

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

Petitioner

IPR2025-01258

U.S. Patent No. 9,622,032

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

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

I. INTRODUCTION

1. I am making this declaration at the request of Apple Inc. in the matter of the *Inter Partes* Review of U.S. Patent No. 9,622,032 (“the ’032 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 1-6 (“the Challenged Claims”) of the ’032 patent would have been obvious to a person having ordinary skill in the art (“POSITA”) at the time of the alleged invention, in light of the prior art. It is my opinion that the Challenged Claims would have been obvious to a POSITA.

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

- the ’032 patent, Ex.1001;
- the prosecution history of the ’032 patent (“’032 File History”), Ex.1002;
- U.S. Patent No. 8,615,256 to Putkiranta (“Putkiranta”), Ex.1005;

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- U.S. Patent Publication No. 6,122,510 to Granberg (“Granberg”), Ex.1037;
- U.S. Patent Publication No. 2006/0135174 to Kraufvelin et al. (“Kraufvelin”), Ex.1006;
- Canadian Publication No. CA2523595 to Duan (“Duan”), Ex.1015;
- International Publication No. WO2000/027152 to Vimpari et al. (“Vimpari”), Ex.1010;
- U.S. Patent Publication No. 2006/0014531 to Nam et al. (“Nam”), Ex.1013; and
- U.S. Patent Publication No. 2010/0167725 Noldus et al. (“Noldus”), Ex.1038.

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:

- U.S. Patent No. 6,230,017 to Andersson et al. (“Andersson”), Ex.1007;
- 3GPP TS 23.171, version 3.10.0 (Jun. 2003), Ex.1018;
- 3GPP TS 23.171, version 1.0.0 (Oct. 1999), Ex.1019;
- 3GPP TS 23.032, version 3.0.0 (May 1999), Ex.1021;

- U.S. Patent No. 6,345,294 to O’Toole (“O’Toole”), Ex.1039;
- U.S. Pub. No. 2002/0126691 to Strong (“Strong”), Ex.1042;
- U.S. Patent No. 5,787,354 to Gray et al. (“Gray”), Ex.1043;
- U.S. Patent No. 6,526,267 to Jokimies et al. (“Jokimies”), Ex.1044;
- U.S. Patent No. 6,493,550 to Raith (“Raith”), Ex.1047;
- U.S. Patent No. 5,781,536 to Ahmadi et al. (“Ahmadi”), Ex.1048;
- 802.11 WLANs and IP Networking Security QoS and Mobility (“Prasad”), Ex.1049;
- Packet Data Transmission Over Mobile Radio Channels (“Goodman”), Ex.1050;
- Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems (4th ed. 2004) (“Fundamentals of Database Systems”), Ex.1066;
- Hermann Maurer et al., From Databases to Hypermedia (1st ed. 1998) (“Introduction to Databases”), Ex.1067; and
- Wen-Hsiang Kevin Liao, Dennis McLeod, Chapter 1.2 - Introduction to Databases, Editor(s): Michael A. Arbib, Jeffrey S. Grethe, Computing the Brain, Academic Press, 2001 (“Liao”), Ex.1068.

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 '032 patent and relevant excerpts of the prosecution history of the '032 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 '032 patent (which I further describe below).

III. LEVEL OF ORDINARY SKILL IN THE ART

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

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

25. A POSITA in the field of the '032 patent, as of its earliest possible priority date of March 28, 2006¹, would have been someone knowledgeable and familiar with using geolocation in the provision of location-based services in a wireless communications network (e.g., a cellular telephone network or Wi-Fi network). Such a POSITA would have a bachelor's degree in electrical engineering, computer science, computer engineering, or a related field, and two years of experience relating to research, design, and development of wireless communications networks. Additional work experience can substitute for specific educational background, and vice versa.

26. For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my own experience and what a POSITA would have understood or known generally (and specifically related to the references I consulted herein), reflect the knowledge that existed in the relevant field as of the priority date of the '032 patent.

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

IV. RELEVANT LEGAL STANDARDS

27. I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the '032 patent, I am relying on certain basic legal principles that Apple's counsel has explained to me.

