinger*.

178. Upon considering *Hunzinger* and *Nanda* in context of the teachings in *Spain-I*, like that of which I discussed above (§§IX.A.1(b)(ii)(1)-(2)), a person of ordinary skill in the art would have been motivated to configure the *Spain-I* system/processes (including as modified above) in such a way so that the MU works in conjunction with substantially continuously operating, fixed-location service-area antenna stations capable of RF communication with the MU to expand/complement applications compatible with those contemplated by *Spain-I*.

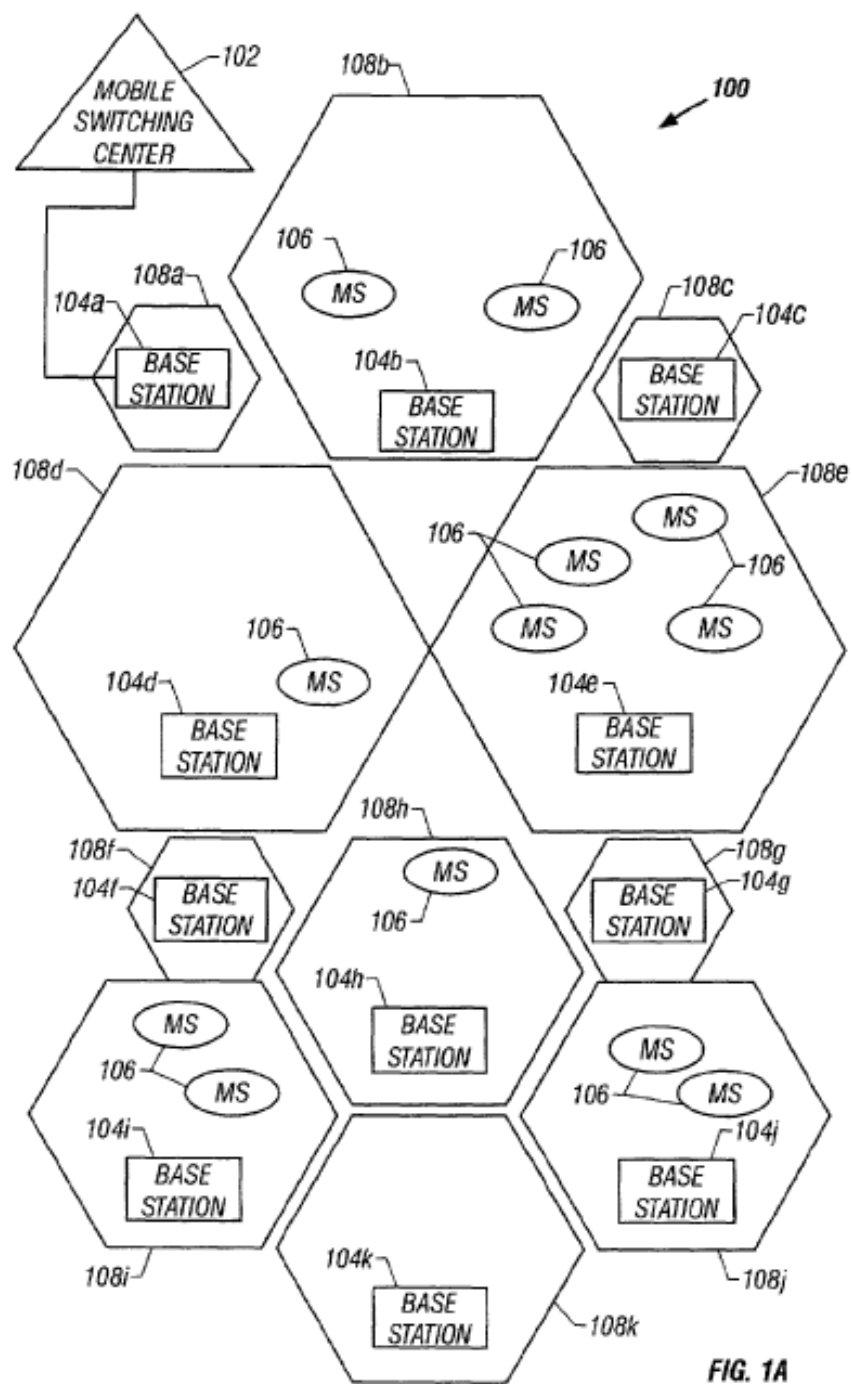
179. For example, in addition to that I discussed above and in §VIII.B, *Nanda* discloses the well-known use of “***fixed base transceiver station[s] (BTS)***”

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.)



180. A person of ordinary skill in the art would have understood that the BTSs and access points are examples of fixed-location service-area antenna stations that substantially continuously operate, given they are in fixed locations and provide beacon/pilot signals and facilitate radio communications with mobile device 102 within a coverage area provided by such stations.

181. *Hunzinger* also discloses use of known base stations. (Ex-1054, FIG. 1A (below), 1:21-54, 5:6-12, 7:9-14.)



182. In my opinion, a person of ordinary skill in the art would have appreciated that implementing such substantially continuously operating fixed stations, like those described by *Nanda* and *Hunzinger* (and also as known in the art), would have enhanced the use of *Spain-I*'s MU in such wireless network infrastructures. This would have involved wireless communications between the MU and the stations to facilitate a location-determination process similar to that disclosed by *Nanda* and *Hunzinger*. (See my above analysis in §§IX.A.1(b)(ii)(1)-(2).) The disclosures of base stations, wireless communications, and the like in *Spain-I*, coupled with the complementary teachings in *Nanda* and *Hunzinger*, and a person of ordinary skill in the art's knowledge of the art, would have motivated such a skilled person to configure and implement the MU in a wireless network that includes a plurality of such antenna stations that substantially continuously operate to provide communication signals that the MU uses to build the fingerprint database and facilitate location determination processes.

183. A person of ordinary skill in the art would have had the skills and rationale in light of the teachings/suggestions of *Spain-I-Hunzinger-Nanda*, and such a skilled person's state-of-art knowledge, to implement the above-configuration with a reasonable expectation of success for reasons similar to those I explained above in §IX.A.1(b)(1)-(2). Likewise, the above implementations would have

involved known technologies/techniques (*e.g.*, use of known antenna stations consistent with that taught by *Spain-I*, *Hunzinger*, and *Nanda*) that would have led to the MU in the modified *Spain-I* system/processes discussed above working in conjunction with conventional antenna stations like those contemplated by *Spain-I*, *Hunzinger*, and *Nanda*. (Ex-1011, 3:34-40, 15:19-29.)

2. Claim 2

a) The method of claim 1 wherein the chosen location signal strengths were measured by the first portable RF communication device.

184. It is my opinion that *Spain-I*, in view of *Hunzinger* and *Nanda*, discloses and/or suggests these limitations for reasons similar to those I explained in claim 1. (§IX.A.1(pre)-IX.A.1(b)(ii).) As I discussed, *Spain-I* discloses that the MU measures signal strengths. (*See id.*; my discussions above in §VIII.A; Ex-1011, 3:55-65, 5:28-32.) Thus, consistent with my analysis and discussions above (§IX.A.1(b)(ii)(1)), the MU in the modified *Spain-I* system/process would have measured the signal strengths of the received communication signals from such user chosen location(s), consistent with *Spain-I*'s teachings/suggestions and those of *Hunzinger* and *Nanda*. (§IX.A.1(pre)-IX.A.1(b)(ii); Ex-1011, 5:20-32, 3:55-58, 5:20-28, 13:49-55; Ex-1005, 3:57-61, 4:16-18; Ex-1009, 3:7-24, 4:34-44; Ex-1010, 3:4-21, 4:32-44; Ex-1006, 9:61-11:9; Ex-1054, 3:49-60, 4:3-5:22, 6:37-49, 7:9-22.)

Thus for similar reasons, it is my opinion that the *Spain-I-Hunzinger-Nanda* combination discussed above for claim 1 discloses or suggests the user chosen location signal strengths were measured by the MU (*e.g.*, the first portable RF communication device), as claimed in claim 2.

3. Claim 3

- a) **The method of claim 1 wherein the chosen location signal strengths were measured by a second portable RF communication device, different from the first portable RF communication device.**

185. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda*, discloses and/or suggests this limitation.

186. *Spain-I* discloses that the MU communicates with location server/Other Party 30 through a wireless infrastructure involving base stations of a cellular network. (Ex-1011, 3:8-11, 4:7-22.) The location server/Other Party 30 can be a mobile device. (*Id.*, 3:9-12 (“The location server may or may not be mobile”).) *Spain-I* describes configurations where the fingerprint database may be stored at the location server/Other Party 30. (See my above analysis in §§IX.A.1; Ex-1011, FIG. 3, 6:9-14 (“fingerprint database is stored at the location server”), 6:15-30; Ex-1005, FIG. 3, 4:28-58; Ex-1009, 5:22-42; Ex-1010, 5:20-41.) Likewise, *Nanda* teaches/suggests similar features where a mobile device creates/sends fingerprint to a remote database. (Ex-1006, 12:14-31.) *Nanda* also discloses configurations where

such a remote database can be used to collect fingerprints (with corresponding signal strengths) from other MUs, thus building a database of fingerprint information relating to signal strengths measured by different MUs. (*Id.*) *Nanda* explains “receiv[ing] fingerprints from multiple mobiles devices” allows for a “much larger database of available access points than would be found in a single mobile device.” (*Id.*)

187. Based on such teachings/suggestions in context of the reasons and teachings/suggestions that I discussed above for claim 1 (§IX.A.1(b)), it is my opinion a person of ordinary skill in the art would have been motivated to configure the *Spain-I-Hunzinger-Nanda* system/processes such that multiple MUs (including a second MU different from the first MU (claim 1)) measure/collect signal strengths from signals received when at a user chosen location selected by the user of the first MU for building a robust fingerprint database, consistent with that contemplated by *Spain-I* and *Nanda*. A person of ordinary skill in the art would have recognized and appreciated that the resulting modifications to the *Spain-I-Hunzinger-Nanda* system/process would have resulted in the system/processes using, in some instances, fingerprint information (station IDs and signal strengths) obtained from a different (second) MU (which may be operated by a different user or by the same user of the first MU) and stored in the database for comparison to current monitored

location fingerprint information corresponding to the first MU, as I discussed above for claim 1 (§IX.A.1).

188. A person of ordinary skill in the art would have been motivated to consider and implement such features to allow the modified system/processes to receive and process fingerprints from multiple MUs to create/maintain a larger database of antenna station fingerprint information, like that suggested by *Nanda* (Ex-1006, 12:26-29), thus beneficially expanding applications of *Spain-I*'s disclosed features. Such a skilled person would have had similar rationale for considering such features from *Nanda* and *Hunzinger* (and *Spain-I*) as those I explained above in claim 1 (§IX.A.1(b)(ii)), as well as had similar capabilities, expectation of success, and state-of-art knowledge, that would have led to the above modifications discussed here. A person of ordinary skill in the art would have recognized that *Spain-I* contemplated processes designed to complement existing location determining technologies and augments their performance. (Ex-1011, 3:34-40.)

189. In one non-limiting example, the resulting modified system/processes would have predictably included the use of a remote fingerprint database (contemplated by *Spain-I*'s FIG. 3 configurations and by *Nanda*), resulting in an accurate fingerprint database with an expanded set of fingerprint information that were available for use in the comparison and related location determining operations

as I discussed for limitation 1(b) in claim 1. (§IX.A.1(b)(ii); *see also* my discussions, rationale, and analysis below for claim 5 (§IX.A.5) regarding remote database features, which are applicable here to support my opinions.) A person of ordinary skill in the art would have been motivated to configure the modified system/processes such that a remote server (*e.g.*, location server/Other Party 30 or other server) maintains a fingerprint database that included measured signal strength and associated ID information that was measured/collected by a plurality of different MUs (*e.g.*, including a first and second “portable. . . device[s]”) associated with and/or operated by a respective user (or same user) (*e.g.*, using a second MU when building databases for user-selected location(s), using the first MU when monitoring location), for use in the processes for determining whether the first MU is at or in proximity of the user chosen location as discussed above. (Ex-1011, 4:23-25.)

190. A person of ordinary skill in the art would have been motivated and capable of configuring and implementing such modifications in the *Spain-I-Hunzinger-Nanda* system/process so that a remote database maintained fingerprints with similar parameter(s) (*e.g.*, signal strength and ID information used to facilitate location determination via the comparison processes I discussed above in claim 1), regardless of the source of the fingerprints. Such a skilled person would have been motivated to configure and implement such features so that a second MU measured

signal strengths at the user chosen location, even where the second device were operated by the same user of the first MU (*e.g.*, at a different time when building fingerprints for the database). For instance, such a skilled person would have known and appreciated that it was common at the time for users to own/use multiple mobile devices (*e.g.*, laptops, tablets, PDAs, mobile telephone, etc.). Thus, in one example, the teachings of *Spain-I* and *Nanda* would have motivated such a skilled person to configure/design the modified *Spain-I* system/processes such that the user of the first MU used a different second mobile device to measure the signal strengths at locations chosen by that user (who may have been a user of the first MU), and for building the fingerprint database maintained by a remote server (such as location server/Other Party 30 or another server). Alternatively, or in addition to, for similar reasons discussed, such a skilled person would have, likewise, been motivated to configure the modified *Spain-I* system/processes such that a second MU operated by a different user provides fingerprint data (signal strengths) for user selected locations (including those selected by the user of the first MU) for building the remote fingerprint database. Either way, the remote database would have been expanded with signal strength and associated ID information obtained from multiple MUs, consistent with that described by *Nanda*.

191. A person of ordinary skill in the art would have had the knowledge, skills, and rationale in light of the teachings/suggestions of *Spain-I-Hunzinger-Nanda*, and a person of ordinary skill in the art's state-of-art knowledge, to implement the above-configurations with a reasonable expectation of success in achieving them for above and similar reason I explained in claim 1 and those I discussed above here (§IX.A.1(b)). Especially given such modifications would have predictably resulted in the fingerprint database (and the underlying signal strength and ID information) to be collected and stored for subsequent analysis consistent with the processes and features disclosed/suggested by the *Spain-I-Nanda* combination I discussed above.

4. Claim 4

- a) **The method of claim 1 wherein the chosen location signal strengths and at least one ID originated from a database of geographic locations and corresponding signal strengths and IDs.**

192. It is my opinion that *Spain-I*, in view of *Hunzinger* and *Nanda*, discloses and/or suggests this limitation. As I explained in claim 1, and as shown below in FIGS. 9-10, *Spain-I*'s MU (including as modified in view of *Nanda* (§IX.A.1(b)(ii)(1)) builds a fingerprint “database” (501) including fingerprint structures (red—FIG. 9) including signal strengths and IDs (yellow/blue) that correspond 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*”), 13:64-14:1 (“[i]n one instance the fingerprint corresponds not to one exact spot on the surface of the earth, but instead to a small areas” where “the Lat and Long fields. . . indicate a position inside the area, preferably the center point”), 14:3-4 (“Fingerprint column contains the actual fingerprint data”); 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.)

