

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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APPLE INC.,

Petitioner

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IPR2025-01261

U.S. Patent No. 9,042,910

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**DECLARATION OF R. MICHAEL BUEHRER, PH.D.,  
UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITION  
FOR *INTER PARTES* REVIEW**

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I, R. Michael Buehrer, Ph.D., do hereby declare as follows:

**I. INTRODUCTION**

1. I am making this declaration at the request of Apple Inc. in the matter of the *Inter Partes* Review of U.S. Patent No. 9,042,910 (“the ’910 patent”) to Pérez LaFuente.

2. I am being compensated for my work in this matter at my standard hourly rate. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this proceeding. My compensation is not contingent on the outcome of this matter or the specifics of my testimony.

3. I have been asked to provide my opinions regarding whether the subject matter of claims 1-14 (“the Challenged Claims”) of the ’910 patent would have been obvious to a person having ordinary skill in the art (“POSITA”) at the time of the alleged invention, in light of the prior art. It is my opinion that the Challenged Claims would have been obvious to a POSITA.

4. In the preparation of this declaration, I have studied:

- a. the ’910 patent, Ex.1001;
- b. the prosecution history of the ’910 patent (“’910 File History”), Ex.1002;
- c. U.S. Patent Publication No. 2006/0135174 to Kraufvelin, et al. (“Kraufvelin”), Ex.1006;

d. U.S. Patent Publication No. 2005/0070283 to Hashimoto, et al.  
("Hashimoto"), Ex.1008;

e. U.S. Patent Publication No. 2004/0203863 to Huomo  
("Huomo"), Ex.1016;

f. U.S. Patent No. 6,230,017 to Andersson, et al. ("Andersson"),  
Ex.1007;

5. In forming the opinions expressed below, I have considered: the documents listed above; the relevant legal standards, including the standard for obviousness; and my own knowledge and experience based upon my work in the field as described below, as well as portions of the following additional materials:

a. 3GPP Specification TS 23.171, version 1.10.0 (Jun. 2003)  
("TS23.171 standard v.3.10.0"), Ex.1018;

b. 3GPP Specification TS 23.171, version 1.0.0 (Oct. 1999)  
("TS23.171 standard v.1.0.0"), Ex.1019;

c. 3GPP Specification TS 23.032, version 3.0.0 (May 1999)  
("TS23.032 standard v.3.0.0"), Ex.1021;

d. Claim comparison chart for '910 patent claims, Ex.1065;

6. Unless otherwise noted, all **emphasis** in any quoted material has been added. Claim terms are *italicized*.

## II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

7. My complete qualifications and professional experience are described in my *Curriculum Vitae*, a copy of which can be found in Exhibit 1004. The following is a brief summary of my relevant qualifications and professional experience.

8. I am currently a Professor of Electrical and Computer Engineering at Virginia Tech and the former (2014-2022) Director of *Wireless @ Virginia Tech*.

9. My academic and professional background is in Electrical and Computer Engineering, and I have been working in those fields since the completion of my Ph.D. over 25 years ago. Below, I provide a short summary of my education and experience that I believe to be most pertinent to the opinions I have formed in this case.

10. I received a B.S. in Electrical Engineering from The University of Toledo in 1991, an M.S. in Electrical Engineering from The University of Toledo in 1993, and a Ph.D. in Electrical Engineering from Virginia Polytechnic Institute and State University in 1996. The focus of my graduate work was wireless communication systems. My Ph.D. thesis involved the application of multiuser detection (an advanced signal processing approach to interference mitigation) to CDMA-based cellular systems.

**11.** After completion of my Ph.D. in 1996, I joined Bell Laboratories, the research division of Lucent Technologies, where I worked for five years as a Member of Technical Staff and later as a Distinguished Member of Technical Staff. My work there focused on developing advanced technologies for cellular telecommunications, including for 3G cellular standards. For example, while at Bell Labs, I developed and implemented algorithms for intelligent antenna systems that increased the voice capacity (i.e., number of simultaneous phone calls) and data capacity of cellular systems. These algorithms were included in Lucent Technologies' 3G CDMA cellular base station. I also developed techniques known as transmit diversity techniques that increased reliability (i.e., reduced the probability of a dropped call) of cellular systems. These transmit diversity techniques were standardized in the 3GPP2 cellular standard known as cdma2000. During that time, I supported the standardization of my ideas by writing contributions to the working groups developing the standards and attending standards meetings. In particular, I participated in the 3GPP2 standardization process. During that time, I worked with colleagues to include my ideas on the use of transmit diversity in CDMA systems in the 3GPP2 standard.

**12.** I am currently a Professor in the Bradley Department of Electrical and Computer Engineering at Virginia Polytechnic Institute and State University (Virginia Tech), where I have taught and conducted research in the area of wireless

communications, geolocation and radar for over 20 years. Specifically, I have taught courses that cover wireless communications and signal processing (including the underlying concepts) at the undergraduate and graduate levels. For example, I teach a sophomore-level course which introduces the concepts of signals and systems, a junior-level course which introduces the basic concepts of communication systems, senior-level and graduate-level courses that cover advanced digital communication topics, and also graduate-level courses that teach the advanced technologies underlying the latest wireless systems, such as Fourth and Fifth Generation (4G/5G) cellular communication standards (e.g., LTE, LTE-Advanced, New Radio) and Wi-Fi. I also teach graduate courses on advanced topics such as Information Theory, Machine Learning Applied to Communication Systems, Spread Spectrum Communications and CDMA. Furthermore, I have taught short courses covering topics such as position location and position location using ultra-wideband signals.

**13.** Additionally, I have conducted research into Ultra-Wideband (UWB) signal propagation, UWB receiver design, and UWB signal processing across a number of funded research projects. I also developed a UWB-based ranging system as part of an automated cargo container transfer system for the United States Navy. Further, I have developed geolocation systems in a number of research projects including designing a prototype system for localizing first responders, developing localization techniques for 5G and 6G cellular networks, localization sub-systems

for in-home smart health systems, algorithms for enhancing cellular-based localization, algorithms for localization in the presence of interference and harsh propagation, and a second UWB-based positioning system.

**14.** From 2014 until 2022, I also served as the director of *Wireless @ Virginia Tech*, a comprehensive research group focusing on wireless communications, which consists of 14 faculty members and approximately 85 graduate students. My specific research focuses on advanced wireless communications and geolocation techniques. This research has examined both advanced theoretical concepts as well as the application of these concepts to the latest wireless standards. As an example of the latter, I (along with my students) have conducted research applying multiuser/multi-antenna signal processing to LTE. I have also applied advanced geolocation techniques to LTE systems.

**15.** My research work has been funded by national agencies including the National Science Foundation (NSF), the Defense Advanced Research Projects Agency (DARPA), the Office of Naval Research (ONR), the Army Research Lab, the Air Force Research Lab as well as many industrial sponsors.

**16.** During 2009, I was a visiting researcher at the Laboratory for Telecommunication Sciences (LTS), a Federal Research Lab that focuses on telecommunication challenges for national defense. While at LTS, my research focus

was in the area of cognitive radio with a particular emphasis on statistical learning techniques.

17. I have authored and co-authored over 350 publications in my area of expertise, which have been published in the leading journals in my field including *IEEE Transactions on Communications*, *IEEE Transactions on Wireless Communications*, *IEEE Transactions on Information Theory*, *Proceedings of the IEEE*, and *IEEE Transactions on Signal Processing*, and at all of the major conferences in my field. These publications include the areas of wireless position location (i.e., geolocation). This research has been cited over 13,000 times. A complete list of my publications over the last 30 years is included in my Curriculum Vitae. I am a Fellow of the IEEE (so named “for contributions to wideband signal processing in communications and geolocation”). Additionally, in 2023 I received the prestigious MILCOM Lifetime Award for Technical Achievement. This award recognizes individuals who have made important technical contributions to military communications over the course of their careers. I was a co-recipient of both the Vanu Bose Award for the best paper and the Fred Eilersick Award for the best paper, both at the 2023 Military Communications Conference for my work on LEO-based geolocation. I was also a co-recipient of the Vanu Bose Award for the best paper at the 2021 Military Communications Conference.

**18.** In 2010, I was awarded the Ellersick Best Paper Award in the Unclassified Technical Program, at the IEEE Military Communications Conference. I received the SDR Forum Best Paper Award in 2007 and the Outstanding Paper Award at the SDR Forum in 2008. I received the Dean's Award for Teaching Excellence in April 2014 and the Dean's Award for Outstanding New Assistant Professor, College of Engineering in 2003. While at Bell Laboratories, I was awarded the Bell Labs President's Silver Award for outstanding research contributions and the 1999 Best Paper Award in the Bell Labs Technical Journal.

**19.** I also hold 18 issued patents in the area of wireless communications, many of which relate to wirelessly locating a wireless device.

**20.** I formerly served as an area editor for *IEEE Transactions on Wireless Communications* supervising a team of 12 editors. I also recently served as a guest editor for a special issue of the *Proceedings of the IEEE* and as a guest lead editor for a special issue of the *IEEE Journal on Special Topics in Signal Processing* relating to non-cooperative position location networks. I was formerly an associate editor for *IEEE Wireless Communications Letters*, *IEEE Transactions on Vehicular Technologies*, *IEEE Transactions on Communications*, *IEEE Transactions on Signal Processing*, and *IEEE Transactions on Education*.

**21.** Additionally, I formerly served as the guest editor for the *IEEE Journal on Special Topics in Signal Processing*. I served as the Technical Program Chair for

the Signal Processing for Communications Symposium at the 2017 IEEE International Conference on Communications. Previously, I was the Organizer and Technical Co-Chair for both the 2015 and 2016 IEEE Global Communications Conference Workshop on Localization and Tracking: Indoors, Outdoors and Emerging Networks (LION). I have also served on the technical program committees of several other conferences and workshops in my field.

**22.** A complete copy of my curriculum vitae, which includes a list of my publications and contains further details on my education, experience, publications, patents, and other qualifications to render an expert opinion, is provided in Exhibit 1004.

**23.** I have reviewed the '910 patent, and relevant excerpts of the prosecution history of the '910 patent. Based on my experience and education, and the acceptance of my publications and professional recognition by societies in my field, I believe that I am qualified to offer opinions as to the knowledge and level of skill of one of ordinary skill in the art at the time of the invention of the '910 patent (which I further describe below).

### **III. LEVEL OF ORDINARY SKILL IN THE ART**

**24.** I understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the

sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

**25.** A POSITA in the field of the '910 patent, as of its earliest possible priority date of March 28, 2006<sup>1</sup>, would have been someone knowledgeable and familiar with using geolocation in the provision of location-based services in a wireless communications network (e.g., a cellular telephone network or Wi-Fi network). Such a POSITA would have a bachelor's degree in electrical engineering, computer science, computer engineering, or a related field, and two years of experience relating to research, design, and development of wireless communications networks. Additional work experience can substitute for specific educational background, and vice versa.

**26.** For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my own experience and what a POSITA would have understood or known generally (and specifically related to the references I consulted herein), reflect the knowledge that existed in the relevant field as of the priority date of the '910 patent.

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<sup>1</sup> I have been asked to apply March 28, 2006 as the priority date for the purposes of my analysis.

#### **IV. RELEVANT LEGAL STANDARDS**

**27.** I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the '910 patent, I am relying on certain basic legal principles that Apple's counsel has explained to me.

**28.** I understand that prior art to the '910 patent includes patents and printed publications in the relevant art that predate the priority date of the '910 patent. For purposes of this Declaration, I am applying March 28, 2006, as the priority date of the '910 patent.

**29.** I have been informed by Apple's counsel that a claimed invention is unpatentable under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA. I have also been informed by Apple's counsel that the obviousness analysis considers factual inquiries, including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

**30.** I have been further informed by Apple's counsel that there are several recognized rationales for combining references or modifying a reference to show obviousness. These rationales include: (a) combining prior art elements according to known methods to yield predictable results; (b) simple substitution of one known element for another to obtain predictable results; (c) use of a known technique to

improve a similar device (method, or product) in the same way; (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (e) choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and (f) some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art or to combine prior art teachings to arrive at the claimed invention.

## **V. BACKGROUND**

**31.** In cellular networks, the location of a mobile device may be estimated based on its interaction with the network's base stations (e.g., cell towers in a cellular telephone network). TS23.171 standard (Ex.1018), 7. For example, each base station generally broadcasts a signal used by mobile devices to detect nearby base stations. Kraufvelin (Ex.1006), [0079]-[0080]; Putkiranta (Ex.1005), 5:65-6:3. The signal includes a unique identifier, such as a cell ID, for the particular base station to allow mobile devices to identify that base station. Kraufvelin, [0009], [0056], [0060]; Hashimoto, [0135]; Putkiranta, 5:65-6:3. Because the location of each base station in a cellular network is generally fixed, the mobile device's location may be estimated based on the set of base stations from which it is currently receiving these broadcast signals. Kraufvelin, [0056], [0060]; Putkiranta, 4:60-5:8. The mobile device may be configured to notify particular computing devices or servers of the cellular network when the set of base stations changes—such as when the mobile

station begins receiving a broadcast signal with a new unique identifier (*e.g.*, when it enters a particular area), or stops receiving one it was previously receiving (*e.g.*, when it leaves a particular area). Kraufvelin, [0060]; Putkiranta, 8:60-65. Cellular network operators collect and store this location information and make it available to authorized external entities to enable location-dependent applications, such as specific call pricing, targeted advertisements associated with the location, and the like. Kraufvelin, [0012]; Putkiranta, 6:13-52.

**32.** These techniques, referred to as “location services,” were well known as early as the 1990s. In fact, by 1999, the 3rd Generation Partnership Project (3GPP), a standards organization for mobile telecommunications, issued multiple technical specifications standardizing aspects of location services. *See* TS23.171 standard v.1.0.0 (Ex.1019) (3GPP specification for “location services in UMTS,” dated October 1999); TS23.032 standard v.3.0.0 (Ex.1021) (3GPP specification for a system for “coding of locations,” dated May 1999). As described herein, the ’910 patent simply rehashes “location services” techniques that were well known—and some that were even standardized—well before its earliest alleged priority date (March 28, 2006).

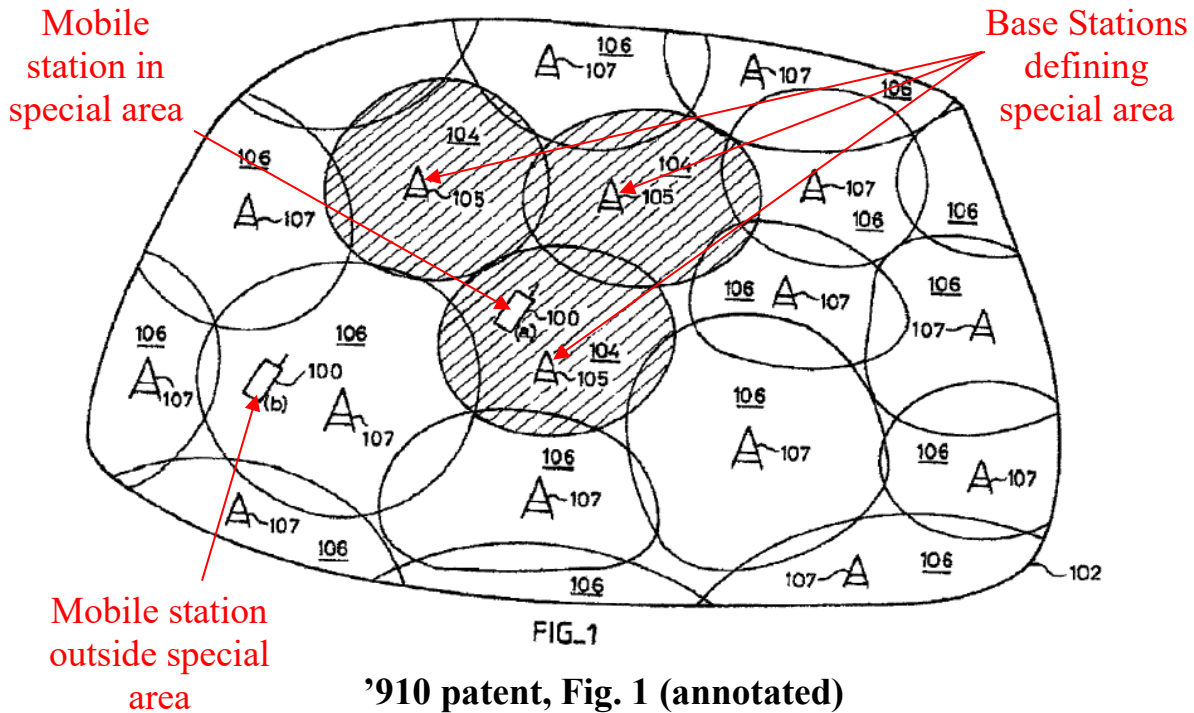
## **VI. THE ’910 PATENT**

**33.** The ’910 patent “relates to a method for monitoring a mobile station presence in a special area” so that services or tariffs can be enabled or disabled on

the mobile station in the special area. Ex.1001 ('910 patent), 1:19-20; 4:17-21 (“In a particular embodiment, the operating parameter is a tariff or a service flag that enables or disables a special tariff or a service for the mobile station. Advantageously, the operator’s services offer can therefore being dependent on the location of the mobile station.”). In particular, the '910 patent aims to “provid[e] the flexibility to the mobile telephone network of associating new special areas for this mobile station in a secure way without modifying any radio transmitting device.” Ex.1001, 2:7-12; 2:44-55 (“Advantageously from the operator’s point of view, the invention brings the flexibility needed to activate a special way of operating a mobile station in a special area by transmitting a checking data that will be stored in a mobile station database without having to modify... at least one radio communication defining device.... Therefore, a radio communication defining device is not required to store all the mobile stations identity codes using the special area defined by at least the coverage of its defining signal(s).”). The '910 patent accomplishes this by using a well known technique in which checking data used to determine whether the mobile station is in a special area is stored in the mobile station rather than in a radio communication defining device. Ex.1001, 2:44-55 (describing storing checking data on the mobile station rather than a radio communication defining device); Section V *supra* (explaining how this technology was well known).

34. Specifically, the '910 patent discloses a mobile telephone network that includes various base stations (where “any base station 107 or 105 of a mobile telephone network of an operator is a radio communication defining device”) that “transmit[] a radio defining signal in a channel used by the mobile telephone network.” Ex.1001, 6:3-6. A subset of the base stations transmit a “distinctive radio defining signal” that “compris[es] a special mobile telephone network identification code” such that “[t]he sum of the coverage of these selected base stations 105 defines a special area.” Ex.1001, 5:65-6:11. The “special mobile telephone network identification code” associated with the base stations defining the special area is stored as “checking data” in the mobile station. Ex.1001, 6:12-14; 6:40-43 (“The checking data (i.e. IC2) is stored into an internal mobile station database included in mobile station 100 storing means, this mobile station 100 being associated to this special area.”). If the mobile station is in the special area, an operator can offer, for example, a lower billing rate to the user of the mobile station. Ex.1001, 7:16-24 (“For example, a mobile telephone network operator can use this embodiment of the invention to offer one set of normal billing rates in an urban environment of a country, and another set of special billing rates for a rural environment.”); *see also* 11:42-47 (“An operator of a mobile telephone network (i.e. the company that operates this mobile telephone network) wishes to propose special billing rates and/or special services to users of its mobile telephone network, each user carrying

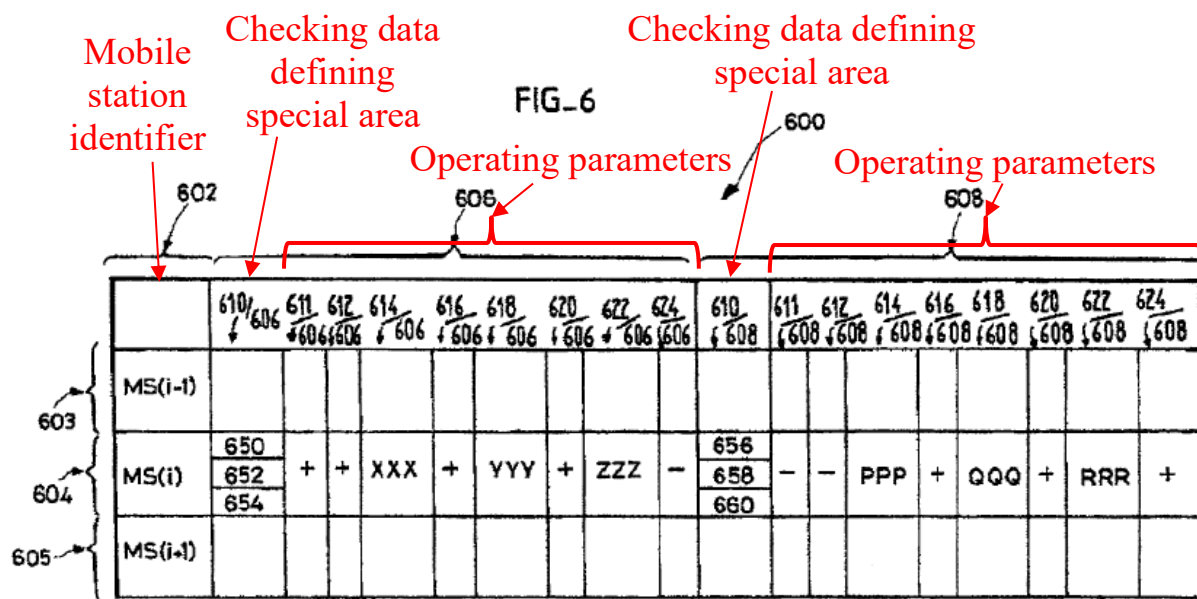
a mobile station, when said users are within special areas of the invention.”). An exemplary mobile telephone network is shown below in Fig. 1 below:



35. The mobile telephone network includes “special operating means...[that] are included in a server and therefore are advantageously centralized and not distributed between each base station of the mobile telephone network.” Ex.1001, 11:37-41. The special operating means includes a “parameters database [that] associate[s] each special area defined with the mobile stations whose presence in such special area is monitored.” Ex.1001, 11:58-61. In particular, “each mobile station identifier is associated with special tariffs and/or services which may be or not available for the mobile station depending on the presence of such mobile station into a given special area.” Ex.1001, 11:61-12:3. The parameters database includes

“operating parameter(s) that may be adapted depending on the presence of the mobile station in one or more special areas at the same time may be notably related to activation or deactivation flags of tariffs and/or services provided to the mobile station by the mobile telephone network.” Ex.1001, 12:4-13.

36. For example, the '910 patent describes an exemplary parameters database 600 shown in Fig. 6 (Ex.1001, 17:51-54):



**'910 patent, Fig. 6 (annotated)**

37. In particular, the part of the parameters database shown in Fig. 6 includes a column 602 that “comprises the mobile stations identification codes,” which “refers to a code that is associated with the subscription of the mobile station user into the mobile telephone network” such as the “MSISDN.” Ex.1001, 17:59-64. The parameters database also includes “the set of checking data of mobile

“station [*sic*] MS(i) for the special area SA1 606, defined in the column 610/606 of the entry 604,” specifically “the distinctive defining signal of a first base station BS1” and “a checking data 652 comprised into the distinctive defining signal of a second base station BS2.” Ex.1001, 17:65-18:13. When “the mobile telephone network receives a confirmation of new checking data...from this mobile station confirming that all the checking data corresponding to the special area has been stored,” “the value of column 611/606 for the mobile station MS(i) and for the special area 606 is enabled (+) or disabled (-).” Ex.1001, 18:26-39.

**38.** Thus, “[t]he column 612/606 corresponding to the operating parameter ‘Mobile Station Control Flag’ is enabled (+) or disabled (-) at a given time for the mobile station MS(i) and for the special area SA1 606 depending on the information comprised into the updating signals received about the presence of the mobile station into the special area 606.” Ex.1001, 18:45-53, 18:14-25 (“The mobile station determines that it is located into the special area SA1 606, when it receives at least one of the three identifiers 650, 652, 654 comprised in the distinctive defining signals coming from BS1, BS2 and WD1.”). “When the ‘Mobile Station Control Flag’ is enabled (+) at a given time for the mobile station MS(i) and for the special area 606, certain tariffs or services related to such special area may be available for the user of the mobile station depending on the value (+) or (-) of the corresponding tariff or service flags for Such mobile station and special area into the operating

parameters database.” Ex.1001, 18:54-60. For example, in the part of the parameters database shown in Fig. 6, “at a given time, in the column Tariff identifier 614/606, the parameter is then set at XXX and in the column 616/606, the Tariff Flag is enabled (+). In the column 618/606, the service identifier parameter is then set at YYY and in the column 620/606, the Service Flag of said service YYY is enabled (+). In the column 622/606, the Service identifier parameter is set at ZZZ and in the column 624/606, the Service Flag of said service ZZZ is disabled (-) because service ZZZ is disabled at that time for the mobile station MS(i) and the special area SA1 606.” Ex.1001, 18:60-19:3; *see also* 19:4-19 (“The set of columns 610/608 to 624/608 provides the same kind of information for the special area SA2 608.”).

**39.** The '910 patent indicates that “a part of the special operating means that allow or forbid the provision of [a] service or multimedia content depending on whether or not the mobile station is into the special area...may be operated by the mobile telephone network operator or by a different provider.” Ex.1001, 4:22-29; 19:20-24 (“In another embodiment of the invention, the special operating means are distributed into different servers of the mobile telephone network or of service providers associated with the mobile telephone network and an updating signal may be sent to any of those servers.”).