28. I understand that prior art to the '032 patent includes patents and printed publications in the relevant art that predate the priority date of the '032 patent. For purposes of this Declaration, I am applying March 28, 2006, as the priority date of the '032 patent.

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

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

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

V. BACKGROUND

31. In cellular networks, the location of a mobile device may be estimated based on its interaction with the network's base stations (e.g., cell towers in a cellular telephone network). TS23.171 standard (Ex.1018), 7. For example, each base station generally broadcasts a signal used by mobile devices to detect nearby base stations. Ex.1005 ("Putkiranta"), 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; Ex.1006, ("Kraufvelin"), [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.

32. These techniques, referred to as “location services,” were well-known as early as the 1990s. In fact, by 1999, the 3rd Generation Partnership Project (3GPP), a standards organization for mobile telecommunications, issued multiple technical specifications standardizing aspects of location services. *See* 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 ’032 patent simply rehashes “location services” techniques that were well-known—and some that were even standardized—well before its earliest alleged priority date (March 28, 2006).

VI. THE ’032 PATENT

33. The ’032 patent “relates to a method for monitoring a mobile station presence in a special area.” Ex.1001 (“’032 patent”), 1:25-26. In particular, the ’032 patent discloses a well-known technique in which checking data for determining whether the mobile station that is in a special area is stored in the mobile station rather than in a radio communication defining device. Ex.1001, 2:53-64 (describing

storing checking data on the mobile station rather than a radio communication defining device); Section V *supra* (explaining how this technology was well-known).

34. Specifically, the '032 patent discloses a mobile telephone network that includes various base stations (where “any base station 107 or 105 of a mobile telephone network of an operator is a radio communication defining device”) that “transmit[] a radio defining signal in a channel used by the mobile telephone network.” Ex.1001, 6:18-21. A subset of the base stations transmit a “distinctive radio defining signal” that “compris[es] a special mobile telephone network identification code” such that “[t]he sum of the coverage of these selected base stations 105 defines a special area.” Ex.1001, 6:13-28. The “special mobile telephone network identification code” associated with the base stations defining the special area is stored as “checking data” in the mobile station. Ex.1001, 6:29-30; 6:56-59 (“The checking data (i.e. IC2) is stored into an internal mobile station database included in mobile station 100 storing means, this mobile station 100 being associated to this special area.”). If the mobile station is in the special area, an operator can offer, for example, a lower billing rate to the user of the mobile station. Ex.1001, 7:34-41 (“For example, a mobile telephone network operator can use this embodiment of the invention to offer one set of normal billing rates in an urban environment of a country, and another set of special billing rates for a rural

environment.”); *see also* 11:62-67 (“An operator of a mobile telephone network (i.e. the company that operates this mobile telephone network) wishes to propose special billing rates and/or special services to users of its mobile telephone network, each user carrying a mobile station, when said users are within special areas of the invention.”). An exemplary mobile telephone network is shown in Fig. 1 below:

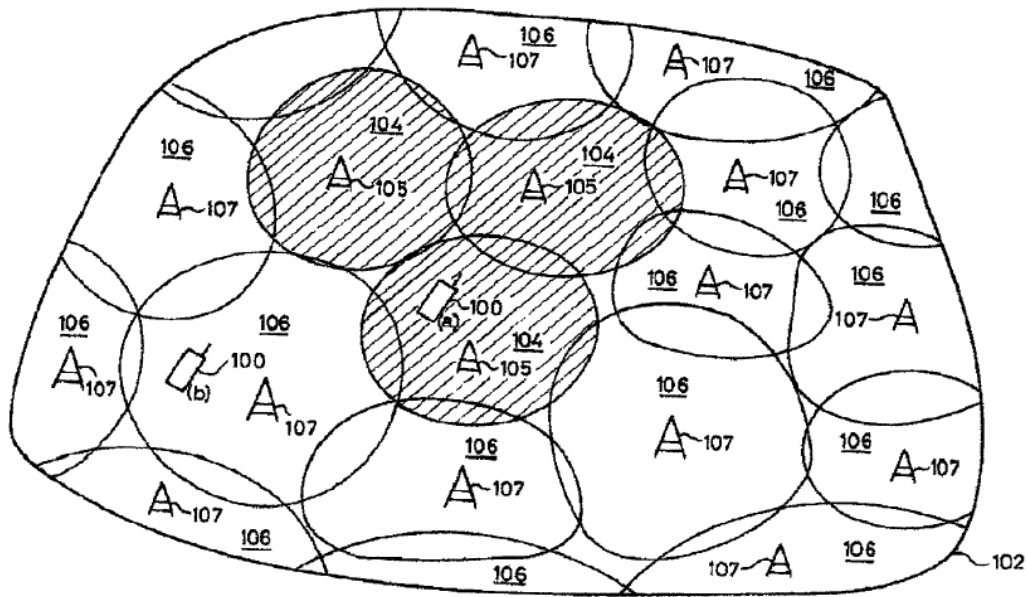


FIG. 1

'032 patent, Fig. 1

35. The mobile telephone network includes “a server” that is “centralized and not distributed between each base station of the mobile telephone network.” Ex.1001, 11:56-61. The '032 patent indicates that the server “may be operated by the mobile telephone network operator or by a different provider.” Ex.1001, 4:34-42; 19:49-53 (“In another embodiment of the invention, the special operating means are distributed into different servers **of the mobile telephone network or of service**

providers associated with the mobile telephone network and an updating signal may be sent to any of those servers.”).

36. The server includes a “parameters database [that] associate[s] each special area defined with the mobile stations whose presence in such special area is monitored.” Ex.1001, 12:13-16. In particular, “each mobile station identifier is associated with special tariffs and/or services which may be or not available for the mobile station depending on the presence of such mobile station into a given special area.” Ex.1001, 12:16-25. The parameters database includes “operating parameter(s) that may be adapted depending on the presence of the mobile station in one or more special areas at the same time may be notably related to activation or deactivation flags of tariffs and/or services provided to the mobile station by the mobile telephone network.” Ex.1001, 12:26-35, 18:16-19:48 (describing one particular embodiment of the parameters database shown in Fig. 6).

37. Therefore, the mobile station monitors the defining signals from the base stations as it moves through the network and compares the identification code received from the base station to the stored checking data. Ex.1001, 15:38-50 (“In step 512, the mobile station decide [*sic*] if it receives a defining signal (possibility 516) or not (possibility 514) after observing and processing any signal received.”). “If the mobile station is...inside the special area, the mobile telephone network identification code received is equal to [the stored checking data] and therefore the

mobile station 100 determines that it is into the special area.” Ex.1001, 6:62-7:7; *see also* 15:51-58 (“Then, in step 520...the mobile station decides whether (possibility 524) or not (possibility 522) the defining signal received is a distinctive defining signal that defines a special area for this mobile station, therefore validating or not the defining signal received as a distinctive defining signal.”).

38. When the mobile station determines that it is in the special area, it “sends and [*sic*] updating signal to the mobile telephone network about its presence in the special area.” Ex.1001, 16:14-16. This updating signal may be sent to the server via various channels in the mobile telephone network. Ex.1001, 16:60-67 (“The updating signal may be sent through a diversity of channels provided by the mobile telephone network.”). The server then “adapt[s] the operation parameters of the special areas database” based on the updating signal and “send[s] an acknowledgement” to the mobile station. Ex.1001, 17:15-27 (“When the acknowledgment is received (possibility 531) into the mobile station, the mobile station knows in step 534 that the [server] will make the appropriate adaptations in the operating parameters of the special areas database.”); 17:34-43 (similar). Then, “the mobile telephone network may enable or disable to the mobile station to use predetermined services depending on the presence of the mobile station into a special area.” Ex.1001, 17:44-47.

39. However, “[i]f the acknowledgement is not received in the mobile station (possibility 532) because the updating signal does not reach the [server] or the mobile station detects a failure in the transmission of the updating signal or there is a failure in the transmission of the acknowledgment, then the mobile station may send the updating signal again.” Ex.1001, 17:7-14.