193. In light of such teachings in context of the rationale I explained for limitation 1(b)(ii) (§IX.A.1(b)(ii), and for the similar reasons I explained for modifying the *Spain-I* system/process as I explained in claim 1, a person of ordinary skill in the art would have been motivated to configure the MU in the above-described modified *Spain-I* system/process to include similar features taught

by *Spain-I* (Ex-1011, FIGS. 9-10) such that the fingerprint database from which the user selected signal strengths and station IDs were stored and later obtained for comparison with the monitored location information included geographic locations corresponding to the strength and ID information.

194. Such a configuration/modification would have predictably resulted in the chosen location signal strengths and at least one ID in the *Spain-I-Hunzinger-Nanda* system/process that I discuss above for claim 1 to have originated from a database of geographic locations and corresponding signal strengths and IDs, like that claimed in claim 4. Such a configuration would have complemented *Spain-I*'s goal of designing processes to complement/augment existing location determining technologies, which in this case would use a fingerprint database consistent with that described by *Spain-I*. (Ex-1011, 3:34-40, 15:19-29.) A person of ordinary skill in the art would have had similar rationale, expectation of success, skills, and capabilities to consider and implement such features (like those taught by *Spain-I*) as those I discussed above for the modifications expressed for claim 1. (See my above analysis in §IX.A.1(b).)

5. Claim 5

- a) The method of claim 4 wherein the database is stored remotely, and not on the first portable RF communication device.**

195. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests this limitation. (§§IX.A.1, IX.A.4.) As I discussed above, *Spain-I* describes configurations where the fingerprint database may be stored remotely from the MU. (See my above analysis in §§IX.A.1, IX.A.3-A.4; Ex-1011, FIG. 3, 6:9-14 (“fingerprint database is stored at the location server”), 6:15-30; Ex-1005, FIG. 3, 4:28-58; Ex-1009, 5:22-42; Ex-1010, 5:20-41.) *Nanda* also discloses similar features where the mobile device creates a fingerprint and transmits it for storage in a remote database for subsequent analysis. (Ex-1006, 12:14-31; see my discussions above for claim 3 in §IX.A.3.)

196. In light of such teachings in context of the rationale and teachings and suggestions that I discussed above in claim 1 (and those for claims 3-4), it is my opinion that a person of ordinary skill in the art would have been motivated to configure the modified *Spain-I-Hunzinger-Nanda* system/processes such that the MU operates in conjunction with a remote fingerprint database, where the MU generates fingerprints (with signal strength measurements and ID information for respective locations) and provides them to a remote server (e.g., location server/Other Party 30 or other server) for storage in a database for subsequent access, use and analysis, consistent with that contemplated by *Spain-I* and *Nanda*.

197. A person of ordinary skill in the art would have been motivated to consider and implement such features to allow the modified system to be able to receive and process fingerprints from multiple MUs, and maintain a larger database of antenna station fingerprint information, like that suggested by *Nanda* (Ex-1006, 12:26-29), thus beneficially expanding the applications of *Spain-I*'s disclosed features. (See also my analysis for claim 3 above.)

198. A person of ordinary skill in the art would have had similar rationale, capabilities, expectation of success, and state-of-art knowledge for considering such features from *Nanda* (and *Spain-I*) as I explained above in claim 1 (§IX.A.1(b)(ii)) and claim 3 (§IX.A.3), that would have led to such a person to design and configure the modified *Spain-I-Hunzinger-Nanda* system/processes to work with a remote database/server responsible and configured to build, maintain, and make accessible the fingerprint database, like that recited in claim 5.

199. For instance, a person of ordinary skill in the art would have been motivated, in light of such teachings/suggestions, to configure the above *Spain-I-Hunzinger-Nanda* combined system/processes to use a remote database for storing fingerprint information, while still providing location determination processes to be performed by the MU consistent with that I discussed above. (§§IX.A.1(a)-(b), IX.A.4.) While a person of ordinary skill in the art would have contemplated using

a remove server/database (*e.g.*, such as the location server or another server) to perform such determining processes, like that taught by *Spain-I* for its Figure 3 configuration (Ex-1011, 6:9-31 (which describes features where the location server perform location determining operations) and similarly in *Nanda* (Ex-1006, 12:14-31), such a skilled person would have likewise been motivated and found benefit in allowing the MU to perform the determination processes like those I discussed above in claims 1 and 4 using signal strength/ID information that were stored at the remote database.

200. Such a skilled person would have recognized advantages, such as conserving memory/processing resources in the MU that would have otherwise been used to build and maintain the fingerprint database locally, while still providing the ability for the MU to perform the comparison processes using the fingerprint comparison features discussed above (*see* my analysis for claims 1 and 4) to determine whether the MU is in proximity of a user chosen location. Such a skilled person was aware of techniques/technologies in the art that used remote database systems that shared fingerprint information to mobile devices. (*See* my discussions above in §V; *see also e.g.*, Ex-1028, 5:1-62 (5:57-61 (“server that delivers reference RF fingerprint information to MUs” for location determination), 6:34-37, 16:42-63; Ex-1032, 1:15-31, 2:48-52, 3:59-4:7.) Such knowledge, coupled with the teachings

from *Nanda* and *Spain-I* (as I pointed out above), would have led a person of ordinary skill in the art to consider, design, and implement use of a remote database for storing fingerprint information corresponding to the user chosen location(s) (like that discussed for limitation 1(b)(ii) (§§IX.A.1(b)-(b)(ii)(1)), and configured to deploy such information to the MU when its location was to be determined in accordance with the processes discussed for limitation 1(b) (including those in light of *Nanda*).

201. In considering and implementing such a modification, a person of ordinary skill in the art would have considered the tradeoffs relating to the various design options available, including those gleaned from the teachings in the prior art (and such a person's state of art knowledge (§V)). For example, such a skilled person would have considered the possible applications of the modified *Spain-I-Hunzinger-Nanda* system, along with associated design constraints, cost considerations, benefits of using such a remote database, and other known factors, to conclude that such modifications would have been feasible for at least certain applications for the modified system. Thus, a person of ordinary skill in the art would have had good reason to consider and implement a configuration where the MU in the modified *Spain-I* system/process obtains stored fingerprint information (with data corresponding to the chosen locations as I discussed above in claims 1

and 4) from a remotely located database (*e.g.*, such as the location server or other server), especially in view of *Spain-I*'s goal of designing processes to complement/augment existing location determining technologies. (Ex-1011, 3:34-40, 15:19-29.)

202. A person of ordinary skill in the art would have had the knowledge, skills, and rationale in light of the teachings/suggestions of *Spain-I-Hunzinger-Nanda*, and such a skilled person's state-of-art knowledge, to implement the above-configuration with a reasonable expectation of success in achieving it. This would have been understood since such a person would have appreciated the modification would have involved applying known technologies/techniques (*e.g.*, programming, design/configuration of components and wireless communications, database systems, etc.) for receiving information from a remote database for local processing by a MU. (*See also* rationale for limitations 1(b)(ii) and claims 3-4.)

6. Claim 6

- a) The method of claim 4¹¹ wherein the database is built by a service provider.**

¹¹ While the '583 patent shows claim 6 being dependent from claim 5, I understand the certificate of correction at the end of the patent changed the dependency to claim 4. (Ex-1001 (Certificate of Correction).)

203. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests this limitation. (See my analysis above for claims 1 and 4 (§§IX.A.1 and IX.A.4).

204. As I discussed for claims 3 and 5 (see my discussions in §§IX.A.3, IX.A.5), *Spain-I* describes configurations where the fingerprint database may be stored remotely at a location server/Other Party 30. (Ex-1011, FIG. 3, 6:9-14 (“fingerprint database is stored at the location server”), 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.) My analysis for claim 5 also explains how and why a person of ordinary skill in the art would have been motivated in light of the teachings of *Nanda* and *Spain-I* to configure the modified *Spain-I* system/processes I discussed in claims 1 and 4 (§§IX.A.1, IX.A.4) such that the MU operates in conjunction with a remote fingerprint database, where the MU generates fingerprints (with signal strength measurements and ID information for respective locations) and provides them to a remote server, such as the location server/Other Party 30 for storage in a database for subsequent analysis, consistent with that contemplated by *Spain-I* and *Nanda*. (See my above analysis in §IX.A.5.)

205. A person of ordinary skill in the art would have had similar rationale for considering such features from *Nanda* (and *Spain-I*) as I explained above in claim

5 (*id.*; *see also* §IX.A.1(b)(ii)), 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 and maintained by a remote server, such as location server 30 or another server.

206. For reasons similar to those I explained in claims 4 and 5 (§§IX.A.4-IX.A.5), it is my opinion that a person of ordinary skill in the art would have been motivated to configure the *Spain-I- Hunzinger-Nanda* modified system to use a database of geographic locations and corresponding signal strengths and IDs maintained remotely at a service provider server, such as one similar to location server 30, so that the fingerprints maintained in the fingerprint database can include a more robust set of signal strength data (*e.g.*, from other MUs), as suggested by *Nanda* (Ex-1006, 12:26-29), thus beneficially expanding the applications of *Spain-I*'s disclosed features. A person of ordinary skill in the art would have had similar rationale for considering such features from *Nanda* (and *Spain-I*) as I explained above in claims 1, 4-5 (§IX.A.1(b)(ii), IX.A.4-IX.A.5), 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 as I discussed.

207. *Spain-I* discloses that the location server 30 may be interested in the location of the MU for “personalized services” (Ex-1011, 3:12-16), which is

consistent with a “service provider” and *Nanda* teaches configurations where base station controllers or mobile switching centers maintain the fingerprint database (Ex-1006, 12:14-31), which a person of ordinary skill in the art would have understood to be related to a service provider (*e.g.*, wireless communication services for MUs) (*id.*, 3:58-7:17). A person of ordinary skill in the art would have thus been motivated to configure the above-discussed resulting modified system/process to implement use of a remote fingerprint database built by a “service provider” as claimed (*e.g.*, location server 30 or other server providing service(s) for the MU/user), especially in view of *Spain-I*’s goal of designing processes to complement/augment existing location determining technologies. (Ex-1011, 3:34-40, 15:19-29.) Such a skilled person would have appreciated the benefits of such a modification, such as allowing the fingerprint database to be built and maintained by a server that also provides services to the MU based on the MU’s determined location, consistent with that described by *Spain-I* and known in the art. (*See e.g.*, my discussions of the state of art technologies in §V.)

7. Claim 7

- a) The method of claim 4 wherein the database is built based on multiple locations, where for each location, GPS measurements and signal strength measurements are performed and the IDs of nearby antenna stations of the plurality of antenna stations are recognized.**

208. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggest these limitations.

209. In addition to the teachings I discussed above (§§IX.A.1, IX.A.4), *Spain-I* discloses that fingerprint database shown in FIG. 10 includes latitude and longitude fields. For instance, *Spain-I* discloses,

Each row in database 501 corresponds to one fingerprint. The *Lat and Long fields indicate the latitude and longitude of the location to which the fingerprint corresponds*. In one instance the fingerprint corresponds not to one exact spot on the surface of the earth, but instead to a small area. *The Lat and Long fields in this embodiment indicate a position inside the area, preferably the center point*. The Time column indicates the time at which the fingerprint was captured. In one embodiment the UTC time format is used to indicate this time. *The Fingerprint column contains the actual fingerprint data*. In one embodiment the structure depicted in FIG. 9 is used to store the fingerprint data. Finally, *the Description column contains a short description of the location corresponding to the fingerprint*. For example, it may indicate a street address, or an intersection.

(Ex-1011, 13:56-14:9, FIG. 10 (highlighted below to show Lat/ and Long. Location fields for each fingerprint).)

501

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

210. Each location (Lat/Long) is associated with a fingerprint, which as I explained above contain signal strength measurements and station IDs. (Ex-1011, FIGS. 9-10, 13:16-14:9.) For instance, *Spain-I* explains:

[T]he database is built by taking off-line snapshots of fingerprints at various locations. ***The fingerprint information along with the coordinates of the location are entered into the database.*** The more the locations, the richer the database. The resolution of location determination is also controlled by how far apart the fingerprint samples are taken. The closer they are, the higher the resolution. Of course, a person skilled in the art can appreciate that ***the resolution of the database is limited by the sensitivity of the fingerprint measuring device.*** In one embodiment the fingerprints are taken using very sensitive signal measuring devices that enable locations that are very close to each other to have distinct fingerprints.

(*Id.*, 14:10-22.) (*See also id.*, 14:23-31 (explaining that the “database [can be] built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations in between the sampled locations.”); *see my* discussions above in §IX.A.1.)

211. A person of ordinary skill in the art would have thus understood that the database (*e.g.*, FIGS. 9-10 (annotated below) is built based on locations (Lat/Long (highlighted in green below)) by performing location measurements (Lat/Long) and signal strength measurements (S (yellow)) and recognizing nearby antenna station IDs (station ID (blue)) as I discussed above and similar to that recited in claim 7. (*See my* discussions above in §§IX.A.1, IX.A.4; Ex-1011, 4:7-22, 4:42-63, 5:20-60, 13:27-36.) For instance, the MU measures signal strengths and recognized the station ID from the received signal(s), which are used to build the fingerprint (FIG. 9), which in turn is used to build the fingerprint database (FIG. 10). (Ex-1011, 5:28-32, 5:54-66, 13:16-14:9).

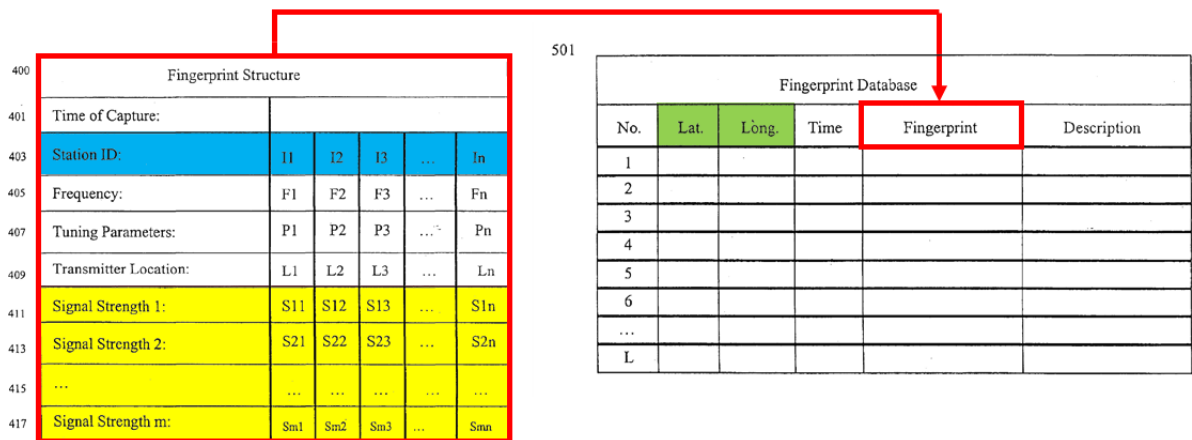


Fig. 9

212. *Spain-I* and *Nanda* also disclosed (and recognized) the known use of GPS circuitry/components in mobile devices, consistent with that known in the art. (Ex-1011, 1:45-48, 3:17-40, 4:32-41; Ex-1006, 6:66-7:6; Ex-1001, 9:11-21, 9:47-10:4). *Spain-I* also explained that the disclosed system/processes were to complement and augment existing location determining technologies (Ex-1011, 3:34-40).

