UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner

IPR2025-01262
U.S. Patent No. 9,485,621

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. 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. 9,485,621 ("the '621 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 1-18 ("the Challenged Claims") of the '621 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 preparing this declaration, I have studied:

- Ex.1001: U.S. Patent No. 9,485,621 ("the '621 patent")
- Ex.1002: Prosecution History of the '621 patent
- Ex.1005: U.S. Patent No. 8,615,256 ("Putkiranta")
- Ex.1006: U.S. Pub. No. 2006/0135174 ("Kraufvelin")
- Ex.1011: U.S. Patent No. 6,628,938 ("Rachabathuni")

- Ex.1037: U.S. Patent No. 6,122,510 ("Granberg")

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:

- Ex.1018: 3GPP TS 23.171, version 3.10.0 (Jun. 2003)
- Ex.1019: 3GPP TS 23.171, version 1.0.0 (Oct. 1999)
- Ex.1021: 3GPP TS 23.032, version 3.0.0 (May 1999)
- Ex.1039: U.S. Patent No. 6,345,294 ("O'Toole")
- Ex.1040: U.S. Pub. No. 2003/0105822 ("Gusler")
- Ex.1041: U.S. Pub. No. 2003/0167172 ("Johnson")
- Ex.1042: U.S. Pub. No. 2002/0126691 ("Strong")
- Ex.1064: Redline Chart Comparing Claim Sets of '621 Patent
- Ex.1071: U.S. Pub. No. 2004/0037255 ("Joong")
- Ex.1073: U.S. Patent No. 5,978,817 ("Giannandrea")
- Ex.1074: U.S. Pub. No. 2004/0010540 ("Puri")

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 Ellersick 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 ’621 patent, and relevant excerpts of the prosecution history of the ’621 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 ’621 patent (which I further describe below).

III. LEVEL OF ORDINARY SKILL IN THE ART

24. In my opinion, a POSITA as of the earliest possible priority date of the ’621 patent (March 28, 2006) would have been knowledgeable and familiar with the use of location determination 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 had 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. Lack of professional experience may be remedied by additional education, and vice versa.

IV. RELEVANT LEGAL STANDARDS

25. I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the '621 patent, I am relying on certain basic legal principles that Apple's counsel has explained to me.

26. I understand that prior art to the '621 patent includes patents and printed publications in the relevant art that predate the priority date of the '621 patent. For purposes of this Declaration, I am applying March 28, 2006, as the priority date of the '621 patent.

27. 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.

28. 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

29. 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. Putkiranta (Ex.1005), 5:65-6:3. The signal includes a unique identifier for the particular base station to allow mobile devices to identify that base station. 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. Putkiranta, 4:60-5:8; Kraufvelin (Ex.1006), [0056], [0060]. 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). 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. Putkiranta, 6:13-52.

30. 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* Ex.1019 (3GPP specification for "location services in UMTS," dated October 1999); Ex.1021 (3GPP specification for a system for "coding of locations," dated May

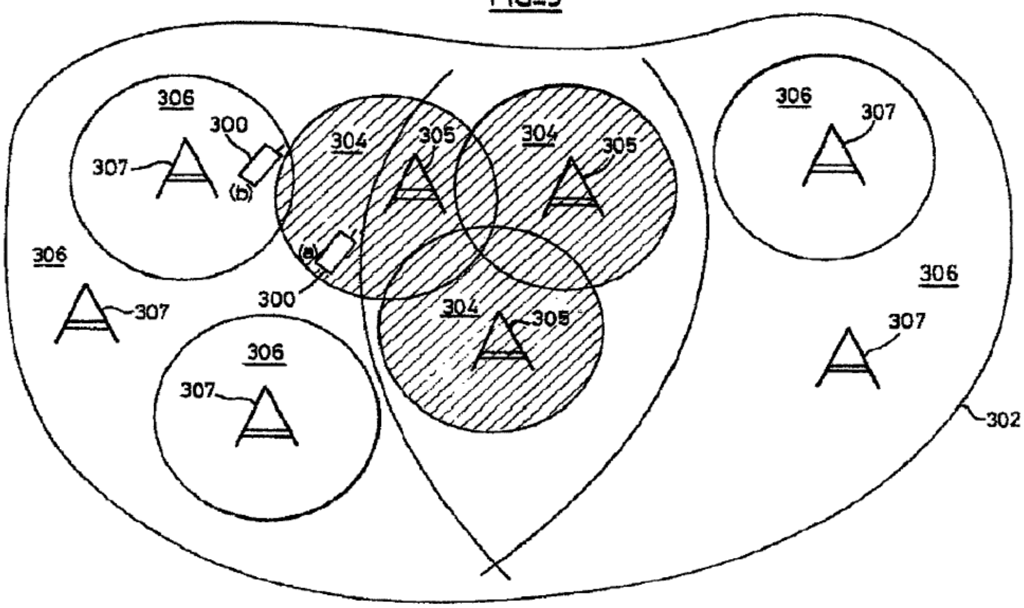
1999). As described herein, the ’621 patent simply rehashes “location services” techniques that were well-known—and some that were even standardized—well before its earliest possible priority date (March 28, 2006).

VI. OVERVIEW OF THE ’621 PATENT

31. The ’621 patent is generally directed to techniques for “monitoring the presence of a mobile station in at least one special area,” which the patent describes simply as a particular physical area in which the mobile station’s presence is configured to be monitored. Ex.1001, Abstract. The patent describes that a mobile station may receive “defining signals” from “radio communication defining devices” such as “the base stations of a mobile telephone network[.]” Ex.1001, 15:27-32. The defining signal includes, for example, an identifier of the particular base station that enables a determination whether the mobile station is present in a “special area” configured by the operator of the network (*e.g.*, an area including the coverage area of a particular set of base stations). Ex.1001, 15:59-16:3. In response to receiving the defining signal, “the mobile station sends an updating signal to the mobile telephone network.” Ex.1001, 16:14-16. Based on this updating signal, components in the mobile telephone network (*e.g.*, a server) can determine the approximate location of the mobile station (*e.g.*, based on the known location of the base station) and whether the mobile station is present in the configured special area (*e.g.*, based on whether the base station is included in the special area). Ex.1001, 16:14-16:59.

32. FIG. 3 of the ’621 patent illustrates a special area (304) comprising the coverage areas of three base stations (305), and a mobile station (300) present in the special area (304):

FIG_3



’621 patent, FIG. 3

VII. CLAIM CONSTRUCTION

33. It is my understanding that in order to properly evaluate the ’621 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 '621 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

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

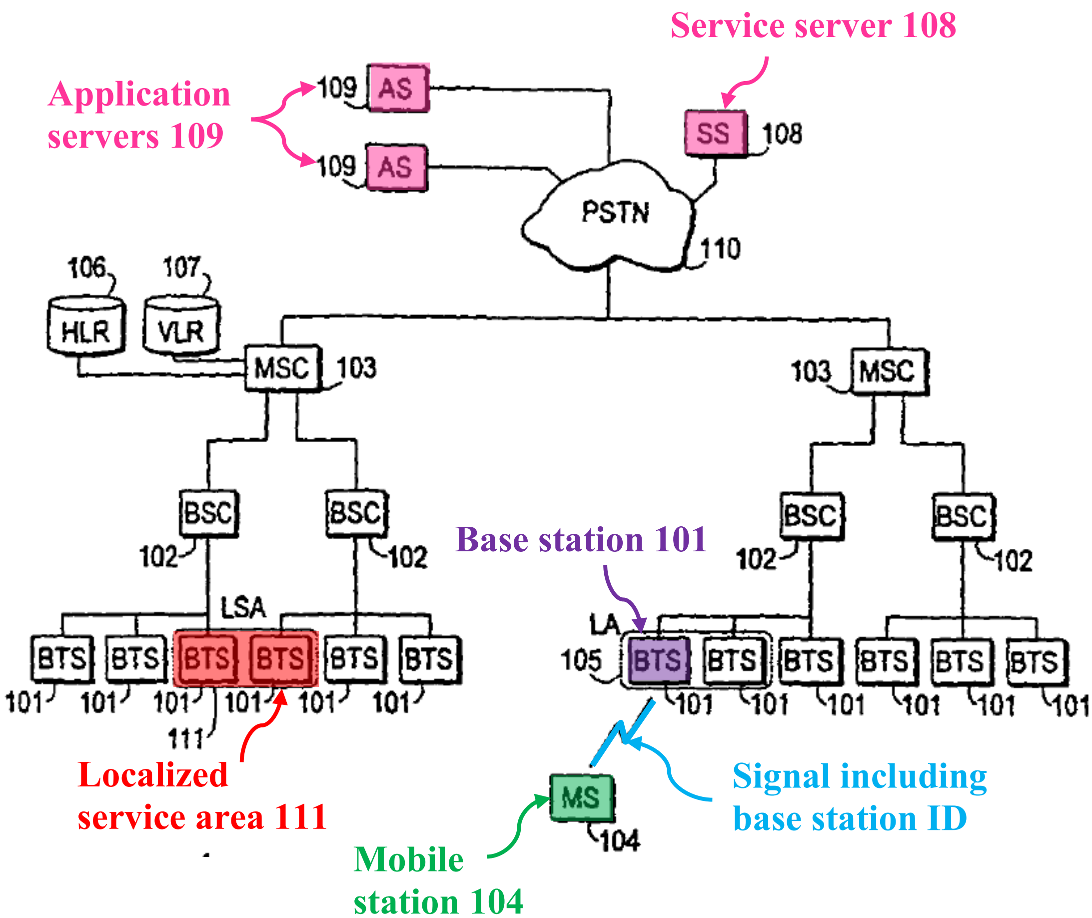
35. As part of my analysis, I have considered, and discuss in detail, the scope and content of the prior art and any differences between the alleged invention and the prior art.

36. 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 '621 patent.

A. Ground 1: Claims 1, 4-10, and 13-18 are obvious over Putkiranta and Kraufvelin

1. Summary of Putkiranta

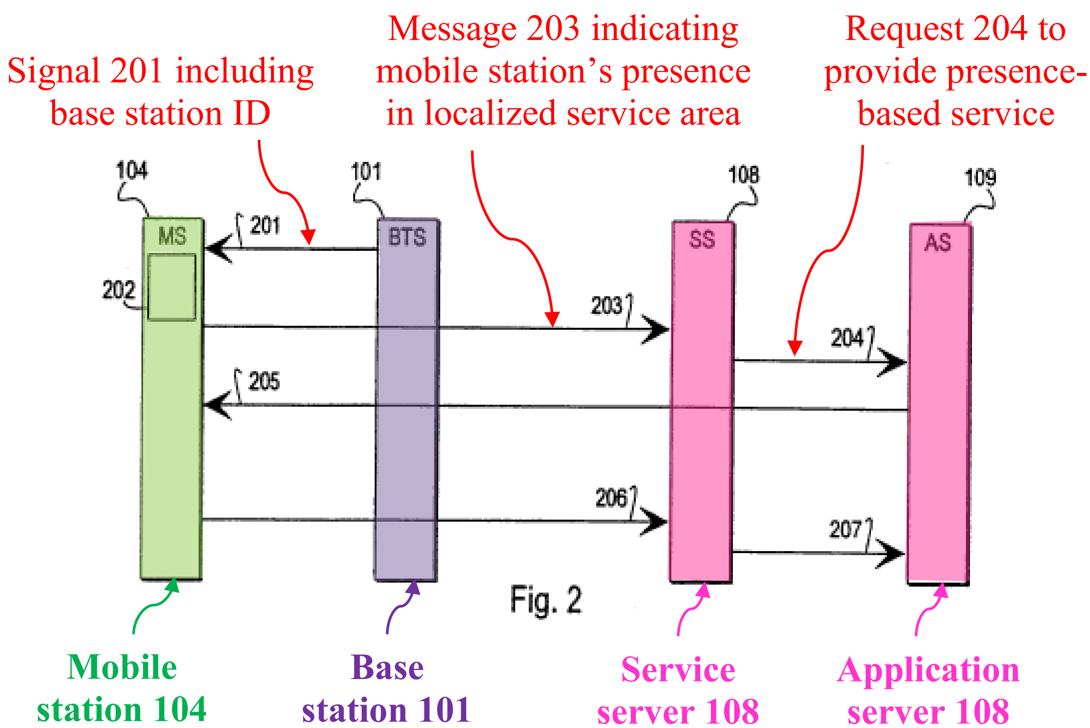
37. Putkiranta describes "a method and system for making services provided by a network available to the user in various ways depending on the location of the user[.]" Putkiranta, 2:9-12. Putkiranta's FIG. 1 below shows a "cellular radio system" used to practice the method:



Putkiranta, Detail of FIG. 1 (annotated)

38. Putkiranta describes a "localized service area" (*e.g.*, 111) as a geographic area in which certain services may be provided to mobile stations (MS) 104 currently located in that area. Putkiranta, 3:8-15. The localized service area may be defined as the geographic area covered by a set of base stations (BTS) 101 (*e.g.*, a set of "cells"). Putkiranta, 4:35-51.

39. As shown in Putkiranta's FIG. 2 below, when a mobile station receives a signal (201) from a base station including its base station identifier (indicating the mobile station is located within the base station's coverage area), the mobile station determines (202), based on a stored "list of the identifiers of the base transceiver stations the cells of which make a particular localized service area," whether the base station is part of a localized service area. Putkiranta, 5:3-8, 6:3-6. If so, the mobile station sends a message (203) to the service server (108 in FIG. 1 above) indicating that it has "arrived in a certain localized service area." Putkiranta, 6:3-12. Upon receipt of this message, "the service server reads from its memory which services should be offered to the mobile station in that localized service area and sends a service request 204 to the appropriate application server" (AS 109 in FIG. 1 above). Putkiranta, 6:27-30. In response to the service request, at 205, "the application server provides the mobile station with a service," such as, for example, "call pricing or prioritization," "routing of incoming email messages to a mobile station instead of the user's desktop workstation," or "activation or inactivation of automatic call transfer and/or voice mail service." Putkiranta, 6:38-52. Putkiranta's FIG. 2 shows this process:



Putkiranta, Fig. 2 (annotated)

2. Summary of Kraufvelin

40. Kraufvelin describes a method and system similar to Putkiranta's, in which a mobile station notifies the network when it is within the coverage area of a base station (*e.g.*, when the mobile station receives a signal including the base station's identifier) included within an "area of interest" (similar to Putkiranta's "localized service area"). Kraufvelin, Abstract, [0060]. Kraufvelin further describes the network performing a "verification" or "sanity check" of the notification from the mobile station to verify that the "cell-ID" (identifier of the base station) in the notification is still configured to be within the "area of interest." Kraufvelin, [0107]-[0109]. Kraufvelin teaches that this "sanity check" ensures that changes to the list of base stations included in an "area of interest" that have not been synchronized from the network to the mobile station do not lead to erroneous determinations of mobile station presence. Kraufvelin, [0107]-[0109].

41. Kraufvelin further explains that, because "operators tune their networks," "a cell-ID may no longer correspond with the intended geographic area" set by the service provider. Kraufvelin, [0108]. Thus, Kraufvelin describes verifying the cell-ID returned by the mobile station "to ensure that the cell is still within the intended geographical area…by comparing the current cell-IDs of the intended geographical area stored in the network with the cell-ID returned response from the terminal." Kraufvelin, [0109]. If the cell-ID does not match the intended geographical area, then "updated cell-ID information may be provided to the [mobile] terminal." Kraufvelin, [0111].

3. The combination of Putkiranta and Kraufvelin

42. In the combination, Putkiranta's service server 108 implements functionality based on Kraufvelin's location "sanity check" feature, by deriving from the location notification received from the mobile station whether or not the mobile station is present in the localized service area by "comparing the current cell-IDs of the" localized service area "stored in the network with the cell-ID returned" by the mobile station in the location notification. Kraufvelin, [0109];

Putkiranta, 6:26-29, 9:2-8.

43. Further, in the combination, Putkiranta's service server 108 implements functionality based on Kraufvelin's cell-ID verification feature, and ensures that when an issue is detected using Kraufvelin's location "sanity check" feature, "updated cell-ID information may be provided to the [mobile] terminal." Kraufvelin, [0111].

4. Reasons to combine Putkiranta and Kraufvelin

44. In my opinion, a POSITA would have found it obvious to combine the teachings of Putkiranta and Kraufvelin in the manner described above. *See* §VIII.A.3.

a) Putkiranta and Kraufvelin are analogous art

45. Putkiranta and Kraufvelin are analogous art to the '621 patent because both references are in the same field of endeavor as the '621 patent. The '621 patent relates to monitoring the presence of a mobile station in particular geographic areas. Ex.1001, Abstract. Putkiranta and Kraufvelin are similarly directed to monitoring the presence of a mobile station in particular geographic areas. Putkiranta, Abstract, 4:35-38, 6:22-25 (describing a method for "maintain[ing] information about which mobile stations are in which localized service areas"); Kraufvelin, Abstract (describing a method for "[m]onitoring… the presence status of the mobile station relative to said area of interest").

46. Putkiranta and Kraufvelin are also analogous art to the ’621 patent because they are reasonably pertinent to a problem the ’621 patent attempted to solve: the lack of a way to “associate[e] new special areas” with a mobile device “without modifying any radio transmitting device.” Ex.1001, 2:6-20. Putkiranta and Kraufvelin both describe mechanisms for configuring location monitoring of mobile devices without modifying the configuration of the cellular base stations in the network. *See, e.g.*, Putkiranta, 2:54-65 (localized service areas defined as lists of cell-ids stored at the mobile station); Kraufvelin, [0113] (same).

47. Thus, Putkiranta and Kraufvelin are analogous art to the ’621 patent.

b) A POSITA would have found it obvious to combine Putkiranta and Kraufvelin in the proposed manner

48. In my opinion, a POSITA would have been motivated to combine the teachings of Putkiranta and Kraufvelin to implement functionality based on the location “sanity check” feature of Kraufvelin in the service server of Putkiranta in the manner described above (*see* §VIII.A.3) in order to, for example, ensure that the mobile station’s reported location is accurate, and that the system delivers the appropriate presence related services to the mobile station.