40. Additionally, “the mobile telephone network sets the values of the operating parameters managed in the parameters database to a set of initial values when the mobile station is switched off (as at that time it is not present in any special area) in order to start operating the mobile station when it is just switched on.” Ex.1001, 15:21-27.

41. Moreover, the '032 patent explains that “the operator can modify a special area” stored in the mobile station. Ex.1001, 14:26-29. First, the operator “defines such modified special area,” by, for example, adding checking data to the previous checking data or by erasing the previous checking data and adding new checking data. Ex.1001, 14:29-43. Then, “the operator updates the parameters database in order to include, if known, the new checking data associated to the mobile station and the modified special area.” Ex.1001, 14:44-48. Next, the server then “send[s]...the new checking data to the mobile station using the mobile telephone network” so that it can be stored in the memory of the mobile station. Ex.1001, 14:49-57. Finally, the mobile station stores the new checking data, thereby

modifying the special area in the storage of the mobile station.” Ex.1001, 14:53-57 (“Once the new checking data has been successfully stored into the part of the internal mobile station database that contains the checking data linked to the special area that has to be modified, a confirmation of modification of checking data is sent to the parameters database.”).

VII. CLAIM CONSTRUCTION

42. It is my understanding that in order to properly evaluate the ’032 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 ’032 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

43. In the following paragraphs of this Declaration, I provide a detailed analysis of how the asserted prior art references teach each limitation of the Challenged Claims.

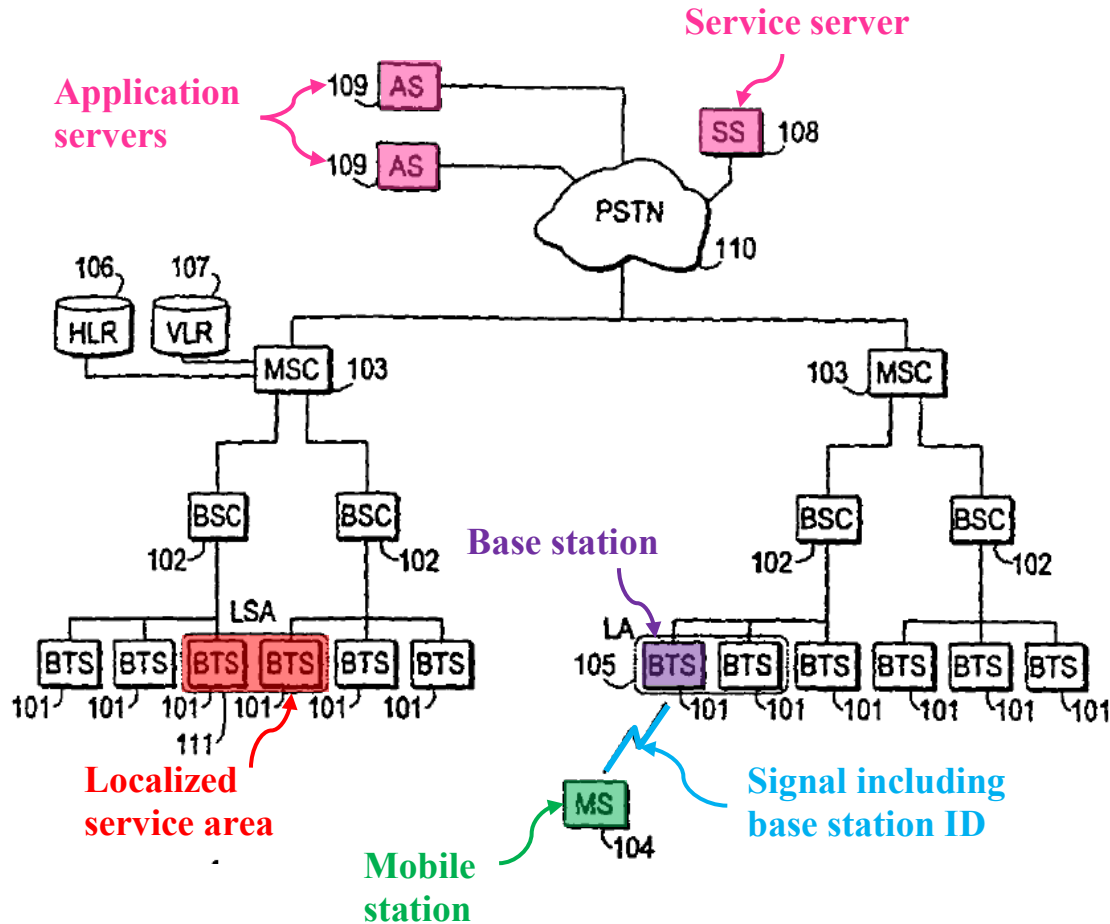
44. As part of my analysis, I have considered, and discuss in detail, the scope and content of the prior art and any differences between the alleged invention and the prior art.