213. A person of ordinary skill in the art would have understood that even though *Spain-I* does not expressly state that the Lat/Long fields used in building the database were obtained by GPS measurements performed for each location, such features were disclosed. For instance, in my opinion, a person of ordinary skill in the art would have recognized and understood that the latitude and longitude coordinate information used in the fingerprint database were likely obtained using

GPS circuitry/components/techniques, as such GPS technology was known to measure and provide latitude and longitude coordinate information like that described by *Spain-I*. A POSITA would have understood Lat/Long information was known to measure/provide latitude/longitude coordinates for a specific location. Therefore, it is my opinion that *Spain-I* discloses performing GPS measurements to generate the Lat/Long data for each location in the fingerprint database shown in FIG. 10.¹²

214. In light of such disclosures and understanding, a person of ordinary skill in the art would have been motivated to incorporate such features (along with the others discussed above from *Spain-I* and also *Hunzinger* and *Nanda*) in the *Spain-I-Hunzinger-Nanda* system/processes that I discuss above for claims 1 and 4 (§§IX.A.1, IX.A.4). Thus, for reasons explained above and in §§IX.A.1 and IX.A.4, the *Spain-I-Hunzinger-Nanda* system/processes would have included a fingerprint

¹² Below in Section IX.C, I provide my opinions as to why a person of ordinary skill in the art would have been motivated to implement such GPS measurement features in the *Spain-I-Hunzinger-Nanda* combined system/process in view of *Houri*, based on the assumption that such GPS measurement features are not disclosed by *Spain-I*. (§IX.C.)

database that was built based on locations, where for each location, GPS measurements and signal strength measurements were performed and station IDs for nearby antenna stations were recognized, like that claimed.

8. Claim 8

- a) The method of claim 7 wherein at least for some of the locations, signal strength measurements are taken at different times.**

215. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggest these limitations.

216. In addition to the teachings discussed above (§§IX.A.1, IX.A.4, IX.A.7), *Spain-I* describes configurations where signal strength measurements can be taken at different times.

Since the change pattern in signal characteristics is predetermined, ***the database is constructed by capturing the fingerprints at different times*** so as to cover all the different patterns in the transmitted signals. ***The time at which a fingerprint was captured is also stored along with its location identity.***

(Ex-1011, 8:3-9.) (See also *id.*, 13:51-56 (“the signal strength is sampled multiple times for each frequency in order to smooth out any variations”), 14:1-3 (“The Time column indicates the time at which the fingerprint was captured”).) In fact, FIG. 9

of *Spain-I* shows multiple strength figures for each fingerprint and station ID (*e.g.*, S11-Sm1), along with a time of capture 401 for the fingerprint, and FIG. 10 shows how the database includes multiple fingerprints. A person of ordinary skill in the art would have thus understood by having multiple signal strength measurements for each station ID, that those measurements were taken at different times (otherwise they would not be depicted as different strength values). Such teachings/understandings would have led a person of ordinary skill in the art to understand *Spain-I* discloses features where at least for some of the locations, signal strength measurements are taken at different times (*e.g.*, strengths measurements (S11-Smn, etc.) for fingerprint1 (location row 1 of FIG. 1) and those for fingerprint2 (S11-Smn)(location row 2 of FIG. 10), etc.

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

217. *Nanda* also discloses measuring fingerprint values (signal strengths) at multiple times for refining a database (Ex-1006, 11:33-64) and *Hunzinger* discloses periodically monitoring a current location (Ex-1054, 4:39-42).

218. Based on the teachings noted above, and those I previously discussed, it is my opinion that a person of ordinary skill in the art would have been motivated to incorporate such features in the *Spain-I-Hunzinger-Nanda* system/processes that I discussed above for claim 7. (See my discussions above in §§IX.A.1, IX.A.4, IX.A.7.) I explain in those sections that such a skilled person at the time would have had the skills, knowledge, reasons, and an expectation of such modifications (as proposed above) would have been successfully achieved. (See *id.*). In my opinion, a person of ordinary skill in the art would have had similar skills, rationale, knowledge, and expectation of success I explain for claims 1, 4, and 7 above to configure the *Spain- Hunzinger-Nanda* system/processes such that signal strength measurements are taken at different times for at least for some of the locations represented in the database.

219. Such a skilled person would have appreciated *Spain-I*'s time entry teachings and disclosures regarding goals to design a system to enhance/augment existing location determining techniques (Ex-1011, 3:37-40) along with the above noted teachings of *Nanda*. In my opinion, such teachings and suggestions would

have motivated a person of ordinary skill in the art to configure the above *Spain-I-Hunzinger-Nanda* system/processes to take signal strength measurements at different times for each location in the database to provide a meaningful sampling of signal characteristics for different locations in the database. Such a skilled person would have appreciated that having signal strength measurements collected at different times for at least some locations, would enhance/complement accuracy of location determining performed by the modified system to ascertain whether the MU is at or sufficiently close to a chosen location as I explained above for claim 1. (See my discussions above in §§IX.A.1(b), IX.C.1.)

9. Claim 9

- a) The method of claim 7 wherein the signal strength measurements are taken using a portable RF communication device.**

220. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggest these limitations. I explain above that *Spain-I*'s MU is configured to measure signal strengths. (See my discussions above §IX.A.1; see also Ex-1011, 5:20-22 (“The mobile unit is equipped with the appropriate circuitry and software to capture the required signals and their parameters”), 5:28-32 (“the mobile unit is equipped with appropriate circuitry to determine the strength of the received signal”), 5:54-60 (“After the mobile unit captures the appropriate signals and

extracts the parameters, it has the basic information for generating the fingerprint...[f]or example, signal strengths may have to be lower and upper limited to eliminate very weak and very strong signals”), 13:49-55, 3:55-58.)

221. A person of ordinary skill in the art would have been motivated to maintain/implement such MU-based signal measuring features in the *Spain-I-Hunzinger-Nanda* combination that I discussed above for claims 1 and 7 (§§IX.A.1(b)(ii), IX.A.7), which would have predictably resulted in the MU taking the signal strength measurements used in the fingerprint database.

10. Claim 10

- a) **The method of claim 9 wherein the signal strength measurements or calculation results made using the signal strength measurements, along with the antenna station IDs, are sent by the portable RF communication device to a server responsible for building the database of geographic locations and corresponding signal strengths and antenna stations IDs.**

222. It is my opinion that *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggest these limitations for reasons similar to those I discuss above. (See my discussions above in §§IX.A.1, IX.A.4-IX.A.5, IX.A.7-9.)

223. For example, I explain above for claim 4 how the *Spain-I-Hunzinger-Nanda* system/processes discloses and/or suggests the chosen location signal strengths and at least one ID originated from a database of geographic locations and

corresponding signal strengths and IDs. (§IX.A.4.) My analysis for claim 5 above also explains how and why in my opinion, a person of ordinary skill in the art would have been motivated to configure the *Spain-I- Hunzinger-Nanda* system/processes such that the fingerprint database is stored remotely from the first MU, such as at a server (e.g., the location server 30 or other server), where the fingerprints (and thus underlying signal strength measurements are sent by the MU to the location server). (See my discussions above in §IX.A.5.) Further, my analysis for claim 7 explains how and why the database in the *Spain-I- Hunzinger-Nanda* system/process would have been built based on multiple locations, where for each locations, GPS and signal strength measurements are performed and IDs of nearby antenna stations are recognized. (See my discussions above in §IX.A.7.) I also explain above for claim 9 how and why the *Spain-I- Hunzinger-Nanda* system/process would have involved the MU taking signal strength measurements.

224. For similar reasons, it is my opinion that a person of ordinary skill in the art would have been motivated to configure the *Spain-I-Hunzinger-Nanda* system/processes such that the signal strength measurements (taken by the MU (see my discussion of claim 9 above)) and antenna station IDs are sent by the MU to a remote server (e.g., location server 30 or other server) that was configured to build and maintain (and responsible for building) the database of geographic locations and

corresponding signal strengths and antenna stations IDs. (*See* my analysis above for claim 5 (§IX.A.5) in connection with those for claims 1, 4, 7, and 9 (§§IXA.1, IX.A.4-A.5, IX.A.7, IX.A.9.)

225. In my opinion, a person of ordinary skill in the art would have understood and appreciated the benefits and advantages of such a modification. For example, such a skilled person would have appreciated the potential benefits of conserving processing and memory resources on the MU, which would have otherwise been used for updating, storing, and maintaining the fingerprint database on the mobile device. Having a server (such as the location server 30 or another server) be responsible for building and maintaining the database would have eliminated or mitigated such loads. Further, such a skilled person would have appreciated with such a configuration, the MU would have been configured to obtain the necessary fingerprint information from the remote server database to locally perform the location determining in the manner I discussed above for claim 1. (*See* my discussions above for claim 1.) Moreover, for similar reasons that I explained for claim 5 (§IX.A.5), it is my opinion that a person of ordinary skill in the art would have appreciated advantages in using a remote server-based database in context of being able to build the database based on measured/collected fingerprint/location data from multiple MUs, thus providing a more robust database of RF strength, GPS,

and ID information, like that taught and suggested by *Spain-I* and *Nanda* (*see e.g.*, Ex-1006, 12:26-29; Ex-1011, FIG. 3, 6:9-30) and as understood in the art at the time (*see e.g.*, Ex-1028, 5:10-62).

226. In deciding, developing, considering, and ultimately configuring such a modification to the *Spain-I- Hunzinger-Nanda* system/processes, a person of ordinary skill in the art would have considered the tradeoffs in using a remote server to build and maintain the database instead of building it locally on the MU, including the cost, resources used for each configuration, potential advantages in such a modification, and the like. It is my opinion that such a skilled person would have found configuring the modified system/process with such a remote server database as I discuss above would have offered advantageous options that would have led to its implementation to expand the application options for the *Spain-I-Nanda* system/processes.

227. Such a skilled person would have had similar skills, knowledge, rationale, and reasonable expectation of success like that I discuss above for modifying *Spain-I*'s system/processes in light of *Hunzinger* and *Nanda* for claims 1, 4-5, and 7-9. (§§IX.A.1, IX.A.4-5, IX.A.7-9.) Like that discussed above, the proposed modification I explain above for claim 10 would have also have involved known technologies/techniques, like those taught by *Spain-I*, *Hunzinger*, and *Nanda*

(including use of a remote server-based fingerprint database) and programming skills and related component design within the capabilities of such a skilled person. Such skills and teachings would have been leveraged by a person of ordinary skill in the art to configure the modified system so that a remote server was responsible for building the fingerprint database using signal strength and ID data measured/collected by the MU, which would have been available for subsequent use in performing the location determining functionalities that I discuss above for limitation 1(b). (See my analysis above for limitation 1(b) in §IX.A.1(b).)

11. Claim 26

- a) **The method of claim 1 wherein the determining of part (b) starts taking place or stops taking place at one or more of the following: (i) at specific time intervals, or (ii) at specific times, or (iii) depending on the rate the user's location changes, or (iv) at the occurrence of an event, or (v) upon a request from the network, or (vi) upon a request from a software application on the device, or (vii) upon a request from the user.**¹³

¹³ I underlined portions of claim 26 only to highlight that the claim only requires at least one of the seven options listed (i)-(vii). I explain below how the *Spain-I-Hunzinger-Nanda* combination discloses or suggests such features.

228. It is my opinion that *Spain-I*, in view of *Hunzinger* and *Nanda*, discloses and/or suggests this limitation for reasons similar to those discussed above for claim 1. (§IX.A.1.)

229. For instance, it is my opinion that *Spain-I* discloses features where determining the location of a MU (related to that performed by the *Spain-I-Hunzinger-Nanda* system/processes discussed for limitation 1(b)) starts taking place “at the occurrence of an event” (like that claimed in claim 26). I explain for claim 1 above how *Spain-I* teaches that the determining of a location occurs when the MU or the location server/Other Party desires location estimation to be performed. (Ex-1011, 4:43-54; §IX.A.1.) A person of ordinary skill in the art would have understood that such an event starts the processes that leads to the MU performing comparison operations so that “its association with a certain location has to be determined.” (*Id.*, 5:61-65.) In response, component 101 is activated to begin the information capture, fingerprint generation, and subsequent comparison operations used to determine whether the location determining processes (*id.*, 4:42-6:14). Similar features would have been implemented in the modified *Spain-I-Hunzinger-Nanda* system/process for reasons similar to those I discussed above for modifying *Spain-I* in view of *Hunzinger* and *Nanda* concerning limitation 1(b) (See §IX.A.1(b) (within proximity of...)) As a result the *Spain-I-Hunzinger-Nanda* system/process would have started

the determining features of limitation 1(b) at the occurrence of an event, like that claimed in claim 26.

230. For similar reasons, *Spain-I* also discloses features where MU location determination starts taking place “(v) upon a request from the network” because the location server 30 (which is part of the network including the MU (Ex-1011, FIGS. 1-2)) may be interested in determining if the MU is at a particular location or not (*id.*, 4:23-25), and *Spain-I* teaches that the determining of a location occurs when the MU or the location server/Other Party desires location estimation to be performed (Ex-1011, 4:43-54; *see* §IX.A.1.) A person of ordinary skill in the art would have understood such teachings disclose that the location server may thus request the location of the MU, and in response, component 101 is activated to begin the information capture, fingerprint generation, and subsequent comparison operations used to determine whether the location determining processes (*id.*, 4:42-6:14). Similar features would have been implemented in the modified *Spain-I- Hunzinger-Nanda* system/process for reasons similar to those I discussed above for modifying *Spain-I* in view of *Hunzinger* and *Nanda* concerning limitation 1(b) (*See* §IX.A.1(b) (within proximity of...)). As a result the *Spain- Hunzinger-I-Nanda* system/process would have started the determining features of limitation 1(b) at the occurrence of an event, like that claimed in claim 26.

231. Additionally, it is my opinion that a person of ordinary skill in the art would have been motivated to configure the modified *Spain-I- Hunzinger-Nanda* system/process such that the location determining process associated with limitation 1(b) “starts taking place or stops taking place i) at specific time intervals” or “(iv) at the occurrence of an event,” in light of *Nanda*, which discloses processes that start location determination processes at specific time intervals, or at the occurrence of an event, similar to that recited in claim 26. For instance, *Nanda* describes discloses that “when the mobile device 102 periodically awakes to listen to the paging channel or a quick paging channel in the WAN, it may also determine its location.” (Ex-1006, 5:44-46.) (*See also id.*, 10:49-11:32 (describing how the mobile device is “controlled” to determine its location).) Such teachings and suggestions would have been considered by a person of ordinary skill in the art, and in context of the teachings of *Spain-I* that I discuss above, and motivated them to configure the *Spain-I- Hunzinger-Nanda* system/processes such that the location determining processes (for limitation 1(b)) are started at certain time intervals. For example, such a skilled person would have been motivated to configure the MU software to execute timer functionalities that periodically awaken relevant components in the MU (of the modified *Spain-I* system) (which is also an example of an occurrence of an event) to initiate location determination functionalities in accordance with the features I

discuss above for limitation 1(b) in claim 1. (*See* my above analysis in §IX.A.1(b).) Such a skilled person would have been motivated to implement such features, and had a reasonable expectation of success in achieving them, given it would have involved the use of known technologies/techniques (*e.g.*, timers and related features) to predictably provide a MU that periodically checks its location to allow for personalized services to be provided at the appropriate time/location, consistent with the features contemplated by *Spain-I*. (Ex-1011, 3:8-16 (location server interested in MU location to provide personalized services), 3:34-40, 15:19-29.)