**40.** Therefore, the mobile station monitors the defining signals from the base stations as it moves through the network and compares the identification code

received from the base station to the stored checking data. Ex.1001, 15:11-23 (“In step 512, the mobile station decide if it receives a defining signal (possibility 516) or not (possibility 514) after observing and processing any signal received.”). “If the mobile station is...inside the special area, the mobile telephone network identification code received is equal to [the stored checking data] and therefore the mobile station 100 determines that it is into the special area.” Ex.1001, 6:45-58; *see also* 15:24-31 (“Then, in step 520...the mobile station decides whether (possibility 524) or not (possibility 522) the defining signal received is a distinctive defining signal that defines a special area for this mobile station, therefore validating or not the defining signal received as a distinctive defining signal.”).

**41.** When the mobile station determines that it is in the special area, it “sends and [*sic*] updating signal to the mobile telephone network about its presence in the special area.” Ex.1001, 15:50-52. This updating signal may be sent to the special operating means of the server via various channels in the mobile telephone network. Ex.1001, 16:27-28 (“The updating signal may be sent through a diversity of channels provided by the mobile telephone network.”). The special operating means then “adapt the operation parameters of the special areas database” based on the updating signal and “send an acknowledgement” to the mobile station. Ex.1001, 16:49-53 (“When the acknowledgment is received (possibility 531) into the mobile station, the mobile station knows in step 534 that the special operating means will

make the appropriate adaptations in the operating parameters of the special areas database.”); 17:1-10 (similar). Then, “the mobile telephone network may enable or disable to the mobile station to use predetermined services depending on the presence of the mobile station into a special area.” Ex.1001, 17:11-15.

**42.** However, “[i]f the acknowledgement is not received in the mobile station (possibility 532) because the updating signal does not reach the special operating means or the mobile station detects a failure in the transmission of the updating signal or there is a failure in the transmission of the acknowledgment, then the mobile station may send the updating signal again.” Ex.1001, 16:41-48.

**43.** Additionally, “the mobile telephone network sets the values of the operating parameters managed in the parameters database to a set of initial values when the mobile station is switched off (as at that time it is not present in any special area) in order to start operating the mobile station when it is just switched on.” Ex.1001, 14:62-67.

**44.** Moreover, the ’910 patent explains that “the operator can modify a special area” stored in the mobile station. Ex.1001, 14:1-4. First, the operator “defines such modified special area,” by, for example, adding checking data to the previous checking data or by erasing the previous checking data and adding new checking data. Ex.1001, 14:4-18. Then, “the operator updates the parameters database in order to include, if known, the new checking data associated to the

mobile station and the modified special area.” Ex.1001, 14:19-22. Next, the special operating means then “send...the new checking data to the mobile station using the mobile telephone network” so that it can be stored in the memory of the mobile station. Ex.1001, 14:28-32. Finally, the mobile station stores the new checking data, thereby modifying the special area in the storage of the mobile station.” Ex.1001, 14:28-32 (“Once the new checking data has been successfully stored into the part of the internal mobile station database that contains the checking data linked to the special area that has to be modified, a confirmation of modification of checking data is sent to the parameters database.”).

## **VII. CLAIM CONSTRUCTION**

**45.** It is my understanding that in order to properly evaluate the '910 patent, the terms of the claims must first be interpreted. It is my understanding that for the purposes of this *inter partes* review, the claims are to be construed under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would have been understood by a POSITA in light of the specification and prosecution history, unless the inventor has set forth a special meaning for a term. I have also been informed that claim terms only need to be construed to the extent necessary to resolve the obviousness inquiry. I have reviewed the entirety of the '910 patent, as well as its prosecution history. It is my opinion that, at this stage, no claim term requires express construction.

## **VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE**

46. The discussion in this Declaration provides a detailed analysis of how the asserted prior art references render obvious each limitation of the Challenged Claims.

47. As part of my analysis, I have considered, and discuss in detail, the scope and content of the prior art and any differences between the alleged invention and the prior art.

48. It is my opinion that the alleged invention recited in the Challenged Claims would have been obvious in view of the teachings of the asserted prior art and the knowledge of a POSITA before the time of the alleged invention of the '910 patent.

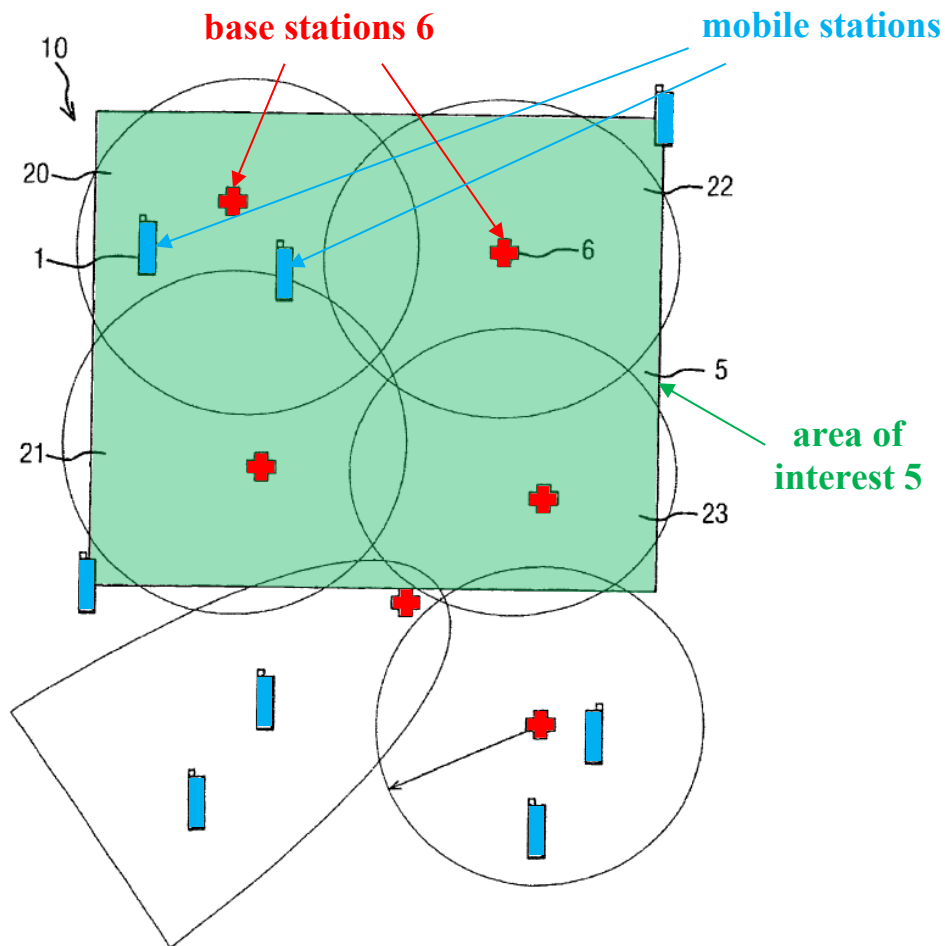
## **IX. GROUND 1: CLAIMS 1-2 AND 4-8 ARE UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF KRAUFVELIN AND HASHIMOTO**

### **A. Summary of Kraufvelin**

49. Kraufvelin is a patent publication that describes systems and methods for providing information regarding the location of a mobile phone, referred to as a mobile station, to a client. Specifically, Kraufvelin describes “monitoring...a change in the presence status of a target mobile station relative to an area of interest.” Kraufvelin, [0023].

50. In Kraufvelin, a client, referred to as the “LCS Client 8,” sends a request to the system to begin monitoring the presence of a particular mobile station in

relation to an area of interest. *See* Kraufvelin, [0063]. Kraufvelin describes this monitoring process with Figure 2 below. Mobile stations (highlighted in blue) move through coverage areas (circles) of base stations 6 or cells (highlighted in red). The base stations of cells 20-23 form an area of interest 5 (highlighted in green). Kraufvelin, [0040]-[0041], [0053].



**Kraufvelin, Detail of Fig. 2 (annotated)**

**51.** As mentioned above, the area of interest 5 is chosen by the client 8, which “makes a request...for information that concerns one or more of the mobile

stations.” Kraufvelin, [0048]. In the example of Figure 2, above, the rectangular shape of the area of interest 5 is an area chosen by the client, and the client wishes to be informed when a particular mobile station enters, exits, or is otherwise present in the area of interest. *See* Kraufvelin, [0063]. To do so, “[t]he request indicates a geographical area of interest and the target subscriber.” Kraufvelin, [0055].

**52.** The system receives the shape from the client and converts it into a list of cell IDs corresponding to the cells within the area of interest 5. “The geographical area” is “translated into a list of Cell Ids.” Kraufvelin, [0056]. “In FIG. 2 the area 5 is shown to be covered by the cells 20 to 23. The IDs of these cells would thus be included in the list.” Kraufvelin, [0056].

**53.** The mobile station that is to be monitored is provisioned with the list of cell IDs. “The list of cells may then be sent to the mobile station 1.” Kraufvelin, [0060]. When the mobile station moves into a new cell, it receives the cell ID of the new cell and “check[s] the new Cell ID against the list.” Kraufvelin, [0060]. “If there is [a] match, the mobile station 1 sends a report back to the network.” Kraufvelin, [0060]; *see also* [0079]-[0080], [0046] (sending “[a]n area event [location services] LCS report indicating” the mobile station’s location). Kraufvelin’s method of providing the list of cell IDs to the mobile station for storage by the mobile station advantageously allows the system to define areas of interest specific to that mobile station and not applicable to other mobile stations within the network. For example,

the mobile station that is to be monitored by the system contains the list of cell IDs and, thus, recognizes entrance into cell 20, for example, as entering the area of interest 5. Other mobile stations, however, that are not provisioned with the same list of cell IDs may enter the cell 20 and not recognize the cell as belonging to an area of interest. Thus, multiple different areas of interest may be provisioned and associated with multiple different mobile stations. This method thus allows for monitoring the location of mobile stations “without causing excessive load into the resources of the communication network.” Kraufvelin, [0012].

54. Kraufvelin also explains that the purpose of implementing such a method may be to provide particular services to mobile stations within the area of interest. For example, Kraufvelin explains that its methods of monitoring the location of a mobile station may be used to provide “**[d]ifferent kinds of services**” such as “various commercial and non-commercial services and similar applications” including “send[ing] information and/or offer[ing] services to a mobile station only in a particular defined geographic area.” Kraufvelin, [0012]. These services may include “push services like advertisements and parents monitoring the whereabouts of their children.” Kraufvelin, [0012]. Because Kraufvelin describes some examples of services that could be provided, a POSITA would have recognized that any type of service may be provided to a mobile station based on its location within the area of interest 5, based on the teachings of Kraufvelin, and would have been very

familiar with the types of services that could be provided (e.g., different tariffs, access to an application, service or function, etc.). *See* Kraufvelin, [0012].

**B. Summary of Hashimoto**

55. Hashimoto is a patent publication describing various aspects of handover procedures in a conventional cellular telecommunications system, concepts with which a POSITA would have been familiar. Hashimoto describes a mobile station that, when entering a new cell, receives the new cell ID of the cell and “transmits a location updating request” to the network. Hashimoto, Abstract. Hashimoto also describes various methods by which a mobile station may be registered to a particular base station or may determine to communicate with one particular base station over another. *See* Hashimoto, [0014]-[0017].

56. Hashimoto explains that to facilitate a handover of the mobile station from one base station to another, cellular base stations “periodically transmit[] system information called ‘broadcast information’ over a channel called ‘BCCH.’” Hashimoto, [0135]. The broadcast information includes “the identification information (ID) of a cell called ‘Cell-ID.’” Hashimoto, [0135]. Hashimoto contemplates that this cell ID may also be any other identification code, value, or parameters, such as any other location area identifier. Hashimoto, Abstract.

**C. The Combination of Kraufvelin and Hashimoto**

57. A POSITA would have recognized that the teachings of Kraufvelin and Hashimoto could be easily combinable and would have been motivated to combine them, as explained in more detail below.

**1. Implementing transmission of cell IDs by base stations in Kraufvelin's system based on Hashimoto.**

58. As explained above, in Kraufvelin, when a mobile station enters the coverage area of a new cell, it checks whether the cell ID of that new cell is included within the prestored list to determine if the mobile station has entered the area of interest 5. *See* Kraufvelin, [0056]-[0060], [0079]-[0080]. Hashimoto provides additional details regarding how the cell ID of the new cell is provided to the mobile station. A POSITA would have recognized these details as conventional steps routinely applied in the implementation of the techniques described by Kraufvelin. In particular, Hashimoto explains that each base station “periodically transmits” its cell ID in the “BCCH” channel of a cellular network. Hashimoto, [0135]. Therefore, in the combination, Kraufvelin's system implements the conventional technique of base stations periodically transmitting their cell IDs based on Hashimoto's teachings.

**2. Implementing reception of multiple cell IDs by a mobile station in overlapping coverage areas of multiple base stations in Kraufvelin's system based on Hashimoto.**

59. Kraufvelin provides a figure illustrating multiple base stations with different coverage areas. Kraufvelin, Fig. 2. The coverage areas of the based stations form an area of interest 5. Kraufvelin, Fig. 2; [0053]. Kraufvelin describes determining the mobile station's location in this area by comparing a received cell ID. Kraufvelin, [0079]-[0080], Fig. 2. Hashimoto also explains that the process of receiving cell IDs from base stations is used to determine location and further explains that it may be performed using multiple cell IDs from multiple base stations when the mobile station is in overlapping coverage of multiple base stations. Hashimoto, Fig. 1, [0134]. Thus, in the combination, Kraufvelin's mobile station implements the conventional technique of receiving cell IDs transmitted by multiple base stations and determining its location based on the received IDs.

**D. Reasons to Combine Kraufvelin and Hashimoto**

60. It would have been obvious to a POSITA to combine the teachings of Kraufvelin and Hashimoto.

**1. Kraufvelin and Hashimoto are analogous art.**

61. Kraufvelin and Hashimoto are analogous to the '910 patent because they are in the same field of endeavor (i.e., monitoring the location of a mobile station relative to a geographical area). The '910 patent describes "monitoring the presence of a mobile station...in at least one special area." Ex.1001, Abstract.

Kraufvelin describes “monitoring...a change in the presence status of a target mobile station relative to an area of interest.” Kraufvelin, [0023]. Hashimoto monitors the location of a mobile station based on transmitted cell IDs. Hashimoto, Abstract (describing “location updating request”).

**62.** Kraufvelin and Hashimoto are also reasonably pertinent to a particular problem with which the inventor was involved (monitoring the location of a mobile station and providing location-based services). Ex.1001, 1:65-2:3; Kraufvelin, [0056]-[0060], [0012]; Hashimoto, Abstract, [0135].

**2. Implementing transmission of cell IDs by base stations in Kraufvelin’s system based on Hashimoto.**

**63.** In Kraufvelin, a POSITA familiar with basic concepts of cellular networking would recognize that each base station repeatedly broadcasts its cell ID because “[w]hen the UE performs a cell handover,” it “check[s] the details of the new serving cell, including the cell ID” and “compare[s] the current cell ID or similar against one or more, target cell IDs in the list received.” Kraufvelin, [0079]. To the extent it is argued, however, that explicit disclosure of this conventional step is required, this concept is described in multiple other references, including Hashimoto. Hashimoto, [0135]. A POSITA would have known that cellular base stations repeatedly transmit their assigned cell ID in the BCCH channel because each mobile station that enters a new cell uses the cell ID to identify the new cell. Hashimoto, [0135].

64. The concept of a base station repeatedly transmitting its cell ID in a BCCH channel was a conventional implementation detail of cellular networks that a POSITA would have been familiar with, as described by both Kraufvelin and Hashimoto. Both Kraufvelin and Hashimoto are compatible with implementations of the 3G cellular standard. Kraufvelin, [0043] (describing “[t]he third generation (3G) systems” including Kraufvelin’s “base station 6”), [0046], [0054]-[0055] (incorporating by reference several 3G standard documents); Hashimoto, [0013] (listing several 3G standard documents as prior art relevant to Hashimoto).

65. Kraufvelin and Hashimoto both explain that multiple mobile stations enter and exit different cells as they move throughout a network, performing handoff procedures as they disconnect from one base station and connect to another. Kraufvelin, Fig. 2, [0047]-[0048] (“one **or more** of the mobile stations”); Hashimoto, Figs. 1-2 (illustrating mobile stations moving through multiple cells BTS11, BTS12, BTS21, BTS31, BTS41, and BTS42). When mobile stations enter a new cell, A conventional cellular base station repeatedly transmits its cell ID throughout the area of its coverage so that any mobile station that newly enters the cell area receives the cell ID and can recognize the cell into which it has just entered. Hashimoto, [0135]. If the cell ID were not repeatedly broadcast by base stations, mobile stations entering the cell would not be able to identify the cells into which

they entered and could not send a location update. Kraufvelin, [0060], [0079]-[0080]; Hashimoto, Abstract (“location updating request”).

**66.** Thus, a POSITA would have been motivated to implement this conventional and well known functionality described by Hashimoto. Doing so would ensure that mobile stations entering a new cell would receive the cell ID of the new cell so they can determine their location and send an updating signal as Kraufvelin describes. Kraufvelin, [0056]-[0060], [0079]-[0083]. Accordingly, the combination of Kraufvelin and Hashimoto would have been the combination of prior art elements, including, for example, Kraufvelin’s monitoring the location of a mobile station and Hashimoto’s base stations repeatedly transmitting a cell ID in a BCCH channel. The combination would be made according to known methods, including receiving a cell ID of an area of interest and finding a match within a prestored list of cell IDs. In addition, the combination would yield the predictable result of a mobile station determining its location and sending a location update, according to conventional standards.

**67.** Further, a POSITA would have expected to successfully combine the conventional teachings of Hashimoto regarding repeatedly transmitting cell IDs from base stations in a cellular network with Kraufvelin’s teachings. Kraufvelin explains that when a mobile station enters a new cell, it receives the cell ID from the base station of the new cell. Kraufvelin, [0079], [0056], [0060], [0039]. Hashimoto

describes the same feature and simply explains that this process occurs repeatedly so that each terminal may receive “various parameters” of the new cell, such as the “Cell-ID,” among others. Hashimoto, [0135]. In addition, both Kraufvelin and Hashimoto describe standardized cellular network components and signals. Kraufvelin, [0043], [0046], [0054]-[0055]; Hashimoto, [0013].

**68.** A POSITA would also have recognized that the concept of base stations repeatedly broadcasting their cell ID throughout their respective coverage areas was conventional because it was described in several 3G standard documents published long before the priority date of the '910 patent. For example, it was commonly known that a base station's cell ID was used by a mobile station to determine its location. *See* TS23.171 standard v.3.10.0, 32 (section 8.7.1.2); TS23.171 standard v.1.0.0, 9-10 (section 4.3). In addition, it was common knowledge that mobile stations use information broadcast from base stations to determine their location. For example, “[t]he [mobile station] MS with an independent location function may also make use of information broadcast by the UTRAN that assists the function.” TS23.171 standard v.1.0.0, 20 (section 6.3.5); *see also* TS23.271 standard v. 6.4.0, 30 (section 6.3.4). An UTRAN is a base station. *See* Vialen, 1:35-38 (“[B]ase station subsystems (BSS), including radio network controllers (RNC) and base stations (BS), is called a UTRAN (UMTS Terrestrial Radio Access Network).”); Auterinen, [0020] (“UTRAN (UMTS Terrestrial Radio Access Network, ie the base stations

and radio network controllers)”). Kraufvelin acknowledges and incorporates by reference these 3G specification documents, showing that these concepts were well known. *See* Kraufvelin, [0010]-[0011], [0043], [0046], [0054]-[0055], [0063]. For all these reasons, a POSITA would have been motivated to combine Hashimoto with Kraufvelin.

**3. Implementing reception of multiple cell IDs by a mobile station in overlapping coverage areas of multiple base stations in Kraufvelin’s system based on Hashimoto.**

69. A POSITA would have recognized that Hashimoto’s teachings regarding a mobile station that receives cell IDs of multiple base stations was also a conventional implementation detail of cellular networks. It was commonly known at the time that the coverage areas of base stations typically overlap in conventional cellular networks, as shown by Hashimoto. This is a well known need to avoid dropping a call/connection. And, as explained above, both Kraufvelin and Hashimoto are implementations of the 3G cellular standard. Kraufvelin, [0043], [0046], [0054]-[0055]; Hashimoto, [0013].

70. A POSITA would have been motivated to implement the functionality described by Hashimoto of mobile stations receiving cell IDs from multiple base stations to ensure that mobile stations within an area of overlapping coverage would identify the overlap in coverage and select one of the base stations for connection to the network. Hashimoto, [0134]. The combination of Kraufvelin and Hashimoto

would have been the combination of prior art elements, such as monitoring the location of a mobile station, as taught by Kraufvelin, and a mobile station receiving cell IDs from multiple base stations, as taught by Hashimoto. This combination would have implemented known methods, including receiving a cell ID of an area of interest and finding a match within a prestored list of cell IDs, as described by Kraufvelin. In this combination, this step would simply be performed for two cell IDs received. The proposed combination of Kraufvelin and Hashimoto would also yield the predictable result of a mobile station determining its location within an area of overlapping coverage and connecting to one base station, according to conventional standards.

71. Further, a POSITA would have expected to succeed in making the combination. Kraufvelin explains that when a mobile station enters a new cell, the mobile station receives the cell ID from the base station of the new cell. Kraufvelin, [0079], [0056], [0060], [0039]. Hashimoto describes the same feature but adds that this process may occur when the mobile is within an area of overlapping coverage. Hashimoto, [0134]. Accordingly, a POSITA would have been motivated to combine Hashimoto with Kraufvelin in the manner proposed.

## **E. Detailed Analysis of Claims**

### **1. Claim 1**

- a. [1.0] *A method associated with the use of a mobile station and at least first and second radio communication***

*defining devices that respectively transmit first and second distinctive defining signals that at least partly define a special area by a sum or intersection of their coverage, the first and second distinctive defining signals respectively including first and second data, the method comprising:*

72. Kraufvelin describes *a method*. Kraufvelin “provide[s] a system and **method**.” Kraufvelin, [0029].

73. Further, Kraufvelin describes *a method associated with the use of a mobile station and at least first and second radio communication defining devices:*

The embodiments of the invention may provide a system and **method** by means of which it is possible to provide information regarding the presence status of **a mobile station** relative a geographical area of interest.

Kraufvelin, [0029].

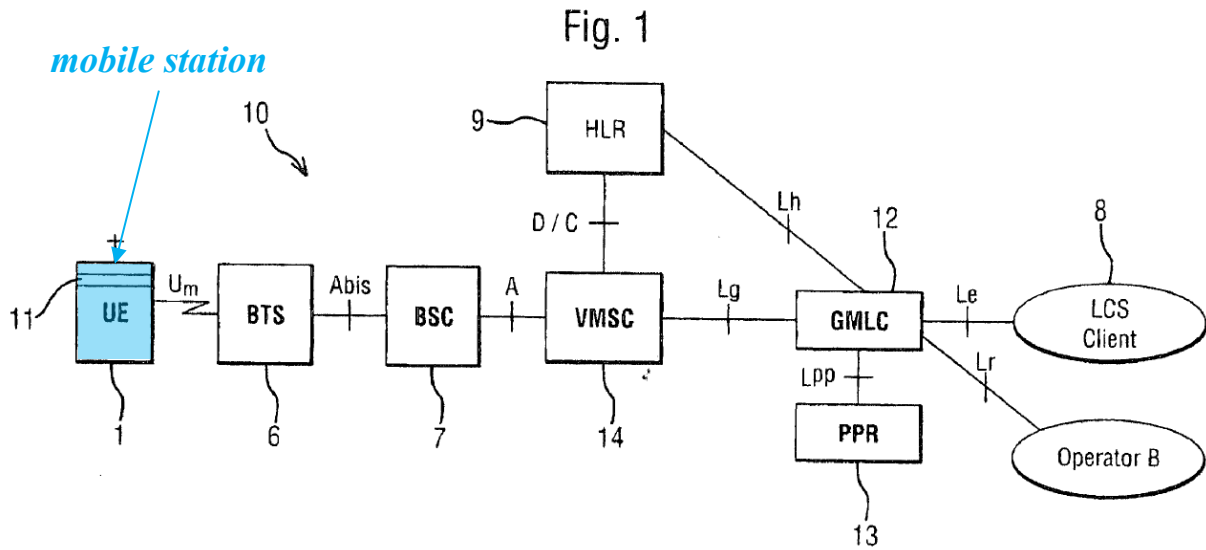
The embodiments of the invention may provide a system and **method** by means of which it is possible to provide information regarding the presence status of **a mobile station** relative a geographical area of interest.

Kraufvelin, [0053].