49. Kraufvelin teaches—and Putkiranta confirms—that “operators tune” (*e.g.*, reconfigure) “their networks on a daily basis,” such as by changing the particular cells that makeup a localized service area. Kraufvelin, [0108];

Putkiranta, 5:15-17 ("establishing a new base station in the area"). When each localized service area is defined by a list of cells (*i.e.*, base stations), as it is in Putkiranta and Kraufvelin's systems, the definition of each localized service area must be synchronized between the network and each mobile station. Kraufvelin, [0108]; Putkiranta, 5:1-8. Kraufvelin teaches that, due to this need for synchronization, "a cell-ID" reported by a mobile station "may no longer correspond with the" localized service area "due to operator changes to the radio network[.]" Kraufvelin, [0108]. To mitigate this issue, Kraufvelin provides its "sanity check" procedure for the network to confirm that the mobile station "is actually in the" localized service area it reported by checking the reported cell-ID against its stored definition of that localized service area. Kraufvelin, [0108]-[0109].

50. In my opinion, a POSITA thus would have been motivated to combine the teachings of Putkiranta and Kraufvelin to implement functionality based on the location "sanity check" feature of Kraufvelin in the service server of Putkiranta to ensure that the mobile station's reported location is accurate (*i.e.*, to confirm that the mobile station "is actually in the" localized service area). Kraufvelin, [0108]-[0109]. A POSITA would have recognized that this verification would improve the performance of Putkiranta's system by ensuring that the system delivers the appropriate presence related services to the mobile station based on its true location, rather than delivering services configured for a particular localized service area to a mobile station located outside that area. Kraufvelin, [0107]-[0109]. A POSITA would have been motivated to combine Putkiranta and Kraufvelin in the proposed manner to achieve at least this benefit.

51. In addition, this modification to Putkiranta represents a simple combination of prior art elements (Putkiranta's service server with Kraufvelin's location "sanity check" feature), according to known methods to yield predictable results (Putkiranta's service server ensuring that the mobile station location information reflects the current network configuration, as taught by Kraufvelin).

52. Further, a POSITA would have been motivated to implement functionality based on the location "sanity check" feature of Kraufvelin in Putkiranta's service server to achieve the same benefits and improve Putkiranta's system in the same way as the similar system of Kraufvelin.

53. A POSITA would have had a reasonable expectation of success in making such a combination because Kraufvelin teaches a system operating in the proposed manner. Kraufvelin, [0107]-[0109]. In my opinion, the combination is nothing more than the predictable use of prior art elements according to their established functions.

54. A POSITA would have been further motivated to implement a process, based on Kraufvelin's teachings, by which Putkiranta's service server updates the cell identifiers stored in the mobile station. Doing so would ensure that each mobile station has an up-to-date and accurate list of cell identifiers to compare against, even as the network changes, thereby ensuring that location-based services remain reliable and accurate.

55. Putkiranta teaches storing a list of "base station specific identifiers…in the mobile station." Putkiranta, 5:1-8. Further, Putkiranta explains that, in some cases, when the network changes the base station identifiers associated with a particular area (*e.g.*, by adding more base stations in that area), an updated list of identifiers is sent to the mobile station to accommodate for the network changes. Putkiranta, 5:14-22. Putkiranta describes this process at a high level because the implementation details were well-known to POSITAs and described extensively elsewhere in the prior art.

56. For example, Kraufvelin describes a process of sending updated lists of base station identifiers from the source (*e.g.*, Putkiranta's service server) to every impacted mobile station. Kraufvelin, [0110]-[0115]. Kraufvelin describes a system for providing location services to mobile stations in which the system sends updated lists of cell IDs to affected mobile stations for storage in each mobile station's memory. Kraufvelin, [0046], [0054]-[0061], [0108]-[0111]. Kraufvelin's teachings provide a straightforward way to accomplish cell identifier updates, consistent with Putkiranta's "simplest case" where cell identifiers making up localized service areas are stored in the mobile station's memory. Kraufvelin, [0108]-[0111]; Putkiranta, 5:3-6. Thus, a POSITA would have been motivated to implement the cell identifier update process in Putkiranta's service server based on the implementation details described in Kraufvelin for its similar process to ensure that each mobile station has an up-to-date and accurate list of cell identifiers to compare against, even as the network changes, thereby ensuring that location-based services remain reliable and accurate. *See* Kraufvelin, [0108]-[0111].

57. A POSITA would have expected success in implementing Kraufvelin's "cell-id update" teachings with Putkiranta's service server, because Kraufvelin and Putkiranta are both directed towards maintaining cell identifiers that define special geographic areas and providing services therewith. Kraufvelin's teachings are compatible with Putkiranta's system teachings. For example, Putkiranta discloses that the mobile station and the service server communicate with each other via a network. Putkiranta, 4:13-34, 6:6-21, 7:17-20. Similarly, Kraufvelin teaches network elements (e.g., LCS node 12, GMLC 8) communicating location information with a mobile station. Kraufvelin, [0060], [0107]-[0109].

58. Moreover, Kraufvelin contemplates that "the elements of the location service functionality may be implemented **anywhere** in the telecommunications system," and generally "in any appropriate entity." Kraufvelin, [0046]; *see also* [0058]-[0059]. Thus, a POSITA would have expected success when implementing Kraufvelin's teachings of sending updated cell identifiers with Putkiranta's teachings of the service server and mobile station communicating with each other, so that the service server can update the list of identifiers that define each localized service area.

59. Accordingly, in my opinion, a POSITA would have found it obvious to combine the teachings of Putkiranta and Kraufvelin in the manner described above. *See* §VIII.A.3-4.

5. Claim 1

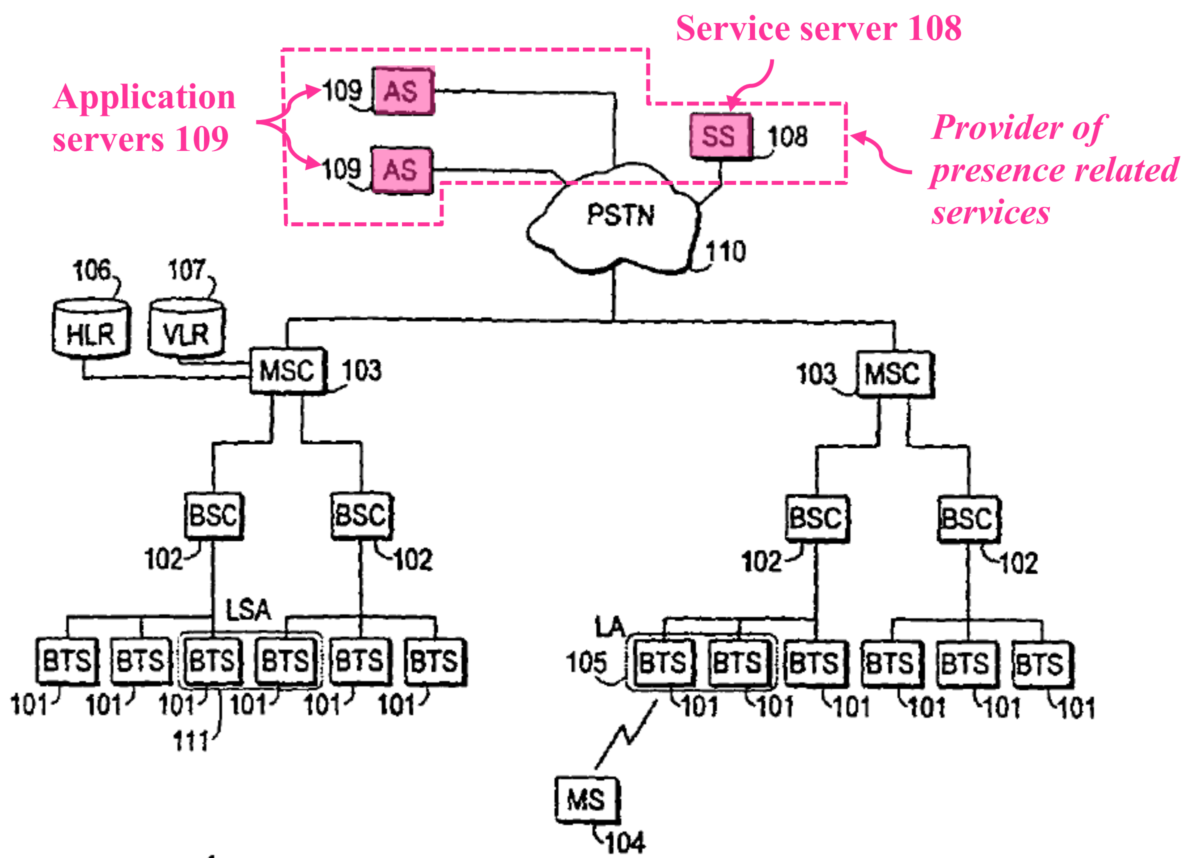
[1.0] A method associated with a provider of presence related services

60. To the extent the preamble of claim 1 ([1.0] – [1.1]) is limiting, it is rendered obvious by Putkiranta-Kraufvelin.

61. Putkiranta describes "**a method** and system for **making services provided by a network available** to the user in various ways **depending on the location of the user**[.]" Putkiranta, 2:9-12. Putkiranta teaches that system includes "**a service server (SS) 108 and application servers (AS) 109**" (collectively *a provider of presence related services*) that are "connected to the cellular radio network through wire links[.]" Putkiranta, 4:25-27. Putkiranta describes that "[t]he role of the service server…is to **maintain information about which mobile**

stations are in which localized service areas and which services should be offered to them accordingly," while the "actual service is provided by the application server." Putkiranta, 6:22-26. Putkiranta's service server 108 and application servers 109 thus collectively teach the *provider of presence related services*, because the service server 108 and application servers 109 provide services to the mobile device in the localized service area in which the mobile device is located. *See* Putkiranta, 6:22-26.

62. Putkiranta's FIG. 1, annotated below, shows the service server 108 and application servers 109 (collectively *a provider of presence related services*) connected to the cellular network via the public switched telephone network (PSTN) 110. Putkiranta, FIG. 1, 4:13-34.



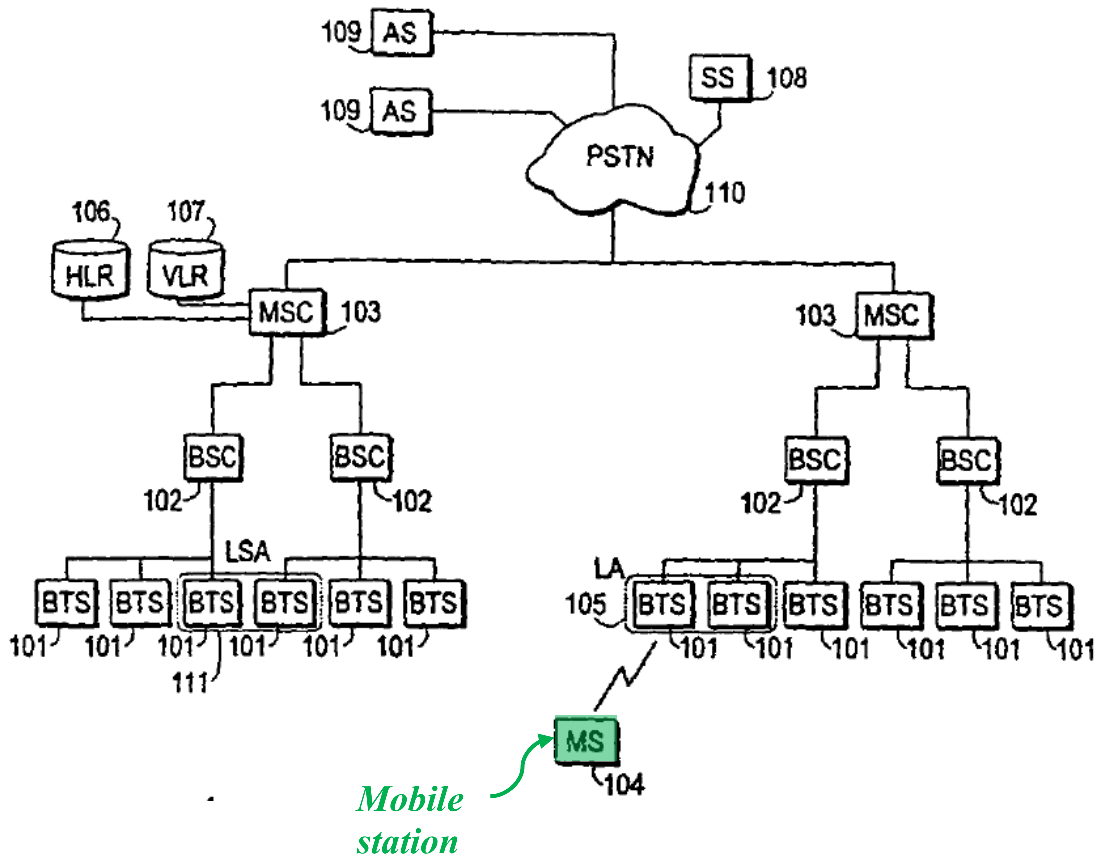
Putkiranta, Detail of FIG. 1 (annotated)

[1.1] in connection with the use of a mobile station that is operable within a mobile telephone network, and at least a first radio communication defining device that transmits a first distinctive defining signal, the first distinctive defining signal at least partly defines a special area by its coverage, the provider of presence related services having one or more servers, the method comprising:

63. Putkiranta-Kraufvelin renders this limitation obvious. The recited components are addressed in turn in the sections below.

a mobile station

64. Putkiranta's FIG. 1 shows the mobile station 104 operating in the "cellular radio system":



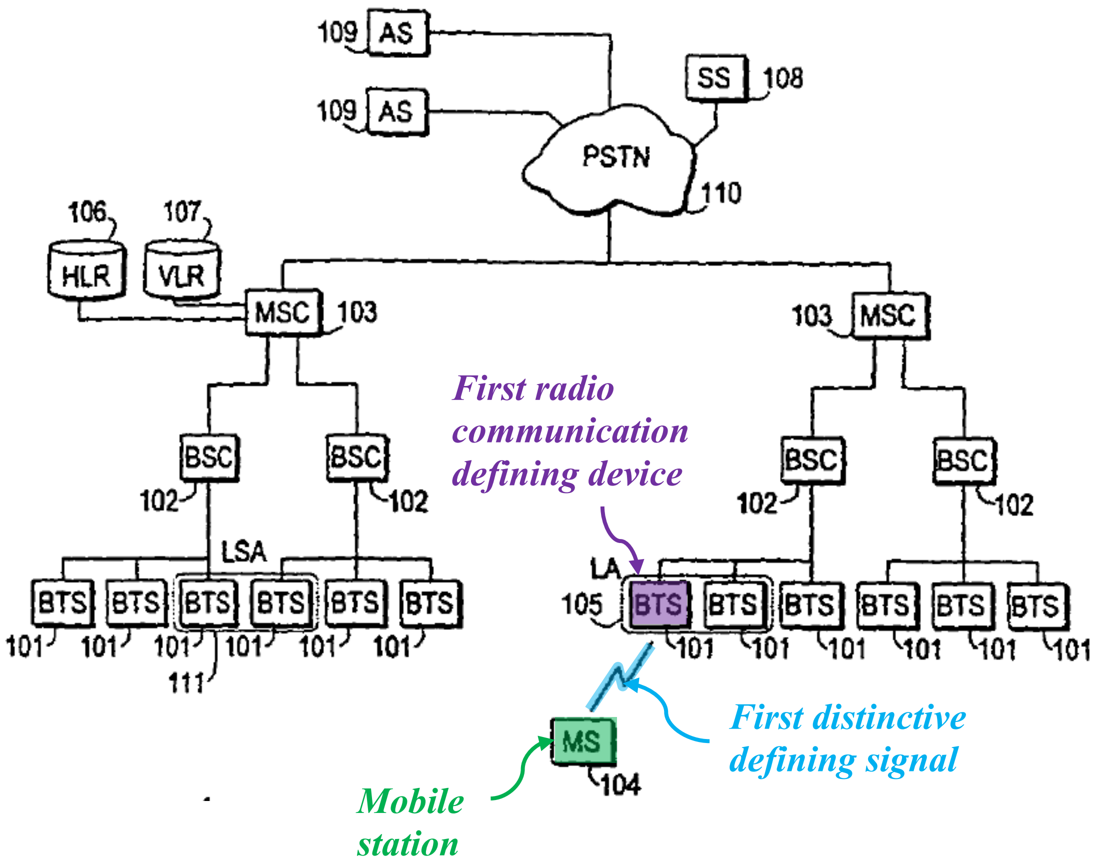
Putkiranta, Detail of FIG. 1 (annotated)

<u>*a first radio communication defining device, a first distinctive defining signal, and a special area*</u>

65. Putkiranta describes that "FIG. 1 shows a cellular radio system 100…compris[ing] **base transceiver stations (BTS) 101**" (*at least a first radio communication defining device*). Putkiranta, 4:13-14. Putkiranta further teaches that "**every base transceiver station** in known cellular radio systems **sends general control information that can be received in the whole cell area**" (*a first distinctive defining signal*) "and which e.g. **comprises the unequivocal identifier**

of the base transceiver station or some other information characteristic of the base transceiver station." Putkiranta, 4:63-5:1. Putkiranta further describes that "**mobile station (MS) 104"** is "connected via radio to at least one base transceiver station 101" (*a mobile station that is operable within a mobile telephone network*). Putkiranta, 4:16-17.