45. 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 '032 patent.

IX. GROUND 1: CLAIMS 1-3 ARE UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF PUTKIRANTA, GRANBERG, AND KRAUFVELIN

A. Summary of Putkiranta

46. 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. Fig. 1 below shows a “cellular radio system” used to practice the method (Putkiranta, 4:13):



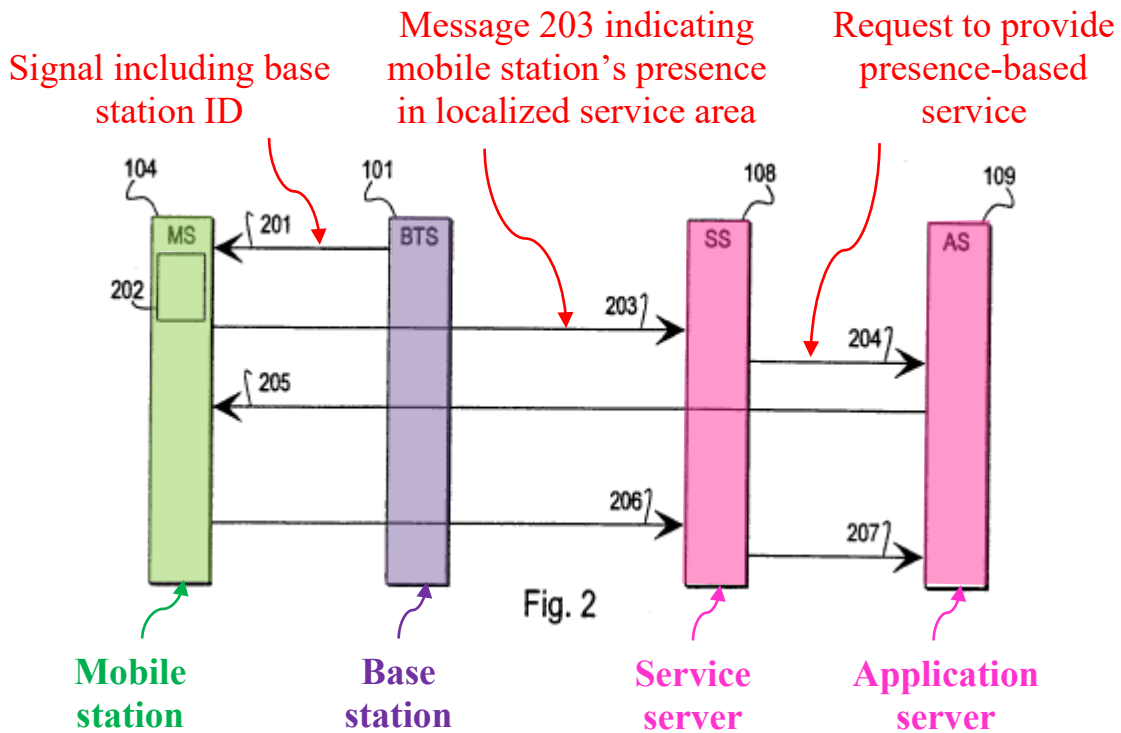
Putkiranta, Detail of Fig. 1 (annotated)

47. Putkiranta describes a “localized service area” (e.g., 111) as a geographic area in which certain services are to be provided to mobile stations (MS) 104 currently located in that area. Putkiranta, 3:8-15 (“In response to a positive identification the user's mobile station sends a message addressed to an apparatus responsible for providing localized services in the network.”). The localized service area can 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 (explaining that the “service area always comprises a certain cell or certain cells.”).