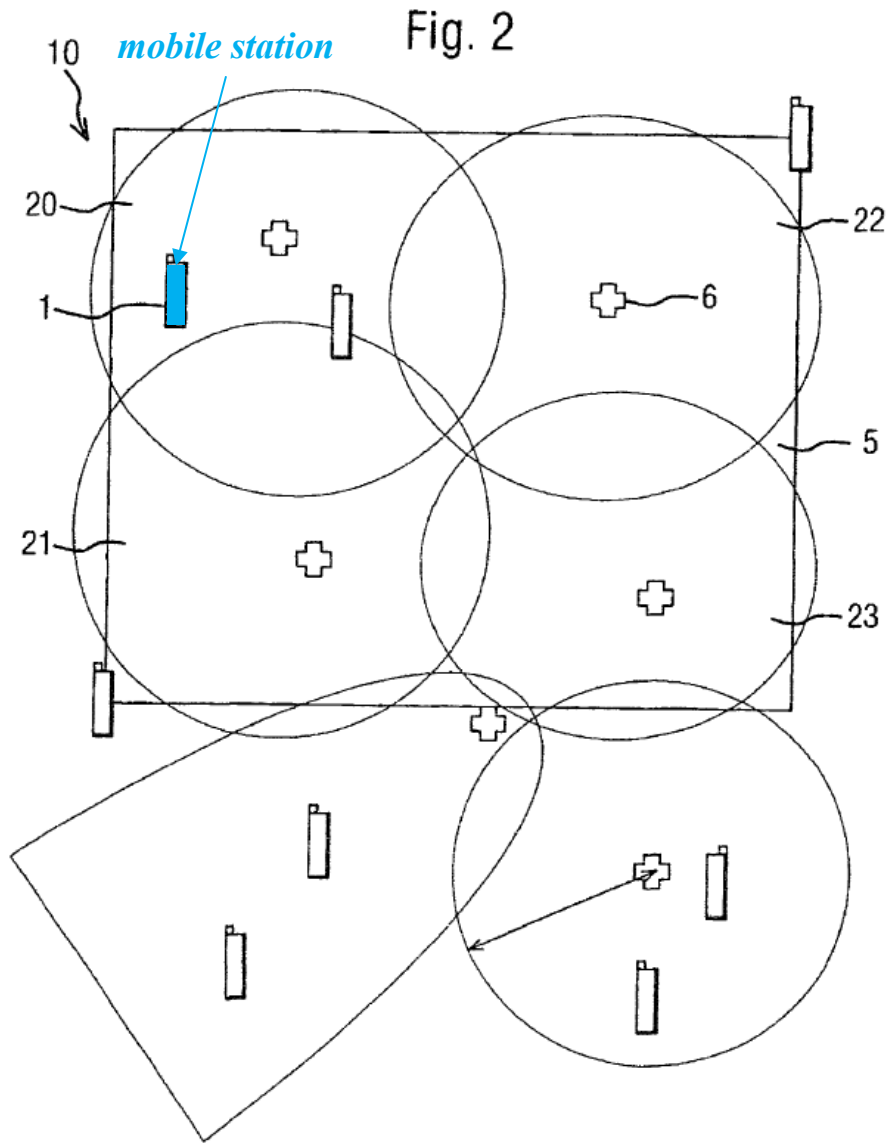
Thus, Kraufvelin describes *a method associated with the use of a mobile station*).

Kraufvelin, [0029], [0053].

74. Kraufvelin’s “mobile station 1,” or “user equipment” (UE) is illustrated in Figures 1, 2, and 4. Kraufvelin, [0048], [0041].



Kraufvelin, Fig. 1 (annotated)



**Kraufvelin, Fig. 2 (annotated)**

*mobile station*

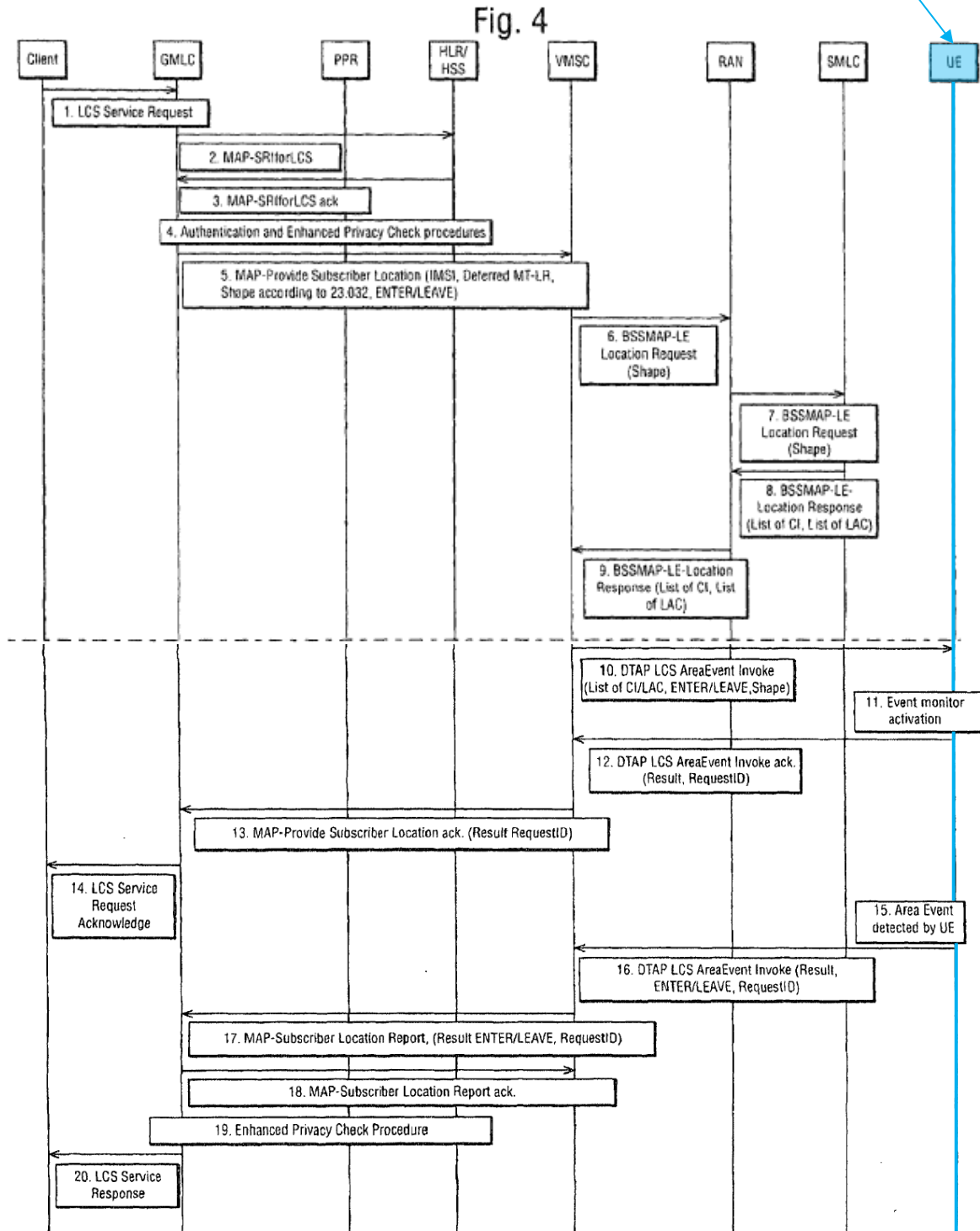


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

75. The method described by Kraufvelin is associated with *the use* of the mobile station because Kraufvelin describes providing “[d]ifferent kinds of services” to the mobile station based on its location.

A location-based application may be interested in when a specific subscriber is entering or leaving a geographical area. **Different kinds of services are possible** if such a mechanism would be in place. It might be useful for various commercial and non-commercial services and similar applications to have information if a mobile station is located within a particular defined geographical area. In some application it might be useful for the network element to be able accomplish the operation for obtaining location information only if the mobile station is detected as being in a selected part of the communication system. For example, various organisations or even individuals may want to send information and/or offer services to a mobile station only in a particular defined geographic area and/or to a certain type of subscriber in a particular geographical area. More detailed examples of these include location based push services like advertisements and parents monitoring the whereabouts of their children.

Kraufvelin, [0012].

The location server node 12 may provide a platform which will enable the support of **location based services** in parallel with other telecommunication services such as

**speech, data, messaging, other teleservices, user applications and supplementary services.**

Kraufvelin, [0051].

These services show that the mobile station is used in connection with Kraufvelin's described method.

76. Kraufvelin's method is also associated with the use of multiple "base station[s] 6," or "base transceiver station[s] (BTS)" (each a *radio communication defining device*), two of which are shown in Figure 2 below, which teach *at least first and second radio communication defining devices*. Kraufvelin, [0039], [0004].

The use of the base stations in Kraufvelin is described in connection with Kraufvelin's method.

In a cellular system, a **base transceiver station (BTS)** provides a wireless communication facility that **serves mobile stations (MS) or similar wireless user equipment (UE)** via an air or radio interface within the coverage area of the cell.

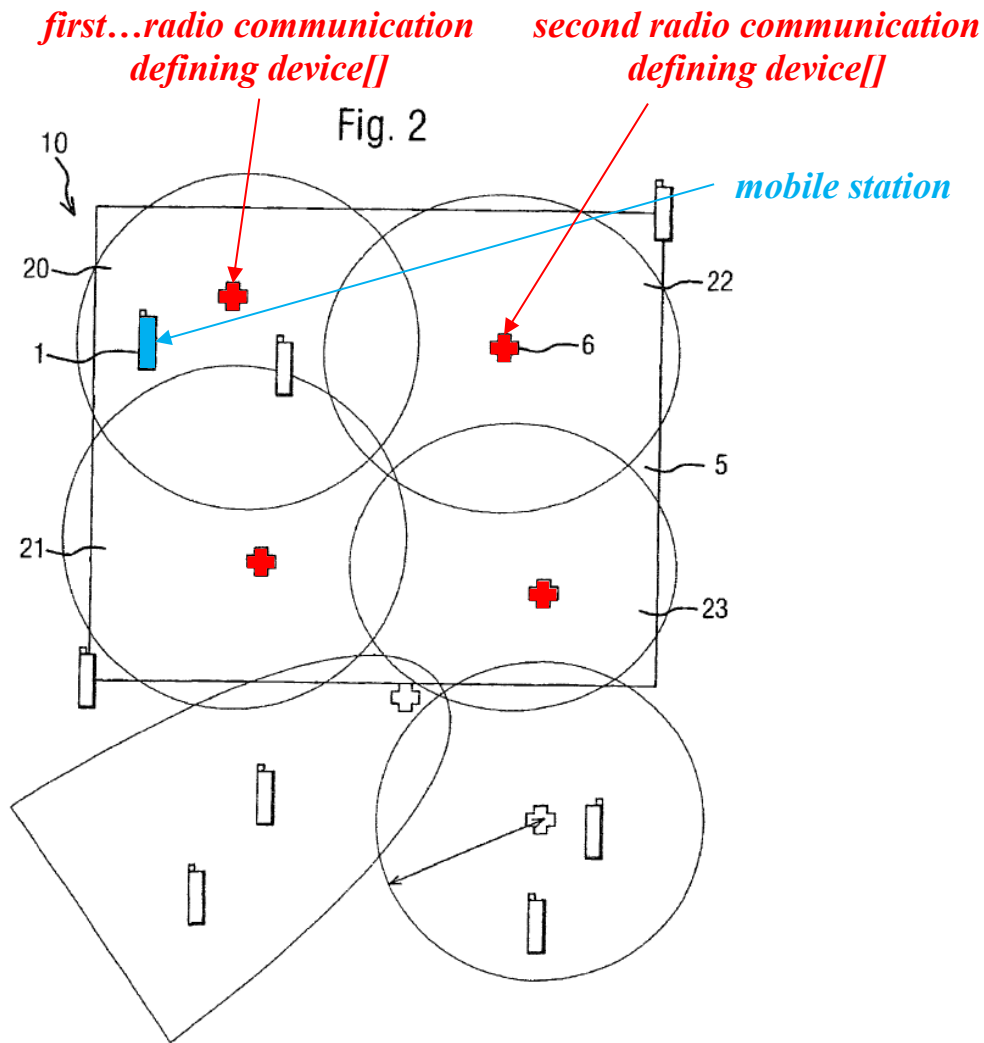
Kraufvelin, [0004].

Each cell has associated therewith a **base station 6**. The 3<sup>rd</sup> generation telecommunications systems the base station may be referred to as node B. The term base station will be used in this document to encompass all elements which transmit to and/or receive signals from mobile stations 1 or the like via the air interface. Likewise, the

wireless station or mobile stations are able to transmit signals to and receive signals from the respective base station via wireless communication with the base stations.

Kraufvelin, [0039].

The base stations described by Kraufvelin are shown below in red.



**Kraufvelin, Fig. 2 (annotated)**

77. Kraufvelin's base stations *respectively transmit first and second distinctive defining signals that at least partly define a special area by a sum or*

*intersection of their coverage.* In Kraufvelin, a client requests that the location of a mobile station be monitored by sending a request to Kraufvelin's system.

Turning now also to FIG. 3, the client 8, such as location-based service sends a **location request** towards the mobile network 10. The request indicates a geographical area of interest and the target subscriber. The definition of the geographical area may be based on as one or several geographical points and shapes, e.g. in the manner as defined by the referenced 3GTS23.032 specification. The request may also include an indication whether the client application is interested in when the subscriber is leaving or entering the area.

Kraufvelin, [0055]; *see also* Kraufvelin, [0016], [0048].

**78.** The area of interest 5 is converted into a list of cell IDs covering the area of interest 5.

The geographical area 5 may be **translated into a list of Cell Ids**. In FIG. 2 the area 5 is shown to be covered by the cells 20 to 23. **The IDs of these cells would thus be included in the list.**

Kraufvelin, [0056].

**79.** The list of cell IDs is stored on the mobile station and when the mobile station enters a new cell, the mobile station receives the cell ID of the cell and determines if the newly received cell ID is within the list of stored cell IDs.

**The list of cells may then be sent to the mobile station 1 to register the “area event trigger”. When the Cell ID is updated as the subscriber is moving the mobile station 1 will check the new Cell ID against the list.** If there is match, the mobile station 1 sends a report back to the network. In FIG. 1 the message would be passed from the mobile Station 1 to the GMLC 12.

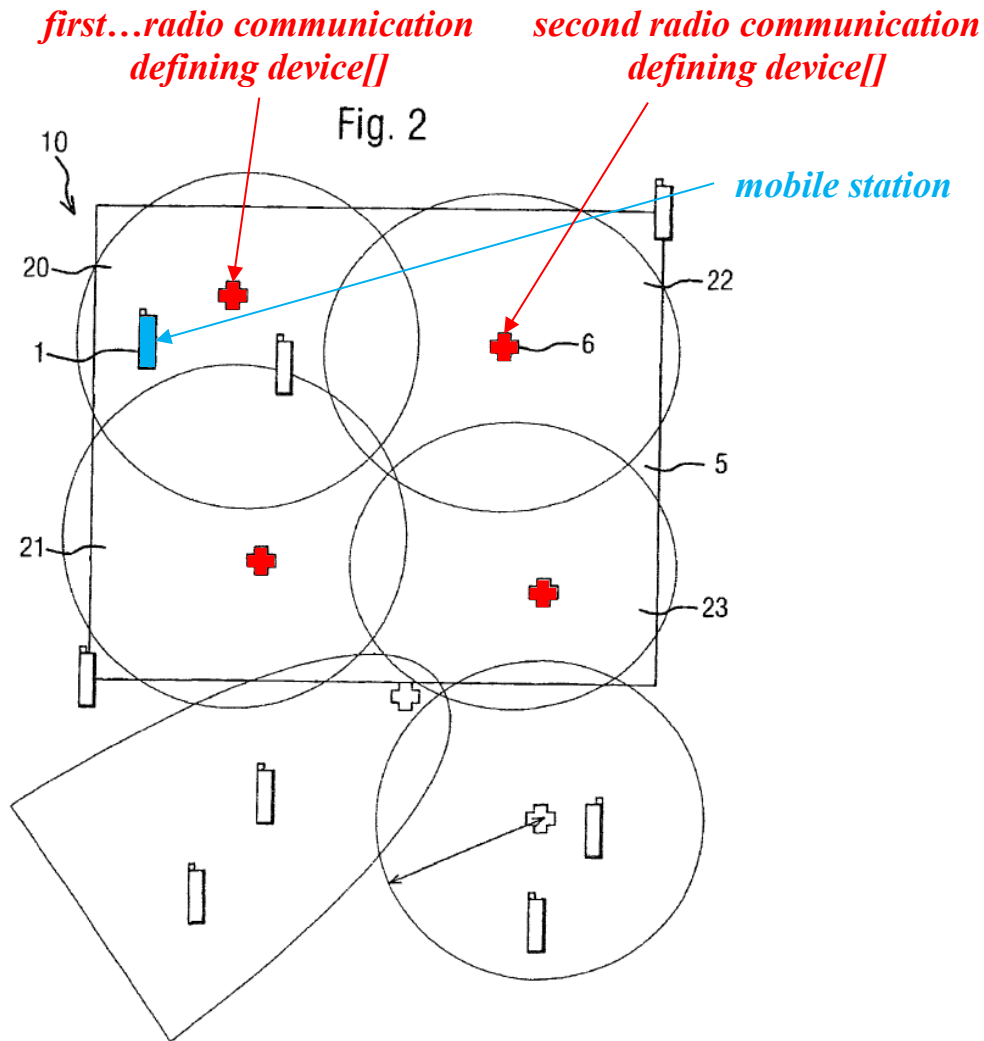
Kraufvelin, [0060].

**80.** If the new cell ID is within the stored list, the mobile station determines that it is within the area of interest 5. Kraufvelin, [0061], [0079]-[0080].

**81.** A cell ID that is transmitted or broadcast from a base station in Kraufvelin is a *distinctive defining signal* if its respective base station is in the area of interest 5. Thus, the cell IDs transmitted by each of the base stations within the area of interest 5 are distinctive defining signals. “The geographical area 5 may be translated into a **list of Cell I[D]s**. In FIG. 2 the area 5 is shown to be covered by the **cells 20 to 23. The IDs of these cells would thus be included in the list [of Cell IDs]**.” Kraufvelin, [0056]. This list is “sent to the mobile station 1” and the mobile station “check[s] the new Cell ID against the list” to determine if it is within the area 5. Kraufvelin, [0060].

**82.** Each cell ID broadcast by a base station in the list of Cell IDs is a *radio distinctive defining signal* because it defines at least a part of the area of interest 5. Kraufvelin, [0056], [0060]. For example, the signal transmitted by the base station

of cell 20 renders obvious a *first...distinctive defining signal[]*. The signal transmitted by the base station of cell 22 renders obvious a *second distinctive defining signal[]*.



**Kraufvelin, Fig. 2 (annotated)**

83. The base stations within cells 20 and 22 described by Kraufvelin transmit the *first and second distinctive defining signals*. “When the UE performs a cell handover,” it “check[s] the details of the new serving cell, including the cell ID.” Kraufvelin, [0079]. Because multiple mobile stations enter and exit different cells as

users move, the mobile stations receive the cell ID of the base stations 6 as they enter different cells, which shows that Kraufvelin's base stations 6 *transmit* their respective cell IDs to the mobile stations entering its coverage. Hashimoto describes this step in more detail. Hashimoto, [0135].

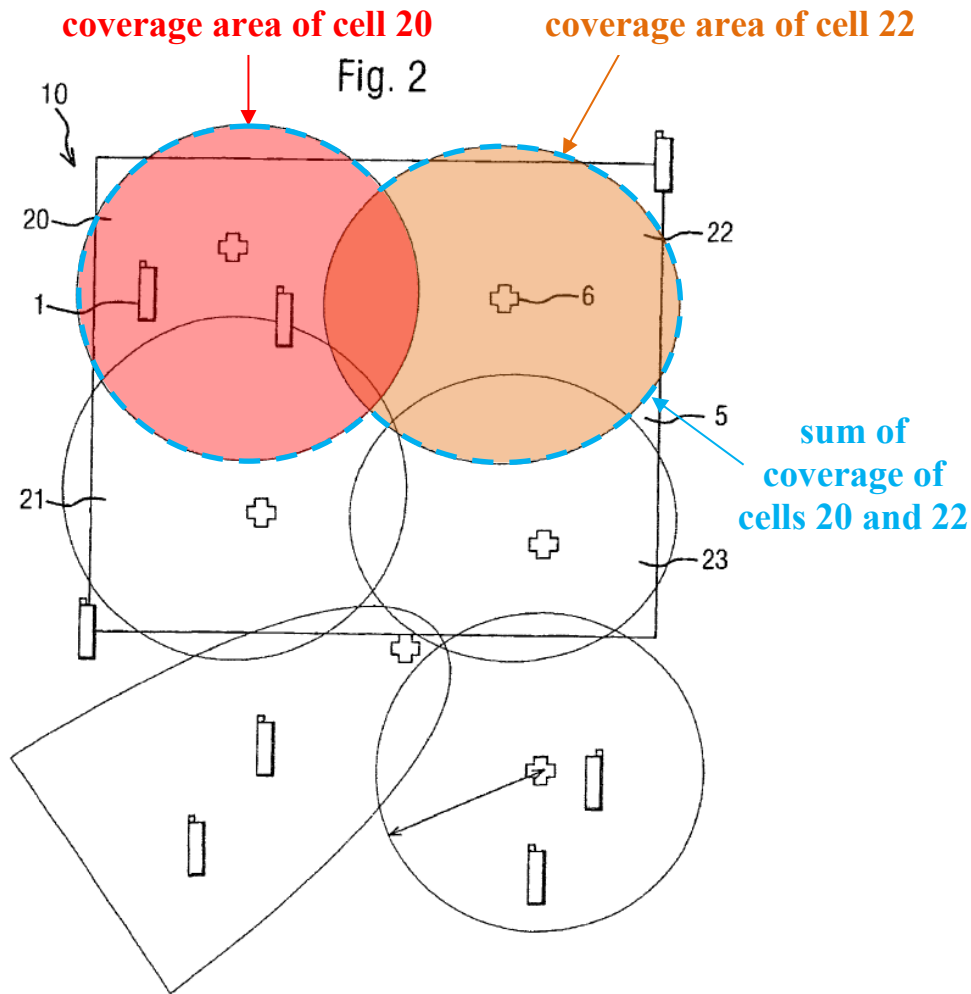
**84.** Hashimoto explains that mobile stations determine their location in a cell because base stations they receive “various parameters” from the base stations when they enter the cell.

Also, in order to inform the terminal of various parameters (such as the identification information (ID) of a cell called “**Cell-ID**”, the ID of an LA called “location area identifier (LAI)”, and various timer values) that are to be used by the terminal to perform communication using the network, the network (base station) periodically **transmits system information called “broadcast information”** over a channel called “BCCH” over which the terminal is capable of receiving the information even in the idle mode.

Hashimoto, [0135].

**85.** In this way, base stations “inform the terminal of various parameters” including the “identification information (ID) of a cell called ‘Cell-ID’” by “**periodically transmit[ting]** system information called ‘broadcast information.’” Hashimoto, [0135], Fig. 17. “[**P**]eriodically **transmit[ting]**” a cell ID renders obvious *transmit[ting]*, as recited in the claims.

86. Kraufvelin also explains that signals transmitted by the base stations of cells 20 and 22 *at least partly define a special area by a sum or intersection of their coverage*. As explained above, the area of interest 5 is selected by the client 8. *See, e.g., Kraufvelin, [0016], [0048]-[0049], [0055]*. The coverage of the signal transmitted in cell 20, which describes a *first...distinctive defining signal[]*, is highlighted below in red. The coverage of the signal transmitted in cell 21, which describes a *second distinctive defining signal[]*, is highlighted in orange. The sum of the coverage of the *first and second distinctive defining signals* is shown with a blue dashed line. This blue dashed line *at least partially defin[es]* the area of interest 5, because it partially defines the upper half of the area of interest 5.



**Kraufvelin, Fig. 2 (annotated)**

87. The sum of the coverage of signals transmitted from all the base stations within the area of interest 5, including cells 20-23, defines the area of interest 5. See Kraufvelin, [0056]. The sum of the coverage of cells 20 and 22 *at least partially defin[es]* the area of interest 5 by defining the upper half of the area of interest 5. By of another example, the sum of the coverage of cells 21 and 23 also *at least partially define[s]* the area of interest 5 by defining the lower half of the area of interest 5. In addition, while the coverage areas of cells 20-23 do not exactly match the rectangular

shape of the area of interest 5, the coverage areas of cells may be adjusted to match more precisely, or the area of interest 5 may be adjusted to match the coverage areas of the cells. This would have been well within the understanding and abilities of a POSITA at the time, and is explained by Kraufvelin.

FIG. 2 shows for clarity reasons that the area of interest 5 has a rectangular shape. However, it shall be appreciated that the area of interest may have any appropriate shape such as ellipsoidal, polygonal or circular shape. The area may also be defined e.g. as an area within a defined radius or distance from a certain point (e.g. base station location or any other location), name of an area (e.g. name of a town, Village or an organisation within a predefined area), by co-ordinates or latitudes and longitudes and so on. The area definition may also comprise an altitude parameter.

Kraufvelin, [0053].

**88.** Kraufvelin also explains that *the first and second distinctive defining signals respectively including first and second data*. Each base station servicing a cell broadcasts a unique “cell ID.” Kraufvelin, [0009], [0056], [0060].

**89.** In the example above, the cell ID transmitted by the base station of the cell 20 corresponds to *first...data*. The cell ID transmitted by the base station of the cell 22 corresponds to *second data*. Similarly, the cell IDs of other base stations

within the area of interest 5, including cells 21 and 23 would correspond to other data.

**90.** Thus, the combination of Kraufvelin and Hashimoto renders obvious *[a] method* (“method,” Kraufvelin, [0029]) *associated with the use of a mobile station* (providing services to a mobile station 1) *and at least first and second radio communication defining devices* (base stations of cells 20 and 22) *that respectively transmit first and second distinctive defining signals* (signals transmitted by base stations of cells 20 and 22) *that at least partly define a special area by a sum or intersection of their coverage* (coverage area of cells 20 and 22 defining upper half of area of interest 5), *the first and second distinctive defining signals respectively including first and second data* (signal transmitted by base station of cell 20 includes cell ID of cell 20 and signal transmitted by base station of cell 22 includes cell ID of cell 22).