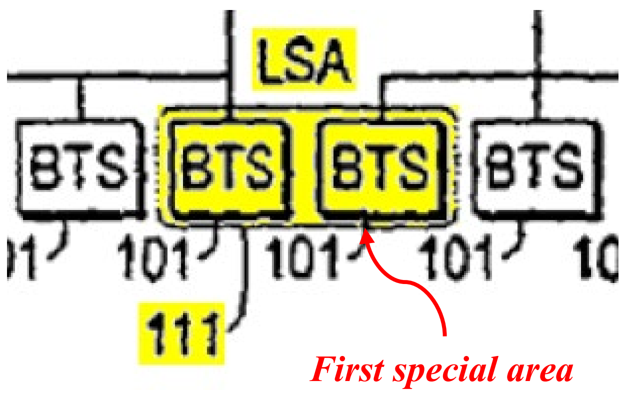
66. Putkiranta's FIG. 1 shows the BTS 101 (*first radio communication defining device*) transmitting the general control information (*first distinctive defining signal*) to the *mobile station* 104. Putkiranta, FIG. 1, 4:63-5:1:



Putkiranta, Detail of FIG. 1 (annotated)

67. Putkiranta further teaches that the "system considers the mobile station to be located in that **location area (LA) 105 to which the coverage area, or cell, of that particular base transceiver station belongs**." Putkiranta, 4:16-20. "A location area may comprise one or more cells." Putkiranta, 4:20-21. Putkiranta further describes a "**localized service area**" or "LSA" (*a first special area*) as an area in which "a mobile station receives a certain service." Putkiranta, 2:54-56, 4:35-51, 7:23-24. A localized service area may be defined by "a base station cell, several cells, a location area (LA), …certain cell identifiers, or an area in which base stations send to mobile stations some other identifier." Putkiranta, 2:54-64. In Putkiranta, the transmission of general control information from a base station is distinctive (*a first distinctive defining signal*) when its "coverage area" defines an area that makes up at least part of a localized service area (*a special area at least partly define[d]* by *the first distinctive defining signal*). *See* Putkiranta, 4:35-51, 2:54-56.

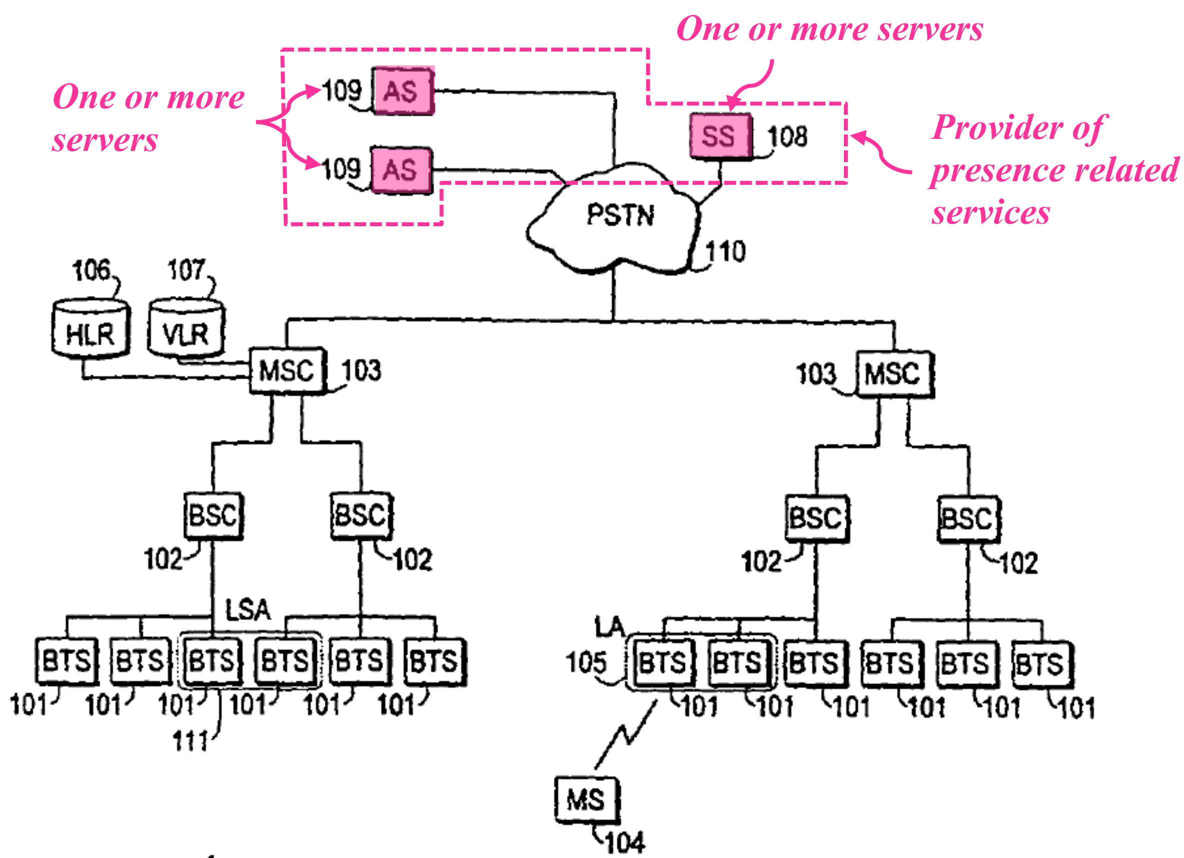
68. The following detail from Putkiranta FIG. 1 shows an LSA 111 (*special area*) that is defined by the "coverage area" of two base transceiver stations 101. Putkiranta, 4:35-51:



Putkiranta, Detail of FIG. 1 (annotated)

<u>*the provider of presence related services having one or more servers*</u>

69. Putkiranta's service **server** 108 and application **servers** 109 (*the provider of presence related services having one or more servers*) provide services to the mobile device in the localized service area via the PSTN and cellular network. Putkiranta, FIG. 1.



Putkiranta, Detail of FIG. 1 (annotated)

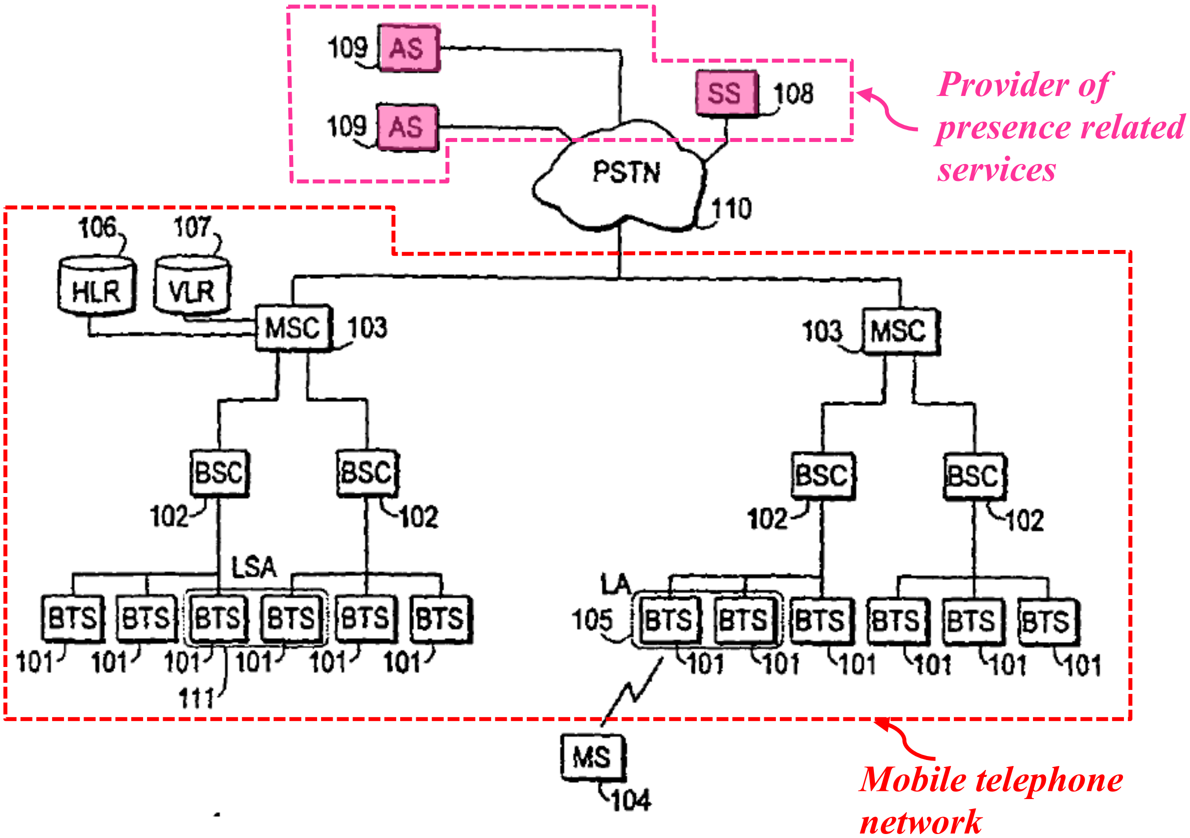
[1.2] electronically storing in the one or more servers of the provider of presence related services data capable of linking the mobile station to the special area, the data including a checking data of the first radio communication defining device and an identifier related to the mobile station,

70. Putkiranta teaches that the service server stores (*electronically storing in the one or more servers of the provider of presence related services*) the claimed *data capable of linking the mobile station to the first special area*. Putkiranta describes that "role of the service server…is to **maintain information about which mobile stations are in which localized service areas**" (*data capable of* *linking the mobile station to the first special area*). Putkiranta, 6:22-25. Putkiranta explains that in the context of its invention, a "localized service area may be defined" by "a **base station cell**" and "**cell identifiers**" (*the data including a checking data of the first radio communication defining device*). Putkiranta, 2:54-64. Putkiranta further explains that mobile stations are identified with "an **identifier characteristic of the mobile station**" such as "an IMSI (International Mobile Subscriber Identifier) code or MS-ISDN (Mobile Subscriber Integrated Services Digital Network) number[.]" (*first identifier related to the mobile station*). Putkiranta, 6:6-12. Putkiranta describes that the service server "**store[s]**" (*electronically stor[es]*) this data in its memory. Putkiranta, 6:26-30; *see also* 2:22-32, 6:59-63. This allows the service server to "read[] from its memory which services should be offered to the mobile station in that localized service area." Putkiranta, 6:26-30.

71. Thus, the service server stores "information about which mobile stations are in which localized service areas," where the mobile station is identified by an IMSI or MS-ISDN and the localized service area is defined by a base station cell identifier, rendering obvious *data capable of linking the mobile station to the first special area, the data including a checking data of the first radio communication defining device and a first identifier related to the mobile station*.

[1.3] the provider of presence related services being different than the mobile telephone network,

72. In the combination, Putkiranta describes that the service server 108 and application server 109 may be "connected to the cellular radio network through wire links" and "routed via the public switched telephone network (PSTN) 110." Putkiranta, 4:13-31, FIG. 1. When connected via the PSTN, the service server 108 and application server 109 (*the provider of presence related services*) are *different than the mobile telephone network* because Putkiranta describes this configuration as an alternative to the service server 108 and application server 109 being "part of the cellular radio system" (*the mobile telephone network*). *See* Putkiranta, 4:28-34 (explaining that the servers can be implemented as "part of the cellular radio system, **or** routed via the public switched telephone network"). Putkiranta's FIG. 1, as annotated below, shows the service servers 108 and application server 109 (*the provider of presence related services*) separate from the cellular radio network (*the mobile telephone network*, outlined in red) and connected to it via the PSTN:



Putkiranta, Detail of FIG. 1 (annotated)

[1.4] receiving in the one or more servers of the provider of presence related services from the mobile station via the mobile telephone network an updating signal uncorrelated to any mobile station phone call establishment that identifies the mobile station's presence in the special area,

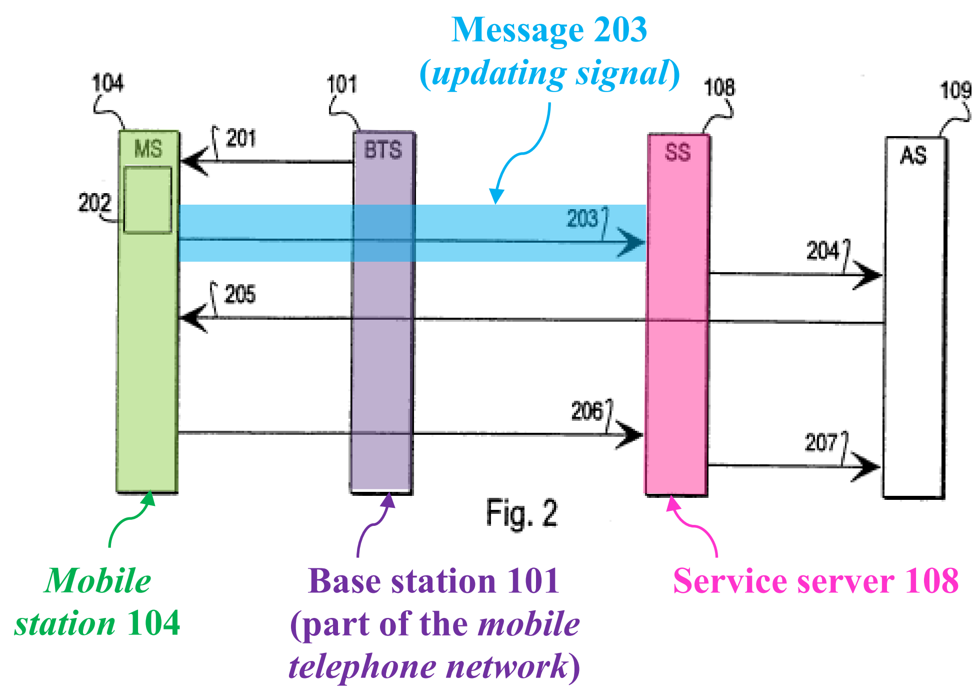
73. Putkiranta describes that "the mobile station is arranged so as to **send**—in response to the recognition of a localized service area—**a notification of its arrival in the localized service area**" (*an updating signal…that identifies the mobile station's presence in the special area*). Putkiranta, 2:37-39. Specifically, Putkiranta teaches that when "the mobile station **detects that it has arrived in a**

certain localized service area" (*the special area*), the mobile station "**sends to the service server a message 203**," as shown in Putkiranta's FIG. 2 below. Putkiranta, 6:3-12. Message 203 "includes an identifier characteristic of the mobile station" and "the location of the mobile station[] in relation to localized service areas." Putkiranta, 6:3-12, 2:22-32, 9:53-54 ("the message specif[ies] that the apparatus is in the localized service area"). Accordingly, Putkiranta's message 203 serves to *identif[y] the mobile station's presence in the special area* because it notifies the service server upon arrival within the localized service area, and includes a unique identifier of the mobile station (*e.g.*, an "IMSI" code or "MS-ISDN" number) in the notification. Putkiranta, 6:6-12, 8:61-9:1, FIG. 5.

74. Putkiranta further teaches that the mobile station sends message 203 (*an updating signal*), for example, using an "**SMS message**" or a **GSM "USSD message"** (*via the mobile telephone network* and *uncorrelated to any mobile station phone call establishment*). Putkiranta, 6:13-21; *see also* Ex.1001, 16:60-64 (describing that the updating signal can be sent "using the USSD ('Unstructured Supplementary Service Data', GSM standards) channel"). Putkiranta contrasts these two non-phone call establishing options with a third option that "establish[es] a call connection to the service server." Putkiranta, 6:13-21.

75. Putkiranta's FIG. 2 below shows the service server 108 receiving the message 203 (*an updating signal*) from the mobile station 104 via the base station

101, which is part of *the mobile telephone network* (*receiving in the one or more servers…from the mobile station via the mobile telephone network an updating signal*). Putkiranta, 6:13-21, FIG. 2:



Putkiranta, Fig. 2 (annotated)

[1.5] the one or more servers of the provider of presence related services deriving from the updating signal by one or more processing devices having access to at least a portion of the data whether or not the mobile station is present in the special area; and

76. As previously discussed in [1.1], Putkiranta teaches that the service server receives the message 203 (*the updating signal*) from the mobile station. As explained below, the service server is a *processing device[]* because it "examines" the message and "recogniz[es]" whether the mobile station is in a localized service area. Putkiranta, 6:26-30, 8:66-9:8; *see also* Gusler (Ex.1040), [0026], [0066] (a "server" includes "one or more processing devices," *e.g.* "a plurality of processors"); Johnson (Ex.1041), [0031] (a "server" includes "one or more processing devices").

77. In more detail, Putkiranta teaches that "[h]aving received message 203" (*the updating signal*, *see* [1.4]) "**the service server**" "**reads from its memory which services should be offered to the mobile station in that localized service area**" (*deriv[es] from the updating signal whether or not the mobile station is present in the first special area*). Putkiranta, 6:26-29. Further, "the service server…maintain[s] information about which mobile stations are in which localized service areas and which services should be offered to them accordingly," and thus *ha[s] access to at least a portion of the data* capable of linking the mobile station to the first special area. Putkiranta, 6:22-25.