232. Also, the *Spain-I- Hunzinger-Nanda* system/process also discloses and/or suggests “the determining of part (b) starts taking place or stops taking place . . . (vii) upon a request from the user” for reasons similar to those I explained for claim 1. (*See* my discussions and analysis in §IX.A.1.) For example, as I explained, *Spain-I* discloses features where the desire for obtaining a location estimate can originate from the MU (Ex-1011, 4:43-47; Ex-1005, 3:29-31), and that a MU user can generate a request for position of the MU (Ex-1011, 6:9-21; Ex-1005, 6:43-46), which initiates the location determining processes as I explained in claim 1 (Ex-1011, 6:20-30; Ex-1005, 6:46-47). (*See* my above analysis in §IX.A.1(b)(ii)(1); *see also* §§IX.A.1(pre)-1(b)(i).) While such teachings relate to a remotely stored fingerprint database in terms of FIG. 3, they informed a person of ordinary skill in

the art that the MU is configured to receive a user request to measure/collect signal information for generating a fingerprint, which ultimately initiates the location determination processes like that described above for limitation 1(b). (§IX.A.1(b)(ii); Ex-1011, 5:55-6:31.) Such teachings, along with those of *Hunzinger* and *Nanda* which also describe features allowing a mobile device user to choose locations where current fingerprint data is collected during monitoring operations that lead to execution of location determining processes (Ex-1006, 8:29-36; *id.*, FIGS. 2-3B, 9:65-10:7; Ex-1054, 3:49-60, 4:3-5:22, 6:37-49, 7:9-22; §§VIII.B, IX.A.1(b)(ii)(1)), would have motivated such a skilled person to configure the *Spain-I- Hunzinger-Nanda* system/processes of claim 1 such that a user could request via the MU to begin location determining processes like those that I explained for limitation 1(b) in §IX.A.1(b).

233. A person of ordinary skill in the art would have appreciated the benefit of such configuration since it would have allowed a user to control when the location determining is performed, which would have provided user-friendly controls for ascertaining when the MU is within proximity of a user selected location (like that explained for claim 1 and consistent with *Spain-I*'s teachings). (*See* my discussions and analysis above in §§IX.A.1(b)(i)-(ii).) A person of ordinary skill in the art would have appreciated that such modifications/configuration(s) would have involved the

use of known technologies/techniques (including those described by *Spain-I*). (Ex-1011, 3:34-40, 15:19-35.) Thus, a skilled person thus would have had the knowledge, skills, rationale in light of the teachings/suggestions of *Spain-I-Hunzinger-Nanda*, and state-of-art knowledge to implement the above-configuration with a reasonable expectation of success in achieving it. (Ex-1011, 6:9-21; 15:19-35.) In fact, adjusting/programming software and related components/processes in the MU to facilitate the above configurations would have been within the capabilities of a person of ordinary skill in the art and supported by the technologies/features implemented by *Spain-I*'s system.

B. *Spain-I* in View of *Hunzinger*, *Nanda*, and *Damarla* Discloses and/or Suggests the Features of Claims 3, 5, and 6

234. It is my opinion that *Spain-I* in view of *Hunzinger*, *Nanda*, and *Damarla* discloses and/or suggests of the limitations of claims 3 and 5 of the '583 patent.

1. Claim 3

235. I explain above how and why the *Spain-I* in view of *Hunzinger* and *Nanda* discloses and/or suggests claim 3 in §IX.A.3. In my opinion, the additional teachings of *Damarla* would have further motivated a person of ordinary skill in the art to configure the *Spain-I-Hunzinger-Nanda* system/processes such that the

chosen location signal strengths were measured by a second MU, different from the first MU, as recited in claim 3.

236. For example, I discussed above for claim 1 how *Spain-I* (as modified) discloses and/or suggests that a user can use its MU to choose a location where fingerprint information is collected/generated and subsequently stored for later comparison with related information for a monitored location. (See my analysis above in §IX.A.1(b)(ii).) And while *Nanda*'s teachings (which describe obtaining signal strength information from multiple MUs for storage in a remote fingerprint database), would have motivated a person of ordinary skill in the art to configure the *Spain-I-Hunzinger-Nanda* system/processes such that the user chosen location signal strengths were measured by a second MU (as I discuss above in §IX.A.3), it is my opinion that such a skilled person would have been further motivated to implement such features (like that of claim 3) so that the chosen location signal strengths in the database are updated with more accurate measurements from a second MU as claimed based on the additional guidance and teachings provided by *Damarla*.

237. Similar to *Spain-I*, *Hunzinger*, and *Nanda*, *Damarla* discloses various techniques that were applicable to the location determination systems for mobile units. (Ex-1028, Abstract ("The invention provides a novel method for preparing a

wireless environment for location determination of a wireless mobile unit, and for location determination of a wireless mobile unit.”).) *Damarla* also discloses RF fingerprinting techniques, which were consistent with *Spain-I*’s and *Nanda*’s RF fingerprinting systems. (Ex-1028, FIG. 4; Ex-1011, FIGS. 9-10; Ex-1006, FIG. 3B.)

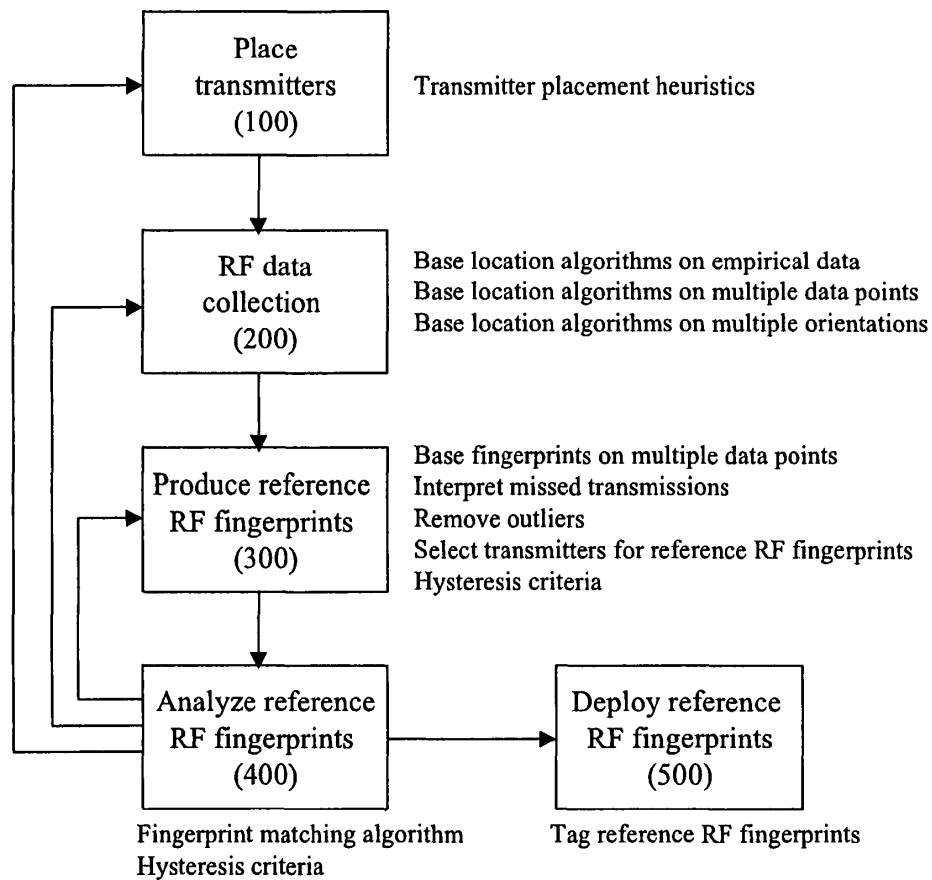


Figure 4

(Ex-1028, FIG. 4.)

238. Thus, a person of ordinary skill in the art would have understood that *Damarla* discloses device location determination technologies/techniques and, like

Spain-I, *Hunzinger*, and *Nanda*, is in the same technical field as the '583 patent. (§IX.A.1(pre)-(b); see my above analysis regarding *Hunzinger*, *Nanda* and *Spain-I*; §VIII.C; Ex-1001, Abstract, 1:23-10:25.) Also, like *Spain-I*, *Hunzinger*, and *Nanda*, *Damarla* discloses features reasonably pertinent to particular problem(s) the '583 patent attempted to address, and those by a person of ordinary skill in the art at the time. (E.g., §IX.A.1(b)(ii); Ex-1001, 1:23-10:25, 3:26-35, 5:14-37, 5:54-56; Ex-1011, 1:16-54, 3:18-40, 15:19-29; Ex-1054, 3:49-60, 4:3-5:22, 6:37-49, 7:9-22; Ex-1006, 1:21-3:2, 6:12-7:27, 8:14-11:32, 12:14-31; Ex-1028, 1:10-4:20 (see also *infra*.) Such teachings thus would have been consulted by a person of ordinary skill in the art designing/implementing a location-determining process/system, like the *Spain-I*-*Hunzinger*-*Nanda* combination I discuss above.

239. In addition to what I explained above, *Damarla* discloses updating signal strengths of reference fingerprints to address known problems with changing RF environments. (Ex-1028, 5:63-6:1 (discussing that “if a permanent environment change affecting RF propagation were made (e.g., taking down a wall or moving a large metal shelf),” for example, an “RF data collection step should be repeated”).) When an RF data collection step is repeated to addresses changes in an environment and improve the accuracy of a location system, *Damarla* explains “[a] MU [mobile unit] is taken to various planned locations in the environment.” (Ex-1028, 5:10-16.)

“At each location” for this process, “RF samples are taken and recorded,” which include “information about the RF environment (*e.g.*, signal strength of transmissions from various sources) and is associated with a timestamp and location.” (Ex-1028, 5:10-16.) Figure 4 (above) illustrates the collection of updated RF data and production of updated reference RF fingerprints in steps 200 and 300. (*Id.*, FIG. 4.)

240. As a part of a fingerprint update process, *Damarla* discloses that the updated location signal strengths are stored in a first mobile device, wherein the updated signal strengths were measured by a different, second device. For instance, *Damarla* discloses that the updated “reference RF fingerprints are deployed 500 to the computing infrastructure used to support location determination in the environment” where the “infrastructure could be a server that delivers reference RF fingerprint information to MUs, or it could be the MUs themselves.” (Ex-1028, 5:57-62.) (*See also id.*, 16:57-58 (“Fingerprint matching could be performed by a MU or infrastructure”), 5:10-6:1.) The updated RF fingerprints include signal strength information from various transmission sources. (*Id.*, 5:57-62, 14:22-23.) One of the mobile units that receives the updated RF fingerprints and corresponding signal strengths is an example of a first portable RF communication device (where location monitoring is determined) and another different mobile unit that measures

signal strengths that are included in the reference fingerprints that can be deployed to the first mobile unit and used for location determining purposes is an example of a “second portable RF communication device” that measures location signal strengths, which are used for location determining purposes consistent with those described by *Spain-I-Nanda*. (Ex-1028, 5:10-62, 6:34-37, 14:22-23.)

241. A person of ordinary skill in the art would have understood that the *Spain-I* system as modified by *Hunzinger* and *Nanda* discloses/suggests that signal strengths for a chosen location are recorded in a database, and that *Damarla* discloses a beneficial way to update signal strengths stored in a database with measurements that made by a second device, a person of ordinary skill in the art would have been motivated to configure the *Spain-I-Nanda* system I discussed in claim 1 (and claim 3 (§IX.A.3)) such that chosen location signal strengths were measured by a second MU different from the first MU, while still allowing the updated fingerprint information to be deployed to a remote fingerprint database used in the location-determining processes as I explained in claim 1. (§IX.A.1(b); Ex-1011, FIGS. 9-10; Ex-1028, 5:10-6:1.) In such a modification, the chosen location signal strengths (*see* §IX.A.1(b)(ii)(1)) would be updated in the fingerprint database based on signal strength measurements taken by a second device, and such information would have been accessible for use during location determining

processes consistent with those I discuss above for limitation 1(b) (§IX.A.1(b); *see also* rationale for modifying the system to use a remote database with fingerprint data collected by different MUs in §IX.A.3.)

242. In addition to the reasons for implementing a remote database for reasons I explained in §IX.A.3, a person of ordinary skill in the art would have had additional reasons to implement such features in light of *Damarla* for updating the chosen location signal strengths, such as to improve the accuracy of the location-determining system/processes and better adjust for changing RF propagation environments that would affect RF-based location services, as suggested by *Damarla*. (Ex-1011, 3:34-40, 15:19-29; Ex-1028, 1:62-2:13, 5:63-6:1.) Additionally, in other applications of such a modification that would have been equally contemplated by a person of ordinary skill in the art at the time, configuring the modified system/process to allow one MU to measure updated signal strength information for deployment to the fingerprint database, which are subsequently used by another MU for location determining, would have reduced the computational/memory load of the MU having its location determined; since it would have been configured (for certain applications) to perform location-determining processes (like that in limitation 1(b)) based on user chosen

location signal strengths measured by a different MU, without requiring the MUs to maintain the database locally. (Ex-1028, 5:10-6:1; §IX.A.3.)

243. Similar to that discussed above for claim 3 in §IX.A.3, it is my opinion that a person of ordinary skill in the art would have had the skills, rationale, and knowledge to design/configure such modifications further motivated by *Damarla*, and have done so with a reasonable expectation of success in achieving them. Consistent with that discussed above in §IX.A.3, the above modifications would have involved applications of known techniques/technologies (e.g., fingerprint generation/updating techniques and use of remote database collecting information from multiple MUs, etc. like those described in *Spain-I*, *Hunzinger*, *Nanda*, and *Damarla*). Thus, a person of ordinary skill in the art would have had good reasons and the capabilities to configure the *Spain-I-Hunzinger-Nanda-Damarla* system/process such that user chosen location signal strengths were measured and provided by a MU different from the MU having its location monitored (like that I discussed in claim 1 and similar to that I discuss for claim 3 above). (§IX.A.1(b); §IX.A.3.) The additional teachings and suggestions of *Damarla* would have further motivated such a skilled person to implement such a modification, and thus complemented and enhanced the rationale I explain above for claim 3 in §IX.A.3.