48. 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 (“Block 202 refers to the comparison at the mobile station with an identifier list, or some other activity on the basis of which the mobile station detects that it has arrived in a certain localized service area.”). 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 (“In response to that observation the mobile station sends to the service server a message 203”). 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)

B. Summary of Granberg

49. Granberg describes a “mobile communications network 10” that includes a “database that stores and manages subscriptions” for a number of subscriber devices (e.g., cell phones). Granberg, 5:38-40, 6:3-4. Granberg states 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.

50. Granberg explains that “when a mobile station enters into a visiting location or service area,” a request is sent for data about the roaming mobile station from the mobile’s home location register (HLR), which triggers the HLR’s updating of the “network-specific indicators” to activate or deactivate “network-based services” as appropriate for the particular network where the mobile station is operating within. Granberg, 5:61-64, 7:34-54, 8:11-22.

C. Summary of Kraufvelin

51. Kraufvelin describes a method and system similar to Putkiranta in which a mobile station notifies the network when it is within the coverage area of a base station (e.g., when it receives a signal including the base station’s identifier) included within an “area of interest” (similar to Putkiranta’s “localized service area”). Kraufvelin, Abstract (“A method of providing information regarding a mobile station adapted for communication via a communication system is provided.

In the method an area even [*sic*] notification request is received at a location service entity provided in association with the communication system, the area event notification request containing information associated with the identity of the mobile station and an area of interest. Monitoring for an even [*sic*] indicative of a change in the presence status of the mobile station relative to said area of interest is then activated. A notification is signalled in response to detection of such event.”), [0060] (“The list of cells may then be sent to the mobile station 1 to register the ‘area event trigger’. When the Cell ID is updated as the subscriber is moving the mobile station 1 will check the new Cell ID against the list. If there is match, the mobile station 1 sends a report back to the network.”). 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].

D. Reasons to Combine Putkiranta, Granberg, and Kraufvelin

52. In my opinion, a POSITA would have been motivated to combine the teachings of Putkiranta, Granberg, and Kraufvelin for several reasons, which are described in depth below. First, combining Granberg's implementation details for maintaining records in a database that tracks mobile stations with Putkiranta's service profile teachings would have been obvious, beneficial, and predictable. Putkiranta describes storing service profiles for mobile stations in a service server, leaving implementation details up to a POSITA. Thus, a POSITA would have been motivated to turn to Granberg's well-known database teachings as a way to store those service profiles. Second, combining Kraufvelin's implementation details for sending updated cell identifiers with Putkiranta's location-based service teachings would have also been obvious, beneficial, and predictable. Putkiranta explains that an updated list of cell identifiers may be sent to the mobile station to accommodate changes in the coverage of the network's base stations, but leaves implementation details for this process up to POSITAs. Thus, a POSITA would have been motivated to implement this process according to Kraufvelin's teachings of sending updated cell identifiers.

1. Putkiranta, Granberg, and Kraufvelin are analogous art to the '032 patent.

53. As a threshold matter, Putkiranta, Granberg, and Kraufvelin are analogous art because they are in the same field of endeavor as the '032 patent,

namely monitoring the presence of a mobile station in a particular area. The '032 patent “relates to a method for monitoring a mobile station presence in a special area.” Ex.1001, 1:25-29; *see also* Abstract. Similarly, Putkiranta is directed “to the provision and delivery of services offered by a network to a mobile station” and, “the utilization of information concerning the location of a mobile station for the purpose of providing services.” Putkiranta, 1:16-20. Additionally, Granberg “relates to providing services to mobile stations in a mobile communications system,” specifically by selectively providing services to the mobile stations based on their location. Granberg, 1:20-23, Abstract (describing a method for selectively providing services to “mobile communication units” when roaming on networks outside their home network). Like Putkiranta and Granberg, Kraufvelin also “relates to provision of information regarding a mobile station” adapted “to signalling of information that is generated based on the geographical location of the mobile station in response to a predetermined event such as entering or leaving a geographical area.” Kraufvelin, [0001]; *see also* Abstract.