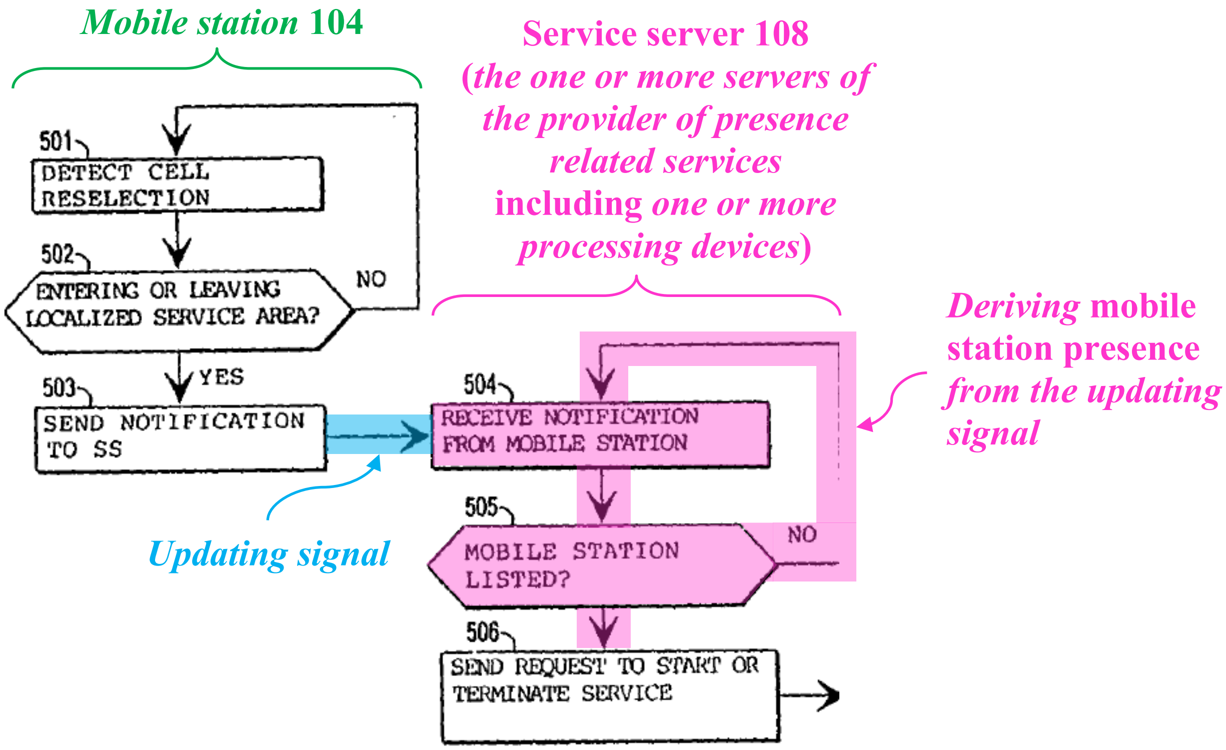
78. Putkiranta elaborates on this functionality with FIG. 5 (below). Upon "reception of the message" from the mobile station (*the updating signal*) at block 504 indicating it has entered or left a localized service area,

> the service server examines whether the mobile station in question **is on the list of those to be served**. If the mobile station is arriving in a localized service area, **it is in block 505 recognized as a mobile station which is to be served**. If, on the other hand, the mobile station

is leaving a localized service area, **it is recognized in block 505 as a mobile station the services to which have to be terminated**.

Putkiranta, 9:2-8.

79. Putkiranta thus teaches the service server "recognizing" (*deriving*), from the *updating signal* and the stored list of mobile stations *(at least a portion of the data)*, the mobile station "as a mobile station which is to be served" or "as a mobile station the services to which have to be terminated" (*whether or not the mobile station is present in the first special area*). Putkiranta, 9:2-8, FIG. 5; *see also* 2:45-53 ("information is generated" by the service server "about the arrival of a mobile station in a localized service area" in response to receiving the message 203 (*updating signal*)). The following annotated detail from Putkiranta's FIG. 5 shows this process:



Putkiranta, Detail of FIG. 5 (annotated)

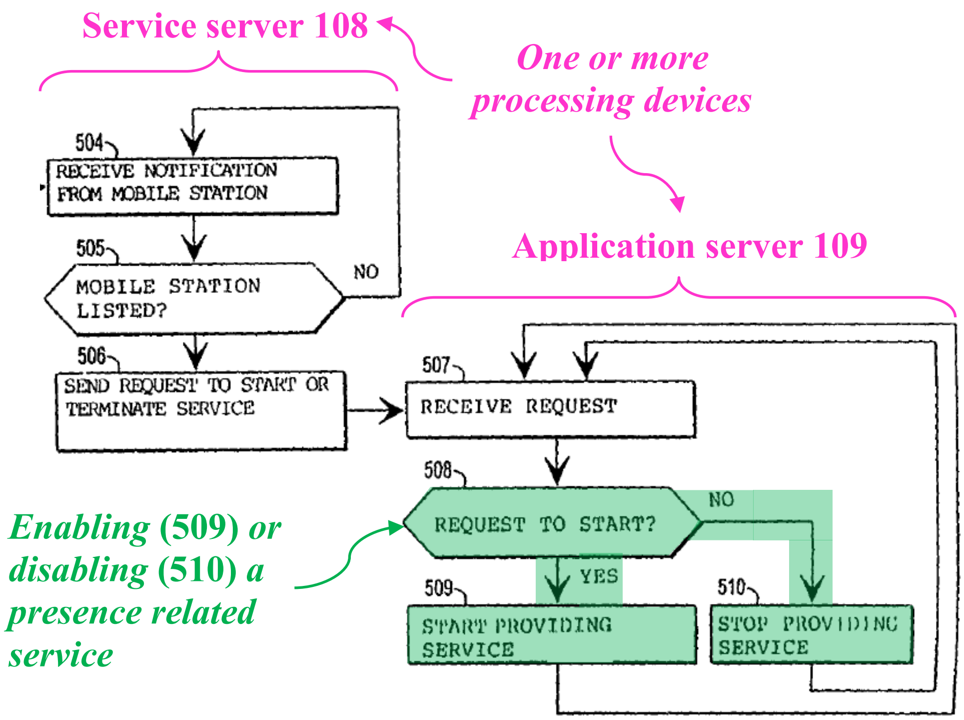
80. Additionally or alternatively, in the combination Kraufvelin teaches that a component of the mobile telephone network performs "a verification—or sanity check—of the" notification (*e.g.*, *an updating signal*) from a mobile station that it has entered a particular geographical area (*e.g.*, *a first special area*). Kraufvelin, [0107]. Kraufvelin teaches that the "cell-ID returned" by the mobile station in the updating signal "is verified" by a component of the mobile telephone network (*e.g.*, Putkiranta's service server) "to ensure that the cell is still within the intended geographical area." Kraufvelin, [0109]. "This may be achieved by comparing the current cell-IDs of the intended geographical area stored in the network with the cell-ID returned response from the terminal." Kraufvelin, [0109]. In the combination, Putkiranta's service server implements Kraufvelin's "sanity check" functionality, and *derives* from the mobile station's notification (*the updating signal*) *whether or not the mobile station is present in the first special area* by "comparing the current cell-IDs of the" localized service area (*first special area*) "stored in the network with the cell-ID returned" (*the updating signal*). Kraufvelin, [0109]; Putkiranta, 6:26-29, 9:2-8.

81. As described above (VIII.A.3-4), a POSITA would have been motivated to implement functionality based on Kraufvelin's "sanity check" feature with Putkiranta's service server to, *e.g.*, ensure that the mobile station is actually present in the localized service area, and thus that the system delivers the appropriate presence related services to the mobile station. Kraufvelin, [0108].

[1.6] enabling or disabling by use of the one or more processing devices a presence related service based upon the mobile station's presence or non-presence in the special area.

82. After Putkiranta's service server determines whether the mobile station is in a localized service area (*see* [1.5]), and, if it is, the service server "reads from its memory which services should be offered to the mobile station **in that localized service area**." Putkiranta, 6:27-30. The service server then sends "[a] corresponding message" to "**an application server**" (which includes *one or processing devices, see* [1.5]) instructing the application server to "start" or "terminate" a service configured for mobile stations in that localized service area (*based upon the mobile station's presence or non-presence in the first special area*). Putkiranta, 8:66-9:12. Referring again to Putkiranta's FIG. 5 below, "the application server which receives the message in block 507 [] determines in block 508 whether the message calls for the **starting or termination of a service**" (*enabling or disabling…a presence related service*). Putkiranta, 9:8-12. "The service is then either **started 509**" (*enable[ed]*) "or **terminated 510**" (*disable[ed]*) "for the mobile station." Putkiranta, 9:12-14. Because Putkiranta's service server instructs the application server to start or terminate services *based upon the mobile station's presence or non-presence in the first special area*, the application server starts or terminates a service (*enabling or disabling…a presence related service*) *based upon the mobile station's presence or non-presence in the first special area*. Putkiranta, 8:66-9:14, 2:22-32.

83. The following annotated detail from FIG. 5 of Putkiranta shows this process:



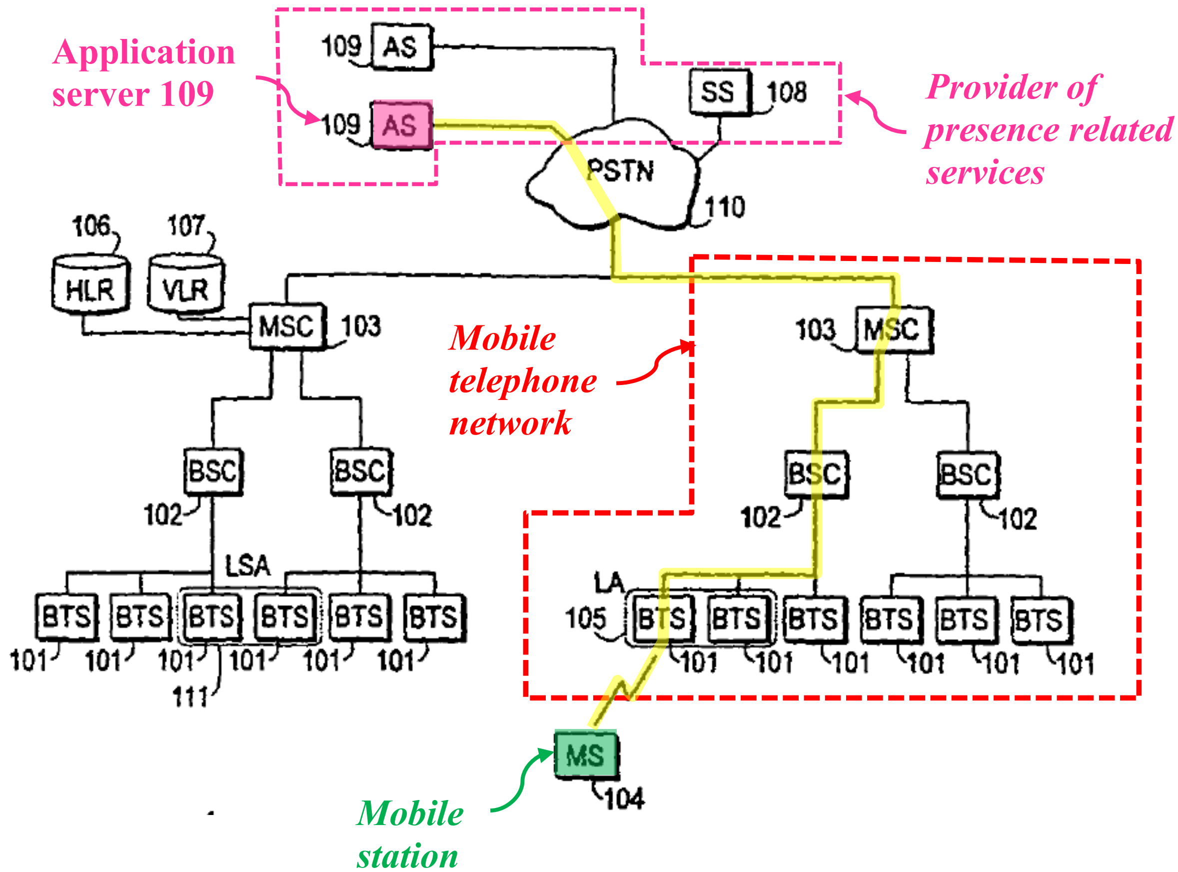
Putkiranta, Detail of FIG. 5 (annotated)

6. Claim 4

[4.0] The method according to claim 1, wherein the enabling or disabling of the presence related service includes transmitting via the mobile telephone network a signal to the mobile station that is capable of being used to enable or disable one or more related functions in the mobile station.

84. As discussed in [1.6], Putkiranta's application server "determines in block 508 whether the message calls for the **starting or termination of a service**" (*the enabling or disabling of the presence related service*). Putkiranta, 9:8-12. The application server then "**provides the mobile station with a service**" (*e.g.*, FIG. 2's arrow 205). Putkiranta, 6:38-40. This operation involves the application server *transmitting* "a simple **message**" (*e.g.,* 205 in FIG. 2) (*a signal*) *to the mobile station* to cause "activation or inactivation" (*that is capable of being used to enable* *or disable*) of a service at the mobile station (*one or more related functions in the mobile station*). Putkiranta, 6:40-42, 6:51-52 (services including, *e.g.*, automatic call transfer and/or voice mail).

85. Putkiranta teaches that the application server 109 transmits messages (*e.g.,* message 205) to the mobile station 104 via “the cellular radio network” (*the mobile telephone network*) including “base transceiver station (BTS) 101.” Putkiranta, 4:13-27, FIG. 1 (below). Putkiranta’s application server 109 is “connected to the cellular radio network through wire links,” such that messages between the application server 109 and the mobile station 104 pass through the “cellular radio network.” Putkiranta, 4:13-27, FIG. 1. Putkiranta’s FIG. 1 (below), shows that the path of message 205 (yellow) from the application server 109 to the mobile station 104 passes through the cellular radio network (outlined in red):



Putkiranta, Detail of FIG. 1 (annotated)

7. Claim 5

[5.0] The method according to claim 1, wherein the storing of the checking data in the one or more servers of the provider of presence related services comprises electronically receiving from the mobile station the checking data.

86. As discussed in [1.2], Putkiranta's service server "maintain[s] information about which mobile stations are in which localized service areas" (*data including checking data*). Putkiranta, 6:22-25. Putkiranta's service server "store[s]" this data in its memory (*the storing of the checking data in the one or more servers of the provider of presence related services*, *see* [1.2]). Putkiranta, 6:26-30; *see also* 2:22-32, 6:59-63. Putkiranta further teaches that the service server "receive[s]" (*electronically receives*) "Message 203" *from the mobile station* when "the mobile station detects that it has arrived in a certain localized service area." Putkiranta, 6: 3-12, 6:26-30. Message 203 "includes an identifier characteristic of the mobile station" and "specif[ies] that the apparatus is in the localized service area," where the localized service area is defined by base station "cell identifiers" (*the checking data*). Putkiranta, 6: 6-12, 9:53-54, 2:54-64, 2:22-32. The service server "maintain[s]" its "information about which mobile stations are in which localized service areas" by storing, from the message 203 received from the mobile station, the particular localized service area (*checking data*) in association with the identifier characteristic of the mobile station. Putkiranta, 6:22-30; *see also* 2:22-32, 6:59-63.

8. Claim 6

[6.0] The method according to claim 1, wherein the mobile telephone network is cellular.

87. As discussed in [1.1], Putkiranta teaches a "**cellular** radio system 100" (*mobile telephone network*) that includes the BTS 101 to which the mobile station 104 is connected. Putkiranta, 4:13-20, FIG. 1.

9. Claim 7

[7.0] 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.

88. As previously discussed in [1.4], in the combination, Putkiranta teaches that when "the mobile station **detects that it has arrived in a certain localized service area**" (*a previous determination performed by the mobile station about the mobile station's presence in the first special area*), the mobile station "sends to the service server a message 203" (*the updating signal*) that "specif[ies] that the apparatus is in the localized service area." Putkiranta, 9:53-54, 6:3-8.

10. Claim 8

[8.0] The method according to claim 1, wherein the updating signal is received in the one or more servers of the provider of presence related services via the mobile telephone network from the mobile station at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exits from the special area, and (iii) when the mobile station remains in the special area.

89. As discussed in [1.4], in the combination, Putkiranta teaches that the mobile station "sends to the service server a message 203" (*the updating signal is received in the one or more servers of the provider of presence related services via the mobile telephone network from the mobile station*) indicating its presence in a localized service area. Putkiranta, 6:6-12. Putkiranta describes that message 203 (*the updating signal*) may be sent when the mobile station "**is arriving in**" or "**leaving a localized service area**" (*at times recent to when the mobile station* *enters into or exits from the first special area*). Putkiranta, 8:61-65, FIG. 5. Message 203 (*the updating signal*) is sent after the mobile station remains in a localized service area for "a certain period of time" to "**renew its message of arrival in the localized service area**" (*when the mobile station remains in the first special area*). Putkiranta, 3:25-36. Putkiranta also teaches the mobile station sending message 203 (the updating signal) "**periodically**" as a "periodic location update (PLU) message." Putkiranta, 3:28-30.

11. Claim 9

[9.0] The method according to claim 1, wherein the updating signal comprises a request to access to a multimedia content and the provider of presence related services enables or disables the provision of the multimedia content depending on the presence of the mobile station in the special area.

90. As discussed in [4.0], in the combination, Putkiranta teaches that the application server (part of the *provider of presence related services*) *enables or disables the provision of the service depending on the presence of the mobile station in the first special area*. Putkiranta further teaches that "message 203" (*the updating signal*) is "intended to function as an impulse for changing the service selection offered to the mobile station" (*comprises a request to access to a multimedia content*). Putkiranta, 2:34-41, 6:3-12, 6:22-34, 6:53-56. Putkiranta's service selections include both more traditional services and *multimedia content* such as "routing of incoming email messages to a mobile station[.]" Putkiranta, 6:42-52. And Putkiranta contemplates implementations of the service it provides for uses including "to send the day's menu at a cafeteria of a company to the mobile stations of all those employees who are within the premises of the company as lunchtime is approaching." Putkiranta, 1:50-55, claim 13 (providing localized services in "an airport or a cafeteria").