2. Claims 5 and 6

244. I explain above how and why the limitations of claim 5 are disclosed and/or suggested by *Spain-I* in view of *Hunzinger* and *Nanda*. (§IX.A.5.) In my opinion, the additional teachings of *Damarla* would have further motivated a person of ordinary skill in the art to configure the *Spain-I-Hunzinger-Nanda* system/processes such that the database is stored remotely, and not on the first MU, as recited in claim 5.

245. Consistent with that I explained in the above for claims 3 and 5 (§IX.A.3, IX.A.5, IX.B.1), *Spain-I*, *Nanda*, and *Damarla* discloses/suggests that a mobile unit can receive updated fingerprint information to update *Spain-I*'s fingerprint database 501. In addition to the teachings noted above, and applicable to claim 5, *Damarla* further discloses that “a server that hosts the” fingerprint “database could send the appropriate reference RF fingerprints to a MU” such that only “portions of the database” are “dynamically transmitted for use at run-time” to a mobile unit. (Ex-1028, 16:42-57.) In such a configuration, “a server delivers reference RF fingerprint information to MUs” (*Id.*, 5:57-62), such that the fingerprint database is stored remotely from mobile devices.

246. A person of ordinary skill in the art would have had similar rationale for considering such features from *Damarla* (and *Spain-I* and *Hunzinger-Nanda*) as

I explained above for claim 3 (*see* §IX.B.1) and those discussed above for claim 5 (*see* §IX.A.5), 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 as I discussed, especially in view of *Spain-I*'s goal of designing processes to complement/augment existing location determining technologies. (Ex-1011, 3:34-40, 15:19-29.) In addition to the teachings/suggestions of *Spain-I* and *Nanda* (as I explained above in §IX.A.5), a person of ordinary skill in the art would have been further motivated by the teachings of *Damarla* to store the fingerprint database (as recited in claims 1, 4 (§§IX.A.1, IX.A.4)) on a remote server that can share/deploy portions of such stored information (signal strengths, ID information, etc.) with the first MU when the location of the MU is sought/requested, consistent with the teachings of *Spain-I* (Ex-1011, 4:43-46) to reduce computational and storage requirements of the MU, as suggested by *Damarla*. (Ex-1028, 16:50-63.) Such a modification would have predictably resulted in applying known technologies/techniques (*e.g.*, like those described in *Spain-I*, *Hunzinger*, *Nanda*, and *Damarla*) for receiving information from a remote database for local processing by a MU. (*See also* rationale for limitations 1(b)(ii) (§IX.A.1(b)(ii)) and claims 3-5 (§§IX.A.3-5, IX.B.1).)

247. The above discussed *Spain-I*, *Hunzinger*, *Nanda*, and *Damarla* system/processes discloses and/or suggests the limitations of claim 6 for reasons similar to those that I discussed above for claim 6 in §IX.A.6 and those above for claim 5. The additional teachings of *Damarla* would have complemented the reasons for modifying/configuring *Spain-I-Hunzinger-Nanda* system/processes for the reasons I explain above for claim 5.

C. *Spain-I* in View of *Hunzinger*, *Nanda*, and *Houri* Discloses and/or Suggests the Features of Claims 7-10

248. It is my opinion that *Spain-I*, in view of *Hunzinger*, *Nanda* and *Houri*, discloses and/or suggests all of the limitations of claims 7-10 of the '583 patent.

1. Claim 7

- a) The method of claim 4 wherein the database is built based on multiple locations, where for each location, GPS measurements and signal strength measurements are performed and the IDs of nearby antenna stations of the plurality of antenna stations are recognized.**

249. It is my opinion that *Spain-I*, in view of *Hunzinger*, *Nanda* and *Houri*, discloses and/or suggests this limitation. (§§IX.A.1, IX.A.4.)

250. I explained above in §IX.A.7 how the *Spain-I- Hunzinger-Nanda* combination discloses or suggests the limitations of claim 7. (See my analysis above in §IX.A.7.) However, I have been asked to consider the scenario where *Spain-I* does not disclose the GPS measurement aspects of claim 7. (See §IX.A.7, explaining

how the Lat/Long fields used in building the database in *Spain-I* were obtained by GPS measurements performed for each location were disclosed.) Under such a scenario, and to the extent *Spain-I- Hunzinger-Nanda* combination does not disclose or suggest the database is built based on multiple locations, ***where for each location, GPS measurements ... are performed***” as claimed, it is my opinion that a person of ordinary skill in the art would have been motivated to configure the *Spain-Hunzinger-Nanda* system/process I discussed above for claims 1 and 4 such that the database was built based on multiple locations, where for each location, GPS measurements and signal strength measurements are performed and the IDs of nearby antenna stations of the plurality of antenna stations are recognized as claimed in claim 7 in light of the teachings of *Houri*.

251. For example, as I explained above in §IX.A.7, *Spain-I* discloses that fingerprint database shown in FIG. 10 includes latitude and longitude fields. For instance, *Spain-I* discloses,

Each row in database 501 corresponds to one fingerprint. The ***Lat and Long fields indicate the latitude and longitude of the location to which the fingerprint corresponds***. In one instance the fingerprint corresponds not to one exact spot on the surface of the earth, but instead to a small area. ***The Lat and Long fields in this embodiment indicate a position inside the area,***

preferably the center point. The Time column indicates the time at which the fingerprint was captured. In one embodiment the UTC time format is used to indicate this time. ***The Fingerprint column contains the actual fingerprint data.*** In one embodiment the structure depicted in FIG. 9 is used to store the fingerprint data. Finally, ***the Description column contains a short description of the location corresponding to the fingerprint.*** For example, it may indicate a street address, or an intersection.

(Ex-1011, 13:56-14:9, FIG. 10 (highlighted below to show Lat/ and Long. Location fields for each fingerprint).)

501

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

252. Each location (Lat/Long) is associated with a fingerprint, which as I explained above contain signal strength measurements and station IDs. (Ex-1011, FIGS. 9-10, 13:16-14:9.) For instance, *Spain-I* explains that,

the database is built by taking off-line snapshots of fingerprints at various locations. ***The fingerprint information along with the coordinates of the location are entered into the database.*** The more the locations, the richer the database. The resolution of location determination is also controlled by how far apart the fingerprint samples are taken. The closer they are, the higher the resolution. Of course, a person skilled in the art can appreciate that ***the resolution of the database is limited by the sensitivity of the fingerprint measuring device.*** In one embodiment the fingerprints are taken using very sensitive signal measuring devices that enable locations that are very close to each other to have distinct fingerprints.

(*Id.*, 14:10-22.) (*See also id.*, 14:23-31 (explaining that the “database [can be] built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations in between the sampled locations.”); *see my* discussions above in §IX.A.1.)

253. A person of ordinary skill in the art would have thus understood that the database (*e.g.*, FIGS. 9-10 (annotated below) is built based on locations (Lat/Long (highlighted in green below)) by performing location measurements (Lat/Long) and signal strength measurements (S (yellow)) and recognizing nearby antenna station IDs (station ID (blue)) as I discussed above and similar to that recited

in claim 7. (See my discussions above in §§IX.A.1, IX.A.4, IX.A.7; Ex-1011, 4:7-22, 4:42-63, 5:20-60, 13:27-36.) For instance, the MU measures signal strengths and recognized the station ID from the received signal(s), which are used to build the fingerprint (FIG. 9), which in turn is used to build the fingerprint database (FIG. 10). (Ex-1011, 5:28-32, 5:54-66, 13:16-14:9).

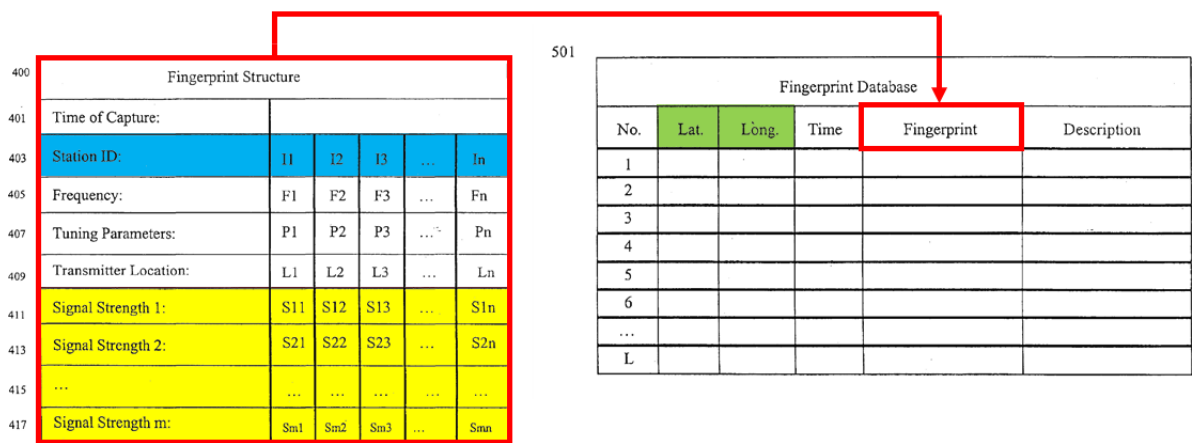


Fig. 9

254. *Spain-I* and *Nanda* also disclosed (and recognized) the known use of GPS circuitry/components in mobile devices, consistent with that known in the art. (Ex-1011, 1:45-48, 3:17-40, 4:32-41; Ex-1006, 6:66-7:6; Ex-1001, 9:11-21, 9:47-10:4). *Spain-I* also explained that the disclosed system/processes were to complement and augment existing location determining technologies (Ex-1011, 3:34-40). Such teachings and suggestions would have led a person of ordinary skill in the art to consider teachings in the art regarding features for obtaining

geographical coordinate information like that considered by *Spain-I*. In doing so, such a skilled person would have found *Houri* to provide relevant guidance for location determining processes and technologies.

255. *Houri* discloses location determining processes/system that includes obtaining both signal strength and GPS measurements and building a database of positional information. For example, *Houri* describes:

[A] [s]ystem and method for enabling a wireless computing device to continuously determine its position includes a wireless computing device and a wireless positioning system substantially collocated therewith. The wireless positioning system has a first positioning mode in which it communicates with a wireless positioning network to enable the geographic location of the computing device to be determined upon reception of signals from the positioning network and a second positioning mode in which it enables the geographic location of the wireless computing device to be determined upon reception of signals from one or more of the wireless beacons and analysis of the signals in light of positional information about wireless beacons contained in a database. The wireless positioning system switches between the positioning modes depending on reception of signals from the wireless positioning network

(Ex-1032, Abstract.) Further that,

The present invention relates generally to a system and method for enabling a wireless computing device to determine its position using a wireless positioning network, e.g., a satellite-based positioning system, irrespective of the reception of positioning signals from the wireless positioning network by the computing device.

The present invention also relates to a system and method for passively building a database of wireless beacons by means of wireless computing devices equipped with positioning systems and disseminating the database to other computing devices.

The present invention also relates to a system and method ascertaining the geographical locations of wireless computing devices based on a database of wireless beacons and a system and method for creating the database of wireless beacons.

(*Id.*, 1:15-31.) (*See also id.*, 2:29-34 (“desirable to provide a single positioning system for a wireless computing device which is capable of continuously determining the position of the wireless computing device using both a wireless positioning network and a database of wireless beacons to enable optimum positional determination”), 3:14-22 (in a second mode, wireless beacons provide identification information which is associated with data about the strength of a signal therefrom and received by the wireless computing device, where the ID and strength

data is input into an algorithm “which determines the geographic location of the wireless computer device” and the ID data used to obtain positional data about the beacons in the database), 3:23-37 (wireless device provided with a scanner that works with a GPS device to obtain positional information about itself and ID and strength information about beacons for inclusion in a database), 3:38-4:26 (“each computing device 10 is coupled to a wireless or satellite-based positioning systems such as a GPS device 12 such that the computing device 10 and GPS device 12 are effectively collocated”), 5:59-6:13; *see* my discussions above in §VIII.D.)

256. In particular, *Houri* discloses a mobile device (which “is provided with a scanner) (*id.*, 3:23-27) that may be “equipped” with a GPS device that obtains readings regarding the position of the scanner (and thus the device it is in) and also measures the signal strength of beacon signal(s) received at this position. (*Id.*, 5:59-64.) The scanner may be a PDA or cell phone with software for analyzing the signal received from every beacon at different positions and estimating a geographic location thereof. (*Id.*, 5:64-6:4, 6:38-39.) *Houri* explains:

Referring to FIG. 3, these readings will look like a series of data sets designated (Xi, Yi, Si) ***where Xi and Yi are the latitude and longitude, respectively, of the position of the scanner 18 and Si is the strength of a signal received at this position*** from wireless beacon 28. With the scanner 18 at position P1, a reading of

(X1,Y1,S1) is obtained, with the scanner 18 at position P2, a reading of (X2,Y2,S2) is obtained and *with the scanner 18 at position P3, a reading of (X3,Y3,S3) is obtained.*

(*Id.*, 6:5-14.)

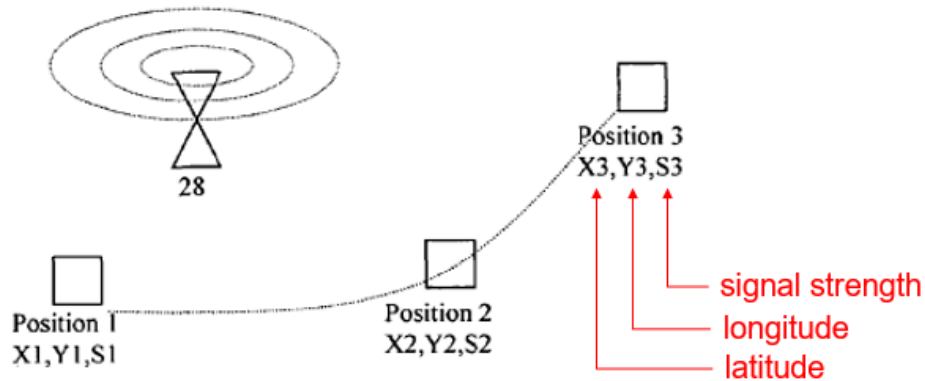


FIG. 3

(*Id.*, FIG. 3 (annotated for position 3 of the scanner/mobile device.))

257. The readings “*may be stored in the scanner’s memory.*” (*Id.*, 6:14-17.)
At *each scanner position, multiple readings can be obtained*, one for each beacon 28 in reception range of the scanner 18,” which “*can be stored with an identification of the beacon 28* so that readings can later be combined with other readings from the same beacon...to determine the location of the beacon 28.” (*Id.*, 6:23-29.) (*See id.*, 3:59-67, 4:59-67, FIG. 2.) Thus, *Houri* discloses the well-known use of a GPS technologies in a mobile device that measures GPS information, which can be

associated with signal strengths and stored in memory, and the use of location information associated with beacons (*e.g.*, wireless beacons, WiFi access points, cell phone towers or other comparable systems (*id.*, 3:59-63). While *Houri* uses positional information to build a database of beacon locations, *Houri* describes features where the mobile unit (using a scanner for instance with GPS components) perform GPS measurements (that provide latitude and longitude data) and signal strength measurements and obtaining identifier information of antenna stations in reception range.