54. Moreover, Putkiranta, Granberg, and Kraufvelin are reasonably pertinent to the problem that the '032 patent purports to address. The '032 patent states that one problem it attempts to solve is how to add special areas without modifying the base stations broadcasting in those areas—an approach that lacks flexibility. Ex.1001, 2:6-11 (“However, this last technical solution does not allow

the mobile network, to add for a mobile station one or more special areas wherein the presence of a mobile station is monitored without having to at least modify one or more guide units broadcasting in such areas. It lacks therefore of flexibility.”).

55. Putkiranta provides a solution that addresses this lack of flexibility, teaching that the mobile stations store information for determining their own locations, allowing the initial location determination to be made by the mobile station rather than the network. Putkiranta, 2:9-18 (“An object of the present invention is to provide 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, without placing large requirements to the network. The objects of the invention are achieved by storing in the memory of the mobile station the information on the basis of which it recognizes that it is situated in a given localized service area.”). Granberg provides a similar solution, describing databases that are used “to more efficiently store information for network-specific information supplementary services for large numbers of mobile subscribers” and also “efficiently administer and update network-specific supplementary services” for those subscribers. Granberg, 3:57-63, 4:10-29; *see also* 4:48-59 (describing “reduc[ing] considerably the amount of data that must be stored in the HLR”). Kraufvelin, likewise, provides a solution that overcomes various problems with location-based services, including, for example, “excessive load into the resources of the communication network,” by sending information to

the mobile station so that it may determine when it is in an area where location-based services are provided. Kraufvelin, [0012]-[0013] (“All proposed [prior art] solutions are based on polling mechanisms and/or they are introducing requirements for new architectural aspects to the communication standards.”), [0055]-[0061] (describing a system in which a list of cells defining a particular geographic area are sent to the mobile station so that the mobile station can monitor its presence in that area). Thus, in my opinion, Putkiranta, Granberg, and Kraufvelin each provide the types of solutions that are reasonably pertinent to problems identified by the ‘032 patent.

2. A POSITA would have been motivated to combine the teachings of Putkiranta with the teachings of Granberg.

56. In my opinion, a POSITA would have been motivated to turn to Granberg’s database teachings for implementation details for Putkiranta’s service server teachings.

57. Putkiranta discloses a service server that “maintain[s] information about which mobile stations are in which localized service areas and which services should be offered to them accordingly” in a “service profile” for each user. Putkiranta, 6:22-25, 6:42-44. It would have been obvious to a POSITA that the information stored in Putkiranta’s service profile would have included at least the (1) mobile station identity, (2) localized service areas, and (3) services offered in each localized service area. This information would have been required for Putkiranta’s service server to know what services to provide to the mobile station

when it enters the localized service area. A POSITA also would have recognized that the service server would have stored this information such that the localized service areas are associated with the services offered therein and such that the localized service areas are associated with the mobile station to which the services are to be provided.

58. A POSITA would have known that a database is a straightforward way to store and maintain Putkiranta's service profiles associated with mobile stations. The term "database" refers to a variety of structures that store a collection of related data. Ex.1066 ("Fundamentals of Database Systems"), 4-5; Ex.1067 ("Introduction to Databases"), 4 ("If the data is a collection of related facts about some enterprise (e.g. a business, an organisation, an activity, etc), then it is called a database."). Well before the priority date of the '032 patent, databases were ubiquitous and would have been a fundamental concept for a POSITA. *See e.g.* Ex.1007 ("Andersson"), 2:24-39 (describing storing "geographical restriction information" for a "mobile subscriber" in a "database"), 4:61-5:4 (describes storing the current location of a mobile subscriber in a "database"); Ex.1068 ("Liao"), 3 ("Collecting and analyzing information using computers is facilitated by current Database Technology, a **relatively mature technology** which is the subject of this book.") (emphasis added). Thus, because several pieces of information would have needed to be stored in association to provide location-based services to a mobile station, a POSITA would

have found it obvious to use a database to store the information in Putkiranta's service server.