**b.** **[1.1]** *determining in the mobile station if the mobile station is receiving one or both of the first and second distinctive defining signals and*

**91.** Kraufvelin describes *determining in the mobile station if the mobile station is receiving...the first...distinctive defining signal[]*. Kraufvelin explains the process by which the mobile station determines if it is receiving one of the cell IDs of the base stations included in the area of interest:

When the UE performs a cell handover the monitoring entity (ME) shall check the details of the new serving cell,

including the cell ID, step 15. If the user equipment comprises the monitoring entity, the area event monitoring functionality of the user equipment (UE) may compare the current cell ID or similar against one or more, target cell IDs in the list received from the network.

When the event occurs, depending upon the LDR requirement, one of the two following responses may be generated:

- a) An area event LCS report indicating a positive match with the target cells, i.e. the subscriber is ENTERing the area; or
- b) An area event LCS report indicating a negative match with the target cells, i.e. the subscriber is LEAVEing the area.

Kraufvelin, [0079]-[0080].

The list of cells may then be sent to the mobile station 1 to register the “area event trigger.” When the Cell ID is updated as the subscriber is moving the mobile station 1 will check the new Cell ID against the list. If there is match, the mobile station 1 sends a report back to the network. In FIG. 1 the message would be passed from the mobile station 1 to the GMLC 12.

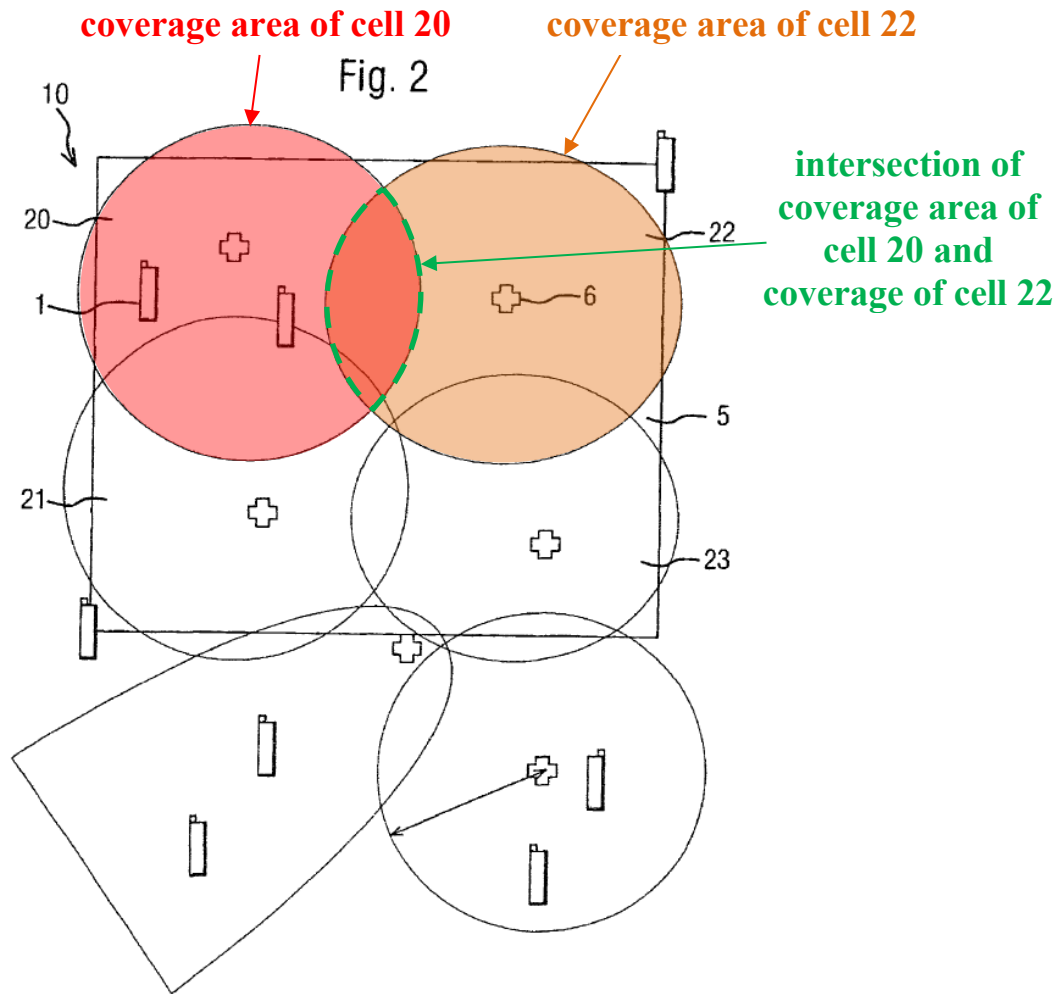
Kraufvelin, [0060].

92. In the example provided above identifying cells 20-23 of the area of interest 5, when the mobile station 1 enters the coverage area of cell 20, it receives the cell ID of cell 20 and compares it to the stored list. Kraufvelin, [0060]. Because the cell ID of cell 20 is included in the list stored by the mobile station and corresponding to the area of interest 5, comparing the received cell ID of cell 20 to the stored list renders obvious *determining in the mobile station* if it is receiving *the first...distinctive defining signal[]*. Kraufvelin, [0079]-[0080].

93. The combination also renders obvious *determining in the mobile station if the mobile station is receiving...the...second distinctive defining signal[]*. A POSITA would have recognized that the same procedure is performed for every cell of the area of interest 5, as described by Kraufvelin. For example, Kraufvelin explains that the procedure of comparing a received cell ID to the stored list occurs every time the mobile enters a new cell, i.e., “performs a cell handover.” Kraufvelin, [0079]. A “handover” refers to the process by which a mobile station disconnects from one base station and connects to another as it moves between the coverage areas of the base station. *See, e.g.,* Lee, [0110] (“the term ‘handover’” refers to “when a predetermined mobile station releases a connection with a base station...connects to one...of neighbor base stations”). Because this procedure of comparing a received cell ID occurs each time the mobile station performs a handover, i.e., enter a new cell, the comparison procedure Kraufvelin describes also

occurs when the mobile station enters cell 22 and the mobile station *determin[es]* if it is receiving the cell ID of cell 22 (*second distinctive defining signal[ ]*). Kraufvelin, [0079].

94. When the mobile station is within the coverage area of both of the cells 20 and 22—green outline below—the same procedure is performed to determine that the mobile station is receiving *both of the first and second distinctive defining signals* because it receives the cell IDs of both cells 20 and 22, as explained by Hashimoto below.



**Kraufvelin, Fig. 2 (annotated)**

95. As explained above, Hashimoto explains that a mobile station receives both of the multiple *distinctive defining signals* when within the coverage areas of multiple cells.

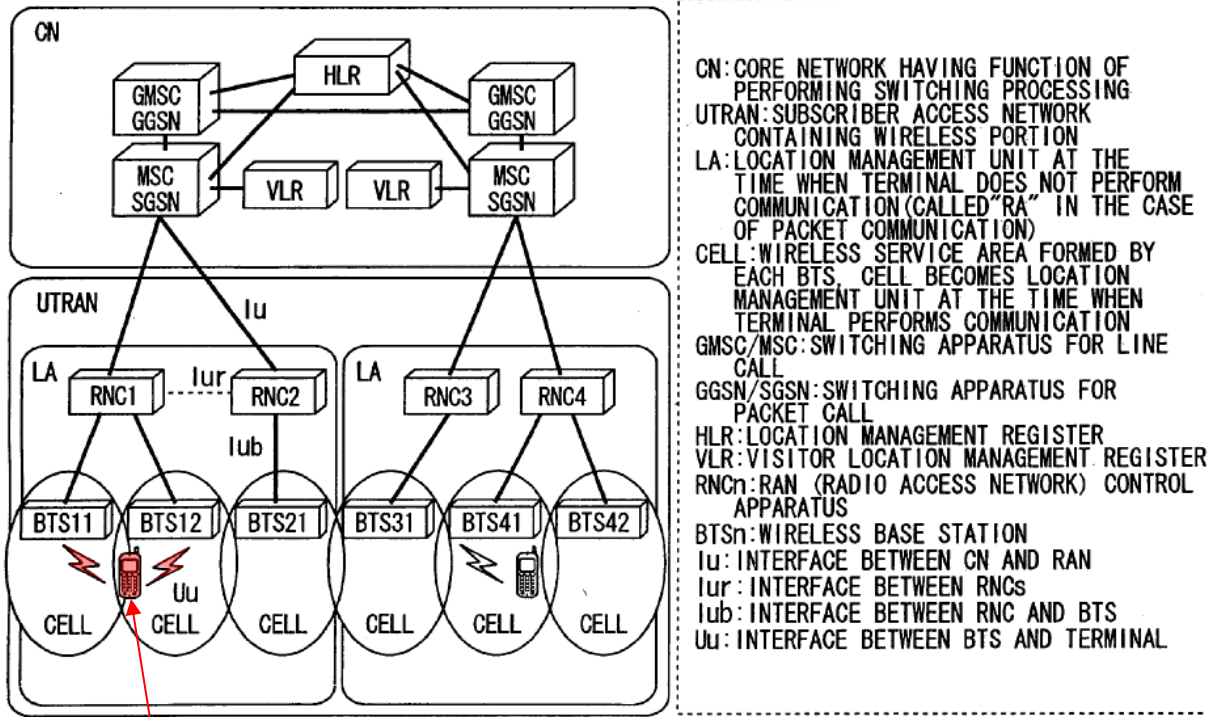
In usual cases, cells in a wireless network are provided so that a part of a cell overlaps its adjacent cell in order to cover the whole region. Therefore, in each overlapping area, the terminal is capable of receiving synchronization signals from multiple cells. Consequently, in the

overlapping area, the terminal is capable of camping on multiple cells. In usual cases, however, the terminal is constructed so as to select one of the multiple cells in accordance with a certain logic (prescribed with consideration given to conditions such that it is possible to maximize a reception radio wave power or to minimize a transmission power on a terminal side, for instance).

Hashimoto, [0134].

**96.** This is illustrated in Figure 1 of Hashimoto below, showing a mobile station within the coverage area of two cells (BTS11 and BTS12) and receiving signals from both base stations. Hashimoto, Fig. 1.

FIG. 1



**mobile station connected  
to two base stations**

Hashimoto, Fig. 1 (annotated)

97. In Hashimoto, "the terminal is constructed so as to select one of the multiple cells in accordance with a certain logic." Hashimoto, [0134]. In the combination of Kraufvelin and Hashimoto, therefore, when the mobile station is within the intersecting coverage area of cells 20 and 22, the mobile station determines that it is receiving both the cell IDs of cells 20 and 22. As taught by Hashimoto, the mobile station 1 determines with which base station to communicate. Hashimoto, [0134]. A POSITA would have recognized that in typical mobile communication networks, the coverage area of base stations overlap and this process

of selecting which base station with which to communicate was a standard, well known process.

98. Thus, the combination of Kraufvelin and Hashimoto describes *determining in the mobile station if the mobile station is receiving one ...of the first and second distinctive defining signals* (comparing cell ID of cell 20 or cell 22 received by mobile station to list of stored cell IDs) and/or *determining in the mobile station if the mobile station is receiving ...both of the first and second distinctive defining signals* (receiving signals from multiple base stations in an overlapping coverage area).

- c. **[1.2] *determining in the mobile station, based on a previously obtained at least portion of one or both of the first and second data, whether or not the mobile station is present in the special area; and***

99. Kraufvelin explains that if a received cell ID matches one of the cell IDs in the stored list, the mobile station determines that “the subscriber is ENTERing the area” (area of interest 5) and sends a report to the network with that result:

When the UE performs a cell handover the monitoring entity (ME) shall check the details of the new serving cell, including the cell ID, step 15. If the user equipment comprises the monitoring entity, the area event monitoring functionality of the user equipment (UE) may compare the current cell ID or similar against one or more, target cell IDs in the list received from the network.

When the event occurs, depending upon the LDR requirement, one of the two following responses may be generated:

- a) An area event LCS report indicating a positive match with the target cells, i.e. the subscriber is ENTERing the area; or
- b) An area event LCS report indicating a negative match with the target cells, i.e. the subscriber is LEAVEing the area.

Kraufvelin, [0079]-[0080].

**100.** In this way, the mobile station determines whether it has entered the area of interest 5, which describes *determining in the mobile station...whether or not the mobile station is present in the special area*. As explained at limitation [1.0], the cell ID of cell 20 discloses *first...data* and the cell ID of cell 22 discloses *second data* in the proposed combination. Kraufvelin, [0056], [0060]. As explained at limitation [1.1], this process occurs when the mobile station is within the coverage area of cell 20, cell 22, or an intersection of the two. Kraufvelin, [0056], [0060], [0079]-[0080]; Hashimoto, [0134]. Kraufvelin also provides additional details, explaining that this determining process is performed by the “the monitoring entity (ME)” of the mobile station. Kraufvelin, [0079].

**101.** Therefore, Kraufvelin’s process of comparing a received cell ID, for example the cell ID of cell 20 and/or cell 22 and finding “a positive match” in the

list stored on the mobile station discloses *determining in the mobile station, based on...one or both of the first and second data, whether or not the mobile station is present in the special area.* Kraufvelin, [0079]-[0080].

**102.** Kraufvelin also explains that the mobile station performs the above-described process of comparing a received cell ID (cell IDs of cells 20 and/or cell 22) after the mobile station has received the list of cell IDs for the area of interest 5. The process of generating and sending the list of cell IDs to the mobile station is shown at Figure 4, particularly at steps 1-10. At step 1, the client sends the service request to the system. *See* Kraufvelin, [0063]. The geographical area (area of interest) specified by the client request is then converted to a list of cell IDs at steps 6-7. *See* Kraufvelin, [0065]-[0071]. At step 10, the list of cell IDs is sent to the mobile station. *See* Kraufvelin [0072]. After the mobile station receives this list, it begins monitoring for new cell IDs (step 11). *See* Kraufvelin, [0073]. The mobile station sends an acknowledgement that it has received the list of cell IDs and has started monitoring at steps 12-14. *See* Kraufvelin, [0076]-[0078]. At step 15, the mobile station, after moving into the area of interest, recognizes the new location. *See* Kraufvelin, [0079]-[0080], Fig. 4.

sending list of cell IDs corresponding  
to area of interest 5 to mobile station

determining...whether or not  
the mobile station is present in  
the special area

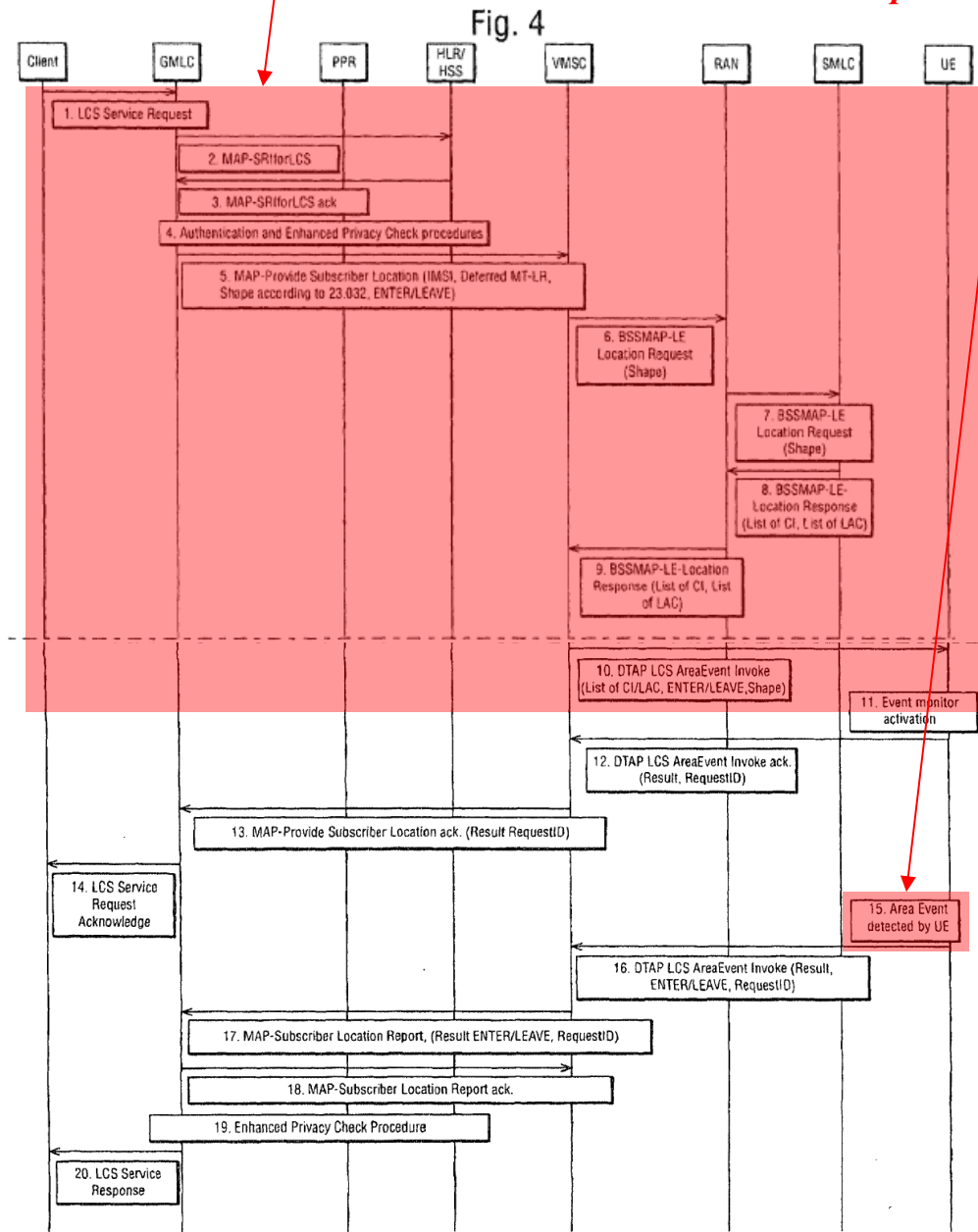


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

103. At step 15, the mobile station performs the above-described comparison step. Kraufvelin, [0079]-[0080]. Therefore, Kraufvelin describes determining that

the mobile station is within the area of interest 5 *based on a previously obtained at least portion of one or both of the first and second data* because the mobile station receives the list of cell IDs at steps 6-7 before performing the comparison step at step 15.

**104.** Thus, the combination of Kraufvelin and Hashimoto describes *determining in the mobile station* (monitoring entity (ME) of mobile station determines), *based on a previously obtained at least portion of one or both of the first and second data* (using the stored list of cell IDs of cells 20-23), *whether or not the mobile station is present in the special area* (whether a newly received cell ID matches the cell IDs 20-23 in the list showing that “the subscriber is ENTERing the area”).

- d.** **[1.3]** *sending from the mobile station via a mobile telephone network an updating signal to one or more servers of a provider of presence related services about the mobile station’s presence in the special area,*

**105.** Kraufvelin describes *sending from the mobile station via a mobile telephone network an updating signal*. In Kraufvelin, if the mobile station determines that it has entered a cell of the area of interest 5, it sends “a DTAP LCS-AreaEventReport...to the MSC/SGSN, see step 16 [in Figure 4].” Kraufvelin, [0082].

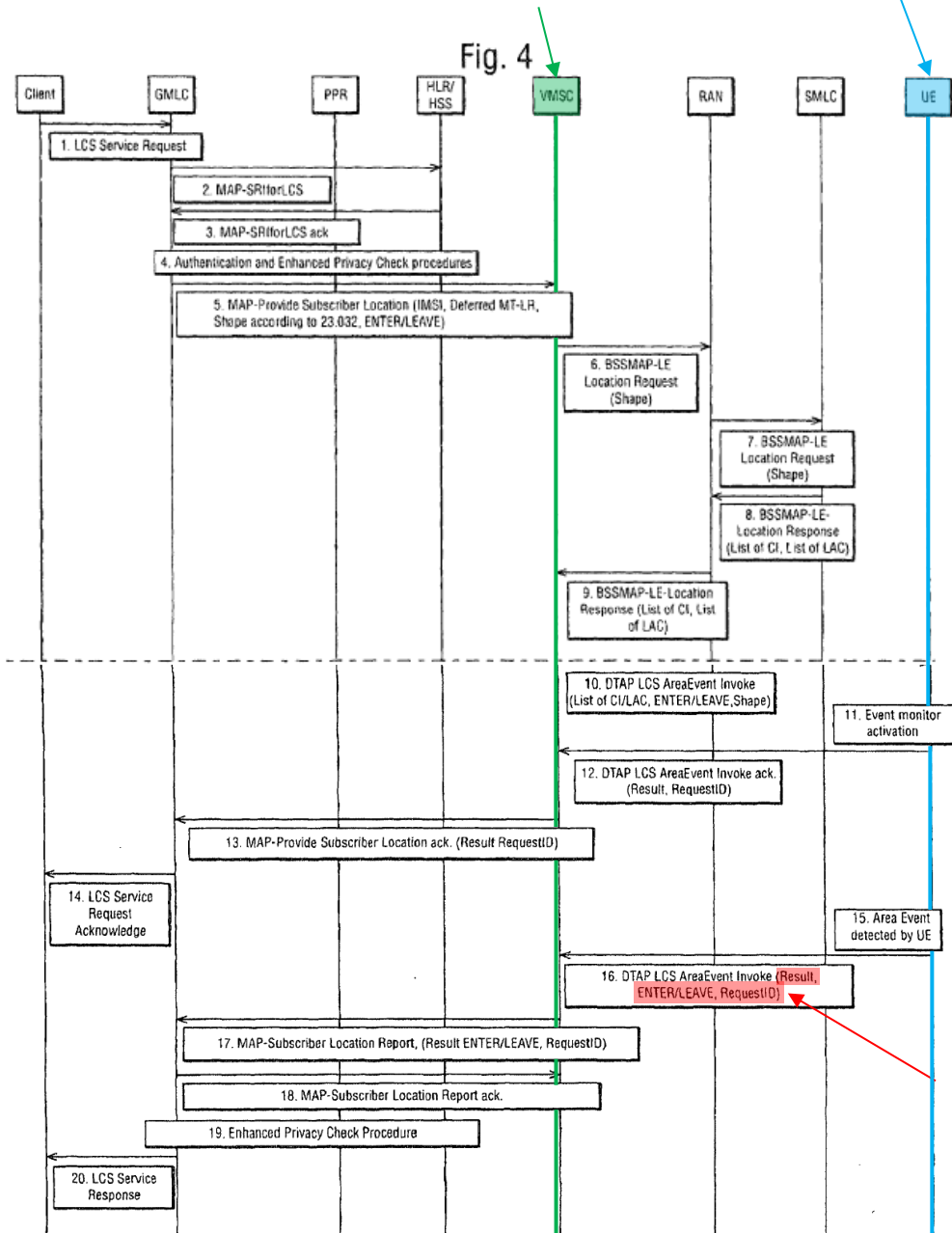
The area event monitoring application may then disable itself and a DTAP LCS-AreaEventReport is sent to the MSC/SGSN, see step 16. The report may include the original LDR reference, the GMLC address, the time that the event occurred and the current serving cell ID. Information relating to the area event or UE status may optionally be included in this report. An exemplifying area event report is shown in FIG. 11.

Kraufvelin, [0082].

In Figure 4 below, the DTAP LCS-AreaEventReport includes the “Result, ENTER/LEAVE,” indicating whether the mobile station entered or left the area of interest 5, and the “Request ID.” Kraufvelin, [0080], Fig. 4. Any of the contents of the DTAP LCS-AreaEventReport render obvious *an updating signal* because they indicate an updated location of the mobile station, i.e., whether the mobile station is “ENTERing the area” or “LEAVEing the area.” Kraufvelin, [0080]. This report is sent from the mobile station to the VMSC 14, which is part of the *mobile telephone network*.

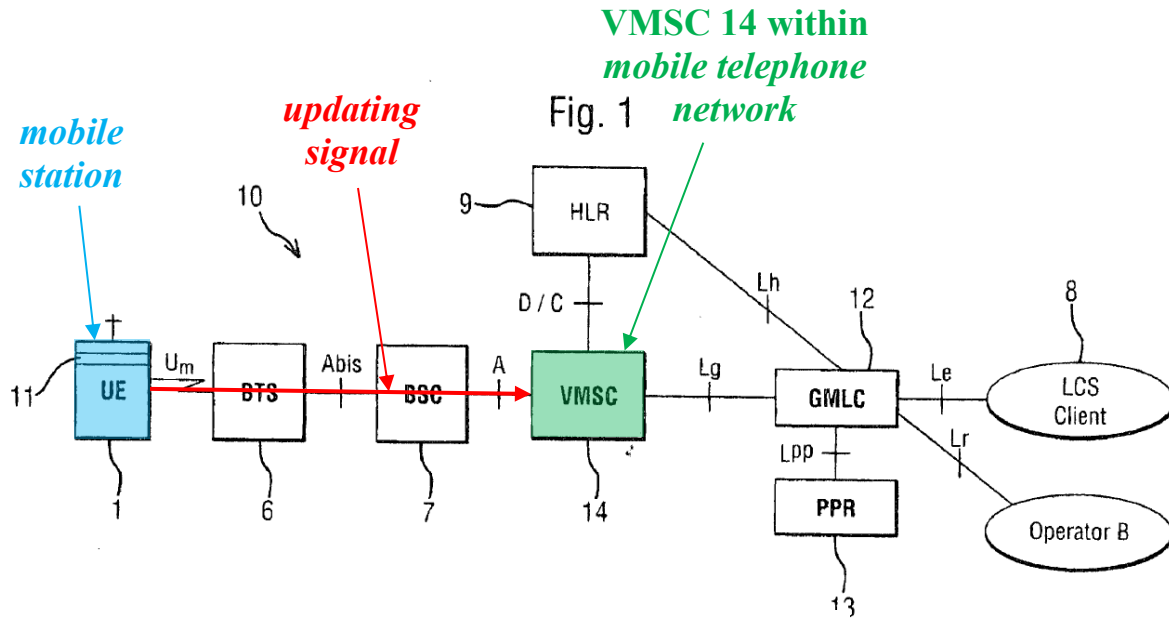
VMSC 14 within mobile telephone network

mobile station



contents of DTAP LCS\_Area EventReport (updating signal)

Fig. 4 (Contd.)  
Kraufvelin, Fig. 4 (annotated)



**Kraufvelin, Fig. 1 (annotated)**

**106.** The VMSC 14 is shown in Figure 1 above, which is “part of a cellular public land mobile network (PLMN) 10.” Kraufvelin, [0038]. With the GMLC 12, the VMSC 14 is “in the core network side of the communication system 10.” Kraufvelin, [0046]. A POSITA would have recognized the VMSC 14 as a common part of the *mobile telephone network*, as explained by Kraufvelin.