258. Accordingly, *Houri* discloses device location determination technologies/techniques, and, like *Spain-I*, *Hunzinger*, and *Nanda*, is in the same technical field as the '583 patent. (*See* my discussions above in §§IX.A.1(b), IX.A.4 regarding *Spain-I*, *Hunzinger*, and *Nanda* (and also above in this section); *see* my above analysis regarding *Houri* and in §VIII.D; §§IX.A.1, IX.A.4; Ex-1001, Abstract, 1:23-10:25; Ex-1032, 1:15-4:26.) Also, like *Spain-I*, *Hunzinger*, and *Nanda*, *Houri* discloses features are reasonably pertinent to particular problem(s) that the '583 patent attempts to address (and those a person of ordinary skill in the art was addressing at the time). (*See id.*; *e.g.*, §IX.A.1(b); Ex-1001, 1:23-10:25, 3:26-35, 5:14-37, 5:54-56); Ex-1011, 1:16-54, 3:18-40, 15:19-29; Ex-1006, 1:21-3:2, 6:12-7:27, 8:14-11:32, 12:14-31; Ex-1032, 1:15-4:26, 4:59-67, 5:59-6:13.)

Such teachings, in my opinion, would have been consulted by a person of ordinary skill in the art designing and implementing a location-determining process/system, like that I discuss above concerning the *Spain-I-Hunzinger-Nanda* combination.

259. Based on *Houri*'s teachings and suggestions in context of those of *Spain-I*, *Hunzinger*, and *Nanda* (including those I discuss above and in §§IX.A.1, IX.A.4, IX.A.7), a POSITA would have been motivated to configure the MU in the *Spain-I-Hunzinger-Nanda* process/system to perform GPS measurements to obtain the latitude/longitude data that is used to build the fingerprint database (as contemplated by *Spain-I* and would have been likewise incorporated into the *Spain-I-Hunzinger-Nanda* system/processes that I discussed above for claims 1 and 4. A person of ordinary skill in the art would have recognized the above-discussed teachings from *Spain-I* and *Nanda*, and leveraged the teachings from *Houri* (which provides express disclosures of using GPS components to measure GPS coordinate data (such as latitude/longitude), consistent with a person of ordinary skill in the art's state of art knowledge) (see my discussions in §V)), such that the MU is configured with includes GPS circuitry/components to perform GPS measurements along with the signal strength measurements and recognized IDs for use in building the database in the *Spain-I-Hunzinger-Nanda* system, consistent with the features contemplated by *Spain-I* and *Houri*. (See my discussions above regarding *Spain-I*

and *Nanda* and *Houri*; *see also e.g.*, Ex-1011, 1:21-49, 3:17-41, FIGS. 9-10.) Such a skilled person would have been motivated to include GPS measurements in building the *Spain-I- Hunzinger-Nanda* database, as suggested by *Houri*, in order to ensure that the database associates measured/collected fingerprint information (signal strengths and IDs) with accurate locations measured via GPS as opposed to approximated location data, and provide that information as the latitude and longitude location data in the database. (Ex-1032, 4:59-67, 5:59-6:13; Ex-1011, 1:28-37, FIG. 10.)

260. In my opinion, such a skilled person would have appreciated using GPS measurements to provide the latitude and longitude location information to build the modified system's database would have enhanced the accuracy of such location information stored in the database, thus promoting confidence that the description/geographic location data associated with each fingerprint accurately reflected where the signal strengths were measured and the station IDs were collected and recognized when building the database. (*See e.g.*, Ex-1011, 1:21-49, 3:17-41, 13:61-14:9.)

261. A person of ordinary skill in the art would have understood such a modification (involving a GPS-enabled MU to perform GPS measurements for use in the fingerprint database) would be compatible with the location-determining

processes that I discussed above for claims 1 and 4, since the database was a source of information collected and provided by the MU and subsequently used when determining if the MU 's monitored location was in proximity of the user chosen location (as performed in accordance with my analysis in §IX.A.1(b)), which can occur even while the MU was in locations where GPS measurements were not available or feasible. In fact, *Spain-I* discusses advantages of using its fingerprint comparison processes to mitigate against such issues. (Ex-1011, 1:21-49, 3:17-41, 15:19-29.) Meaning, when building the fingerprint database using signal characteristics (signal strengths), station ID information and location data when the MU is at user chosen location(s), the modified system would have been configured to perform GPS measurements (where it was available) to obtain the latitude/longitude coordinate data that is associated with the signal strengths/ID in each corresponding fingerprint. Later, when the MU location was desired at a current monitored location, the MU would have relied on the above-discussed comparison and threshold features/techniques (*see* §IX.A.1(b)) to determine whether the monitored location was in proximity of a user chosen location corresponding to a matching or acceptably close (including being below the predetermined threshold), consistent with the processes of claim 1 as discussed.

262. A person of ordinary skill in the art would have had the skills, knowledge, reasons, and capabilities to configure such a modification, and would have done so with a reasonable expectation of success given the teachings of *Spain-I-Nanda-Hunzinger-Houri* and the state of art at the time. (See my discussions above in §V; see also e.g., Ex-1064, ¶¶0002, 0030, Abstract, FIGS. 1-2; Ex-1016, 1:34-43, 10:1-6 (GPS-enabled mobile phone).) Implementing such GPS measuring features as claimed in the *Spain-I-Hunzinger-Nanda-Houri* system/processes would have been consistent with *Spain-I*'s goal of designing processes to complement/augment existing technologies (Ex-1011, 3:34-40, 15:19-29.)

263. The resulting modified *Spain-I-Hunzinger-Nanda-Houri* system/processes would have thus predictably resulted in the MU using conventional GPS technologies/techniques to perform GPS measurements along with the signal strengths measurements and recognizing the station IDs to build the database of geographic locations and corresponding signal strengths and IDs. (See my discussions in §§V, IX.A.1, IX.A.4.)

2. Claim 8

- a) The method of claim 7 wherein at least for some of the locations, signal strength measurements are taken at different times.**

264. It is my opinion that the *Spain-I-Hunzinger-Nanda-Houri* combination discloses and/or suggests this limitation for reasons similar to those I discuss above for claim 8 in §IX.A.8 and claim 7 in §IX.C.1) (*See also* my analysis for claim 1 in §IX.A.1.) The additional teachings of *Houri* would have complemented the rationale for modifying/configuring *Spain-I-Hunzinger-Nanda* system as I discussed above in §IX.A.8 and explain below.

265. As I discussed, *Spain-I* describes configurations where signal strength measurements can be taken at different times.

Since the change pattern in signal characteristics is predetermined, ***the database is constructed by capturing the fingerprints at different times*** so as to cover all the different patterns in the transmitted signals. ***The time at which a fingerprint was captured is also stored along with its location identity.***

(Ex-1011, 8:3-9.) (*See also id.*, 13:51-56 (“the signal strength is sampled multiple times for each frequency in order to smooth out any variations”), 14:1-3 (“The Time column indicates the time at which the fingerprint was captured”).) In fact, FIG. 9 of *Spain-I* shows multiple strength figures for each fingerprint and station ID (e.g., S11-Sm1), along with a time of capture 401 for the fingerprint, and FIG. 10 shows how the database includes multiple fingerprints.

266. A person of ordinary skill in the art would have thus understood by having multiple signal strength measurements for each station ID, that those measurements were taken at different times (otherwise they would not be depicted as different strength values). Such teachings/understandings would have led a person of ordinary skill in the art to understand *Spain-I* discloses features where at least for some of the locations, signal strength measurements are taken at different times (*e.g.*, strengths measurements (S11-Smn, etc.) for fingerprint1 (location row 1 of FIG. 1) and those for fingerprint2 (S11-Smn)(location row 2 of FIG. 10), etc.

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

267. *Nanda* also discloses measuring fingerprint values (signal strengths) at multiple times for refining a database. (Ex-1006, 11:33-64.)

268. Based on the teachings noted above, and those I previously discussed, it is my opinion that a person of ordinary skill in the art would have been motivated to incorporate such features in the *Spain-I-Hunzinger-Nanda-Houri* system/processes I discussed above for claim 7. (See my discussions above in §§IX.A.1, IX.A.4, IX.C.1.) I explain in those sections that such a skilled person at the time would have had the skills, knowledge, reasons, and an expectation of such modifications (as proposed above) would have been successfully achieved. (See *id.*). In my opinion, a person of ordinary skill in the art would have had similar

skills, rationale, knowledge, and expectation of success I explain for claims 1, 4, (§§IX.A.1, IX.A.4) and claim 7 (§IX.C.1) above to configure the *Spain- Hunzinger-Nanda-Houri* system/processes such that signal strength measurements are taken at different times for at least for some of the locations represented in the database.

269. Such a skilled person would have appreciated *Spain-I*'s time entry teachings and disclosures regarding goals to design a system to enhance/augment existing location determining techniques (Ex-1011, 3:37-40) along with the above noted teachings of *Nanda* (including in context with the teachings of *Houri* regarding claim 7). In my opinion, such teachings and suggestions would have motivated a person of ordinary skill in the art to configure the above *Spain-I-Hunzinger-Nanda-Houri* system/processes to take signal strength measurements at different times for each location in the database to provide a meaningful sampling of signal characteristics for different locations in the database. Such a skilled person would have appreciated that having signal strength measurements collected at different times for at least some locations, would enhance/complement accuracy of location determining performed by the modified system to ascertain whether the MU is at or sufficiently close to a chosen location as I explained above for claim 1. (*See my discussions above in §§IX.A.1(b), IX.A.4, IX.C.1.)*

3. Claim 9

- a) The method of claim 7 wherein the signal strength measurements are taken using a portable RF communication device.**

270. It is my opinion that the *Spain-I-Hunzinger-Nanda-Houri* combination discloses and/or suggests this limitation for reasons similar to those I discuss above for claim 1 in §IX.A.1, claim 9 in §IX.A.9 and claim 7 in §IX.C.1.) The additional teachings of *Houri* would have complemented the rationale for modifying/configuring *Spain-I-Hunzinger-Nanda* system as I discussed above and below.

271. I discussed above that *Spain-I*'s MU is configured to measure signal strengths. (See my discussions above §IX.A.1; see also Ex-1011, 5:20-22 (“The mobile unit is equipped with the appropriate circuitry and software to capture the required signals and their parameters”), 5:28-32 (“the mobile unit is equipped with appropriate circuitry to determine the strength of the received signal”), 5:54-60 (“After the mobile unit captures the appropriate signals and extracts the parameters, it has the basic information for generating the fingerprint...[f]or example, signal strengths may have to be lower and upper limited to eliminate very weak and very strong signals”), 13:49-55, 3:55-58.)

272. In my opinion, a person of ordinary skill in the art would have been motivated to configure and implement such features in the above-discussed *Spain-I-Hunzinger-Nanda-Houri* system-processes for reasons similar to those I discussed for claims 1 and 7 (§§IX.A.1; IX.C.1), which would have predictably resulted in the MU of the *Spain-I-Hunzinger-Nanda-Houri* system/processes to take the signal strength measurements used in building the fingerprint database as I discussed for claims 1, 4 (§§IX.A.1, IX.A.4) and 7 (§IX.C.1).

4. Claim 10

- a) The method of claim 9 wherein the signal strength measurements or calculation results made using the signal strength measurements, along with the antenna station IDs, are sent by the portable RF communication device to a server responsible for building the database of geographic locations and corresponding signal strengths and antenna stations IDs.**

273. The *Spain-I-Hunzinger-Nanda-Houri* combination I discussed above for claim 9 discloses/suggests the features of claim for similar reasons I discussed above in §IX.A.10. (See my analysis in §§IX.A.1, IX.A.4-IX.A.5, IX.A.10, IX.C.1-2.) My analysis/rationale for claim 10 in §IX.A.10 in context of my analysis/rationale above for claims 7-9 (§§IX.C.1-2) demonstrates why, in my opinion, a person of ordinary skill in the art would have been motivated to configure the *Spain-I-Hunzinger-Nanda-Houri* system/processes such that the signal strength

measurements and antenna station IDs are sent by the MU to a server responsible for building the database of geographic locations and corresponding signal strengths and antenna stations IDs as claimed in claim 10. In my opinion, the additional teachings of *Houri* would have complemented the rationale for modifying/configuring *Spain-I- Hunzinger-Nanda* system/processes regarding claim 10 as I explained above.

274. For example, as I explained above for claim 10 in §IX.A.10, my analysis for claim 4 explains how the *Spain-I-Hunzinger-Nanda* system/processes discloses and/or suggests the chosen location signal strengths and at least one ID originated from a database of geographic locations and corresponding signal strengths and IDs. (§IX.A.4.) Also my analysis for claim 5 above also explains how and why in my opinion, a person of ordinary skill in the art would have been motivated to configure the *Spain-I-Hunzinger-Nanda* system/processes such that the fingerprint database is stored remotely from the first MU, such as at a server (e.g., the location server 30 or other server), where the fingerprints (and thus underlying signal strength measurements are sent by the MU to the location server). (*See* my discussions above in §IX.A.5.) Further, my analysis for claim 7 in §IX.C.1 explains how and why the database in the *Spain-I-Hunzinger-Nanda-Houri* system/processes would have been built based on multiple locations, where for each locations, GPS

and signal strength measurements are performed and IDs of nearby antenna stations are recognized. (See my discussions above in §IX.C.1.) I also explain above for claim 9 how and why the *Spain-I-Hunzinger-Nanda-Houri* system/processes would have involved the MU taking signal strength measurements. (See my discussions above in §IX.C.2.) The reasons for modifying *Spain-I-Hunzinger-Nanda* system/processes for purposes of the features recited in claim 10 in §IX.A.10 are applicable to the *Spain-I-Hunzinger-Nanda-Houri* combination I discuss above for claims 7 and 9 in §§IX.C.1-2.

275. Additionally, a person of ordinary skill in the art, upon considering *Houri* for reasons that I explained above for claim 7 (§IX.C.1), would have recognized and appreciated other teachings regarding providing signal strength measurements/IDs to a remote server. For example, *Houri* also discloses that the mobile device obtains identification and signal strength data, which is sent “to a central monitoring or administration facility which is charged with the responsibility for providing an accurate database of wireless beacons.” (Ex-1032, 8:4-43, Abstract, 4:59-67, 5:15-6:16, 6:38-52, 7:12-46, 8:11-15; see also my discussions in §IX.C.1.) With this information, the facility (which would have been understood as a server) creates/builds a collaborative fingerprint database. (Ex-1032, 8:4-43.) Thereafter,

the database information is disseminated to “all wireless computing devices using the same positioning technique.” (*Id.*; *see also id.*, 7:5-46.)

276. Therefore, such additional teachings from *Houri* in context of the reasons and disclosures regarding *Spain-I-Hunzinger-Nanda* (as I explained for claim 10 in §IX.A.10) would have further motivated a person of ordinary skill in the art to configure the *Spain-I-Hunzinger-Nanda-Houri* system/processes (discussed above in §§IX.C.1-2) such that the signal strength measurements and station IDs are sent by the MU to a server (such as for example, location server 30 or another server) responsible for building the database of geographic locations and corresponding signal strengths and stations IDs. A person of ordinary skill in the art would have had similar reasons and motivations for such a modification as those I discussed above for claim 10 (§IX.A.10) and for claims 1, 4-5, and 7-9 (§§IX.A.1, IX.A.4-5) in context of the teachings from *Houri* above and in §§IX.C.1-2. (Ex-1032, 7:12-8:43.)