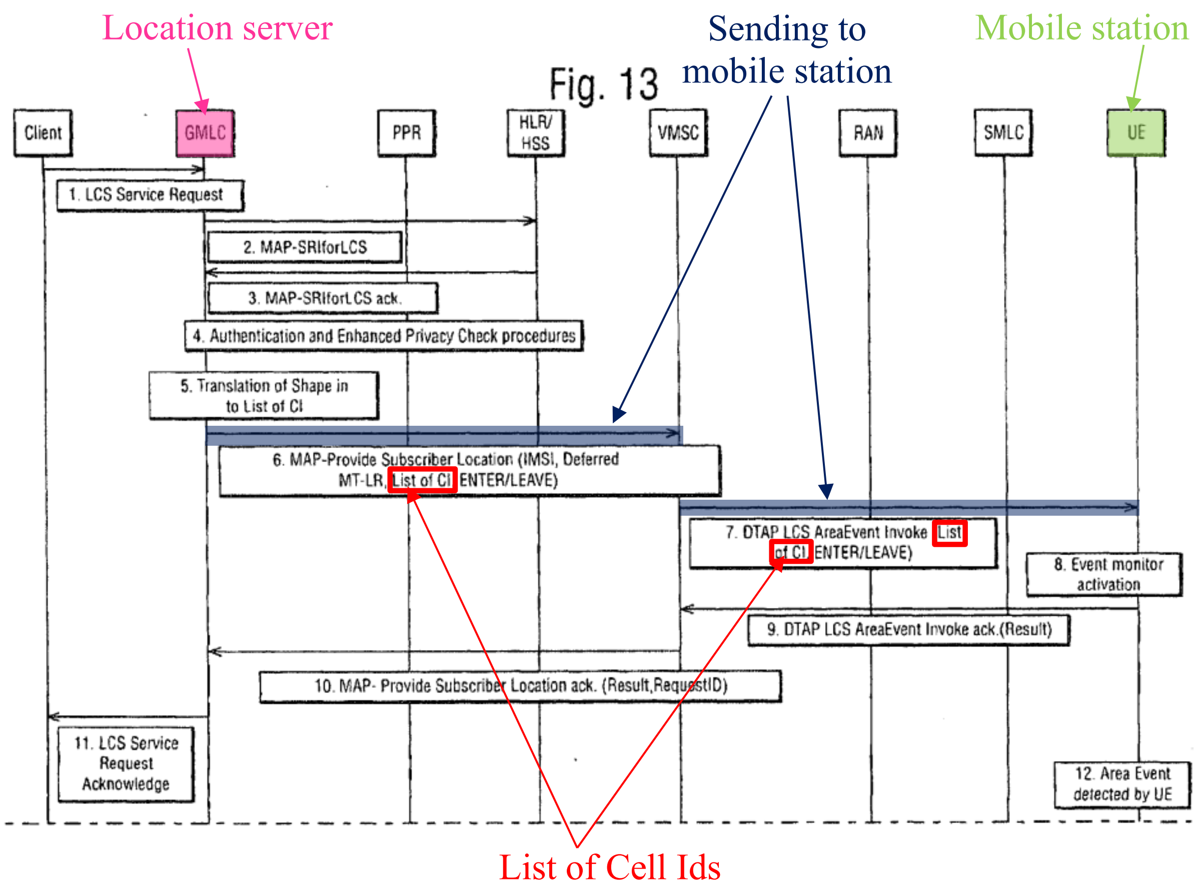
12. Claim 10

91. I note that claim 10 is substantially similar to claim 1, with minor differences. The analysis below addresses the added material in limitations [10.2]-[10.3]. Further, limitations [10.3]-[10.4] remove "of the provider of presence related services" following "the one or more servers," though that language appears in limitations [10.1]. Ex.1064 (comparison). Accordingly, the limitations with deleted elements are rendered obvious for the same reasons as discussed above with respect to claim 1.

[10.2] transmitting to the mobile station from the one or more servers at least a portion of the checking data,

92. Putkiranta teaches that the *mobile station* stores a list of base station identifiers (*checking data*) that it compares to a received identifier to determine whether it is in a localized service area. Putkiranta, 5:3-8. Putkiranta further explains that networks may change the base stations associated with a particular localized service area by, for example, adding a new base station. Putkiranta, 5:14-22 (increasing communications capacity in a localized service area by adding a new base station). Because Putkiranta contemplates that the list of identifiers stored in the memory of the *mobile station* would need to be updated to accommodate changes to the base stations associated with a localized service area, it would have been obvious that the service server (*one or more servers*) sends a new list of identifiers to the *mobile station* when the network changes the base stations associated with the localized service area. Putkiranta 5:14-22 (changes to the base stations associated with a localized service area accommodated by "send[ing] the identifier of the new base station to each mobile station to which the localized service area has been assigned").

93. This type of implementation was well known, as demonstrated by Kraufvelin. Kraufvelin, [0107]-[0115]. Similar to Putkiranta, Kraufvelin explains that network "operators tune their networks on a daily basis" by changing the geographic area associated with certain base stations or changing the identifier (cell-ID) associated with a base station. Kraufvelin, [0108]. Thereafter, "a cell-ID may no longer correspond with the intended geographical area." Kraufvelin, [0108]. To address this, Kraufvelin teaches that the service provider may "update the predefined area definition in all mobiles" by providing "the updated cell-ID information" (*transmitting at least a portion of the checking data*) to the mobile station. Kraufvelin, [0110]-[0111]; FIG. 13.



Kraufvelin, FIG. 13 (annotated)

94. Thus, Kraufvelin teaches that, when the network changes the cell-ID information associated with a geographic area, an updated list of Cell IDs that reflect the geographic area is sent to the mobile station from the location services server. In the combination, Putkiranta's service server would transmit an updated list to mobile devices of IDs (*transmitting to the mobile station from the one or more servers at least a portion of the checking data*) when a change in area occurs.

[10.3] receiving in the one or more servers from the mobile station via the mobile telephone network an updating signal uncorrelated to any mobile station phone call establishment that identifies the mobile station's presence in the special area, the updating signal including the identifier or other identifier related to the mobile station,

95. Limitation [10.3] is substantially similar to limitation [1.4], additionally reciting *the updating signal including the identifier or other identifier related to the mobile station*.

96. In the combination, Putkiranta teaches that the "message 203" (*the updating signal*, *see* [1.4]) includes "**an identifier characteristic of the mobile station**" (*including the identifier or other identifier related to the mobile station*) such as "an IMSI (International Mobile Subscriber Identifier) code or MS-ISDN (Mobile Subscriber Integrated Services Digital Network)[.]" Putkiranta, 6:8-12.

13. Claims 13-18

97. Claims 13-18 are substantially similar to claims 4-9, except that each depends from claim 10, not claim 1. *See* Ex.1064 (comparison). Accordingly, claims 13-18 are rendered obvious for at least the same reasons discussed with respect to claims 4-9.

B. Ground 2: Claims 2-3 and 11-12 are obvious over Putkiranta, Kraufvelin, and Granberg

1. Summary of Granberg

98. Granberg teaches "a database that stores and manages subscriptions" for a number of subscriber devices (*e.g.*, cell phones). Granberg, 6:3-4. Granberg describes that the database "stores a number of subscriber records," each including "individual subscriber data such as MSISDN, IMSI, current VLR location, and supplementary services data." Granberg, 7:40-44. Granberg further describes that "each subscriber record may include one or more network-specific indicators, *e.g.*, one or more flags, corresponding to one or more network-specific services." Granberg, 7:45-48. "Each network-specific indicator is then set or activated when that subscriber is to receive a corresponding network-based service in a network that supports that network-based service." Granberg, 7:49-53. Or, "[i]f that subscriber is not to receive the service" in the particular network to which it is presently registered, "the flag is reset or otherwise deactivated." Granberg, 7:53-54.

2. The combination of Putkiranta, Kraufvelin, and Granberg

99. In the combination, the Putkiranta-Kraufvelin service server 108 (as previously modified based on Kraufvelin, *see* §§VIII.A.3-4)[1] maintains information, including activating or deactivating the "network-specific indicator"

[1] For the sake of brevity, the remaining analysis in this Ground refers to Putkiranta's service server as previously modified based on Kraufvelin in Ground 1A simply as the "Putkiranta-Kraufvelin service server."

associated with a "network-based service" depending on the presence of the mobile station in a network that supports that particular "network-based service," based on the teachings of Granberg. *See* Putkiranta, 4:21-25, 6:22-25, FIG. 1; Granberg, 7:45-54; §§VIII.B.2-3.

3. Reasons to combine Putkiranta, Kraufvelin, and Granberg

100. In my opinion, a POSITA would have found it obvious to modify the Putkiranta-Kraufvelin service server based on the teachings of Granberg.

a) Granberg is analogous art

101. Granberg, like Putkiranta and Kraufvelin (*see* §VIII.A.4), is analogous art because it is in the same field of endeavor as the '621 patent. The '621 patent relates to monitoring the presence of a mobile station in particular geographic areas. Ex.1001, Abstract. Granberg is similarly directed to monitoring the presence of a mobile station in particular geographic areas to properly configure which services are provided to the mobile station in that particular area. Granberg, Abstract (describing a method for selectively providing services to "mobile communication units" when roaming on networks outside their home network). Granberg is also reasonably pertinent to a problem the '621 patent attempted to solve: the lack of a way to "associate[e] new special areas" with a mobile device "without modifying any radio transmitting device." Ex.1001, 2:6-20. Granberg describes databases used "to more efficiently store information for network-specific information supplementary services for large numbers of mobile subscribers" and "efficiently administer and update network-specific supplementary services" for those mobile subscribers. Granberg, 3:57-63, 4:10-29.

b) A POSITA would have been motivated to perform the combination

102. In my opinion, a POSITA would have been motivated to implement functionality with the Putkiranta-Kraufvelin service server to maintain information in a database, including activating or deactivating the "network-specific indicator" associated with a "network-based service" in the database depending on the presence of the mobile station in a network that supports that particular "network-based service," based on the teachings of Granberg. *See* Putkiranta, 4:21-25, 6:22-25, FIG. 1; Granberg, 7:45-54; §§VIII.B.2-3. A POSITA would have recognized that maintaining "network-specific indicators," like those taught in Granberg, with Putkiranta-Kraufvelin's service server teachings would provide an easily comprehensible summary of the status of particular services for a particular mobile station based on its location in the form of a list of flags (one for each service) indicating whether each service is currently enabled or disabled. *See* Putkiranta, 6:22-33; Granberg, 7:45-54. A POSITA would have recognized that such a status summary would benefit administrators of the Putkiranta-Kraufvelin service server by enabling them to easily determine which services were currently being provided to the mobile station in a particular location, thereby facilitating verification and troubleshooting of service configurations. *See* Putkiranta, 6:22-33; Granberg, 7:45-54; O'Toole (Ex.1039), 16:38-42 (describing the utility of a "status table" for "troubleshooting" network services).

103. In addition, this modification to Putkiranta-Kraufvelin represents a simple combination of prior art elements (the Putkiranta-Kraufvelin service server with Granberg's service configuration functionality), according to known methods to yield predictable results (the Putkiranta-Kraufvelin service server maintaining service configuration information, as taught by Granberg, for use with activating and deactivating services based on the current location of the mobile station).

104. Further, a POSITA would have been motivated to implement functionality based on the Granberg's service configuration feature with the Putkiranta-Kraufvelin service server teachings to achieve the same benefits and improve the Putkiranta-Kraufvelin system "in the same way" as the similar system of Granberg.

105. A POSITA would have had a reasonable expectation of success in making such a combination because Granberg teaches a system operating in the proposed manner. Granberg, 6:3-15, 7:34-54. Indeed, the combination is nothing more than the predictable use of prior art elements according to their established functions.

4. Claim 2

[2.0] The method according to claim 1, wherein the one or more processing devices has access to at least a portion of the data and updates at least one operating parameter in a database of the provider of presence related services depending on the presence of the mobile station in the special area.

106. In the combination, Putkiranta teaches that the "role of the **service server**" (which includes *one or more processing devices*, *see* [1.6]) "is to **maintain information about which mobile stations are in which localized service areas**" (*at least a portion of the data capable of linking the mobile station to the first special area*, previously discussed in [1.6]) "and which services should be offered to them accordingly." Putkiranta, 6:22-25. Because the service server "maintains" this information, it also *has access* to it. Putkiranta, 6:22-25.

107. While Putkiranta does not explicitly describe how the information regarding mobile stations would be maintained, it was well-known in the art that such information would be stored *in a database*. For instance, Granberg describes a database "that stores and manages subscriptions." Granberg, 6:3-4. Granberg's database "stores subscriber records for mobile communication units" (*mobile station*), each including "individual subscriber data such as **MSISDN, IMSI, current VLR location**, and supplementary services data." Granberg, Abstract, 7:40-44. Granberg further describes that "each subscriber record may include **one or more network-specific indicators**" (*operating parameters*) "*e.g.*, one or more flags, **corresponding to one or more network-specific services**." Granberg, 7:45-

48. "**Each network-specific indicator is then set or activated**" (*updat[ing] at least one operating parameter in a database of the provider of presence*) "**when that subscriber is** to receive a corresponding network-based service **in a network that supports that network-based service**" (*depending on the presence of the mobile station in the first special area*). Granberg, 7:49-53. Or, "[i]f that subscriber is not to receive the service" in the particular network to which it is presently registered, "the flag is reset or otherwise deactivated." Granberg, 7:53-54. Thus, Granberg teaches that a "**network-specific indicator**" (*operating parameter*) in the database (*database of the provider of presence related services*) is either **"set"/"activated"** or **"reset"/"deactivated"** (*update[d]*) based on the network to which the subscriber (*mobile station*) is currently connected—specifically whether that particular network supports the particular "network-based service" associated with the "network-specific indicator" (*depending on the presence of the mobile station in the first special area*). *See* Granberg, 7:45-54.

108. In the combination, Putkiranta's service server 108 maintains information in a database of the service server, including activating or deactivating (*updating*) the "network-specific indicator" (*operating parameters*) associated with a "network-based service" *depending on the presence of the mobile station* in a localized service area that supports that particular "network-based service" (a *first special area*), based on the teachings of Granberg. *See* Putkiranta, 4:21-25, 6:22-

25, FIG. 1; Granberg, 7:45-54; §§VIII.B.2-3. As discussed in §§VIII.B.2-3, it would have been obvious to implement such functionality with Putkiranta-Kraufvelin's service server based on Granberg's teachings.

5. Claim 3

[3.0] The method according to claim 2, wherein the operating parameter is a tariff flag or a service flag that enables or disables a special tariff or a service for the mobile station.

109. As described at [2.0], in the combination, Putkiranta's service server 108 activates or deactivates a "network-specific indicator" (*operating parameter*) associated with a "network-based service," based on Granberg's teachings. *See* [2.0]. Granberg teaches that the **"**network-specific indicators" (*operating parameters*) "corresponding to one or more network-specific services" include "**one or more flags**" (*a service flag*). Granberg, 7:45-48. Granberg further teaches that activating or deactivating the flag activates or deactivates (*enables or disables*) a corresponding *service for the mobile station*. Granberg, 7:49-54 (the flag is "activated when that subscriber is to receive a corresponding network-based service," and "deactivated" when "that subscriber is not to receive the service").

6. Claims 11-12

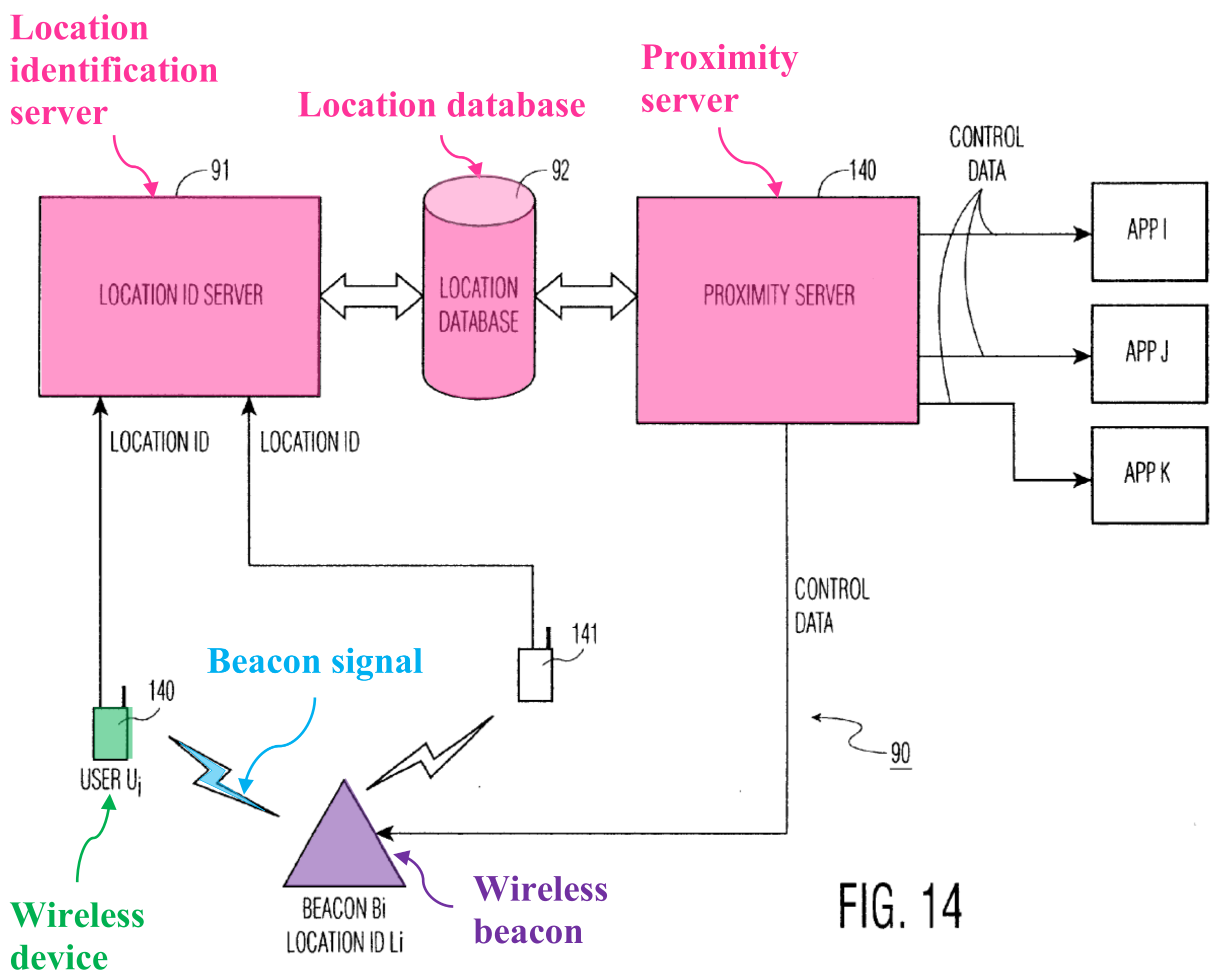
110. Claims 11-12 are substantially similar to claims 2-3, with the only difference being that each depends from claim 10, not claim 1. *See* Ex.1064 (comparison). Accordingly, claims 11-12 are rendered obvious for the same reasons as discussed with respect to claims 2-3.