**107.** Kraufvelin describes *sending* the report indicating the physical location of the mobile station *from the mobile station...to one or more servers of a provider of presence related services*. As shown in Figure 4, above, the mobile station sends the LCS\_AreaEventReport to the VMSC 14. Kraufvelin, Fig. 4 (step 16), [0080]. After the VMSC 14 (which is part of the *mobile telephone network*) has received the contents of the LCS\_AreaEventReport (*updating signal*), the VMSC 14 compiles

the contents into another report, the “MAP-SUBSCRIBER-LOCATION-REPORT,” and sends it to the GMLC 12. Afterwards, the contents of the report, showing the location of the mobile station, are sent to the LCS Client 8.

When the VMSC/SGSN receives the DTAP LCS-AreaEventReport it may generate a MAP-SUBSCRIBER LOCATION-REPORT message and send it to the GMLC, as indicated in the DTAP message.

Kraufvelin, [0083].

The location server node 12 may provide location information to a client 8. The client 8 is a logical functional entity that makes a request to the GMLC node 12 for information that concerns one or more of the mobile stations of the cellular system. The LCS client 8 may be an entity that is external to the PLMN. The client may also be an internal client (ILCS) i.e. reside in any entity (including a mobile station) within the PLMN. The client is entitled to receive at least some degree of information concerning the location (or location history) of the mobile station 1.

Kraufvelin, [0048].

This step of providing the location information to the client is illustrated at step 20 of Figure 4, below.

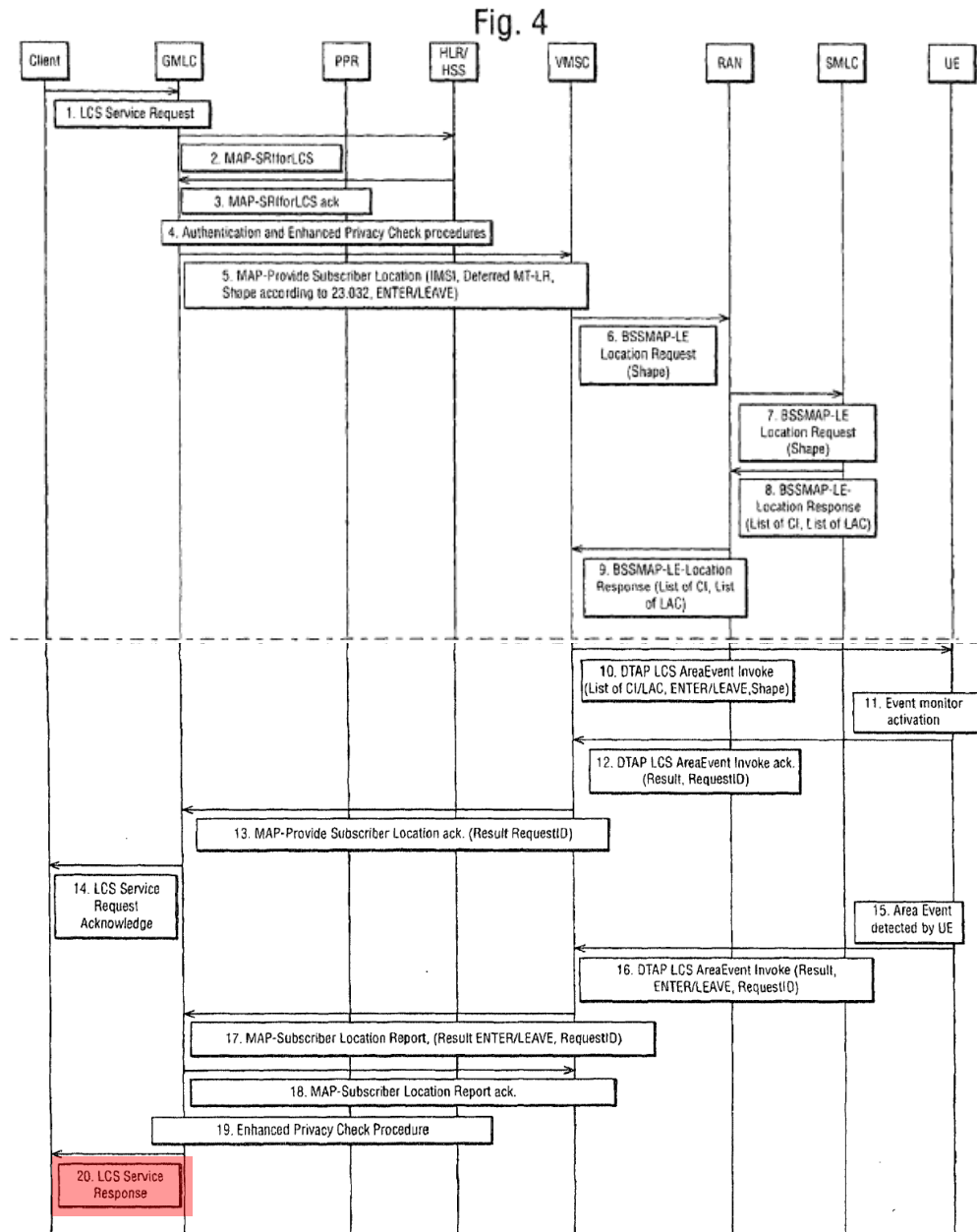


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

**108.** In addition, the LCS client 8 is a server *of a provider of presence related services* because the LCS client 8 may provide services to the mobile station based

on the location it received from the GMLC 12. Kraufvelin, [0012], [0051].

Specifically, Kraufvelin explains:

**Different kinds of services are possible** if such a mechanism would be in place.... For example, various organisations or even individuals may want to **send information and/or offer services to a mobile station** only in a particular defined geographic area and/or to a certain type of subscriber in a particular geographical area. More detailed examples of these include location based **push services** like advertisements and parents monitoring the whereabouts of their children.

Kraufvelin, [0012].

**109.** Kraufvelin further explains that the LCS client 8 may be any entity to provide services to the mobile station based on the mobile station's location.

Turning now also to FIG. 3, the client 8, such as location-based service sends a location request towards the mobile network 10. The request indicates a geographical area of interest and the target subscriber. The definition of the geographical area may be based on as one or several geographical points and shapes, e.g. in the manner as defined by the referenced 3GTS23.032 specification. The request may also include an indication whether the client application is interested in when the subscriber is leaving or entering the area.

Kraufvelin, [0055].

**110.** Thus, the combination of Kraufvelin and Hashimoto describes *sending from the mobile station via a mobile telephone network* (sending from the mobile station 1 to the VMSC 14) *an updating signal* (contents of DTAP LACS-AreaEventReport) *to one or more servers of a provider of presence related services about the mobile station's presence in the special area* (forwarding contents of report from VMSC 14 to GMLC 12 and LCS client 8).

- e. **[1.4] *the sending of the updating signal being uncorrelated to any mobile station phone call establishment,***

**111.** As explained at limitation [1.3], Kraufvelin describes *sending...the updating signal* from the mobile station to the VMSC 14. Kraufvelin, Fig. 4 (step 16). As shown by Kraufvelin, and explained in more detail at limitation [1.5], it was well known that the timing of sending a location update report from a mobile station to a mobile communication network may be varied in various ways. For example, Kraufvelin's LCS report is sent at times such as "every 10-15 minutes," when the mobile station enters or leaves the area of interest, or "after it has been camping on" the area of interest. Kraufvelin, [0080], [0101]. Therefore, the sending of the LCS report is not tied to the mobile station making a call, i.e., it is *uncorrelated to any mobile station phone call establishment*. Kraufvelin, [0080], [0101]. Accordingly, Kraufvelin's process is performed when the mobile station is idle.

**112.** Kraufvelin provides additional explanation of the sending of the updating report.

A mobile terminal changes cells quite often in idle mode and in connected mode in normal operation, and this may cause a large and unnecessary signalling load for the area event service. Two enhancements to embodiments of the invention are provided in order to minimise any such load.

Kraufvelin, [0097].

When the UE performs a cell handover the monitoring entity (ME) shall check the details of the new serving cell, including the cell ID, step 15. If the user equipment comprises the monitoring entity, the area event monitoring functionality of the user equipment (UE) may compare the current cell ID or similar against one or more, target cell IDs in the list received from the network.

When the event occurs, depending upon the LDR requirement, one of the two following responses may be generated:

- a) An area event LCS report indicating a positive match with the target cells, i.e. the subscriber is ENTERing the area; or
- b) An area event LCS report indicating a negative match with the target cells, i.e. the subscriber is LEAVEing the area.

Kraufvelin, [0079]-[0080].

Because the mobile station determines its location and sends an update report each time it performs a handover, and because the mobile terminal can change cells when in idle mode, Kraufvelin explains that the mobile station sends the location update report uncorrelated from the establishment of any phone call, i.e., “in idle mode.”

*See also* Kraufvelin, [0098]-[0106].

**113.** In addition, Kraufvelin explains that this process is performed “**independent from the network operators.**” Kraufvelin, [0093].

Kraufvelin, [0093].

- f. **[1.5] *the updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the special area, and (iii) when the mobile station remains in the special area.***

**114.** The combination of Kraufvelin and Hashimoto renders obvious limitation [1.5], including all three recited timing options for *the updating signal* (contents of Kraufvelin’s LACS-AreaEventReport, *see* limitation [1.3]).

**115.** The combination renders obvious *the updating signal being sent...periodically*. Kraufvelin explains that if the mobile station is stationary for an extended period of time, “[i]n the case of permanent area event reporting,” the mobile station will send the LCS-AreaEventReport at “a predetermined time interval, e.g., **every 10-15 minutes, 24 hours.**” Kraufvelin, [0101].

3. In case of permanent area event reporting the mobile does not send a repeated area arrival report or leaving area report for a cell belonging to the same service area more than once in a predetermined time interval e.g. **every 10-15 minutes, 24 hours**.
4. The mobile only sends an area arrival report (AAR) after it has been camping on, or using, the relevant cell for a predetermined time period, e.g. 2 minutes.
5. The mobile may only send the leaving area report if it has previously sent the AAR for the same area and only after it has been camping on (or using) the relevant cell for a predetermined time interval, e.g. 1-2 minutes.

Kraufvelin, [0101].

**116.** The combination renders obvious *the updating signal being sent...at times recent to when the mobile station enters into or exists from the special area.*

Kraufvelin's mobile station may also send the report when it enters or exits the area of interest 5, including "[a]n area event LCS report indicating a positive match...i.e. the subscriber is **ENTERing the area**" or "indicating a negative match...i.e. the subscriber is **LEAVEing the area.**" Kraufvelin, [0080].

When the UE performs a cell handover the monitoring entity (ME) shall check the details of the new serving cell, including the cell ID, step 15. If the user equipment comprises the monitoring entity, the area event monitoring

functionality of the user equipment (UE) may compare the current cell ID or similar against one or more, target cell IDs in the list received from the network.

When the event occurs, depending upon the LDR requirement, one of the two following responses may be generated:

- a) An area event LCS report indicating a positive match with the target cells, i.e. the subscriber is ENTERing the area; or
- b) An area event LCS report indicating a negative match with the target cells, i.e. the subscriber is LEAVEing the area.

Kraufvelin, [0079]-[0080].

**117.** As shown in Figure 4 below, this report is sent at step 16 after the mobile station determines that it has *enter[ed] into or exit[ed] from* the area of interest 5 at step 15.

**determining whether mobile station  
enters or exits area of interest 5**

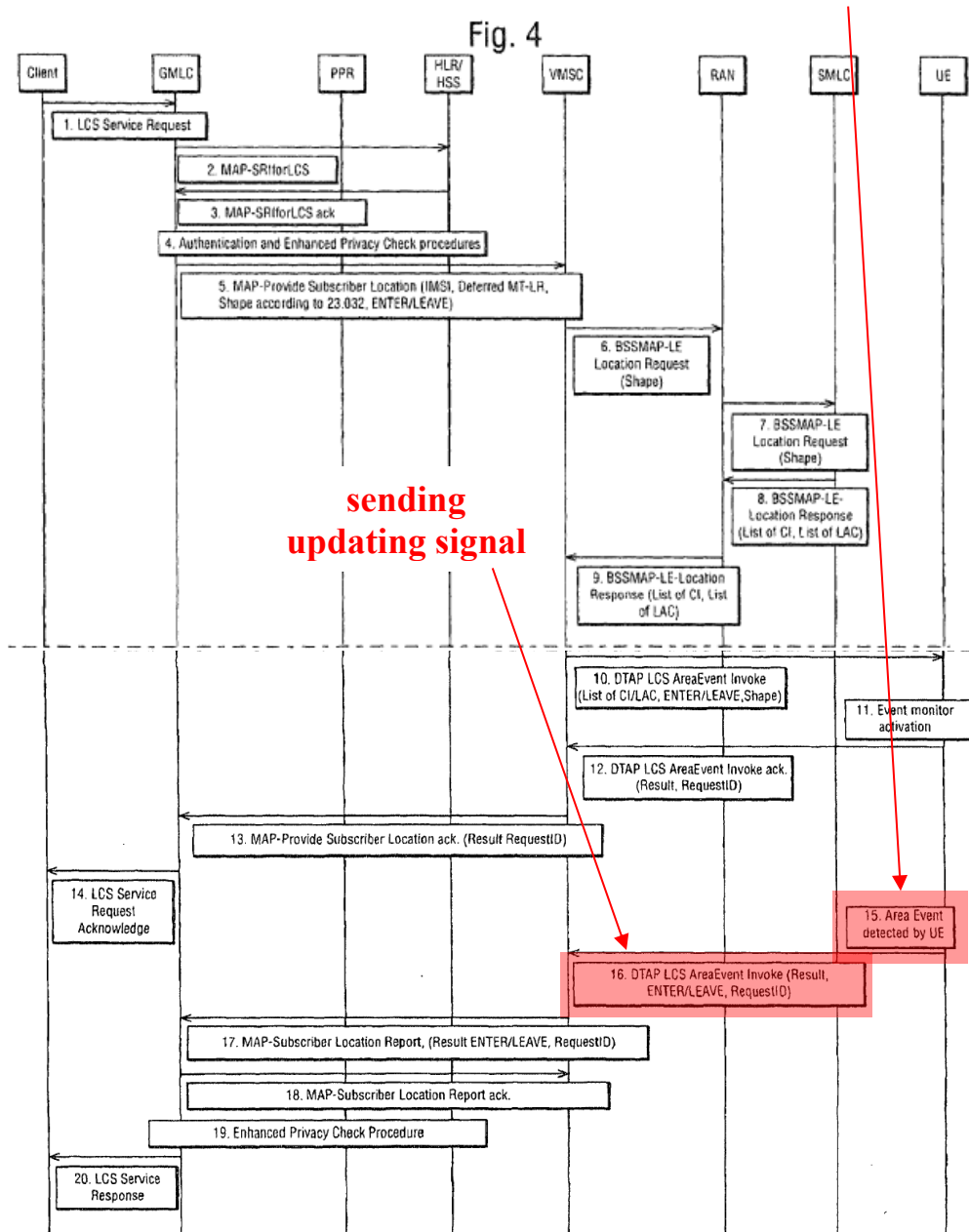


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

118. The combination renders obvious *the updating signal being sent...when the mobile station remains in the special area*. Kraufvelin also explains that rather

than sending the report immediately after entering a cell of the area of interest, the mobile station may generate and send the report “**after it has been camping on, or using, the relevant cell for a predetermined time period, e.g. 2 minutes.**”

Kraufvelin, [0101].

3. In case of permanent area event reporting the mobile does not send a repeated area arrival report or leaving area report for a cell belonging to the same service area more than once in a predetermined time interval e.g. **every 10-15 minutes, 24 hours.**

4. The mobile only sends an area arrival report (AAR) after it has been camping on, or using, the relevant cell for a predetermined time period, e.g. 2 minutes.

5. The mobile may only send the leaving area report if it has previously sent the AAR for the same area and only after it has been camping on (or using) the relevant cell for a predetermined time interval, e.g. 1-2 minutes.

Kraufvelin, [0101].

**119.** These timing configurations are used when “the mobile changes cells quite frequently” and “may be advantageously used to prevent the mobile or SIM card from reporting area changes too frequently.” Kraufvelin, [0099].

A second enhancement is to standardize area event reporting rules for a mobile or a SIM card. It should be noted that there are already standardized rules as to how

the mobile changes cells in different states and what thresholds it applies. Even so, the mobile changes cells quite frequently, so the further rules discussed hereinbelow may be advantageously used to prevent the mobile or SIM card from reporting area changes too frequently.

Kraufvelin, [0099].

**2. Claim 2**

- a. **[2.0]** *The method according to claim 1, wherein the updating signal comprises the result of a previous determination performed by the mobile station about the mobile station's presence in the special area.*

**120.** As explained at limitation [1.2], Kraufvelin describes *determining...whether or not the mobile station is present in the special area*. If there is “a positive match” between a received cell ID and a cell ID in the stored list, the mobile station determines that it “is ENTERing the area.” Kraufvelin, [0079]-[0080].

When the UE performs a cell handover the monitoring entity (ME) shall check the details of the new serving cell, including the cell ID, step 15. If the user equipment comprises the monitoring entity, the area event monitoring functionality of the user equipment (UE) may compare the current cell ID or similar against one or more, target cell Ids in the list received from the network.

When the event occurs, depending upon the LDR requirement, one of the two following responses may be generated:

- a) An area event LCS report indicating a positive match with the target cells, i.e. the subscriber is ENTERing the area; or
- b) An area event LCS report indicating a negative match with the target cells, i.e. the subscriber is LEAVEing the area.

Kraufvelin, [0079]-[0080].

**121.** The result of this determination is included in the “DTAP LCS-AreaEventReport” which is sent from the mobile station “to the MSC/SGSN.”

Kraufvelin, [0082]. This is illustrated in step 16, below.

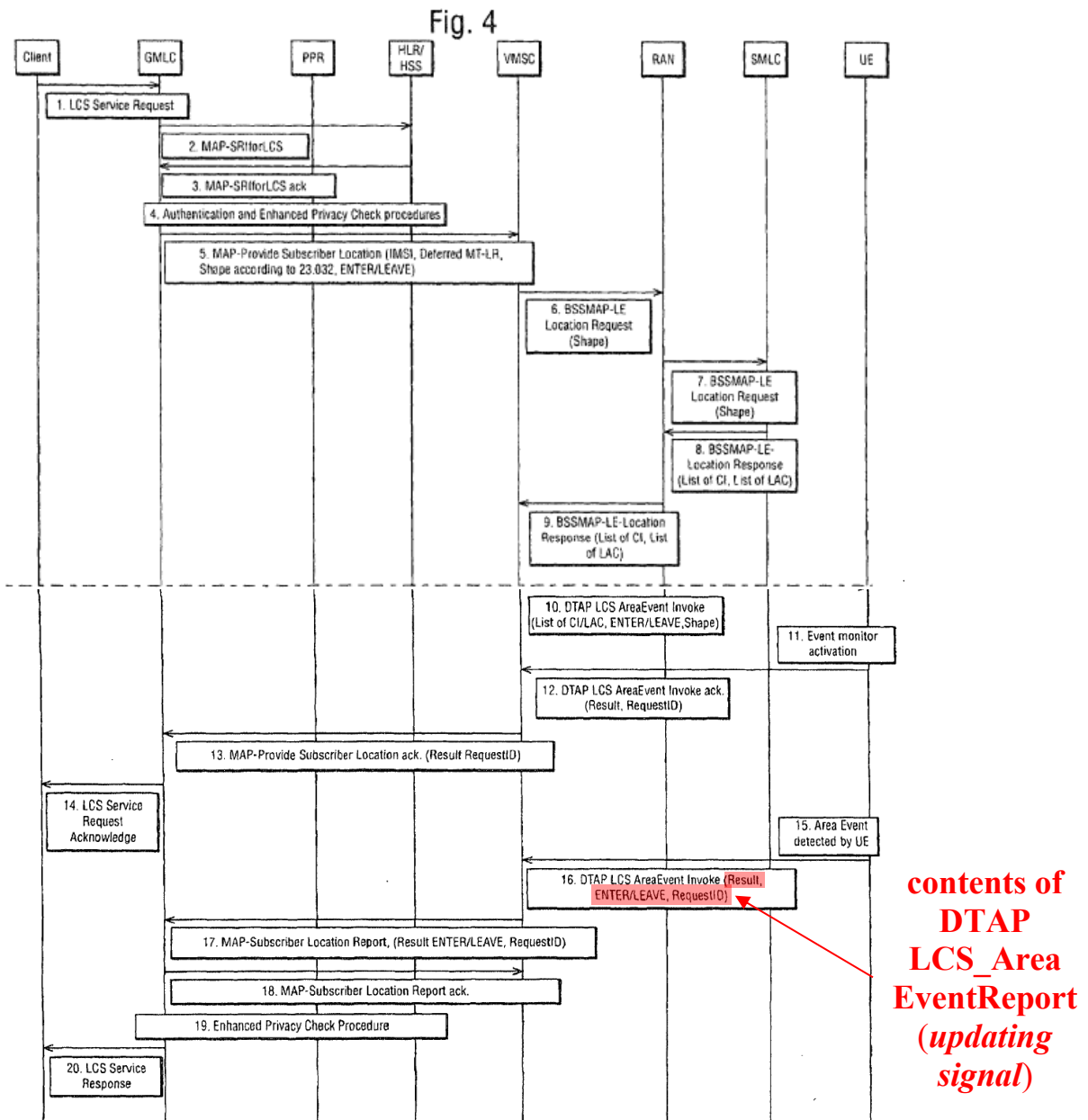


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

122. Because the determining at step 15 is performed before sending the result at step 16, and because the contents of the report at step 16 includes the result of the determination at step 15, the combination of Kraufvelin and Hashimoto

renders obvious *the updating signal comprises the result of a previous determination performed by the mobile station*. Kraufvelin, Fig. 4 (steps 15 and 16), [0079]-[0083].

123. Thus, the combination of Kraufvelin and Hashimoto renders obvious *the updating signal* (contents of DTAP LCS-AreaEventReport) *comprises the result of a previous determination performed by the mobile station about the mobile station's presence in the special area* (indicating that mobile station has “ENTERed” the area of interest 5).

### 3. Claim 4

- a. [4.0] *The method according to claim 1, wherein the mobile station enables or disables one or more functions related to a presence related service upon receiving enabling or disabling instructions from the provider of presence related services.*

124. Kraufvelin describes *the mobile station enabl[ing] or disabl[ing] one or more functions*, including an “area event monitoring application.”

A location-based application may be interested in when a specific subscriber is entering or leaving a geographical area. **Different kinds of services are possible** if such a mechanism would be in place. It might be useful for various commercial and non-commercial services and similar applications to have information if a mobile station is located within a particular defined geographical area. In some application it might be useful for the network element to be able accomplish the operation for obtaining location information only if the mobile station is detected

as being in a selected part of the communication system. For example, various organisations or even individuals may want to send information and/or offer services to a mobile station only in a particular defined geographic area and/or to a certain type of subscriber in a particular geographical area. More detailed examples of these include location based push services like advertisements and parents monitoring the whereabouts of their children.

Kraufvelin, [0012].

The area event monitoring application may then disable itself and a DTAP LCS-AreaEventReport is sent to the MSC/SGSN, see step 16. The report may include the original LDR reference, the GMLC address, the time that the event occurred and the current serving cell ID. Information relating to the area event or UE status may optionally be included in this report. An exemplifying area event report is shown in FIG. 11.

Kraufvelin, [0082].

**125.** As explained at limitation [1.1], the monitoring entity of the mobile station executes an “area event monitoring application” to determine the mobile station’s presence within area of interest 5. Kraufvelin, [0079]. This location information is then used to provide “[d]ifferent kinds of services” to the mobile station including “various commercial and non-commercial services and similar applications.” Kraufvelin, [0012]. Because the area location information is used to

provide location-specific services, it is *related to a presence related service*. Kraufvelin, [0082], [0012].