277. In my opinion, a person of ordinary skill in the art would have had the same skills, knowledge, reasons, capabilities, and reasonable expectation of success and appreciation of resulting benefits/advantages for such a modification as I discussed above for claim 10 in §IX.A.10, complemented with the additional motivations offered by *Houri*’s teachings and suggestions. (Ex-1032, 8:4-43;

§§IX.A.10, IX.C.1-2.) Like that discussed above, the proposed modification would have involved known technologies/techniques, like those taught by *Spain-I*, *Hunzinger*, *Nanda* and *Houri* (including use of a remote server-based database) and programming skills and related component design within the capabilities of such a skilled person. Such skills and teachings would have been leveraged by a person of ordinary skill in the art to configure the modified *Spain-I-Hunzinger-Nanda-Houri* system as I discuss above. Accordingly, for similar reasons explained for claim 10 in §IX.A.10, it is my opinion that a person of ordinary skill in the art would have been further motivated to configure the *Spain-I-Hunzinger-Nanda-Houri* system/processes (discussed for claims 7-9 (§§IX.C.1-2)) such that a remote server maintained responsibility for building the fingerprint database using the fingerprint information measured/collected and sent to the server by the MU, for subsequent use in location determining consistent with that I discussed above for limitation 1(b). (See my discussions above in §IX.A.1(b).)

278. For example, a person of ordinary skill in the art would have been motivated to implement configure the *Spain-I-Hunzinger-Nanda-Houri* system/processes such that the MU works in conjunction with a remote server that is tasked with and responsible for building/maintaining the fingerprint database that includes updated information based on measurements/data provided by the MU (and

possibly other MUs), thus conserving resources of the MU associated with maintaining the database while increasing the reach/reliability of the system and increasing user convenience as suggested by *Houri*. (Ex-1032, 8:4-43.) A person of ordinary skill in the art also would have appreciated the benefits in having such a remote server build/maintain the in light of changing network environments and use of multiple measurements obtained from a plurality of MUs. (Ex-1032, 8:4-43.) Indeed, such a skilled person would have appreciated such modifications that would have allowed the modified system/processes to receive and process fingerprint data from multiple MUs and maintain a more robust database of RF strength, GPS, and ID information, like that suggested by *Nanda* (Ex-1006, 12:26-29; Ex-1032, 8:4-43) and *Houri* (see my above analysis) as understood in the art (Ex-1028, 5:10-62), thus beneficially expanding the applications of the modified system/processes.

279. In deciding, developing, considering, and ultimately configuring such a modification to the *Spain-I-Hunzinger-Nanda-Houri* system/processes, a person of ordinary skill in the art would have considered the tradeoffs in using a remote server to build and maintain the database instead of building it locally on the MU, including the cost, resources used for each configuration, potential advantages in such a modification, and the like. It is my opinion that such a skilled person would have found configuring the modified system/process with such a remote server

database as I discuss above would have offered advantageous options that would have led to its implementation to expand the application options for the *Spain-I-Hunzinger-Nanda-Houri* system/processes.

D. *Spain-I* in View of *Hunzinger*, *Nanda*, and *Blomqvist* Discloses and/or Suggests the Features of Claims 17-20 and 24-25

280. As explained below, it is my opinion that *Spain-I* in view of *Hunzinger*, *Nanda*, and *Blomqvist* discloses and/or suggests all of the features of claims 17-20 and 24-25 of the '583 patent.

1. Claim 17

- a) The method of claim 1 wherein the monitoring step comprises 'low accuracy monitoring' and 'high accuracy monitoring'.

2. Claim 18

- a) The method of claim 17 wherein 'low accuracy monitoring' includes comparing the chosen location IDs with the current location IDs.

3. Claim 19

- a) The method of claim 18 wherein 'high accuracy monitoring' takes place only if the current location IDs are determined to match the chosen location IDs in the 'low accuracy monitoring' step.

4. Claim 20

- a) The method of claim 19 wherein 'high accuracy monitoring' includes measuring a signal strength at the current location.

281. Claims 18-20 depend from dependent claim 17 and recite features that further elaborate what is encompassed by the claimed “low accuracy” and “high accuracy” monitoring recited in claim 17 and thus I address them collectively here.

282. As I explain below, it is my opinion that *Spain-I* in view of *Hunzinger*, *Nanda*, and *Blomqvist* discloses and/or suggests the limitations of claims 17-20, where the MU in the modified system/processes would have been configured to perform a modified monitoring step (limitation 1(a)) where extracted current monitored location station IDs are first compared with user chosen location station IDs from the database (low accuracy monitoring (claims 17-18)), and only if the IDs match, move forward with operations to measure the signal strength at the current location (high accuracy monitoring) (claims 17, 19-20) used in the comparison operations consistent with my opinions above for limitations 1(a)(iii) and 1(b).

283. I discussed above for claim 1 how *Spain-I* discloses the monitoring step of limitation 1(a). (See my discussions above in §IX.A.1(a).) For example, *Spain-I* discloses that the MU extracts parameter information from communication signals received from antenna stations when the MU is at a monitored location, including station ID information and determines/measures the strength of the received signals. (See my discussions above in §IX.A.1(pre)-IX.A.1(a); Ex-1011, 4:43-63; 5:20-60, 13:16-14:37; FIGS. 9-10.) I also explained above how the modified *Spain-I*

system/processes (in view of *Nanda*) would have been configured to use that information to determine whether the MU's monitored location is in proximity of a user chosen location like that recited in limitation 1(b), by, for example, comparing the station ID and measured signal strengths for the monitored location with the station ID and signal strengths of the user chosen location corresponding to stored fingerprint data in the database. (See my discussions above in §IX.A.1(b); Ex-1011, 4:7-22, 4:43-63, 5:33-6:8, 13:27-36.)

284. As I explain further below, a person of ordinary skill in the art would have been motivated to configure the modified *Spain-I-Hunzinger-Nanda* system/process to implement to conserve operation resources in view of the teachings and suggestions provided by *Blomqvist* in context of a person of ordinary skill in the art's state of art knowledge at the time and the disclosures of *Spain-I*, *Hunzinger*, and *Nanda*.

285. A person of ordinary skill in the art would have recognized and appreciated that in addition to the teachings I noted above for claim 1 (§IX.A.1; §VIII.A), *Spain-I* contemplated features to make location determining more efficient and/or accurate. For example, *Spain-I* explains in one implementation, the fingerprint database can be designed to compensate for interference measured by the MU, by performing corrections of algorithms for mobile unit location based on

measurements of base station signal strengths. (Ex-1011, 6:32-61.) *Spain-I* also contemplated generating the fingerprint database by computer calculations with RF prediction models using certain parameters based on environment conditions and using learning/training techniques to improve the accuracy of the database. (*Id.*, 6:62-7:57.) Further, *Spain-I* describes configurations that use dynamic location techniques that consider the time series nature of measured fingerprints to improve location accuracy (*id.*, 8:27-9:24) and techniques that use measured fingerprints from multiple times and multiple hypotheses for MU locations over time to select the best one based on statistical measures (*id.*, 9:25-36). Additionally, *Spain-I* considered the length of time a search takes to complete based on the number of possible locations of the MU and techniques to reduce the number of “possible locations of the mobile unit that must be searched...when an approximate estimate of the mobile unit’s location is available. (*Id.*, 10:1-22.) For example, the approximate location can be determined from the identity of the cell site serving the MU, which can reduce the number of possible locations. (*Id.*, 10:22-27.) *Spain-I* describes other ways the number can be reduced, such as by considering which signals the MU has reported it is able to receive as described in connection with FIGS. 11-19. (*Id.*, 10:29-13:15.)

286. Moreover, *Spain-I* contemplated configurations involving services and other actions that could be performed based on an MU's determined location in accordance with its disclosed processes. (*Id.*, 3:5-17; 4:23-32 (location server is interested in determining if mobile unit 10 is at a particular location or not).)

287. Accordingly, the disclosures of *Spain-I* coupled with considerations that would have already in the mind of a person of ordinary skill in the art considering the design, configuration, and implementation of the *Spain-I-Hunzinger-Nanda* system/processes discussed for claim 1, would have motivated such a skilled person to consider teachings in the art that provided guidance on conserving resources in location determining-based systems. *Blomqvist* was a source of guidance that would have been considered by such a person. (*See also* my discussions above in §V.)

288. For example, *Blomqvist* discloses systems and processes for efficiently determining the location of a mobile device. (Ex-1033, Abstract, 1:43-2:16, 2:63-3:12; *see also* my discussions above in §VIII.E.) *Blomqvist* explains that,

The present invention relates to a method for activating a location-based function, in which ***at least one item of position data is determined for the function as a condition for activating the function***, the device being used in a wireless communication network in which signals are transmitted. The invention also

relates to a system comprising determination means for determining a location-based function, ***in which at least one item of position data is determined for the function as a condition for activating the function***, processing means for activating the location-based function in a device, and a wireless communication network comprising at least one transmitter for transmission of signals. Moreover, the invention relates to a device comprising determination means for determining a location-based function, in which ***at least one item of position data is determined for the function as a condition for activating the function***, processing means for activating the location-based function in a device, and wireless communication means for setting up a data network connection to a wireless communication network. The invention also relates to a program containing a group of machine-executable program commands for presenting messages in a device, ***and at least one location-based condition for presenting the message is determined in the message***, said program being intended to be executed in a device used in a communication network in which signals are transmitted.

(Ex-1033, 1:14-39.)

289. In particular, *Blomqvist* describes a location determining system with features that determine the position (location) of a mobile device 1 where the device

can automatically activate a location-based function when it is determined the device is at or within vicinity of a specified location. (*Id.*, FIG. 2 (annotated below), 1:14-39, 2:20-62, 5:10-60.)

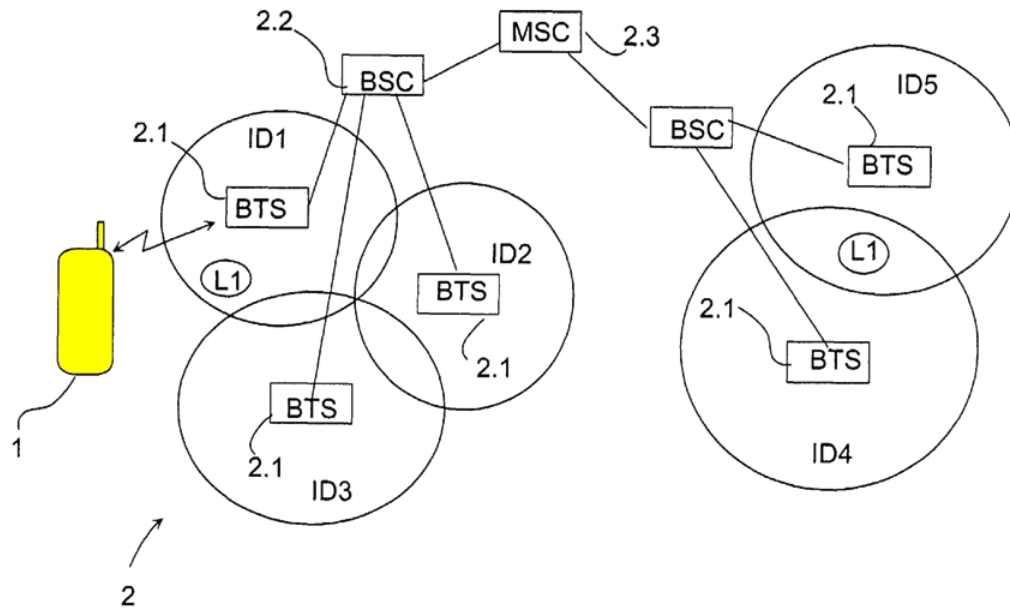


Fig. 2

290. *Blomqvist's* processes are based on the idea that at least one property of a wireless communication network is monitored, where a change in at least one property of the network is used as a condition for performing other processes. (*Id.*, 2:23-27.) *Blomqvist's* processes aim to reduce the need to perform positioning processes as often as previously done in the art, which reduces “power consumption,” “loading of the processor” of the mobile device, and loading of the

network the device operates in, and also results in possible savings in service positioning costs. (*Id.*, 2:63-3:12.)

291. To obtain such advantages, *Blomqvist* discloses various processes that use a change in at least one network property as a condition for performing subsequent operations leading to location determination. For example, the device may perform positioning only when it is determined the mobile device has moved to a new cell (and corresponding base station), which is determined based on monitoring cell IDs and comparing them to stored IDs. (*Id.*, 2:27-31, 4:35-60 (program compares cell IDs according to a previously identified base station with the cell IDs of a currently received cell identifier, and if they match (meaning the cell has not changed), “it is not necessary to conduct positioning”), 6:39-64 (“Information on the identifiers of such a cell or cells is transmitted to the device 1” and “stored into the memory 1.1” and when “the cell identifier changes, the device 1 examines the information on the location-based functions on the basis of the new cell identifier”), 7:19-26 (“the cell identifier is also compared with the stored cell identifiers”).) A person of ordinary skill in the art would have understood that such features are consistent with low accuracy monitoring in context of the ’583 patent. (*See e.g.*, Ex-1001, claims 17-18 (low accuracy monitoring includes comparing the chosen location IDs with the current location IDs); 12:14-26.)

292. *Blomqvist* also explains that “[i]f one or several cell identifiers that have been determined for a location-based function match with the cell identifier of the new serving base station, i.e. the device 1 is probably in the vicinity of such a location in which the execution of a location-based function is determined, positioning is conducted.” (Ex-1033, 6:56-61; *id.*, 6:39-7:18 (*e.g.*, positioning is initiated always when cell identifier changes and is repeated until device position is close enough to the location to initiate the position function, or has moved further away from the location), 7:19-26 (“Positioning is not started immediately when the cell identifier changes, but the cell identifier is also compared with the stored cell identifiers...”). The positioning that occurs after ID matching can be performed according to known GPS position systems. (*Id.*, 4:52-60.) However, it is “possible to perform the position by another method,” such as based on signal reception times and base station location information, where signals transmitted by several base stations is received by the device. (*Id.*, 4:61-5:9.)

293. While *Blomqvist* describes processes where instead of cell IDs, signal strength measurements can be used to determine whether positioning-related processes need to take place (*id.*, 5:43-62), *Blomqvist* also describes configurations where **signal strength measurements are taken/used for monitoring only after cell ID matching is determined** (*id.*, 5:62-6:5). For instance, *Blomqvist* describes

processes where strength measurements are restricted to be used only in a cell where a location-based function relates, by first monitoring the “changing of the cell identifier as presented earlier” and “[o]nly at that stage when the device is in the area of such a cell to which a location-based function relates, the results of a signal strength measurement...are utilized to estimate whether the device 1 has moved significantly, and whether is its necessary to conduct new positioning.” (*Id.*) A person of ordinary skill in the art would have understood such features are consistent with high accuracy monitoring in context of the ’583 patent, which indicates such monitoring is performed only when IDs match in context of the ’583 patent. (Ex-1001, claims 17, 19 (“‘high accuracy monitoring’ takes place only if the current location IDs are determined to match the chosen location IDs in the ‘low accuracy monitoring step’”), claim 20 (“‘high accuracy monitoring’ includes measuring a signal strength at the current location”), 12:14-26 (“higher accuracy monitoring activity—which takes the necessary resources to make the necessary determining definitive”); Ex-1033, 2:20-3:19.)