C. Ground 3: Claims 1, 4-10, and 13-18 are obvious over Rachabathuni

1. Summary of Rachabathuni

111. Rachabathuni describes a "method of selecting an application in a wireless device and a user location method[.]" Rachabathuni, Abstract. Rachabathuni's method involves a "wireless device" (mobile station such as a "cell phone") receiving "beacon signal[s]" from "wireless beacons" including a "location identifier" associated with the particular beacon that transmitted the signal. Rachabathuni, 4:28-60, 7:63-65. Because the location and coverage area of each wireless beacon is known, the physical location of a wireless device at a given time may be estimated based on which beacon signal (or signals) it is currently receiving. Rachabathuni, 6:59-64. When the wireless device receives a beacon signal, meaning it is located "in-range" of a particular wireless beacon, the wireless device sends a message to a "location identification server" including the received location identifier associated with that wireless beacon. Rachabathuni, 6:45-57, 8:8-12. The "location identification server" stores a record in a "location database" indicating the user's presence at the location indicated by the location identifier (*e.g.*, within the coverage area of the particular wireless beacon associated with the location identifier) at that particular time. Rachabathuni, 6:58-64. Rachabathuni describes a "proximity server" that "uses the location information collected by the location identification server 91 and processes it to determine the proximity of…users to locations"—and "[b]ased on the information…modifies parts of the system it controls accordingly," for example by "control[ling] the wireless beacon 142 and selection of applications I, J, and K [shown in FIG. 14]." Rachabathuni, 8:60-67; *see also id*., 5:5-13 (the beacons in the wireless system "provide a tailored set of applications covering a given geographical area")..

112. Rachabathuni's FIG. 14 shows a "wireless system 90" used to perform the method described above:



Rachabathuni, FIG. 14 (annotated)

Rachabathuni describes that the "proximity server" "uses the location information collected by the location identification server 91 and processes [the location information] to determine the proximity of users to users and users to locations," and "[b]ased on the information…modifies parts of the system it controls accordingly," for example by "control[ling] the wireless beacon 142 and selection of applications I, J, and K [shown in FIG. 14]." Rachabathuni, 8:60-67; *see also id.*, 5:5-12 (the beacons in the wireless system "provide a tailored set of applications covering a given geographical area.”).

113. Rachabathuni is analogous art because it is in the same field of endeavor as the ’621 patent because it is similarly directed to monitoring the presence of a mobile station in particular geographic areas. Ex.1001, Abstract; Ex.1011, Abstract, 4:28-60, 6:45-57, 7:63-65, 8:8-12. Rachabathuni is also reasonably pertinent to a problem the ’621 patent attempted to solve: the lack of a way to “associate[e] new special areas” with a mobile device “without modifying any radio transmitting device.” Ex.1001, 2:6-20; Ex.1011, Abstract, 6:18-57.

2. Claim 1

[1.0] A method associated with a provider of presence related services

114. Rachabathuni describes a “**method** of selecting an application in a wireless device and a user location **method**[.]” Rachabathuni, Abstract. The method generally involves a “wireless device” (such as a “cell phone”) receiving “beacon signal[s]” from “wireless beacons” including a “location identifier” associated with the particular beacon that transmitted the signal, and the wireless device notifying a “location identification server” that tracks the location of the wireless device relative to the wireless beacons. Rachabathuni, 4:28-60, 6:45-57, 7:63-65, 8:8-12.

115. Rachabathuni’s “**location identification server 91**…is coupled to a **location database 92**.” Rachabathuni, 6:45-47; FIG. 14 (below). The “location identification server 91 registers locations and user identities of users of wireless devices" based on the notifications received from the wireless devices, and stores this location information in the location database. Rachabathuni, 6:55-65. Further, Rachabathuni's "**proximity server 140**" "uses the location information collected by the location identification server 91 and processes it to **determine the proximity of…users to locations**." Rachabathuni, 8:61-63. "Based on [this] information," the proximity server "**modifies parts of the system** it controls accordingly," such as the "[s]election of applications" (services) on the wireless device. Rachabathuni, 8:64-67.[2] Rachabathuni's location identification server, location database, and proximity server are thus configured to modify the services provided to a wireless device based on the device's proximity to a location (*i.e.*, *presence*), and therefore, collectively, comprise *a provider of presence related services*. *See* Rachabathuni, 6:45-65, 7:5-8 ("**Services may be provided that use relative location information**"), 8:61-67.

116. Rachabathuni's FIG. 14 shows the provider of presence related services:

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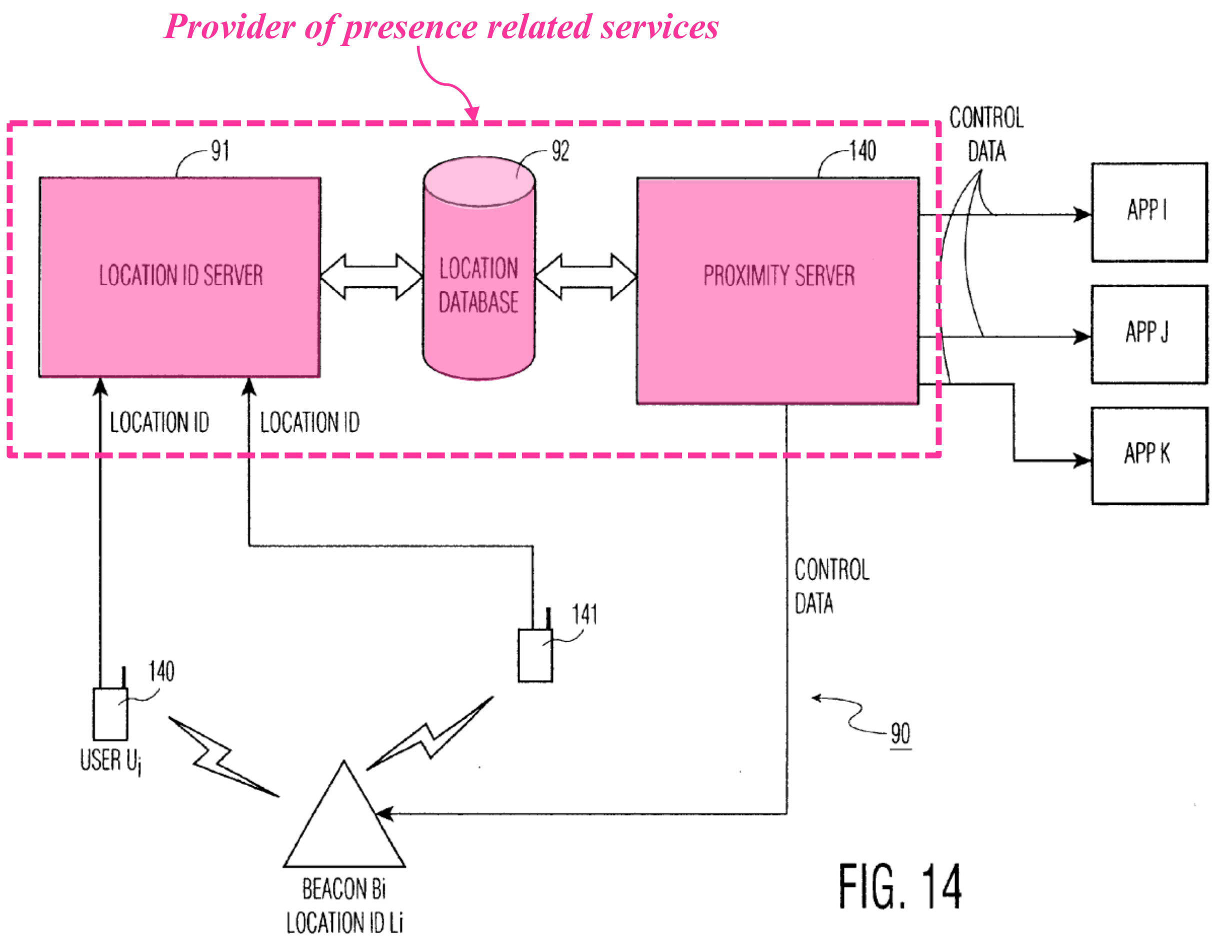
[2] Rachabathuni's "proximity server" operation is explained in greater detail in [1.5].



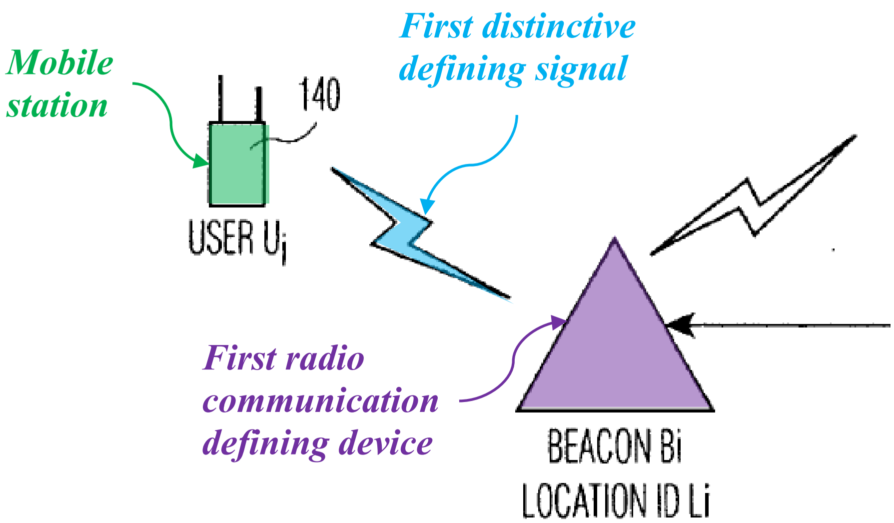
Rachabathuni, FIG. 14 (annotated)

117. Rachabathuni's FIG. 14 above shows a "wireless system 90" used to perform the method described above, including the *provider of presence related services* (collectively the location identification server 91, the location database 92, and the proximity server 140). Rachabathuni, 8:51-57.

[1.1] in connection with the use of a mobile station that is operable within a mobile telephone network, and at least a first radio communication defining device that transmits a first distinctive defining signal, the first distinctive defining signal at least partly defines a special area by its coverage, the provider of presence related services having one or more servers, the method comprising:

118. Rachabathuni's "**wireless device**" (*in connection with the use of a mobile station*) receives "beacon signal[s]" from a "**wireless beacon[]**" (*in connection with the use of…a first radio communication defining device*). Rachabathuni, 4:28-60, 6:45-57, 7:63-65. The wireless device then transmits the beacon information to the location identification server "through [a] wide area network or carrier network 97, that may be **a cellular network**" (*the mobile station…is operable within a mobile telephone network*). Rachabathuni, 6:50-53, FIG. 9.

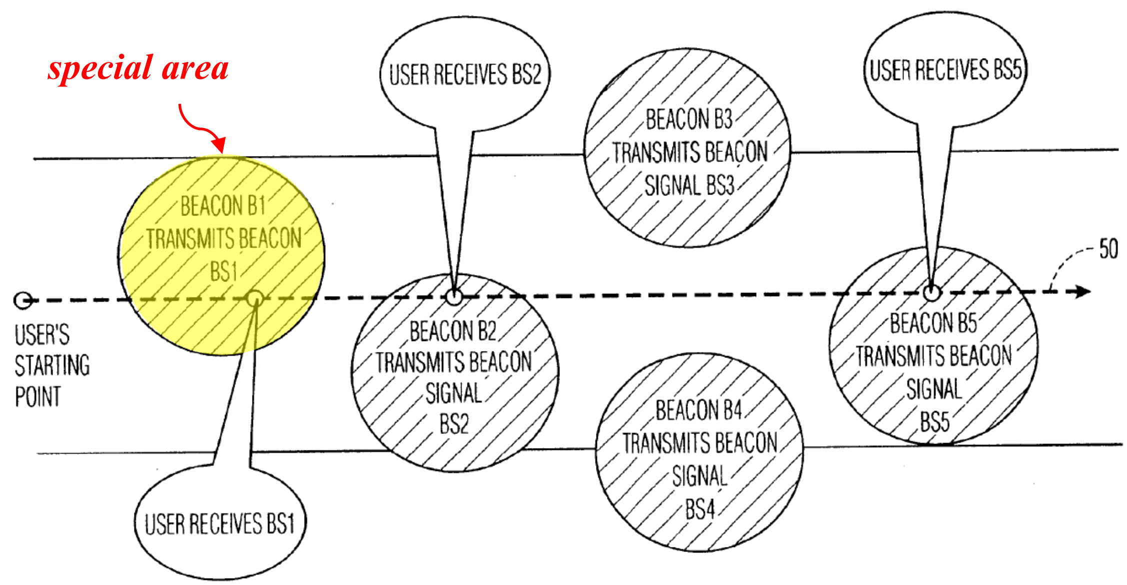
119. Rachabathuni's "wireless beacon" is configured to "**continuously broadcast**" (*transmit*) a "**beacon signal**" including a "location identifier" associated with the beacon. Rachabathuni, 5:63-65, 6:47-50, 7:63-65 ("wireless device 93 transmits a location identifier it acquired from the wireless beacon 95 to the location identification server 91"), 8:56-57, 9:35-37, FIG. 9 (showing beacon signal from beacon 96 including a "LOCATION ID"), FIG. 14. The beacon signal with the location identifier is *a first distinctive defining signal* because the location identifier is unique and differentiates the beacon signal from signals transmitted by other beacons. Rachabathuni, 7:46-47 ("location identifiers…**uniquely identify** a global location"), 7:63-65, 9:35-37. Rachabathuni's FIG. 14 shows the *first radio communication defining device that transmits a first distinctive defining signal,* which is received by the *mobile station*:



Rachabathuni, Detail of FIG. 14 (annotated)

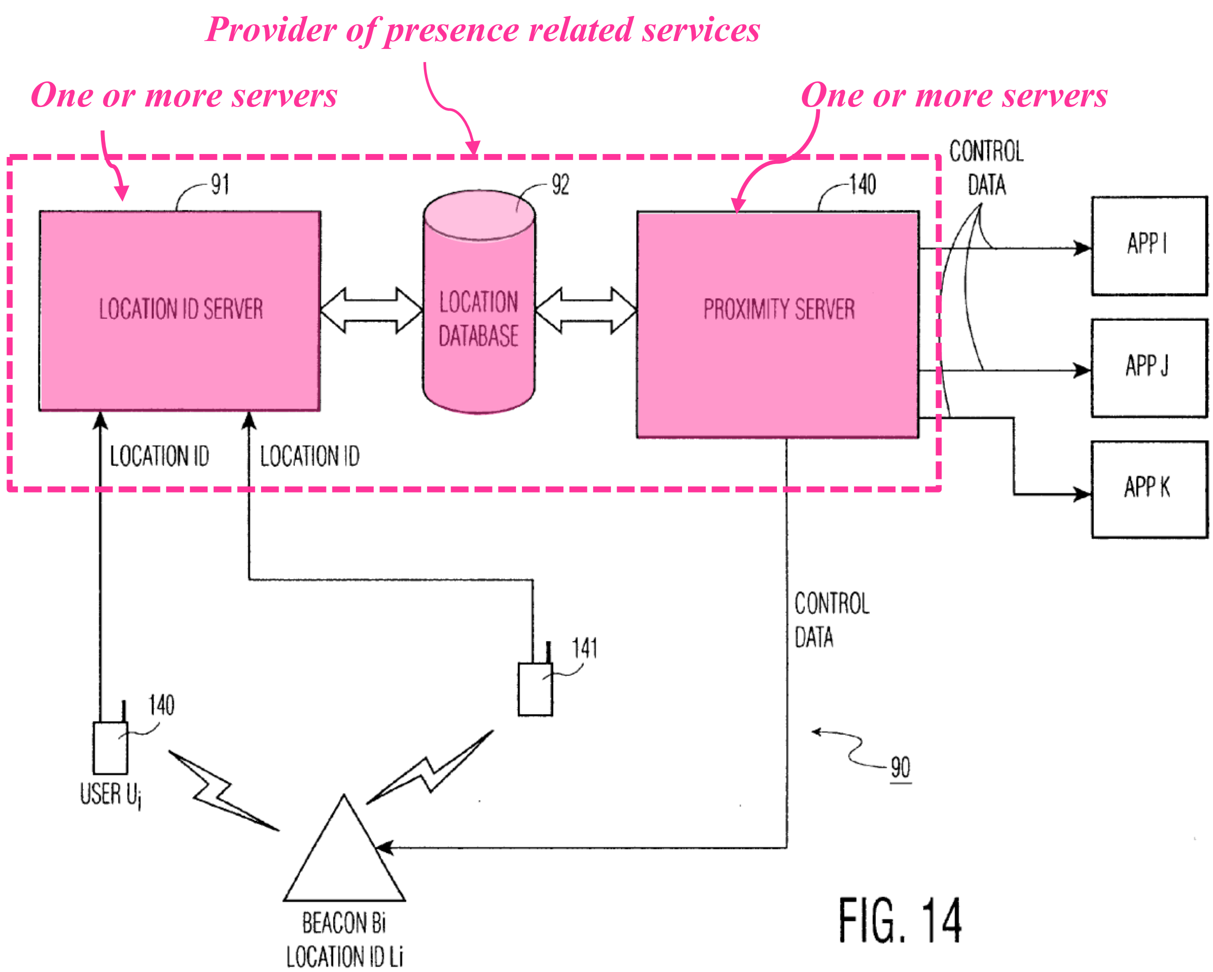
120. Further, "[w]hile roaming[,] the wireless device 7 enters into **a range of a wireless beacon**" (an *area at least partly defined by the coverage of the first distinctive defining signal*). Rachabathuni, 5:56-58, 7:32-34, 8:8-14, FIGs. 5, 13. When the wireless device "enter[s] [the] **transmission ranges** of the beacons B1, B2 and B5," it receives beacon signals BS1, BS2 and BS5 "from respective wireless beacons B1, B2 and B5[.]" Rachabathuni, 5:58-61, FIG. 5. Rachabathuni's system is configured to provide "location dependent services" to mobile stations located in the transmission range of a wireless beacon, such as within the transmission range of wireless beacon B1, and thus receive its beacon signal BS1 (*distinctive defining signal*). Rachabathuni, 3:16-22. The transmission range of a wireless beacon (*e.g.*, B1 in FIG. 5) *at least partly defines a special area* when the system is configured to provide "location dependent services" to mobile stations located within its transmission range. Rachabathuni, 3:16-22, 5:58-61, FIG. 5.