**126.** Further, Kraufvelin's mobile station *enables or disables* the area event monitoring application *upon receiving enabling or disabling instructions from the provider of presence related services*. As explained at limitation [1.3], the GMLC 12 and/or LCS client 8 are services of *provider[s] of presence related services*. See limitation [1.3]; Kraufvelin, [0083], [0048], [0061], [0012], [0051]. As explained at limitation [1.0], the LCS client 8 sends a request for location monitoring to the system indicating the mobile station and the area of interest 5. See limitation [1.0]; Kraufvelin, [0016], [0048], [0055]. The area of interest 5 is "translated into a list of Cell Ids" and "sent to the mobile station 1." Kraufvelin, [0056], [0060]. The activation of the area event monitoring application is illustrated at step 11 of Figure 4 and renders obvious *enabl[ing]...one or more functions...upon receiving enabling...instructions*.

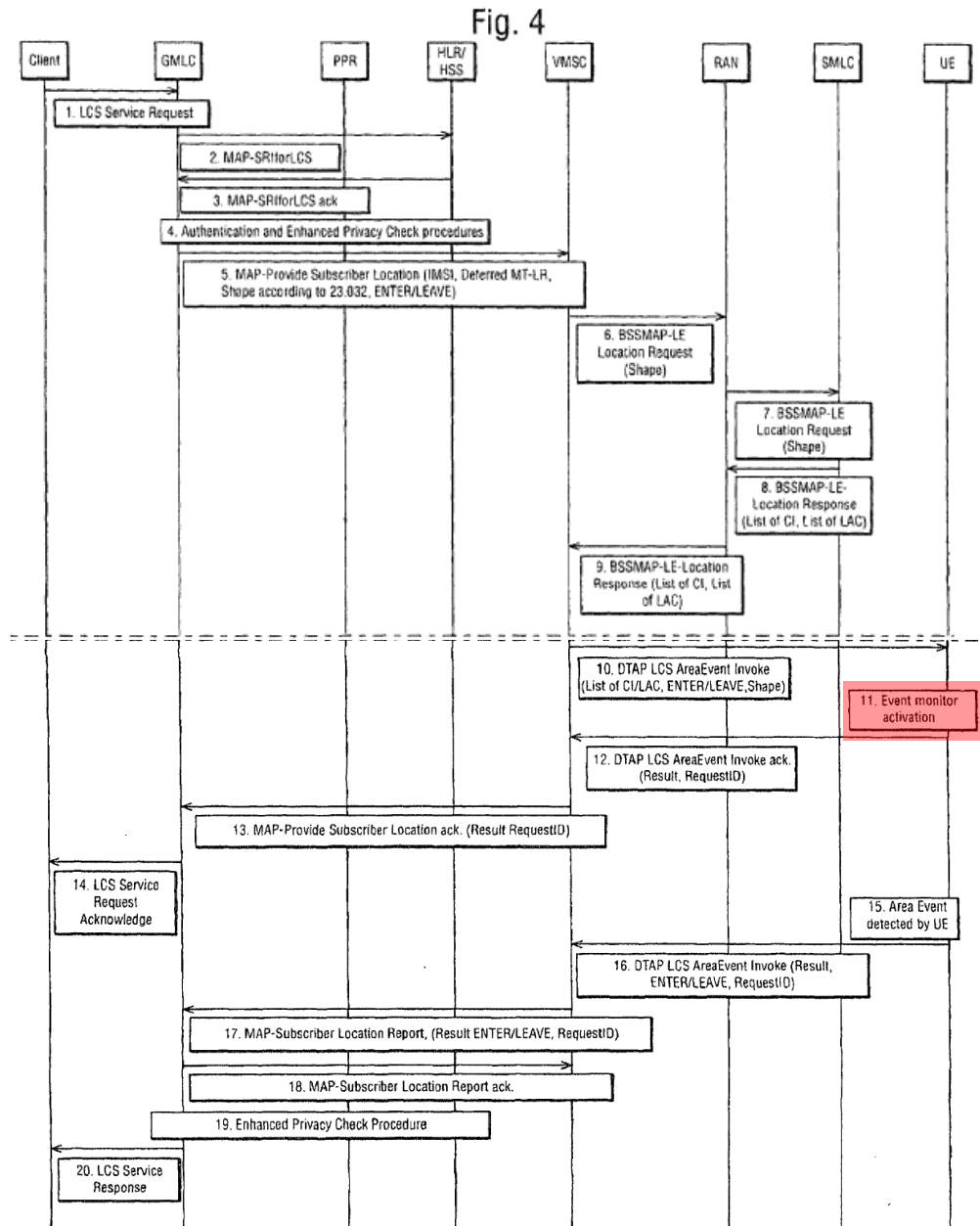


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

127. Kraufvelin also describes disabling the area event monitoring application. The area event monitoring application may be disabled upon request of the LCS client 8 if the LCS client 8 no longer wishes to monitor location.

FIG. 15 illustrates the procedures for cancelling a Deferred Location Request where the Location Report is returned to the network by the user equipment following the occurrence of an Area Event. In step 1 the LCS Client requests the cancellation of a previously requested Deferred Location Request. The cancellation may also be initiated by the GMLC itself for some reasons. For example, implementation dependent timer in the GMLC has expired, or the UE's privacy settings stored in the GMLC/PPR was changed and the Deferred Location Request is not allowed any more. The event type to cancel must be indicated in the Cancellation procedure. The cancellation may also be initiated by the user equipment. For example, implementation dependent timer in the UE expires, or a timer received from, the network expires.

In the next step the GMLC may make an SRIforLCS to the HLR of the subscriber to obtain the current VMSC as this might have changed since the Area Based trigger was registered with the UE. Steps 3 and 4 may be performed in accordance with the TS 23.271 for an ordinary MT-LR. The GMLC may indicate the cancellation request in the Provide Subscriber Location message toward the VMSC/SGSN, see step 5.

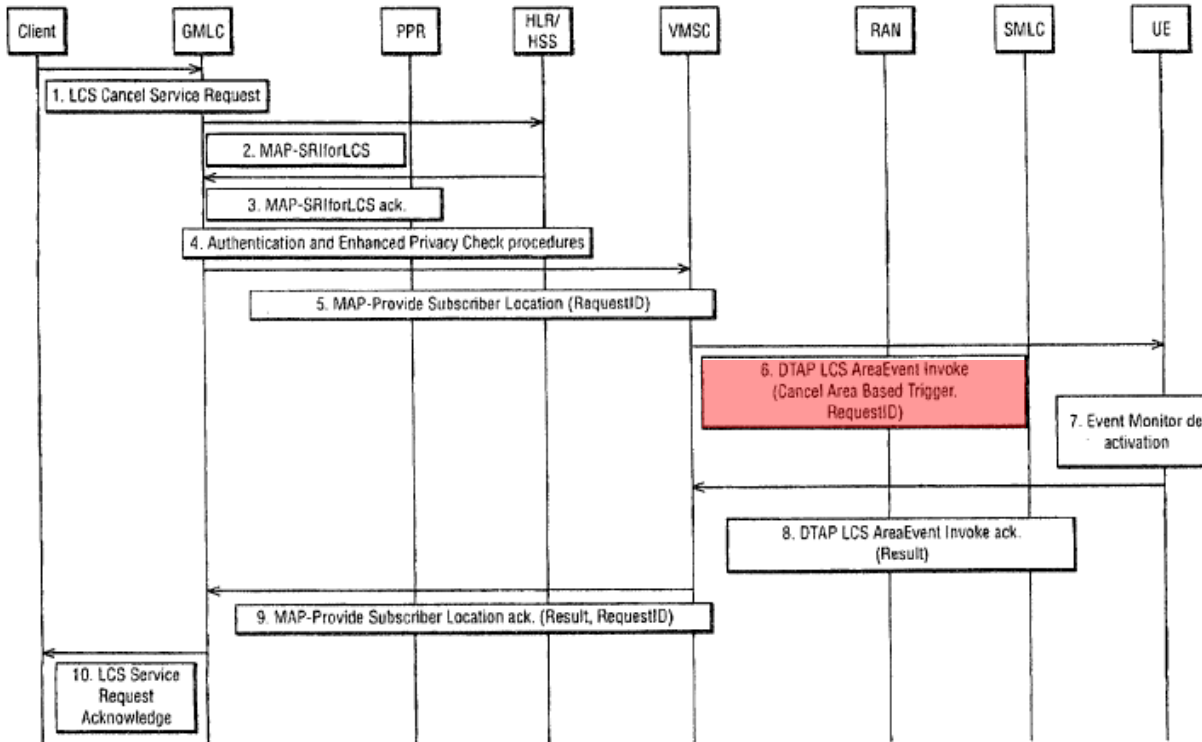
The MSC may then send a DTAP LCS-AreaEventInvoke message at step 6 to the UE carrying the RequestID and an indication that the corresponding Deferred Location

Request is cancelled. The UE de-activates the monitoring and purges the corresponding list of CGIS, LACs and Shape, see step 7. The user equipment may respond with and result indication that the Deferred Location Request was successfully cancelled, step 8. The VMSC may then send at step 9 an acknowledgement to the GMLC indicating that the Deferred Location Request was successfully cancelled. The GMLC may then purge any data related to the cancelled Deferred Location Request and send an acknowledgement at step 10 to the LCS Client, if the cancellation procedure was initiated by the LCS Client as indicated in step 1.

Kraufvelin, [0089]-[0091].

**128.** Kraufvelin explains that a request for location-monitoring is referred to as a “deferred location request.” Kraufvelin, [0062]. Figure 15 “illustrates the procedures for **cancelling** a Deferred Location Request.” Kraufvelin, [0089].

Fig. 15



Kraufvelin, Fig. 15 (annotated)

129. At step 6, “[t]he MSC may...send a DTAP LCS-AreaEventInvoke message...to the UE carrying the RequestID and an indication that the corresponding Deferred Location Request is cancelled.” Kraufvelin, [0091], Fig. 15. This deactivation of the area event monitoring application renders obvious *disabl[ing] one or more functions...upon receiving...disabling instructions.*

130. Thus, the combination of Kraufvelin and Hashimoto describes *the mobile station (mobile station 1) enables or disables one or more functions related to a presence related service (enabling area event monitoring application or disabling area event monitoring application) upon receiving enabling or disabling*

*instructions from the provider of presence related services (enabling after receiving list of cell IDs corresponding to area of interest 5 or disabling after receiving cancelation request from LCS Client 8/GMLC 12).*

**4. Claim 5**

- a. **[5.0]** *A non-transitory computer readable medium storing computer readable program code for causing a processor of a mobile station to perform a method associated with the use of at least first and second radio communication defining devices that respectively transmit first and second distinctive defining signals that at least partly define a special area by a sum or intersection of their coverage, the first and second distinctive defining signals respectively including first and second data, the method comprising:*

**131.** Limitation [5.0] is similar to limitation [1.0]. Ex.1065, 1. As explained at limitation [1.0], the combination of Kraufvelin and Hashimoto renders obvious *a method*. Kraufvelin, [0029], [0053]; limitation [1.0]. Kraufvelin's method is associated with *first and second radio communication defining devices* (base stations of cells 20 and 22). Kraufvelin, [0039], [0004], Fig. 2; limitation [1.0]. As also explained at limitation [1.0], the base stations of cells 20 and 22 *respectively transmit first and second distinctive defining signals that at least partly define a special area by a sum or intersection of their coverage, the first and second distinctive defining signals respectively including first and second data*. Kraufvelin, [0016], [0048], [0055]-[0056], [0060]; Hashimoto, [0134]; Ex.1065, 1.

**132.** Kraufvelin also explains that its mobile station 1 includes a memory, which is *[a] non-transitory computer readable medium*. Kraufvelin, [0011] (storing “DEGA information...in a SIM/USIM (subscriber identity module/UMTS SIM) of the mobile station”), [0073] (storing “the list of CGIs, and other possible information to the memory thereof”). It was commonly known at the time that mobile stations included a memory, as shown by Kraufvelin.

**133.** Kraufvelin’s mobile station also includes a processor. “The user equipment such as the mobile station 1 may be provided with...a processor unit.” Kraufvelin, [0042], [0094]. Kraufvelin also explains that the mobile station executes software stored in the memory which is executed by the processor. Kraufvelin, [0013] (describing an “application running in the Subscriber Identity Module (SIM) of the mobile station”), [0051] (“user applications”), [0082] (describing an “area event monitoring application”), [0093] (“an application running in the controller means of the mobile station”). It was well known that processors running on mobile stations executed software. Executing software stored on the mobile station with the processor of the mobile station renders obvious *storing computer readable program code for causing a processor of a mobile station to perform* various functions, including the method claimed.

**134.** Thus, the combination of Kraufvelin and Hashimoto renders obvious *[a] non-transitory computer readable medium* (memory of mobile station) *storing*

*computer readable program code* (applications executed by mobile station) *for causing a processor of a mobile station* (processor unit of mobile station) *to perform a method* (“method,” Kraufvelin, [0029]).

- b. **[5.1] *determining in the mobile station if the mobile station is receiving one or both of the first and second distinctive defining signals and***

135. Limitation [5.1] is identical to limitation [1.1]. Ex.1065, 1. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same reasons described at limitation [1.1]. The analysis presented at limitation [1.1] is incorporated by reference as analysis for limitation [5.1].

- c. **[5.2] *determining in the mobile station, based on a previously obtained at least portion of one or both of the first and second data, whether or not the mobile station is present in the special area; and***

136. Limitation [5.2] is identical to limitation [1.2]. Ex.1065, 1. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same reasons described at limitation [1.2]. The analysis presented at limitation [1.2] is incorporated by reference as analysis for limitation [5.2].

- d. **[5.3] *sending from the mobile station via a mobile telephone network an updating signal to one or more servers of a provider of presence related services about the mobile station’s presence in the special area,***

137. Limitation [5.3] is identical to limitation [1.3]. Ex.1065, 2. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same

reasons described at limitation [1.3]. The analysis presented at limitation [1.3] is incorporated by reference as analysis for limitation [5.3].

- e. **[5.4] *the sending of the updating signal being uncorrelated to any mobile station phone call establishment,***

**138.** Limitation [5.4] is identical to limitation [1.4]. Ex.1065, 2. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same reasons described at limitation [1.4]. The analysis presented at limitation [1.4] is incorporated by reference as analysis for limitation [5.4].

- f. **[5.5] *the updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the special area, and (iii) when the mobile station remains in the special area.***

**139.** Limitation [5.5] is identical to limitation [1.5]. Ex.1065, 2. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same reasons described at limitation [1.5]. The analysis presented at limitation [1.5] is incorporated by reference as analysis for limitation [5.5].

## **5. Claim 6**

- a. **[6.0] *The non-transitory computer readable medium storing computer readable program code according to claim 5 that further causes the processor to enable or disable one or more functions in the mobile station related to a presence related service upon the mobile***

***station receiving enabling or disabling instructions from the provider of presence related services.***

**140.** As explained at limitation [5.0], the combination of Kraufvelin and Hashimoto renders obvious *[t]he non-transitory computer readable medium storing computer readable program code that...causes the processor to perform the functions described by Kraufvelin. See limitation [5.0].*

**141.** The remainder of claim 6 is similar to claim 4. Ex.1065, 2. The combination of Kraufvelin and Hashimoto renders it obvious for the same reasons described at claim 4. The analysis presented at claim 4 is incorporated by reference as analysis for claim 6.

**6. Claim 7**

- a.** ***[7.0] A mobile station capable of receiving first and second distinctive defining signals respectively from first and second radio communication defining devices, the first and second distinctive defining signals at least partly defining a special area by a sum or intersection of their coverage, the first and second distinctive defining signals respectively including first and second data, the mobile station comprising:***

**142.** Limitation [7.0] recites similar features as limitation [1.0] and limitation [5.0], but adds *[a] mobile station capable of receiving first and second distinctive defining signals respectively from first and second radio communication defining devices.* Ex.1065, 1. The combination of Kraufvelin and Hashimoto renders obvious these features. The analysis presented at limitations [1.0] and [5.0] is incorporated by reference as analysis for limitation [7.0].

**143.** As explained at limitation [1.0], the combination of Kraufvelin and Hashimoto renders obvious *a mobile station* (mobile station 1). Kraufvelin, [0048], [0041], Figs. 1-2, 4. As also explained at limitation [1.0], the combination of Kraufvelin and Hashimoto renders obvious *first and second distinctive defining signals respectively from first and second radio communication defining devices* (signals sent from base stations of cells 20 and 22). Kraufvelin, [0039], [0004], Fig. 2.

**144.** Kraufvelin also explains that its mobile station is *capable of receiving* the signals including cell IDs of cells 20 and 22. “When the UE performs a cell handover the monitoring entity (ME) shall check the details of the new serving cell,” which is received from the base stations by the mobile station. Kraufvelin, [0079]. Elsewhere, Kraufvelin explains:

Kraufvelin, [0039].

**145.** Thus, the combination of Kraufvelin and Hashimoto renders obvious *[a] mobile station* (mobile station 1) *capable of receiving* (“mobile stations are able to...receive signals from the respective base station”) *first and second distinctive defining signals* (signals transmitted by base stations of cells 20 and 22) *respectively from first and second radio communication defining devices* (base stations of cells 20 and 22).

b. **[7.1] *an electronic storage medium that stores at least a portion of the first and second data; and***

**146.** As explained at limitation [5.1], Kraufvelin's mobile station 1 includes a memory, which is an electronic storage medium. Kraufvelin, [0011] (storing "DEGA information...**in a SIM/USIM** (subscriber identity module/UMTS SIM) of the mobile station"), [0073] (storing "the list of CGIs, and other possible information **to the memory**" of "the user equipment"). A POSITA would have recognized that a cell ID and CGI would both be ways of identifying cells and corresponding geographical areas in Kraufvelin's system. *See* Kraufvelin, [0056] ("The **geographical area 5 may be translated into a list of Cell Ids**. In FIG. 2 the area 5 is shown to be covered by the cells 20 to 23. The **IDs of these cells would thus be included in the list.**"), [0057] ("It shall be appreciated that other possibilities for the area definition may be used as well. For example, **the area may be defined based on Cell Group Identities (CGI)**, Service Area identities (SAI), Location Areas Codes (LAC), Routing Area (RAC) and so on.").

**147.** Additionally, the memory of the mobile station 1 *stores at least a portion of the first and second data*. As explained at limitation [1.0], the cell ID of cell 20 renders obvious *the first...data* and the cell ID of cell 22 renders obvious *the...second data*. *See* limitation [1.0]. These cell IDs are included in the list of cell IDs stored on the mobile station. Kraufvelin, [0056] ("In FIG. 2 the area 5 is shown

to be covered by the **cells 20 to 23. The IDs of these cells would thus be included in the list.**”), [0060] (“**The list of cells** may then be sent **to the mobile station 1.**”).

**148.** The analysis presented at limitations [1.0] and [5.1] is incorporated by reference as analysis for limitation [7.1].

**149.** Thus, the combination of Kraufvelin and Hashimoto renders obvious *an electronic storage medium (memory) that stores at least a portion of the first and second data* (storing cell IDs of cells 20 and 22, part of the cell IDs of cells 20-23 of the stored list).

- c. **[7.2] *a processor adapted to process the first and second distinctive defining signals to determine, based on at least portion of one or both of the first and second data, whether or not the mobile station is present in the special area,***

**150.** As explained at limitation [5.0], Kraufvelin’s mobile station 1 includes “a processor unit” which renders obvious *a processor*. Kraufvelin, [0042], [0094]; Ex.1065, 1.

**151.** In addition, the processor of the mobile station 1 processes signals received. For example, “[w]hen the UE performs a cell handover the monitoring entity (ME) shall **check the details of the new serving cell, including the cell ID**” and “**compare the current cell ID or similar against one or more, target cell IDs in the list received from the network.**” Kraufvelin, [0079], [0060].

**152.** Kraufvelin describes that if the received cell ID matches one of the cell IDs in the stored list, the mobile station determines that it is within the area of interest 5 and sends a report to the network, which may include:

- a) An area event LCS report indicating a positive match with the target cells, i.e. the subscriber is ENTERing the area; or
- b) An area event LCS report indicating a negative match with the target cells, i.e. the subscriber is LEAVEing the area.

Kraufvelin, [0080].

**153.** When the mobile station enters cell 20, it receives the signal containing the cell ID of cell 20 (*first...distinctive defining signal[]*) and compares this cell ID to the stored list. Kraufvelin, [0079]. If there is “a positive match,” the processor determines that the mobile station is “ENTERing the area” of interest 5. Kraufvelin, [0080]. This process of comparing the cell ID for cell 20 to the stored list of cell IDs renders obvious *process[ing] the first...distinctive defining signals to determine, based on at least portion of...the first...data, whether or not the mobile station is present in the special area.*

**154.** The same process is performed when the mobile station enters any cell, particularly, “[w]hen the UE performs a cell handover.” Kraufvelin, [0079]. As a result, when the mobile station enters the coverage area of cell 22, it receives the

signal containing the cell ID of cell 22 (*second distinctive defining signal*) and compares it to the stored list. Kraufvelin, [0080]. This process of comparing the received cell ID for cell 22 to the stored list renders obvious *process[ing] the...second distinctive defining signals to determine, based on at least portion of...the...second data, whether or not the mobile station is present in the special area.*

**155.** As explained at limitation [1.1] above, in the combination, Kraufvelin's mobile station may receive both the cell ID of cell 20 and cell 22 when it is within overlapping coverage areas of both cells and determine its presence in the special area based on both *the first and second distinctive defining signals* including *one or both of the first and second data*. Kraufvelin, Fig. 2; Hashimoto, [0134], Fig. 1.

**156.** The analysis presented at limitations [1.1] and [5.0] is incorporated by reference as analysis for limitation [7.2].

**157.** Thus, the combination of Kraufvelin and Hashimoto renders obvious *a processor (processor unit) adapted to process the first and second distinctive defining signals to determine, based on at least portion of one or both of the first and second data, whether or not the mobile station is present in the special area* (receiving cell ID of cell 20 and/or cell 22, comparing to stored list of cell IDs, and determining that the mobile station is within the area of interest 5 if there is a match).

**d.** **[7.3]** *the processor further adapted to send from the mobile station via a mobile telephone network an*

***updating signal to one or more servers of a provider of presence related services about the mobile station's presence in the special area,***

**158.** As explained at limitation [5.0] and limitation [7.2], Kraufvelin's mobile station includes "a processor unit." Kraufvelin, [0042], [0094]. The analysis presented at limitations [5.0] and [7.2] is incorporated by reference as analysis for limitation [7.3].

**159.** In addition, as explained at limitation [1.3], the mobile station in Kraufvelin is configured to *send from the mobile station via a mobile telephone network an updating signal to one or more servers of a provider of presence related services about the mobile station's presence in the special area.* See limitation [1.3]; Ex.1065, 2; Kraufvelin, [0082] ("a DTAP LCS-AreaEventReport"), Fig. 4 (step 16, "Result, ENTER/LEAVE," indicating whether the mobile station entered or left the area of interest 5). The combination of Kraufvelin and Hashimoto renders obvious limitation [7.3] for at least the same reasons described at limitation [1.3], above. The analysis presented at limitation [1.3] is incorporated by reference as analysis for limitation [7.3].

- e. ***[7.4] the sending of the updating signal being uncorrelated to any mobile station phone call establishment,***

**160.** Limitation [7.4] is identical to limitation [1.4]. Ex.1065, 2. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same

reasons described at limitation [1.4]. The analysis presented at limitation [1.4] is incorporated by reference as analysis for limitation [7.4].

- f. **[7.5] *the updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the special area, and (iii) when the mobile station remains in the special area.***

**161.** Limitation [7.5] is identical to limitation [1.5]. Ex.1065, 2. The combination of Kraufvelin and Hashimoto renders it obvious for at least the same reasons described at limitation [1.5]. The analysis presented at limitation [1.5] is incorporated by reference as analysis for limitation [7.5].

## **7. Claim 8**

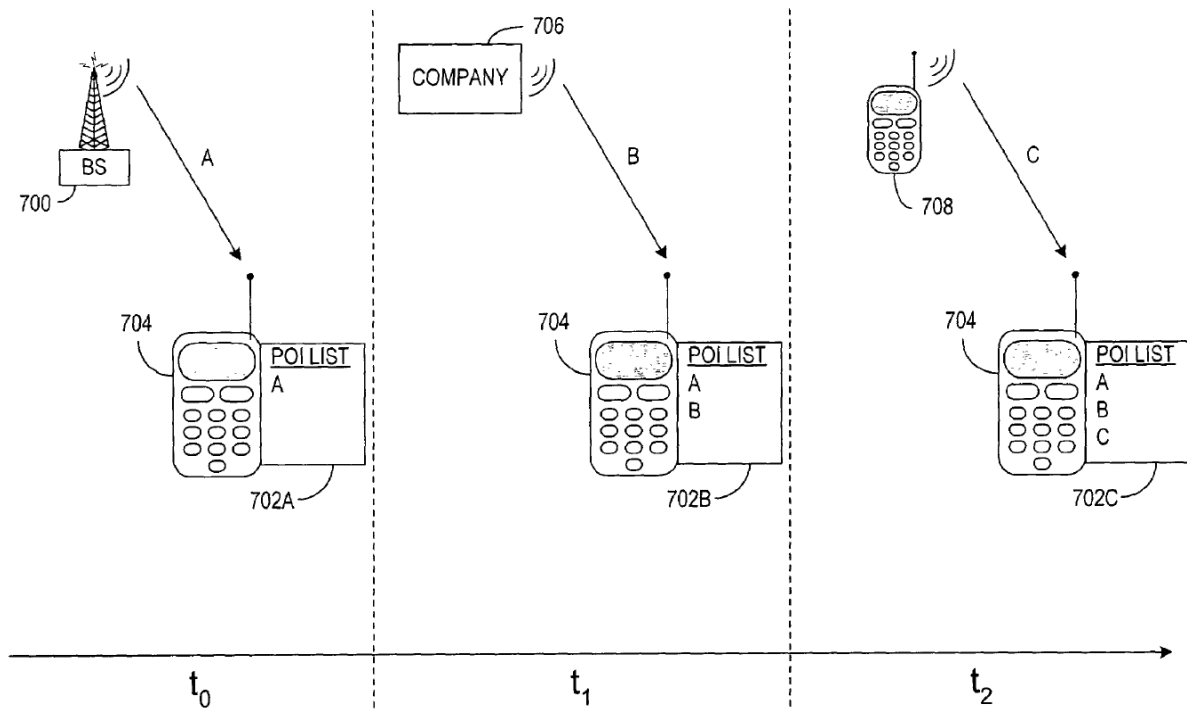
- a. **[8.0] *The mobile station according to claim 7, wherein the processor is adapted to enable or disable one or more functions related to a presence related service upon the mobile station receiving enabling or disabling instructions from the provider of presence related services.***

**162.** As explained at limitation [7.0], the combination of Kraufvelin and Hashimoto renders obvious a mobile station. As explained at limitation [7.2], Kraufvelin's mobile station includes a processor. The remainder of claim 8 is similar to claim 4. Ex.1065, 2. the combination of Kraufvelin and Hashimoto renders obvious claim 8 for at least the same reasons described at claim 4. The analysis presented at limitations [7.0] and [7.2] is incorporated by reference as analysis for claim 8.