294. A person of ordinary skill in the art would have understood *Blomqvist* to disclose device location determination technologies and techniques, and like *Spain-I*, *Hunzinger*, and *Nanda*, is in the same technical field as the ’583 patent. (§IX.A.1(b)(ii); see my above analysis regarding *Blomqvist* and §§IX.A.1 (regarding

Nanda and *Spain-I*); Ex-1001, Abstract, 1:23-10:25; Ex-1032, 1:15-4:26.) Also, like *Spain-I*, *Hunzinger*, and *Nanda*, *Blomqvist* discloses features reasonably pertinent to particular problem(s) that the '583 patent attempted to address (and those by a person of ordinary skill in the art at the time). (E.g., Ex-1001, 1:23-10:25, 12:5-26; Ex-1011, 1:16-54, 3:18-40, 15:19-29; Ex-1006, 1:21-3:2, 6:12-7:27, 8:14-11:32, 12:14-31; Ex-1033, 1:14-3:26, 4:35-6:66, 7:43-8:51, 9:6-14.) Such teachings thus would have been consulted by a person of ordinary skill in the art designing/implementing a location-determining process/system, like that described by the *Spain-I-Hunzinger-Nanda* combination.

295. Upon considering the teachings and suggestions of *Blomqvist* in context of the teachings and suggestions of *Spain-I-Hunzinger-Nanda* and a person of ordinary skill in the art's state of art knowledge, it is my opinion that a person of ordinary skill in the art would have been motivated to configure the modified *Spain-I-Nanda* system/processes such that the MU performs monitoring operations (as I discussed above for limitation 1(a)) that include low accuracy monitoring and high accuracy monitoring like that recited in claims 17-20. Such a skilled person would have appreciated the benefits of providing conditioned monitoring operations in the *Spain-I-Hunzinger-Nanda-Blomqvist* system/processes (such as performing high accuracy monitoring (measuring signal strengths) only when conditions are met for

low accuracy monitoring (IDs match)) to avoid unnecessarily using power/processing resources needed to measure signal strengths and performing location determining when the MU is determined to have moved (or is moving) to different locations (e.g., cells), thus conserving MU processing/memory capacities for other uses, and potentially reducing applicable positioning/service costs attributed to the network and location server services, and other understood benefits, like that suggested by *Blomqvist*. (Ex-1033, 2:20-3:19.)

296. In light of their experience and knowledge in the art, and based on the teachings and suggestions of *Spain-I*, *Hunzinger*, *Nanda*, *Blomqvist*, a person of ordinary skill in the art would have understood that accuracy of the location determining processes of the *Spain-I-Hunzinger-Nanda* system/processes was associated with whether signal parameters (signal strength) for signals received from the same antenna stations are analyzed, which would have been confirmed by checking the station IDs of the current location with the stored IDs corresponding to the chosen locations. Therefore, in my opinion, such a skilled person would have found and appreciated efficiencies, especially in light of *Blomqvist*, in first checking whether the IDs match, thus confirming received signals are received from the same stations or such stations were previously recorded in the fingerprint database, before using resources to measure appropriate signal strengths for use in the comparison

operations performed to determine whether or not the MU is at a specific location as I explained for claim 1. (§IX.A.1.) *Blomqvist* teachings use of signal strength measurements only after cell IDs are checked/matched for monitoring whether the MU has changed locations as a condition for subsequent positioning operations would have guided a person of ordinary skill in the art to implement similar low accuracy/high accuracy monitoring features in the *Spain-I-Hunzinger-Nanda* monitoring processes. Such teachings in context of *Spain-I*, which describes features similar to staggered and conditioned operations, would have motivated such a skilled person to consider and implement such low accuracy/high accuracy monitoring features like that claimed. (*Id.*; Ex-1011, 4:42-47 (capturing signal information when location estimate is desired), 5:55-65 (discussing how only after the appropriate signals/parameters are captured/extracted the MU has the basic information for generating the fingerprint).)

297. A person of ordinary skill in the art would have had the skills, knowledge, rationale to configure/implement the above modifications, with a reasonable expectation of success in achieving them, especially where they would have involved use of known techniques/technologies, including programming/modifying software executed by the MU, consistent with that described by *Spain-I* and *Blomqvist*. (Ex-1011, 15:19-29; Ex-1033, 8:33-51.) The

collective teachings/suggestions of *Spain-I-Hunzinger-Nanda-Blomqvist* would have predictably led such a skilled person to configure the monitoring step performed by the *Spain-I-Hunzinger-Nanda* system discussed above for claim 1 with low and high accuracy monitoring just like that recited in claims 17-20.

298. For example, in light of such teachings/suggestions and knowledge in the art, a person of ordinary skill in the art would have been motivated to leverage their skills and knowledge in context of such teachings to configure the MU in the *Spain-I-Hunzinger-Nanda-Blomqvist* system/processes to receive communication signals from the first antenna stations (limitation 1(a)(i)), identify IDs within the received signals (limitation 1(a)(ii)) and compare the current monitored location IDs with the station IDs for user chosen locations stored in the fingerprint database (*see* §IX.A.1(b)(ii)(2)) to determine whether they match (claims 17-18), similar to features described by *Blomqvist*. Similarly, such a skilled person would have been motivated to configure the MU to use resources to measure signal strengths from the current monitored location signals only when the IDs matched (claims 17, 19-20), since that would have indicated the MU is receiving signals from relevant antenna station(s) for user chosen location(s) fingerprint data stored in the database. A person of ordinary skill in the art would have appreciated and understood such modified operations would have conserved resources in the MU (and possible in the

network) (like that taught by *Blomqvist*) by only performing signal strength measurement operations (and ultimately location-determining operations) when relevant information is available for use by the modified system/processes to determine whether MU is within proximity of the user chosen location in accordance with the operations discussed above for limitation 1(b). (§IX.A.1(b).)

299. Thus, a person of ordinary skill in the art would have had ample reasons to consider and configure the *Spain-Hunzinger-Nanda-Blomqvist* system/processes such that the monitoring processes (as I discussed above for limitation 1(a)) included comparing user chosen location station IDs with the current location IDs (low accuracy monitoring) (claims 17-18) and only if the current location station IDs were determined to match the user chosen location IDs in the fingerprint database, would the MU measure signal strengths at the current monitored location (high accuracy monitoring) (claims 17, 19-20).

5. Claim 24

- a) **The method of claim 1 wherein determining if the monitored location is within proximity of a location chosen by the user of the first portable RF communication device further includes informing a location-based software program application running on the portable device that the device is at the location chosen by the user or is no longer at the location chosen by the user.**

300. It is my opinion that *Spain-I* in view of *Hunzinger*, *Nanda*, and *Blomqvist* discloses and/or suggests this limitation. As I discussed above for claim 1, the *Spain-I-Hunzinger-Nanda* combination discloses and/or suggests determining if the monitored location is within proximity of a location chosen by the user of the first MU, like that claimed in limitation 1(b). (See my discussions above in §IX.A.1(b) (e.g., based on the comparison and threshold operations performed by the *Spain-I-Hunzinger-Nanda* system/processes, the MU determines whether the MU is in proximity of a user chosen location corresponding to fingerprint information in the database).) Given *Spain-I* also discloses location-based service features (Ex-1011, 3:8-16 (location server interested in MU location for providing “personalized services,” etc.), a POSITA would have had reasons to consider teachings in the art providing details regarding MU-based features that would leverage the location determining features discussed above, including use of a location-based software applications known to be available in mobile devices at the time. In view of *Hunzinger* and *Blomqvist* (see my analysis above), it is my opinion that a person of ordinary skill in the art would have been motivated to configure the *Spain-I-Hunzinger-Nanda* system/process such that the proximity location determination informing a location-based software program application running on

the MU that the MU is at the location chosen by the user or is no longer at the location chosen by the user, like that claimed in claim 24. .

301. As I explained above, *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 my discussions above in §§IX.A.1(b)(ii)(1)-(2).)

302. Also, in addition to the disclosures I mentioned above for claims 17-20 (see my discussions in §§IX.D.1-D.4), *Blomqvist* describes features where the mobile device activates a location-based function when it is determined the device is at or within vicinity of a specified location. (Ex-1033, FIG. 2, 1:14-39, 2:20-62, 5:10-60.) The device user can determine the “location-based function,” which can be a reminder, picture/text/sound message, starting of a program or service in the device, or a corresponding function, and the determination of the function contains coordinate information or the like. (*Id.*, 3:44-64, FIGS. 1a-1b.) The reminder service function is associated with the positioning processes in that after device location is determined and “[w]hen *the 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.) Such features would have been understood to exemplify a location-based software application being informed that (and launched) when it is determined the MU/user is at a chosen location. Other functions in similar context can be activated on the basis of the determined/informed location, such as starting a program, changing settings/profiles, security functions, and notifications etc. (*Id.*, 5:46-6:36.) *Blomqvist* explains that “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*,” such as indicating “that the user has arrived to a certain location, activating a map application, etc.”). (*Id.*, 8:52-62.)

303. Upon considering *Blomqvist* for reasons explained (*see* §IX.D.1-D.4), and in light of the above-teachings in context of the *Spain-I-Hunzinger-Nanda* system/processes discussed above for claim 1 (which determines when the MU is at a user chosen location (§IX.A.1(b))), it is my opinion that a person of ordinary skill in the art would have been motivated to configure the MU in the *Spain-I-Hunzinger-Nanda* system/processes (§IX.A.1) to include a location-based software program

application, similar to that taught by *Blomqvist*, that is informed/launched/executed that/when it is determined that the MU is at the user chosen location as performed in accordance with the processes I explained above for limitation 1(b) (*see* my discussions above in §IX.A.1(b)), and consistent with the teachings of *Hunzinger* and *Blomqvist*. Such a skilled person would have appreciated that providing such features and location-based applications on the MU in the modified system would have been a known implementations common features, given mobile devices at the time were known to store and execute applications to assist the user with various tasks, events, and the like, including those based on location of the MU (as demonstrated by *Blomqvist*). (*See* also my discussions above in §V.) Thus, based on the collective teachings and suggestions of *Spain-I-Hunzinger-Nanda-Blomqvist* like that explained above, it is my opinion that a person of ordinary skill in the art would have been motivated to configure the location determining processes performed by the modified system (§IX.A.1(b)) to further include informing a location-based software program application running on the MU that the device is at the location chosen by the user or is no longer at the location chosen by the user like that recited in claim 24. Such a skilled person would have been motivated to include such features in the *Spain-I-Hunzinger-Nanda* system in order to increase user convenience and help users remember events or to-do items when they are at a given

location, similar to the teachings/guidance offered by *Hunzinger* and *Blomqvist*. (See my discussions of *Hunzinger* and *Blomqvist* above; see also e.g., Ex-1033, 1:43-58, 5:10-37.)

304. A person of ordinary skill in the art 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-1011, 3:8-16.) Such a skilled person would have had the skills, knowledge, and rationale to configure/implement the above modifications, with a reasonable expectation of success in achieving them, especially where they would have involved use of known techniques/technologies, including programming/modifying software executed by the MU, consistent with that described by *Spain-I* and *Blomqvist*. (Ex-1011, 15:19-29; Ex-1033, 8:33-62.)

305. The collective teachings/suggestions of *Spain-I-Hunzinger-Nanda-Blomqvist* would have predictably led a person of ordinary skill in the art to configure the location determining processes performed by the *Spain-I-Hunzinger-Nanda* system discussed above for claim 1 such that as part of determining whether the MU is in proximity of a user chosen location, the MU performed processes that informed a location-based software program application running on the MU that the

device is at the user chosen location so that the application could launch and execute relevant operations consistent with such features, like those taught by *Blomqvist* and similarly suggested by *Hunzinger* in terms of performing location-based actions on the MU based on determined location processes. (*See also* my analysis below for claim 25.)

6. Claim 25

- a) **The method of claim 1 wherein determining if the monitored location is within proximity of a location chosen by the user of the first portable RF communication device further includes launching a location-based software program application on the portable device when the device is at the location chosen by the user.**

306. It is my opinion that the *Spain-I-Hunzinger-Nanda-Blomqvist* combination that I discussed above for claim 24 discloses and/or suggests the limitations of claim 25 for similar reasons. (*See* my discussions above in §IX.D.5.)

307. For example, my analysis for claim 24 also explains how and why a person of ordinary skill in the art would have been motivated to modify the *Spain-I-Hunzinger-Nanda* system/processes such that the determining if the monitored location is within proximity of a location chosen by the user of the first MU further includes launching a location-based software program application on the portable device when the device is at the location chosen by the user like that claimed in claim

25. (§IX.D.5.) For the same reasons, such a skilled person would have been motivated to configure the *Spain-I-Hunzinger-Nanda* system/processes in light of *Blomqvist* such that the proximity location determination (§IX.A.1) further includes launching a location-based software program application on the portable device when the device is at the location chosen by the user like that recited in claim 25. (§§IX.A.1(b), IX.D.5.)

308. As I discussed above for claim 24, the resulting modification would have predictably resulted in the MU launching/executing such a location-based software application program running on the MU upon determining the MU is at the user chosen location (explained for claim 1), like that recited in claim 25. (*See* §IX.D.5; Ex-1033, 8:52-62 (“*activate an application (program)* installed in the device 1...when the device 1 is positioned close to a predetermined location”).))

309. A person of ordinary skill in the art would have been motivated to include such features in the *Spain-I-Hunzinger-Nanda-Blomqvist* system to *e.g.*, provide user-friendly and convenient mechanism to help users to remember events or to-do items, or receive location-based information, when it is determined they (based on the MU they carry) is at a given location, such as a user chosen location consistent with the teachings and guidance offered by *Blomqvist* and the features I discussed above for limitation 1(b) (Ex-1033, 1:43-58, 5:10-37; §IX.A.1.) Such a

skilled person would have appreciated the benefits of launching a location-based software application program running on the MU upon such a determination 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 would have complemented the service-based features contemplated by *Spain-I*. (Ex-1011, 3:8-16.)

310. A person of ordinary skill in the art would have had the same rationale, skills, knowledge, and expectation of success as I discussed above for claim 24 to configure/implement such a modification, and appreciated similar benefits in such modification. (§IX.D.5.) Consequently, for similar reasons, the collective teachings of *Spain-I-Hunzinger-Nanda-Blomqvist* would have led such a skilled person to configure the modified system/processes in a manner that discloses or suggests the limitations of claim 25.

X. CONCLUSION

311. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: November 7, 2023



Kevin C. Almeroth