121. Rachabathuni's FIG. 5 shows the wireless device in the transmission range of the beacon B1 (*the special area*):



Rachabathuni, Detail of FIG. 5 (annotated)

122. Rachabathuni's location identification server 91 and proximity server 190 (*one or more servers*) modify the services provided to a wireless device based on the device's proximity to a location (*the provider of presence related services* *having one or more servers*):



Rachabathuni, FIG. 14 (annotated)

[1.2] electronically storing in the one or more servers of the provider of presence related services data capable of linking the mobile station to the special area, the data including a checking data of the first radio communication defining device and an identifier related to the mobile station,

123. Rachabathuni describes "a location identification server 91 that is coupled to a **location database 92**" (such that *the one or more servers* is *electronically storing* data). Rachabathuni, 6:45-47. The "location identification server 91 **registers locations and user identities of users of wireless devices**" (*data capable of linking the mobile station to the first special area*) based on the notifications received from the devices, and *electronically stores* this location information in the location database coupled to the location identification server (*electronically storing in the one or more servers*). Rachabathuni, 6:45-50 ("location identification server 91 [] coupled to a location database 92"); 6:55-65 (explaining information stored by location identification server 91 in a database record), 7:20-29 ("server 91 updates the location database 92"). Rachabathuni teaches that the location database stores records including "**a user identity or identification field 102**" (*the data including…a first identifier related to the mobile station*), "**a location identification field 103**" (*the data including a checking data of the first radio communication defining device*), "and a date and time field 104 registering when the user was last encountered at a given location such as at a location of a wireless beacon." Rachabathuni, 6:58-64. Rachabathuni's FIG. 10 shows an example table from the location database for storing such records with "user ID" (*first identifier*) and "location ID" (*checking data*) fields annotated:

100

	S.NO.	FIELD NAME	TYPE	EMPTY OK
101	1	RECORD NUMBER	NUMBER	NO
102	2	USER ID	NUMBER	NO
103	3	LOCATION ID	NUMBER	NO
104	4	LAST ENCOUNTERED	DATE	NO

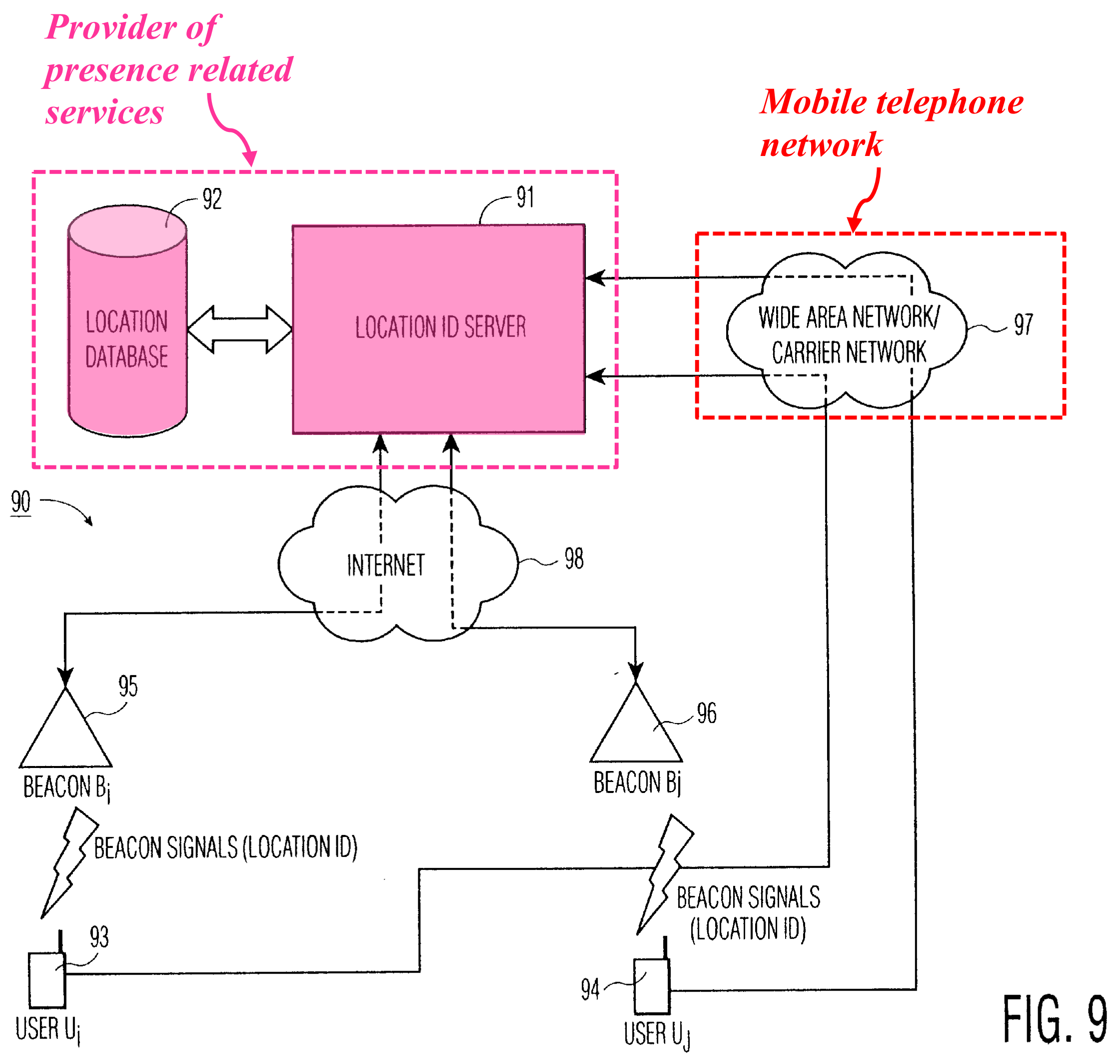
FIG. 10

Rachabathuni, FIG. 10 (annotated)

124. The location ID stored in Rachabathuni's database identifies a particular beacon and is received by a wireless device when it enters the range of that beacon. *See* Rachabathuni, 7:63-65, FIG. 9 (showing "location ID" in the beacon signal sent by beacon 96). The '621 patent describes one example of the "*checking data*" recited in claim 1 as a "base station identification code." *See, e.g.*, Ex.1001, 4:5-7; 18:37-38. Rachabathuni's location ID is a "base station identification code" (and thus corresponds to "*checking data*") because both are (i) identifiers of network components (a "wireless beacon" and a "base station," respectively), (ii) included in signals broadcast by those network components over a coverage area, and (iii) used in their respective systems to indicate the presence of a mobile station in that coverage area. *See* Rachabathuni, 6:58-64, 7:63-65, FIGS. 9-10; Ex.1001, Abstract, 2:39-42, 4:5-7; 18:37-38. In addition, Rachabathuni renders obvious that the mobile station compares the location identifier received in the beacon signal against a stored identifier (*checking data*) in order to filter repetitive location updates (e.g., repeat updates including the same location identifier) from being sent to the location identification server. Rachabathuni, 9:63-10:2 ("the wireless device is in a position to determine[e] which data is redundant to the location identification server").

[1.3] the provider of presence related services being different than the mobile telephone network,

125. As Rachabathuni explains, wireless devices "are configured to communicate with the location identification server 91 through wide area network or carrier network 97, that may be a cellular network." Rachabathuni, 6:50-53. And wireless beacons are able to "contact the location identification server 91 through the Internet 98." Rachabathuni, 6:53-55. As reflected in FIG 9, the location identification server 91 and location database are separate from and connected to both the cellular network and the Internet. Accordingly, while Rachabathuni's servers and databases, including location identification server 91 and location database (*the provider of presence related service*), are connected to the cellular network and the Internet, they are *different than the mobile telephone network*. Rachabathuni, FIG. 9.



Rachabathuni, FIG. 9 (annotated)

[1.4] receiving in the one or more servers of the provider of presence related services from the mobile station via the mobile telephone network an updating signal uncorrelated to any mobile station phone call establishment that identifies the mobile station's presence in the special area,

126. Rachabathuni describes that "when roaming, the users" of its system "encounter a succession of [wireless] beacons" by receiving the beacon signals broadcast by the wireless beacons. Rachabathuni, 7:22-23. Upon receiving a beacon signal (including the location identifier of the beacon, *see* [1.4]), "[t]he wireless device 7" (*the mobile station*) "then acts as a bridge or relay to **pass beacon information**" (*an updating signal*) "**to the location identification server 91**" (*receiving in the one or more servers of the provider of presence related services*). Rachabathuni, 7:23-25. "Upon reception of passed beacon information, the server 91 updates the location database 92 so that the database 92 **reflects which wireless beacons wireless device have or had proximity to**." Rachabathuni, 7:25-29; *see also* 9:35-37 (the "wireless device transmits location identification to the location identification server whenever it receives a new location identification from a wireless beacon").

127. The mechanisms Rachabathuni describes for the wireless device passing the beacon information to the location identification server (*e.g.*, acting as a "bridge or relay to pass beacon information," calling a "CGI (Common Gateway Interface) script that resides on the web server 121 that can be reached through the Internet," etc.) are all *uncorrelated to any mobile station phone call establishment* because they relate to data transmission between network components (the wireless device and the location identification server) and not to setting up a phone call. Rachabathuni, 7:21-25, 7:60-8:6.

128. The passed beacon information (*the updating signal*) *identifies the mobile station's presence in at least the special area* because it includes the "location identifier" of the wireless beacon that sent the beacon signal, which indicates the wireless device's (*mobile station's*) presence in the coverage area of that wireless beacon (*the special area*, *see* [1.1]). Rachabathuni, 5:63-65, 6:47-50, 8:56-57, FIGS. 9, 14; *see* [1.4].

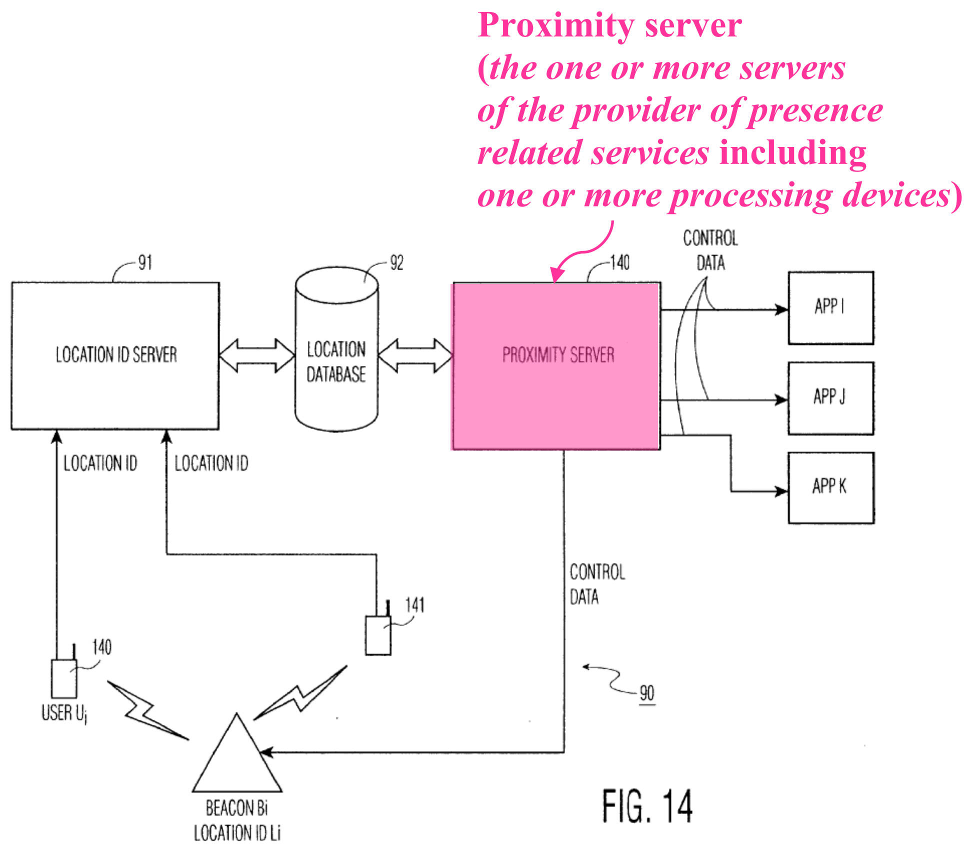
129. Rachabathuni further teaches that the wireless device (*mobile station*) transmits the beacon information to the location identification server "through [a] wide area network or carrier network 97, that may **be a cellular network**" (*receiving from the mobile station via the mobile telephone network*). Rachabathuni, 6:50-53, FIG. 9.

[1.5] the one or more servers of the provider of presence related services deriving from the updating signal by one or more processing devices having access to at least a portion of the data whether or not the mobile station is present in the special area; and

130. The location identification server and the proximity server are *processing devices* because they each "process[]" the received location information, as discussed in more detail below. Rachabathuni, 9:37-40 ("The location identification server **processes** all location identifications it receives and stores them in the location database for use by other applications."), 8:60-63 (proximity server "**processes** [location information] to determine the proximity of users"); *see also* Gusler, [0026], [0066]; Johnson, [0031].

131. As previously discussed in [1.4], Rachabathuni teaches that "[u]pon reception of passed beacon information" (*the updating signal*), "the server 91 updates the location database 92 **so that the database 92 reflects which wireless beacons wireless device have or had proximity to**." Rachabathuni, 7:25-29. The "proximity server" (*the one or more servers of the provider of presence related services*) "uses the location information collected by the location identification server 91" (provided by *the updating signal*) "and **processes it to determine**" (*derive*) "the proximity of users to…locations" such as the wireless beacon (*whether or not the mobile station is present in the first special area*). Rachabathuni, 8:60-63. Further, Rachabathuni teaches that the proximity server (th*e one or more servers of the provider of presence related services*) "processes," and thus *has access to*, "the location information collected by the location identification server 91" (*the data capable of linking the mobile station to the first special area*, *see* [1.1]). Rachabathuni, 8:60-63.

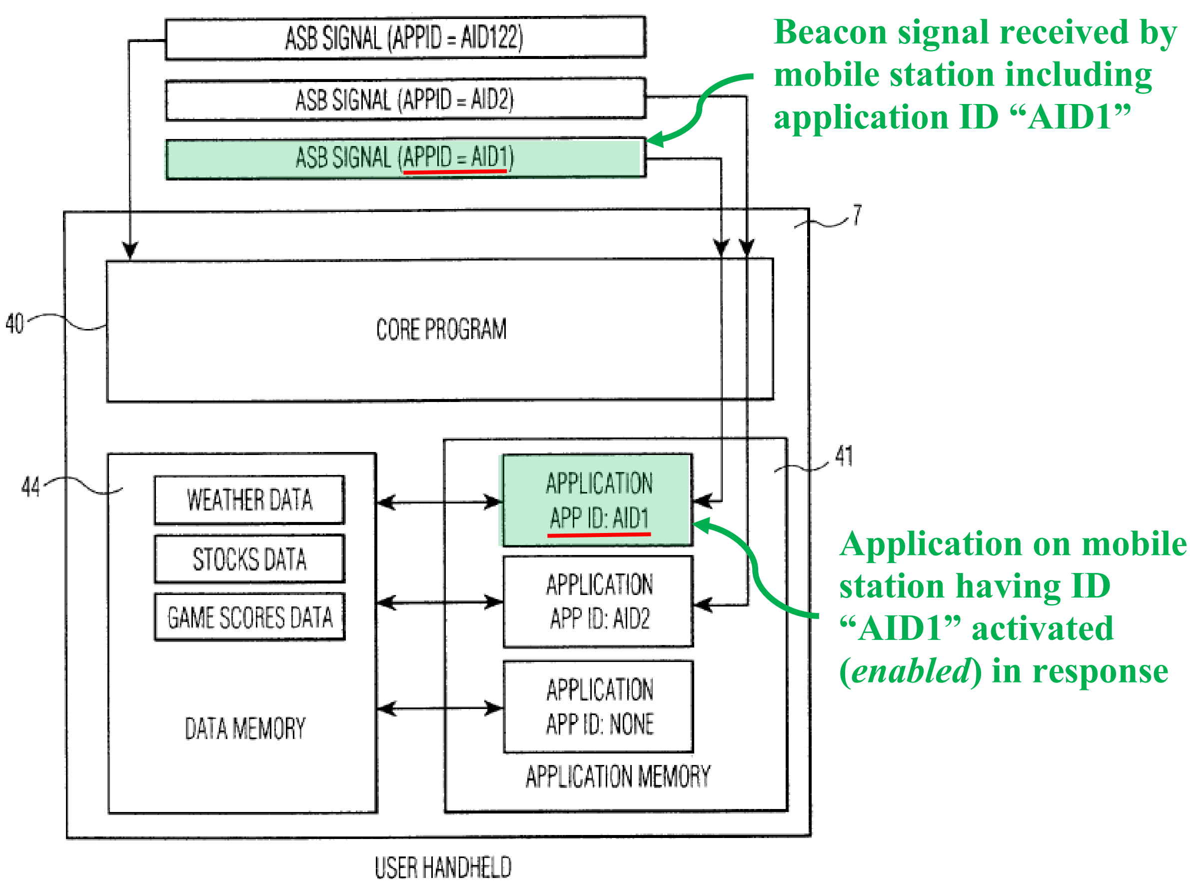
132. Rachabathuni's FIG. 14 shows the proximity server (*the one or more servers of the provider of presence related services* including *one or more processing devices*):



Rachabathuni, FIG. 14 (annotated)

[1.6] enabling or disabling by use of the one or more processing devices a presence related service based upon the mobile station's presence or non-presence in the special area.