**X. GROUND 2: CLAIM 3 IS UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF KRAUFVELIN, HASHIMOTO, AND HUOMO**

**A. Summary of Huomo**

**163.** Huomo relates to a system and method “for facilitating location based triggering of actions, applications, services, and the like on wireless devices.” Huomo (Ex.1016), Abstract. Huomo’s locations are defined using “base station identifiers in a cellular network” or “identifier[s]” “provided by an access point” using a “short-range wireless service, such as Bluetooth, Wireless Local Area Network (WLAN), etc.” Huomo, [0010]. Figure 7 provides an example of Huomo’s system. As shown in Figure 7, “[a]t a first time,” “the mobile terminal user is within a cellular network cell, and receives an identifier ‘A’ from a base station 700.” Huomo, [0053]. Later, “[t]he user may then travel to a new location,” “at which time a company 706, such as a retail store, provides a radio frequency identifier ‘B’ to the mobile terminal 704.” Huomo, [0053].



**Huomo, Fig. 7.**

**164.** A mobile terminal receives the identifiers associated with “Points of Interest (POI).” Huomo, [0036]. “One or more actions, applications, services, etc. may then be linked to each POI.” Huomo, [0036]. For example, “a user’s re-entry into an area/cell 110, 112, 114 where a POI has been stored can automatically invoke an application(s) or other action(s) in accordance with the invention.” Huomo, [0036].

**B. Reasons to Combine Huomo with Kraufvelin and Hashimoto**

**165.** In my opinion, a POSITA would have been motivated to combine the teachings of Huomo with the combination of Kraufvelin and Hashimoto for several

reasons as discussed further below. Combining Huomo's teachings related to defining locations using both cellular network and short-range wireless technologies with Kraufvelin and Hashimoto would have been obvious, beneficial, and predictable. A POSITA would have been motivated to combine the teachings of Huomo with Kraufvelin and Hashimoto to more granularly define locations for providing services. For example, a special area may be defined by the coverage area of a WiFi network of "a retail store or mall," or "an airport," which may be smaller than the coverage of a cellular base station, allowing more precise definition of a special area. Huomo, [0057]-[0058].

**1. Huomo is analogous art to the '910 patent.**

**166.** Huomo is analogous art to the '910 patent. Like the '910 patent, Huomo is in the same field of endeavor because it relates to systems and methods for monitoring the location of a wireless device for providing location-based services. Huomo, Abstract. ("A system, apparatus, and method for facilitating location based triggering of actions, applications, services, and the like on wireless devices").

**167.** Additionally, Huomo is reasonably pertinent to a particular problem with which the inventor of the '910 patent was involved (i.e., monitoring the location of a wireless device and providing location-based services). Huomo offers solutions for "provid[ing] location-based service and application triggering for users"

“without imposing heavy burdens on the network infrastructure.” Huomo, Abstract, [0005]. Accordingly, Huomo is analogous art.

**2. A POSITA would have been motivated to combine the teachings of Huomo with the teachings of Kraufvelin and Hashimoto.**

**168.** In my opinion, a POSITA would have been motivated to modify the combination of Kraufvelin and Hashimoto to include zone identification using both cellular-network and short-range wireless technologies, similar to the system taught by Huomo. Huomo explains that “[i]n the cellular network context, the accuracy of the identified location substantially corresponds to the size of the cell,” and it is “desirable to further regulate which actions will be automatically invoked while in a particular cell, by further distinguishing subsections of a cell using a smaller scale wireless service such as Bluetooth, a WLAN, etc.” Huomo, [0041]. In particular, Huomo explains that it is desirable to trigger services, for example, based on “a retail store” in a mall or “obtain information specific to” “a particular airline.” Huomo, [0057]-[0058]. Based on Huomo’s explicit teachings, a POSITA would have been motivated to apply Huomo’s teachings for the desirable benefit of using short-range wireless technologies to mark smaller and more precise zones, for example, within a mall or airport.

**169.** A POSITA would have had a reasonable expectation of success in modifying the combined teachings of Kraufvelin and Hashimoto to use both cellular

network and short-range wireless technologies. Huomo explains that, as of the earliest possible priority date of the '910 patent, it was known to define geographical locations for location-based services using both a cellular network and short-range wireless technologies. Huomo, [0010] (“[R]eceiving wireless service area identifiers includes receiving base station identifiers in a cellular network” as well as receiving an identifier “provided by an access point serving [a] wireless service area,” where the wireless service “may be a short-range wireless service, such as Bluetooth, Wireless Local Area Network (WLAN), etc.”), [0041] (explaining that “[i]n the cellular network context, the accuracy of the identified location substantially corresponds to the size of the cell” but that it may be desirable to “further distinguish[] subsections of a cell using a smaller scale wireless service such as Bluetooth, a WLAN, etc.”). This is confirmed by other prior art of the time. Li, [0007]; Sundar, Abstract.

**170.** The combination of Kraufvelin, Hashimoto, and Huomo would have been the combination of prior art elements (Kraufvelin’s location-monitoring) according to known methods (based on establishing areas of interest defined by coverage areas of access points of different wireless technologies, taught by Huomo) to yield the predictable result of defining smaller and more precise areas of interest.

171. Thus, it is my opinion that a POSITA would have found it obvious to modify the combined teachings of Kraufvelin and Hashimoto to use both cellular network and short-range wireless technologies, like the system taught by Huomo.

### C. Detailed Analysis of Claims

#### 1. Claim 3

- a. [3.0] *The method according to claim 1, wherein the frequency of the updating signal is different from the frequency of the distinctive defining signal.*

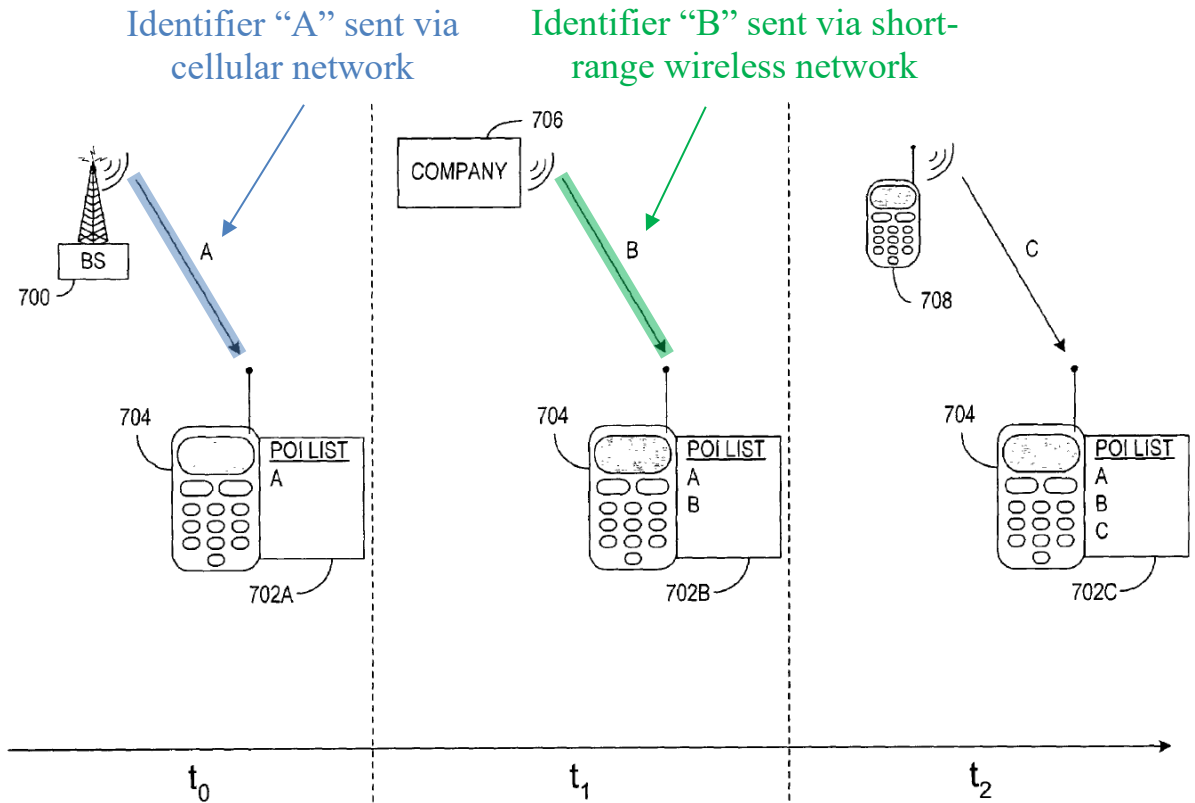
172. As explained at limitation [1.0] and limitation [1.1] above, Kraufvelin discloses *first and second distinctive defining signals* (signals transmitted from base stations of cells 20 and 22). As also discussed at limitation [1.3], Kraufvelin also describes sending an *updating signal* (contents of LCS-AreaEventReport). While Kraufvelin describes these signals transmitted in the context of cellular communications, Kraufvelin explains that the same signal transmission steps “are also applicable to any other cellular communication system,” including those of different frequency ranges. Kraufvelin, [0119]. Huomo provides a well known example of such implementation details.

173. Huomo discloses a system that provides location-based services using “cellular network” communications as well as “smaller-scale wireless services” corresponding to “short-range wireless services, such as Wireless Local Area Networks (WLAN), Bluetooth, or other radio technologies.” Huomo, [0028], [0040]. Huomo explains that “[a]t a first time,” “the mobile terminal user is within

a cellular network cell, and receives **an identifier ‘A’ from a base station 700**” (*distinctive defining signal*). Huomo, [0053]. Later, “[t]he user may then travel to a new location,” “at which time a company 706, such as a retail store, **provides a radio frequency identifier ‘B’ to the mobile terminal 704**” (*distinctive defining signal*). Huomo, [0053].

174. Huomo explains that a wireless device (*mobile station*) may receive “base station identifiers in a cellular network” as well as an identifier “provided by an access point serving” a “short-range wireless service” area. Huomo, [0010].

Figure 7 shows the different signals received by Huomo’s mobile terminal:



**Huomo, FIG. 7 (annotated)**

175. In the combination, Kraufvelin and Huomo render obvious a system of location-based services where a mobile station receives a “radio frequency identifier” (*distinctive defining signal*) using “short-range wireless services, such as Wireless Local Area Networks (WLAN), Bluetooth, or other radio technologies,” as taught by Huomo, then sends an *updating signal* using cellular communications, as taught by Kraufvelin. At the time of invention, it was well known that cellular communications and short-range wireless communications operated at different frequencies. Li, [0007]; Sundar, Abstract.

176. Thus, the combination of Kruafvelin's teachings of a cellular signal transmitted from the mobile station to the mobile telephone network and Huomo's teachings of a short-range wireless signal transmitted from the access point to the mobile station, together, renders obvious *wherein the frequency of the updating signal is different from the frequency of the distinctive defining signal*.

**XI. GROUND 3: CLAIMS 9-14 IS UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF KRAUFVELIN, HASHIMOTO, AND ANDERSSON**

**A. Summary of Andersson**

177. Andersson describes monitoring the location of a mobile station (shown in blue) as it moves between the coverage areas of different base stations or cells (shown in red) relative to an area of interest. Andersson, Figs. 1A-1C, 2:52-57, 6:67-7:2.

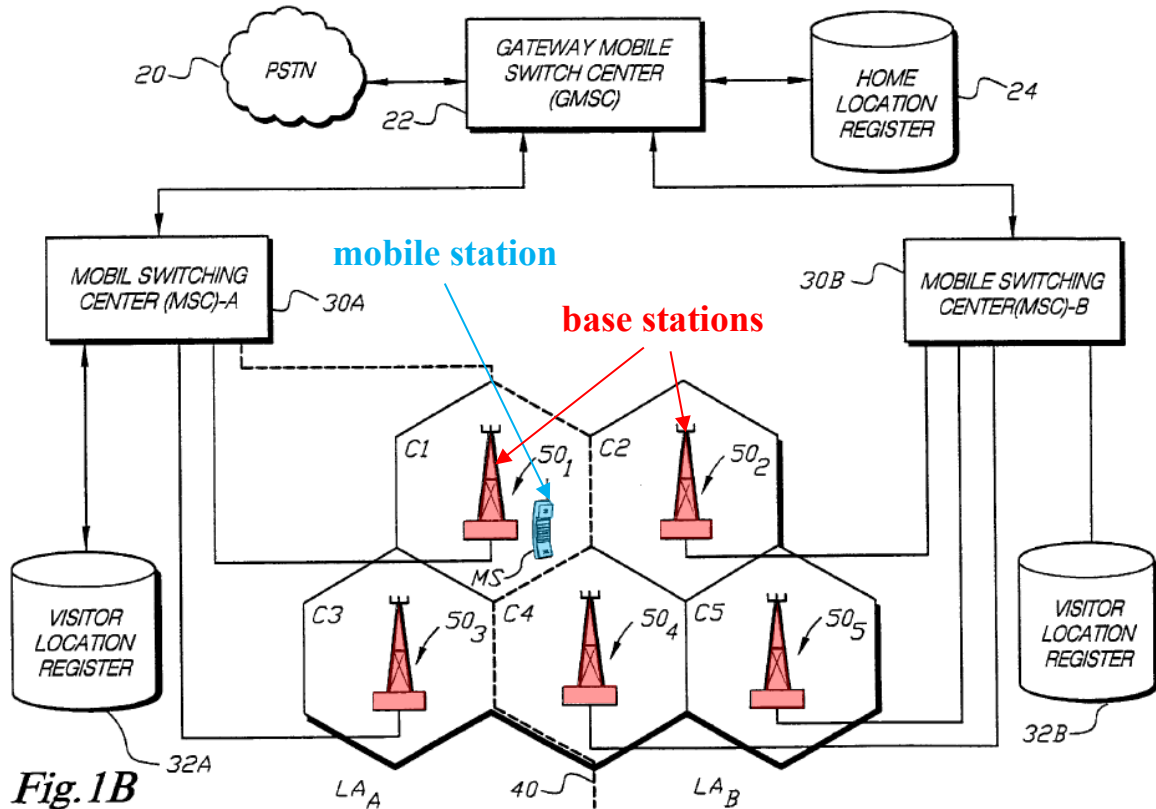


Fig. 1B

Andersson, Fig. 1B (annotated)

178. Multiple areas of interest may be defined. For example, as shown in Figure 1C below, the mobile station may only place calls in cells C1 and C2 (shown in red) and may only receive calls in cells C1 and C3 (shown in blue). Andersson, 7:63-8:1. Andersson refers to this restriction as a “hard restriction.” Andersson, 6:63-7:7. Andersson also describes a “soft restriction” in which different tariffs rates are applied to the mobile station in preconfigured areas. Andersson, 8:52-67.

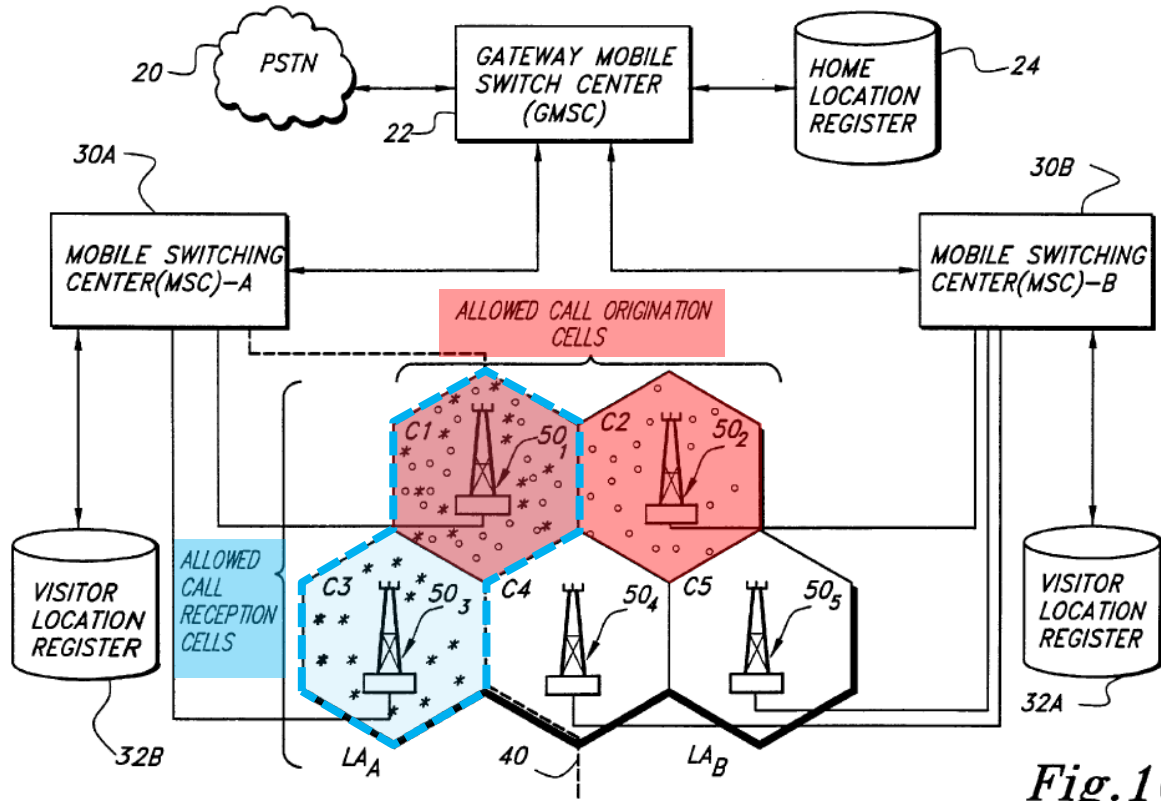


Fig. 1C

Andersson, Fig. 1C (annotated)

**B. Reasons to Combine Andersson with Kraufvelin and Hashimoto**

179. It is my opinion that a POSITA would have been motivated to combine the teachings of Andersson with Kraufvelin and Hashimoto. As explained above, in the combination of Kraufvelin and Hashimoto, the mobile station receives a list of cell IDs corresponding to an area of interest 5 and determines its location within the area of interest 5 by comparing a newly received cell ID to the stored list. Kraufvelin, [0079]-[0080]. Combined with Andersson's teachings, the mobile station stores lists of cell IDs corresponding to multiple areas of interest, i.e., an "Allowed Cells List #1" and an "Allowed Cells List #2." Andersson, Fig. 2B. In the combination,

multiple areas of interest are defined such that a mobile station may determine its presence in any or all of the areas of interest. Andersson, Fig. 1C, 7:63-8:1 (describing “a first set of cells (e.g., cell C1 and C2, as in Fig. 1A), and “a second set of cells (e.g., cells C1 and C3)”).

**1. Andersson is analogous art to the '910 patent.**

**180.** As a threshold matter, Andersson is analogous to the '910 patent. Like the '910 patent, Andersson is in the same field of endeavor because it related to providing location-based services to a mobile station. Andersson describes monitoring a mobile station's location within multiple areas of interest and providing location-based services and/or reduced tariffs. Andersson, Figs. 2A-2D, 8:52-67; Ex.1001, Abstract, 6:56-65.

**181.** Additionally, Andersson is reasonably pertinent to a particular problem with which the inventor of the '910 patent was involved (i.e., monitoring the location of a wireless device and providing location-based services). Andersson offers solutions for monitoring the location of a mobile station relative to multiple areas of interest. Andersson, Figs. 1C, 2B-2D (illustrating multiple allowed cells lists), 6:54-59, 7:24-29. Accordingly, Andersson is analogous art.

**2. A POSITA would have been motivated to combine the teachings of Andersson with the teachings of Kraufvelin and Hashimoto.**

**182.** A POSITA would have been motivated to implement functionality in the mobile station to store the information of multiple areas of interest, based on the teachings of Andersson. Kraufvelin, [0056]-[0060]; Andersson, Figs. 1C, 2B-2D (illustrating multiple allowed cells lists), 6:54-59, 7:24-29. A POSITA would have recognized that doing so would provide greater flexibility to a client, such as Kraufvelin's LCS client 8, in specifying what location information it should receive regarding the presence of the mobile station. For example, it was well known that the client may offer different services based on the location of the mobile station in different special areas. Kraufvelin, [0012]. In addition, it was also well known that multiple different clients may request to monitor the location of a mobile station in different special areas and implementing Andersson's teachings would provide this added functionality. Kraufvelin, [0012], [0046] (describing "different applications or clients 8"); Andersson, Figs. 1C, 2B-2D, 6:54-59, 7:24-29. Further, it was known that multiple special areas would be designated for a mobile station, such that some services are available to a mobile station in one area while other services are available to a mobile station in another area. *See* Andersson, Figs. 1C, 2B-2D, 6:54-59, 7:24-29.

**183.** In addition, a POSITA would have recognized that this combination represents a simple combination of prior art elements, including multiple lists of allowed cells corresponding to different areas of interest, as described by Andersson, according to known methods to yield predictable results, including monitoring the presence of a mobile station in multiple areas of interest.

**184.** A POSITA would have had a reasonable expectation of success in making such a combination because both Kraufvelin and Andersson describe monitoring the presence of mobile stations in areas of interest based on comparing cell IDs to stored lists. Kraufvelin, [0056]-[0060], [0079]-[0080]; Andersson, 6:1-7. Indeed, a POSITA would have recognized that the combination of Andersson with Kraufvelin and Hashimoto was nothing more than the predictable use of prior art elements according to their established functions.

### **C. Detailed Analysis of Claims**

#### **1. Claim 9**

- a. ***[9.0] A method associated with a mobile station receiving first and second distinctive defining signals respectively from first and second radio communication defining devices, the first and second distinctive defining signals at least partly define first and second special areas, respectively, by their coverage, each of the first and second distinctive defining signals respectively including first and second data, the method comprising:***

**185.** As explained at limitation [1.0], the combination of Kraufvelin and Hashimoto renders obvious *[a] method associated with a mobile station. See*

limitation [1.0]; Kraufvelin, [0029] (“a system and **method.**”). The analysis presented at limitation [1.0] is incorporated by reference as analysis for limitation [9.0]. Kraufvelin in combination with Hashimoto explains that the mobile station *receiv[es] first and second distinctive defining signals* (signal transmitted by the base station of cell 20 and signal transmitted by the base station of cell 22). *See* limitation [1.0]; Kraufvelin, [0056]-[0060]; Hashimoto, [0135] (“periodically transmit”). As explained at limitation [1.0], the signals transmitted by the base stations of cells 20 and 22 *at least partly define [a] special area[]...by their coverage*. *See* limitation [1.0]; Kraufvelin, [0016], [0048]-[0049], [0055]. The combination of Kraufvelin, Hashimoto, and Andersson renders obvious *each of the first and second distinctive defining signals respectively including first and second data* (cell ID of cell 20 and cell ID of cell 22). *See* limitation [1.0]; Kraufvelin, [0009], [0056], [0060].

**186.** Monitoring a mobile station in more than one area of interest (i.e., *first and second special areas*) was well known, as taught by Andersson. Andersson’s system monitors the location of the mobile station relative to two different areas of interest, “a first set of cells (e.g., cell C1 and C2, as in Fig. 1A), and “a second set of cells (e.g., cells C1 and C3).” Andersson, 7:63-8:1. Cells C1 and C2 (shown in red) below, include “a first set of cells” (*first...special area[]*) in which the mobile station may originate calls. Andersson, 7:63-8:1. Cells C1 and C3 (shown in blue) form “a

second set of cells” (*second special area[]*) in which the mobile station may receive calls. Andersson, 7:63-8:1.

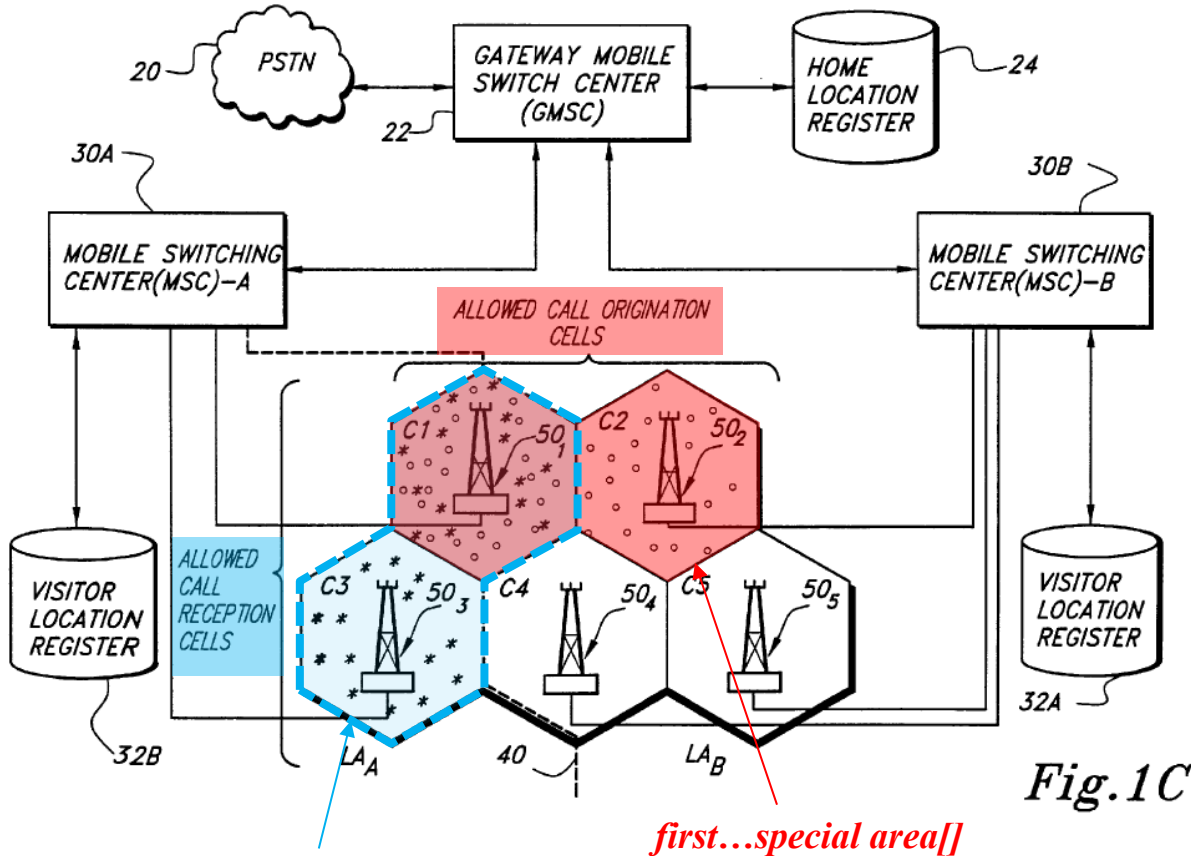


Fig.1C

*second special area[]*

*first...special area[]*

Andersson, Fig. 1C (annotated)

FIG. 1C depicts a particular embodiment of the invention in which a differing geographical restriction is imposed for call origination and call reception. According to the subscription agreement for the mobile subscriber of FIG. 1C, mobile station MS can originate calls in a first set of cells (e.g., cell C1 and C2, as in FIG. 1A), but can only receive incoming calls while in a second set of cells (e.g., cells C1 and C3). In FIG. 1C, the first set of cells is

indicated by dotted stippling, while the second set of cells is depicted by starred stippling. Since cell C1 is common to both sets of cells, cell C1 is both types of stippling.

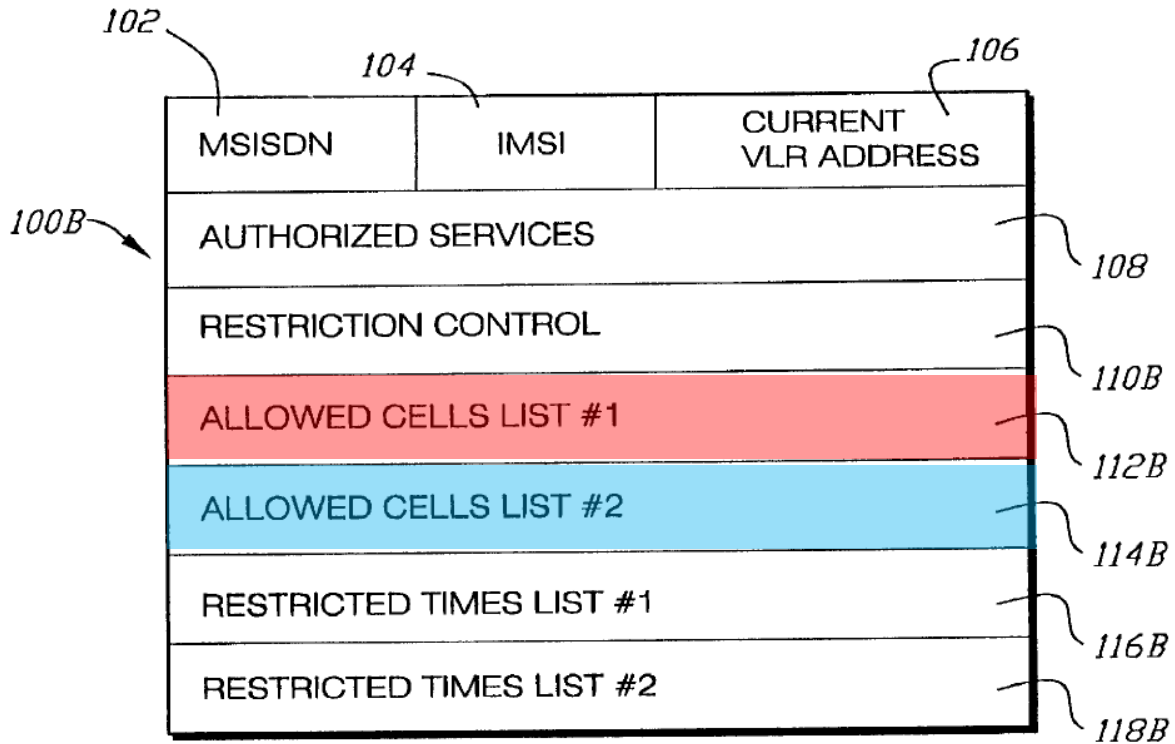
Andersson, 7:63-8:1.

**187.** Like Kraufvelin, the location of Andersson's mobile station is monitored based on cell identifiers sent from base stations within the special areas.

In cell C2, mobile station MS detects the location area identity (LAI) which is continuously transmitted by base station 502 over the air interface. Upon detecting a change in the location area identity (LAI), mobile station MS sends a location update request over the appropriate radio channel to base station 502.

Andersson, 6:1-7.

**188.** The new cell ID is checked against both the "allowed cells list #1" (*first...special area[]*) and the "allowed cells list #2" (*second special area[]*). Andersson, 6:54-59 ("check[ing]" the location of the mobile station "in an allowed cell"), 7:24-29. The allowed cells lists #1 and #2 are illustrated below.



**Fig. 2B**

**Andersson, Fig. 2B (annotated)**

189. Based on Andersson, it would have been obvious that the base stations of cells C1 and C2 (*first...special area[]*) transmit a *first...distinctive defining signal* including identification numbers of the cells C1 and C2, defining a first special area and the base stations of cells C1 and C3 (*second special area[]*) transmit a *second distinctive defining signal* including identification numbers of the cells C1 and C3, defining a second special area. Andersson, 4:18-25, 4:44-47, 6:1-7.

190. Thus, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious [*a*] *method* (“method,” Kraufvelin, [0029]) *associated with a mobile station* (providing services to a mobile station 1) *receiving first and second*

*distinctive defining signals respectively from first and second radio communication defining devices (signals transmitted by base stations of cells C1 and C2 and cells C1 and C3, respectively), the first and second distinctive defining signals at least partly define first (cells C1 and C2) and second special areas (cells C1 and C3), respectively, by their coverage, each of the first and second distinctive defining signals respectively including first (cell IDs of cells C1 and C2) and second data (cell IDs of cells C1 and C3).*

- b. [9.1] *receiving and processing one or more defining signals in the mobile station to determine, based on a previously obtained at least portion of the first data, whether the one or more defining signals are one or more first distinctive defining signals and to determine whether or not the mobile station is present in the first special area,***

**191.** As explained at limitation [1.1], the mobile station described by Kraufvelin includes a “monitoring entity (ME)” that “check[s] the details of the new serving cell” and includes “area event monitoring functionality.” Kraufvelin, [0079]. In the combination, the “details of the new serving cell” include the Cell ID, is periodically transmitted. Hashimoto, [0135]. The analysis presented at limitation [1.1] is incorporated by reference as analysis for limitation [9.1].

**192.** When the mobile station receives the list of Cell IDs, it sends an acknowledgment indicating that it is “**waiting for a trigger event.**” Kraufvelin,

[0076], claims 1-2 (“activating monitoring”). This acknowledgment is illustrated at step 12 below, with step 11 illustrating mobile station monitoring:

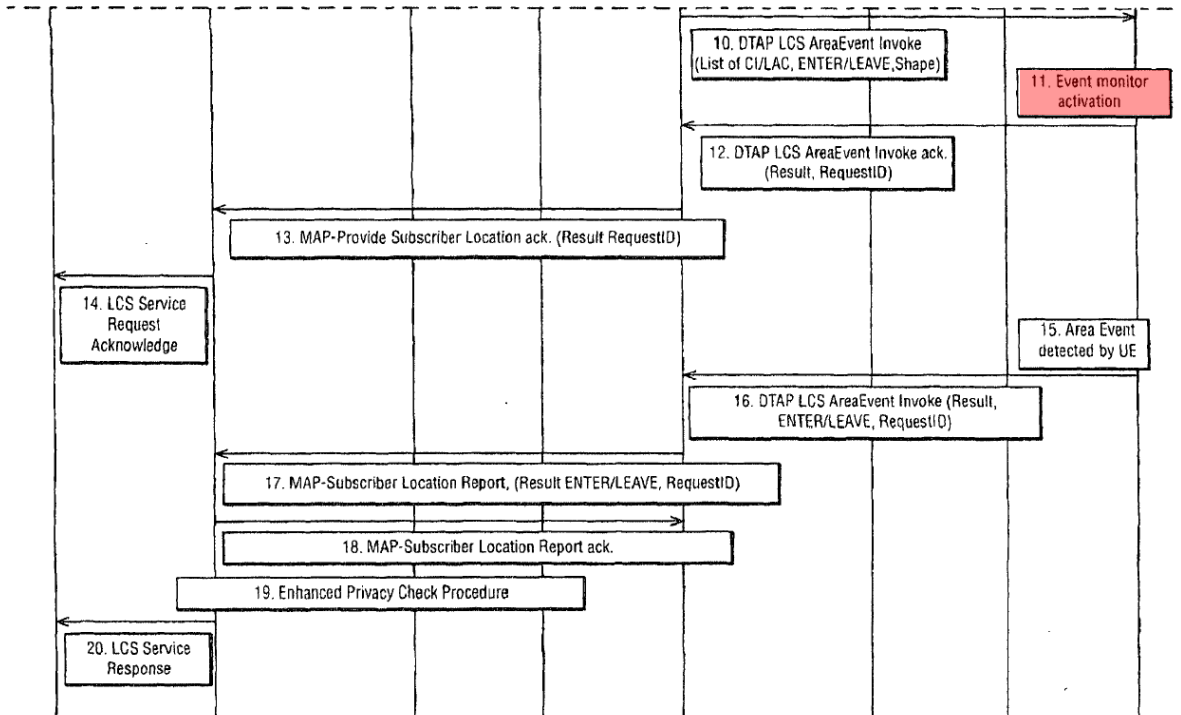


Fig. 4 (Contd.)

**Kraufvelin, Fig. 4 (annotated)**

193. When the mobile station enters a new cell, it receives the cell ID. Kraufvelin, [0079]; Hashimoto, [0135]. The cell ID transmitted by each base station within the cell is a *defining signal* because it defines the area of coverage of the cell. See limitation [1.0].

194. Kraufvelin describes receiving a cell ID and comparing it to the stored list of cell IDs (*receiving and processing one or more defining signals in the mobile station*). Kraufvelin, [0079]. Because the stored list of cell IDs is received by the

mobile station is made before the comparison is performed (Kraufvelin, Fig. 4 (steps 1-11, sending list of cell IDs to mobile station, performed before step 15, detecting entrance to area of interest 5) this comparison is *based on a previously obtained at least portion of the first data*. By this comparison, Kraufvelin's mobile station determines whether the received cell ID (*whether the one or more defining signals*) is one of the cell IDs in the stored list (*are one or more first distinctive defining signals*). Kraufvelin, [0079]-[0080]. In the example provided at limitation [1.1], the cell ID of the cell 20 corresponds to a *first...distinctive defining signal*. See limitation [1.1]. This step is performed *based on a previously obtained at least portion of the first data*. See limitation [1.2]; Kraufvelin, Fig. 4. Therefore, when the mobile station enters cell 20, the mobile station finds a match in the prestored list of cell IDs and determines that the mobile station is "ENTERing" the area of interest 5. Kraufvelin, [0079]-[0080]. In the combination with Andersson, when the mobile station enters either cell C1 or C2, it compares the ID received to the Allowed Cells Lists #1 and #2. Andersson, Fig. 2B. If the mobile station entered cell C2, it determines that it has entered the "first set of cells" (*first...special area[]*) because cell C2 is included in the Allowed Cells List #1.

**195.** Thus, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious *receiving and processing one or more defining signals in the mobile station* (mobile station receives signal from base stations within cells C1 and/or C2)

*to determine, based on a previously obtained at least portion of the first data, whether the one or more defining signals are one or more first distinctive defining signals (checks for a match between received cell ID with the cell IDs of Allowed Cells List #1) and to determine whether or not the mobile station is present in the first special area (determining that mobile station is within first set of cells if there is a match between received cell ID and Allowed Cells List #1).*

- c. ***[9.2] receiving and processing one or more defining signals in the mobile station to determine, based on a previously obtained at least portion of the second data, whether the one or more defining signals are one or more second distinctive defining signals and to determine whether or not the mobile station is present in the second special area,***

**196.** Limitation [9.2] is identical to limitation [9.1], simply applying the same steps described at limitation [9.1] to *the second special area*. Ex.1065, 3. Limitation [9.2] is, therefore, rendered obvious by the same analysis presented at limitation [9.1], as well as the analysis below. The analysis presented at limitation [9.1] is incorporated by reference as analysis for limitation [9.2]. As explained at limitation [9.0], the combination of Kraufvelin, Hashimoto, and Andersson renders obvious multiple special areas, including a “first set of cells” and a “second set of cells.” Andersson, 7:63-8:1.

**197.** The same process is performed relative to the second special area. When the mobile station enters either cell C1 or C3, the mobile station compares the

ID received to the Allowed Cells Lists #1 and #2. Andersson, Fig. 2B. If the mobile station entered cell C3, it determines that it has entered the “second set of cells” (*second special area*[]) because cell C3 is included in the Allowed Cells List #2.

- d. [9.3] *sending from the mobile station via a mobile telephone network, when the mobile station determination refers to the first special area, a first updating signal to one or more servers of a first provider of presence related services about the mobile station’s presence in the first special area,*

198. Limitation [9.3] is identical to limitation [1.3], except limitation [9.3] additionally recites *a first updating signal, a first provider of presence related services, and the first special area*. Ex.1065, 2-3. The analysis presented at limitation [1.3] is incorporated by reference as analysis for limitation [9.3]. As explained at limitation [9.0] above, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious multiple special areas, including a “first set of cells” and a “second set of cells” and the techniques described by Kraufvelin relative to one special area are equally and predictably applied to additional special areas. Andersson, 7:63-8:1.

- e. [9.4] *the sending of the first updating signal being uncorrelated to any mobile station phone call establishment, the updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the first special area, and (iii) when the mobile station remains in the first special area; and*

199. Limitation [9.4] is identical to limitations [1.4] and [1.5], except limitation [9.4] additionally recites *the first updating signal, and the first special*

*area*. Ex.1065, 2-3. The analysis presented at limitations [1.4] and [1.5] is incorporated by reference as analysis for limitation [9.4]. As explained at limitation [9.0] above, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious multiple special areas, including a “first set of cells” and a “second set of cells” and the techniques described by Kraufvelin relative to one special area are equally and predictably applied to additional special areas. Andersson, 7:63-8:1.

- f. **[9.5] *sending from the mobile station via a mobile telephone network, when the mobile station determination refers to the second special area, a second updating signal to one or more servers of a second provider of presence related services, different than the first provider of presence related services, about the mobile station’s presence in the second special area,***

**200.** Limitation [9.5] is identical to limitation [1.3] and limitation [9.3], except limitation [9.5] recites *a second updating signal, a second provider of presence related services, different than the first provider of presence related services, and the second special area*. Ex.1065, 2-4. The analysis presented at limitation [1.3] is incorporated by reference as analysis for limitation [9.5]. As explained at limitation [9.0] above, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious multiple special areas, including a “first set of cells” and a “second set of cells” and the techniques described by Kraufvelin relative to one special area are equally and predictably applied to additional special areas. Andersson, 7:63-8:1.

**201.** The combination of Kraufvelin, Hashimoto, and Andersson also renders obvious *the second provider of presence related services* may be ***different than the first provider of presence related services***. Specifically, Kraufvelin explains that the “location services (LCS) node 12” may “provid[e] location services for **different** applications or **clients 8**.” Kraufvelin, [0046].

FIG. 1 also shows a location services (LCS) node 12 providing location services for different applications or clients 8.

Kraufvelin, [0046].

**202.** In the combination, the different special areas described by Andersson (first set of cells and second set of cells) correspond to areas of interest specified by different clients providing different location-specific services to a mobile station. Kraufvelin, [0012] (“[d]ifferent kinds of services are possible” including “various commercial and non-commercial services”).

- g.** [9.6] *the sending of the updating signal being uncorrelated to any mobile station phone call establishment, the second updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the second special area, and (iii) when the mobile station remains in the second special area.*

**203.** Limitation [9.6] is identical to limitations [1.4] and [1.5] and limitation [9.4], except limitation [9.4] additionally recites *the second updating signal*, and *the second special area*. Ex.1065, 2-4. The analysis presented at limitations [1.4] and

[1.5] is incorporated by reference as analysis for limitation [9.6]. As explained at limitation [9.0] above, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious multiple special areas, including a “first set of cells” and a “second set of cells” and the techniques described by Kraufvelin relative to one special area are equally and predictably applied to additional special areas. Andersson, 7:63-8:1.

**2. Claim 10**

- a. **[10.0]** *The method according to claim 9, wherein the first updating signal is sent with information related to the result of a previous determination performed by the mobile station about the mobile station’s presence in the first special area.*

**204.** Claim 10 is substantially similar to claim 2, except claim 10 additionally recites *the first updating signal* and *the first special area*. Ex.1065, 2, 4. The analysis presented at claim 2 is incorporated by reference as analysis for claim 10. As explained at claim 2, Kraufvelin’s mobile station determines that it is within a special area by comparing a received cell ID to the stored list and that the result of that determination is included as contents of the “DTAP LCS-AreaEventReport.” See claim 2; limitation [1.2]; Kraufvelin, [0079]-[0080], [0082]. This report indicating the mobile station’s presence in a special area is sent after the determination is performed. See claim 2; Kraufvelin, Fig. 4 (steps 15 and 16).

**205.** In addition, as explained at claim 9 above, the combination of Kraufvelin, Hashimoto, and Andersson explains that a mobile station may determine

its location in one or multiple special areas, including a “first set of cells” and a “second set of cells” and the techniques performed relative to one special area are equally and predictably applied to additional special areas. Andersson, 7:63-8:1

**3. Claim 11**

- a. **[11.0]** *The method according to claim 9, wherein the second updating signal is sent with information related to the result of a previous determination performed by the mobile station about the mobile station’s presence in the second special area.*

206. Claim 11 is similar to claims 2 and 10, except claim 11 recites *the second updating signal* and *the second special area*. Ex.1065, 2, 4. The analysis presented at claim 2 is incorporated by reference as analysis for claim 11. Claim 11 is rendered obvious by the analysis presented at claims 2 and 10 for the same reasons. The combination of Kraufvelin, Hashimoto, and Andersson explains that a mobile station may determine its location in one or multiple special areas, including a “first set of cells” and a “second set of cells” and the techniques described relative to one special area are equally and predictably applied to additional special areas. Andersson, 7:63-8:1.

**4. Claim 12**

- a. **[12.0]** *A non-transitory computer readable medium storing computer readable program code for causing a processor of a mobile station to perform a method associated with the mobile station receiving first and second distinctive defining signals that at least partly define first and second special areas, respectively, by their coverage, each of the first and second distinctive*

***defining signal respectively including first and second data, the method comprising:***

**207. First**, as explained at limitation [5.0] above, the combination renders obvious *[a] non-transitory computer readable medium storing computer readable program code for causing a processor of a mobile station to perform a method. See limitation [5.0]; Ex.1065, 1, 3.*

**208. Second**, as explained at limitation [9.0] above, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious *a method associated with the mobile station receiving first and second distinctive defining signals that at least partly define first and second special areas, respectively, by their coverage, each of the first and second distinctive defining signal respectively including first and second data. See limitation [9.0].*

**209.** The analysis presented at claims 5 and 9 is incorporated by reference as analysis for limitation [12.0].

- b. [12.1] *receiving and processing one or more defining signals in the mobile station to determine, based on a previously obtained at least portion of the first data, whether the one or more defining signals are one or more first distinctive defining signals and to determine whether or not the mobile station is present in the first special area,***

**210.** Limitation [12.1] is identical to limitation [9.1]. Ex.1065, 3. The analysis presented at limitation [9.1] is incorporated by reference as analysis for

limitation [12.1]. The combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for at least the same reasons described at limitation [9.1].

- c. ***[12.2] receiving and processing one or more defining signals in the mobile station to determine, based on a previously obtained at least portion of the second data, whether the one or more defining signals are one or more second distinctive defining signals and to determine whether or not the mobile station is present in the second special area,***

**211.** Limitation [12.2] is identical to limitation [9.2]. Ex.1065, 3. The analysis presented at limitation [9.2] is incorporated by reference as analysis for limitation [12.2]. The combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for at least the same reasons described at limitation [9.2].

- d. ***[12.3] sending from the mobile station via a mobile telephone network, when the mobile station determination refers to the first special area, a first updating signal to one or more servers of a first provider of presence related services about the mobile station's presence in the first special area,***

**212.** Limitation [12.3] is identical to limitation [9.3]. Ex.1065, 3. The analysis presented at limitation [9.3] is incorporated by reference as analysis for limitation [12.3]. The combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for at least the same reasons described at limitation [9.3].

- e. ***[12.4] the sending of the first updating signal being uncorrelated to any mobile station phone call establishment, the updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the first special area,***

*and (iii) when the mobile station remains in the first special area; and*

**213.** Limitation [12.4] is identical to limitation [9.4]. Ex.1065, 3. The analysis presented at limitation [9.4] is incorporated by reference as analysis for limitation [12.4]. The combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for at least the same reasons described at limitation [9.4].

f. [12.5] *sending from the mobile station via a mobile telephone network, when the mobile station determination refers to the second special area, a second updating signal to one or more servers of a second provider of presence related services, different than the first provider of presence related services, about the mobile station's presence in the second special area,*

**214.** Limitation [12.5] is identical to limitation [9.5]. Ex.1065, 3. The analysis presented at limitation [9.5] is incorporated by reference as analysis for limitation [12.5]. The combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for at least the same reasons described at limitation [9.5].

g. [12.6] *the sending of the updating signal being uncorrelated to any mobile station phone call establishment, the second updating signal being sent at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exists from the second special area, and (iii) when the mobile station remains in the second special area.*

**215.** Limitation [12.6] is identical to limitation [9.6]. Ex.1065, 3. The analysis presented at limitation [9.6] is incorporated by reference as analysis for

limitation [12.6]. The combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for at least the same reasons described at limitation [9.6].

**5. Claim 13**

- a. **[13.0]** *The non-transitory computer readable medium storing computer readable program code according to claim 12 that further causes the processor to send the first updating signal with information related to the result of a previous determination performed by the mobile station about the mobile station's presence in the first special area.*

**216.** Claim 13 is substantially similar to claim 10. Ex.1065, 4. The analysis presented at claim 10 is incorporated by reference as analysis for claim 13. As explained at limitation [12.0] above, the combination renders obvious *[a] non-transitory computer readable medium storing computer readable program code. See* limitation [12.0]. The remaining language of claim 13 is substantially similar to claim 10 and the combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for the same reasons described at claim 10.

**6. Claim 14**

- a. **[14.0]** *The non-transitory computer readable medium storing computer readable program code according to claim 12 that further causes the processor to send the second updating signal with information related to the result of a previous determination performed by the mobile station about the mobile station's presence in the second special area.*

**217.** Claim 14 is substantially similar to claim 11. Ex.1065, 4. The analysis presented at claim 11 is incorporated by reference as analysis for claim 14. As

explained at limitation [12.0] above, the combination of Kraufvelin, Hashimoto, and Andersson renders obvious *[a] non-transitory computer readable medium storing computer readable program code*. See limitation [12.0]. The remaining language of claim 14 is substantially similar to claim 11 and the combination of Kraufvelin, Hashimoto, and Andersson renders it obvious for the same reasons described at claim 11.

**XII. CONCLUSION**

219. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and that these statements were made with 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: 9/9/25

  
\_\_\_\_\_  
R. Michael Buehrer, Ph.D.