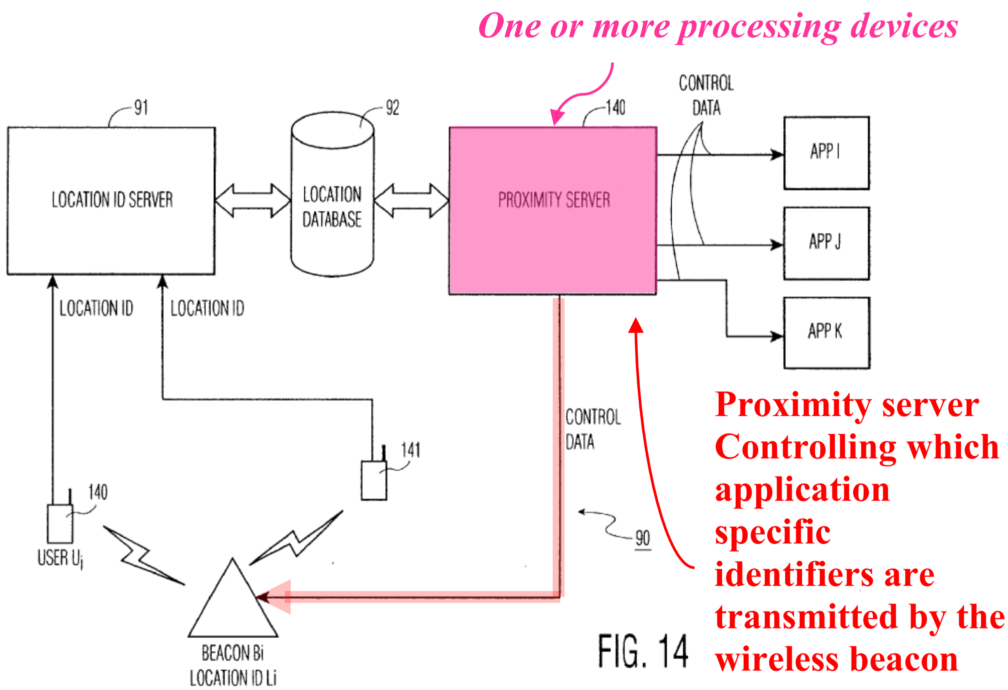
133. First, in the combination, Rachabathuni teaches that the wireless beacons include "application specific identifier[s]" in beacon signals that, when received by the mobile station, cause applications on the mobile station (*presence related services*) associated with those identifiers to be "activated" (*enabl[ed]*) and applications not associated with those identifiers to not be activated (*disabl[ed]*). Rachabathuni, 6:8-37; FIG. 7. Rachabathuni teaches that, upon receiving the beacon signal including an application specific identifier, the mobile station "activate[s]" an application (*enable[es] a service*) associated with that application specific identifier. Rachabathuni, 6:24-37. If the beacon signal does not include the application specific identifier for a particular application, the application is not activated (*disabl[ed]*). Rachabathuni, 6:8-17. Rachabathuni's FIG. 7 shows this configuration:



Rachabathuni, Detail of FIG. 7 (annotated)

134. Second, Rachabathuni teaches that the proximity server (including *one or more processing devices*, *see* [1.4]) controls the wireless beacons to set which "application specific identifier[s]" are included in the transmitted beacon signals, and does so based on the mobile station's presence in the transmission range of a particular wireless beacon (*the first special area*). Rachabathuni, Abstract, 3:15-20, 8:51-67, FIG. 14.

135. Using this mechanism, the proximity server controls the "**selection of applications**" or "**services**" (*enabl[es] or disabl[es] presence related services*) based on the presence or non-presence of the wireless device (*mobile station*) in range of a particular wireless beacon (*in the first special area*). Rachabathuni, Abstract, 8:51-67; *see also* 3:18-19 (the system "provid[es] a mechanism to relate services to users, such as location dependent services to a single user"). The proximity server "**modif[ies] the behavior of the system or parts of system based on the proximity of…users to locations**" (*e.g.*, particular wireless beacons). Rachabathuni, 8:58-63. In the example shown in Rachabathuni FIG. 14 below, "**the proximity server 140 controls the wireless beacon 142 and selection of applications I, J, and K**" based on the presence of the wireless device. Rachabathuni, 8:58-67:



Rachabathuni, FIG. 14 (annotated)

3. Claim 4

[4.0] The method according to claim 1, wherein the enabling or disabling of the presence related service includes transmitting via the mobile telephone network a signal to the mobile station that is capable of being used to enable or disable one or more related functions in the mobile station.

136. As discussed in [1.6], Rachabathuni describes that the proximity server controls the selection of services provided to the mobile device by causing the wireless beacon to include or not include "application specific identifier[s]" in its transmitted beacon signal (*a signal to the mobile station that is capable of being used to enable or disable one or more related functions in the mobile station*).

Rachabathuni, Abstract, 8:58-67. Upon receiving the beacon signal, the mobile station "activate[s]" an application (*enable[es] a service*) associated with the application specific identifier in the beacon signal. Rachabathuni, 6:24-36. If the beacon signal does not include the application specific identifier for a particular application, the application is not activated (*disabl[ed]*). Rachabathuni, 6:8-17.

137. Further, Rachabathuni explains that the proximity server communicates with the wireless beacon over a wide area network (WAN). Rachabathuni, 5:2-4; *see also* 4:35-37, FIGs. 1-2. A POSTIA would have understood that a well-known example of a WAN was a cellular network. *See, e.g.*, *See, e.g.*, Joong (Ex.1071), [0008]. Thus, Rachabathuni controls the selection of services through control data transmitted from the proximity server to the beacons via a WAN (*transmitting via the mobile telephone network a signal*) that is then passed to the mobile device (*to the mobile station*) to activate applications. Rachabathuni, Abstract, 6:24-36, 8:58-67.

4. Claim 5

[5.0] The method according to claim 1, wherein the storing of the checking data in the one or more servers of the provider of presence related services comprises electronically receiving from the mobile station the checking data.

138. As discussed in [1.2], Rachabathuni describes "a location identification server 91 that is coupled to a location database 92" (*one or more servers of the provider of presence related services*). This location database stores records including "a location identification field 103" (*storing of the checking data in the one or more servers of the provider of presence related services*). Rachabathuni, 6:58-64. Specifically, "**the wireless device 93 passes location** and user identity **information** to the location identification server 91 **for inclusion into the database 92**." Rachabathuni, 7:56-60. Thus, Rachabathuni teaches that the location identification server receives location information (*checking data*) transmitted from the wireless device via the cellular network for inclusion in the database (*electronically receiv[es] from the mobile station the checking data*). Rachabathuni, 7:56-60.

5. Claim 6

[6.0] The method according to claim 1, wherein the mobile telephone network is cellular.

139. As discussed in [1.1], Rachabathuni teaches that the wireless device transmits the beacon information to the location identification server "through [a] wide area network or carrier network 97, that may be **a cellular network**" (*the mobile telephone network is cellular*). Rachabathuni, 6:50-53, FIG. 9.

6. Claim 7

[7.0] 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.

140. Rachabathuni teaches that the mobile station may "filter" "the number [of] location identifications that are transmitted to the location identification server" if, for example, the mobile station stays in the same location. Rachabathuni, 9:63-10:2. It does this by "**determining which data is redundant to the location identification server**." Rachabathuni, 9:63-10:2. Thus, Rachabathuni teaches that the mobile station "determine[s]" its presence in the first special area (*e.g.*, whether it remains in an area about which it has already notified the location identification server) prior to sending the updating signal to "filter" out "redundant" signals. Rachabathuni, 9:67-10:12. If the updating signal is not redundant and thus not filtered, it includes an indication of the new area the mobile station determines it has entered (*the result of a previous determination performed by the mobile station about the mobile station's presence in the first special area*). Rachabathuni, 9:67-10:12.

7. Claim 8

[8.0] The method according to claim 1, wherein the updating signal is received in the one or more servers of the provider of presence related services via the mobile telephone network from the mobile station at least one of (i) periodically, (ii) at times recent to when the mobile station enters into or exits from the special area, and (iii) when the mobile station remains in the special area.

141. As discussed in [1.4], Rachabathuni teaches that the wireless device passes beacon information to the location identification server (*the one or more servers of the provider of presence related services*) via the cellular network. Rachabathuni, 7:23-25. This occurs when the wireless device enters the range of the beacon (*at times recent to when the mobile station enters into or exits from the* *first special area*).

142. Further, Rachabathuni explains that "[i]n several situations the wireless device is in a position to determining which data is redundant to the location identification server" for purposes of limiting redundant beacon information passed to the server. Rachabathuni, 9:67-10:2. "For instance, a user's wireless device may implement a simple filter that follows the rule '**transmit only once a minute**'" (*periodically*) such that transmissions do not occur too quickly as a device passes through wireless beacon ranges quickly. Rachabathuni, 10:3-13. Rachabathuni's "transmit only once a minute" principle is also applied when the mobile station remains in the same location, meaning that beacon information is passed *when the mobile station remains in the first special area* for a time (*i.e.*, one minute). Rachabathuni, 10:3-13.

8. Claim 9

[9.0] The method according to claim 1, wherein the updating signal comprises a request to access to a multimedia content and the provider of presence related services enables or disables the provision of the multimedia content depending on the presence of the mobile station in the special area.

143. As discussed in [1.6], in the combination, Rachabathuni describes the proximity server (part of *the provider of presence related services, see* [1.0]) reconfiguring wireless beacons to *enabl[e] or disabl[e]…service[s] depending on the presence of the mobile station in the first special area*. Further, Rachabathuni's teachings are not limited to services, but further relate to applications that would include *multimedia content*. For instance, Rachabathuni contemplates an implementation of applications where an HTML page (*multimedia content* including text and images) is accessible based on proximity to wireless beacons, or specific maps or other information (*multimedia content*) is provided to a mobile phone based on location. Rachabathuni, 1:24-2:5; *see, e.g.*, Giannandrea (Ex.1073), 2:30-36 (describing an HTML page as including "text and at least one image"); Puri (Ex.1074), (describing HTML pages including "text" and "images").

144. In addition, Rachabathuni teaches that the message sent by the mobile station when it is in range of a beacon (*the updating signal*, *see* [1.5]) acts as *a request*, because the proximity server responds by configuring the wireless beacon to enable the appropriate applications (and corresponding *multimedia content*) for the mobile station in that particular location. *See* Rachabathuni, 8:58-67, FIG. 14.

9. Claim 10

145. As discussed above in Ground 1, Claim 10 is substantially similar to claim 1, with differences addressed in the analysis below. *See* VIII.A.12; Ex.1064 (comparison). The analysis below addresses the added material in limitations [10.2]-[10.3]. Further, limitations [10.3]-[10.4] remove "of the provider of presence related services" following "the one or more servers," though that language appears in limitations [10.1]. Ex.1064 (comparison). Accordingly, the limitations with deleted elements are rendered obvious for the same reasons as discussed above with respect to claim 1.

[10.2] transmitting to the mobile station from the one or more servers at least a portion of the checking data,

146. Rachabathuni teaches "a proximity alert application" that sends proximity alerts to a user's wireless device from the location identification server (*transmitting to the mobile station from the one or more servers*) based on the presence of the user. Rachabathuni, 8:15-50, FIG. 13. As reflected in FIG. 13, the location identification server 91, "upon receipt of new information, determines the proximity between the user and all the users and locations user expressed desired having alerted about." Rachabathuni, 8:43-46. "If the application determines any of **the locations…are in the proximity of the user, the user is alerted**." Rachabathuni, 8:46-48. These alerts contain *at least a portion of the checking data* because, as discussed in [1.2], *the checking data* includes "a **location identification field** 103" corresponding to a location of a beacon. Rachabathuni, 6:58-64.

[10.3] receiving in the one or more servers from the mobile station via the mobile telephone network an updating signal uncorrelated to any mobile station phone call establishment that identifies the mobile station's presence in the special area, the updating signal including the identifier or other identifier related to the mobile station,

147. Limitation [10.3] is substantially similar to limitation [1.4], additionally reciting *the updating signal including the identifier or other identifier* *related to the mobile station*.

148. As discussed in [1.4] above, Rachabathuni describes that "upon reception of passed beacon information" (the *updating signal*, *see* [1.4]), "the server 91 updates the location database 92 so that the database 92 reflects which wireless beacons wireless device have or had proximity to." Rachabathuni, 7:25-29. The beacon information (*updating signal*) received by the location server from the wireless device includes "location and **user identity information**" (*e.g.*, the "user ID" shown in the database record in FIG. 10) "for inclusion into the database 92" (*including the identifier or other identifier related to the mobile station*). Rachabathuni, 7:58-60.

10. Claims 13-18

149. Claims 13-18 are rendered obvious for the same reasons as discussed with respect to claims 4-9. *See* VIII.A.6-11; Ex.1064 (comparison).

D. Ground 4: Claims 2-3 and 11-12 are obvious over Rachabathuni and Granberg

1. The combination of Rachabathuni and Granberg

150. In the combination, Rachabathuni's proximity server maintains information in the location database 91, including activating or deactivating a "network-specific indicator" associated with a particular service for a particular mobile station depending on the presence of the mobile station in a location where the particular service is configured to be provided to the particular mobile station, based on the teachings of Granberg. *See* Rachabathuni, 8:58-67, FIGS. 10, 14; Granberg, 7:45-54.

2. Reasons to combine Rachabathuni and Granberg

151. In my opinion, a POSITA would have found it obvious to implement the functionality described above with Rachabathuni's proximity server and location database based on the teachings of Granberg.

152. As previously discussed, Granberg is analogous art. *See* §VIII.B.3.

153. In my opinion, a POSITA would have been motivated to implement functionality with Rachabathuni's proximity server and location database to activate or deactivate a "network-specific indicator" associated with a "network-based service" for a particular mobile station depending on its presence, based on the teachings of Granberg. *See* Rachabathuni, 8:58-67, FIGS. 10, 14; Granberg, 7:45-54. A POSITA would have recognized that maintaining "network-specific indicators," like those taught in Granberg, with Rachabathuni's location database would provide an easily comprehensible summary of the status of particular services for a particular mobile station based on its location in the form of a list of flags (one for each service) indicating whether each service is currently enabled or disabled. *See* Rachabathuni, 8:58-67, FIGS. 10, 14; Granberg, 7:45-54. A POSITA would have recognized that such a status summary would benefit administrators of Rachabathuni's system by enabling them to easily determine which services were currently being provided to the mobile station in a particular location, thereby facilitating verification and troubleshooting of service configurations in Rachabathuni's system. *See* Rachabathuni, 8:58-67, FIGS. 10, 14; Granberg, 7:45-54; O'Toole (Ex.1039), 16:38-42 (describing the utility of a "status table" for "troubleshooting" network services).

154. This modification to Rachabathuni represents a simple combination of prior art elements (Rachabathuni's service server with Granberg's service configuration functionality), according to known methods to yield predictable results (Rachabathuni's service server activating and deactivating services in the HLR based on the current network of the mobile station, as taught by Granberg)..

155. Further, a POSITA would have been motivated to implement functionality based on the Granberg's "service configuration" feature with Rachabathuni's proximity server to achieve the same benefits and improve Rachabathuni's system in the same way as the similar system of Granberg.

156. A POSITA would have had a reasonable expectation of success in making such a combination because Granberg teaches a system operating in the proposed manner. Granberg, 6:3-15, 7:34-54. In my opinion, the combination is nothing more than the predictable use of prior art elements according to their established functions.

3. Claim 2

[2.0] The method according to claim 1, wherein the one or more processing devices has access to at least a portion of the data and updates at least one operating parameter in a database of the provider of presence related services depending on the presence of the mobile station in the special area.

157. As previously discussed in [1.4], Rachabathuni teaches that "[u]pon reception of passed beacon information" (*the updating signal*), the location identification server 91 (including *one or more processing devices*) "**updates the location database 92**" (*a database of the provider of presence related services*) "so that the database 92 **reflects which wireless beacons wireless device have or had proximity to**" (*updat[es]* the database *depending on the presence of the mobile station in the first special area*). Rachabathuni, 7:25-29.

158. In the combination, Granberg teaches a database including "one or more **network-specific indicators**" (*operating parameters*) "*e.g.*, one or more flags, corresponding to one or more network-specific services." Granberg, 7:45-48. "Each network-specific indicator is then **set or activated when that subscriber**" (*e.g.*, the mobile station) "**is to receive a corresponding network-based service**," such as when the mobile station is the first special area as taught by Rachabathuni. Granberg, 7:49-53; Rachabathuni, 6:58-64, FIG. 10. Or, "[i]f that subscriber" (the mobile station) "**is not to receive the service**" at the particular location, "**the flag is reset or otherwise deactivated**." Granberg, 7:53-54; Rachabathuni, 6:58-64, FIG. 10.

159. Accordingly, in the combination, the location database of Rachabathuni includes an *operating parameter* in the form a flag corresponding to a service (*a service flag*) that is either "set"/"activated" or "reset"/"deactivated" (*update[d]*), as taught by Granberg, based on the location of the mobile station. Granberg, 7:53-54; Rachabathuni, 6:58-64, FIG. 10.

4. Claim 3

[3.0] The method according to claim 2, wherein the operating parameter is a tariff flag or a service flag that enables or disables a special tariff or a service for the mobile station.

160. As previously discussed in [2.0], in the combination, Granberg teaches a database including "one or more network-specific indicators" (*operating parameters*) "*e.g.*, **one or more flags, corresponding to one or more network-specific services**" (*a service flag*). Granberg, 7:45-48. "Each network-specific indicator is then **set or activated when that subscriber**" (the mobile station) "**is to receive a corresponding network-based service**," such as when the mobile station is the first special area as taught by Rachabathuni. Granberg, 7:49-53; Rachabathuni, 6:58-64, FIG. 10. Or, "[i]f that subscriber" (the mobile station) "**is not to receive the service**" at the particular location, "**the flag is reset or otherwise deactivated**." Granberg, 7:53-54; Rachabathuni, 6:58-64, FIG. 10.

161. Accordingly, in the combination, the location database of Rachabathuni includes an *operating parameter* in the form a flag corresponding to a service (*a service flag*) that is either "set"/"activated" or "reset"/"deactivated" (*update[d]*), as taught by Granberg, based on the location of the mobile station. Granberg, 7:53-54; Rachabathuni, 6:58-64, FIG. 10.

5. Claims 11-12

162. Claims 11-12 are rendered obvious for the same reasons as discussed with respect to claims 2-3. *See* VIII.D.3-4; Ex.1064 (comparison)

IX. CONCLUSION

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.