59. Granberg provides examples of these well-known database structures. For example, Granberg discloses “a database that stores and manages subscriptions” for each mobile subscriber, including the “unique identity allocated to each subscriber” and “a list of services which a mobile subscriber is authorized to use along with the current subscriber location number corresponding to the VLR address.” Granberg, 6:4-15. Granberg explains that this database stores “network-specific indicators, e.g., one or more flags, corresponding to one or more network-specific services” that are “set or activated when that subscriber is to receive a corresponding network-based service in a network that supports that network-based service” and “reset or otherwise deactivated” when “that subscriber is not to receive the service.” Granberg, 7:45-54.

60. Thus, Granberg's database stores the services offered to the subscriber as “flags” that can be easily enabled or disabled when the mobile station reports that it has entered or exited a particular geographic area. A POSITA would have understood that applying these teachings to Putkiranta's service server teachings would have allowed the service profiles for each user to be stored in a database that associates the required information with the user's mobile station and allows the services to be enabled or disabled depending on the location of the mobile station.

Accordingly, Granberg's database teachings provided the necessary structure for Putkiranta's service servers to maintain service profiles for each user and provide location-based services to the mobile station as its location changes.

61. Applying Granberg's database teachings is simply a practical and conventional way to implement profile management functionality with Putkiranta's service server teachings. Both references operate within the context of cellular networks, where subscriber profiles are routinely maintained in structured databases. Putkiranta, 4:13-34 (describing a "cellular radio system" in which the mobile station and service server operate); Granberg, 5:38-6:2 (describing a "GSM mobile communications network" in which the mobile station and HLR operate). Thus, Granberg's database teachings are compatible with Putkiranta's service server teachings. The use of a database structure like Granberg's to store location-based service data, as Putkiranta and Granberg both teach, is a predictable and routine implementation detail for any system that manages per-user, location-dependent services/tariffs, like Putkiranta. Moreover, implementing predictable and routine databases facilitates efficient verification and troubleshooting of service configurations in the Putkiranta's system. *See* Granberg, 7:44-54; O'Toole (Ex.1039), 16:38-42 (describing the utility of a "status table" for "troubleshooting" network services); Ex.1003, ¶61.

62. A POSITA would have had a reasonable expectation of success using Granberg’s database teachings with Putkiranta’s service profile in Putkiranta’s service server teachings. Putkiranta’s service server would have included a mechanism to store and manage the service profiles that includes location-based service rules—indeed, Putkiranta explicitly discloses this. Putkiranta teaches 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.” Putkiranta, 6:22-25. Specifically, this information is stored in “a service profile” that includes the services and/or tariffs offered to the mobile station in each localized service area. Putkiranta, 6:42-44. A POSITA would have known that Putkiranta’s service profile would have been stored in a structure that relates the required information to the mobile station (i.e., a database).

63. Granberg’s database teachings provide a well-understood, standardized way to store and manage such profiles in a database, which includes fields for flags regarding network-specific services. Granberg, 4:10-29, 6:3-15, 7:45-54. Granberg teaches doing so to provide information regarding the mobile station’s configured services when visiting different network areas. Granberg, 5:61-64 (“Typically, when a mobile station enters into a visiting location or service area, the corresponding VLR requests and receives data about the roaming mobile station from the mobile’s

home location register (HLR) 16 and stores it. As a result, when the mobile station makes a call, the VLR already has the information needed for call set up.”).

64. Moreover, implementing Granberg’s database structure teachings with Putkiranta’s service server teachings leverages established database practices for managing subscriber data in telecommunications networks. The service server’s function of determining which services to offer based on location naturally fits with the use of a profile record that includes allowed locations and service flags. Thus, a POSITA would have been motivated to combine Granberg with Putkiranta as a straightforward implementation for managing service profiles.

3. A POSITA would have been motivated to combine the teachings of Putkiranta and Granberg with the teachings of Kraufvelin.

65. 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 have provided a system where the mobile station has an up-to-date and accurate list of cell identifiers to compare against the cell identifier received by the base station serving the mobile station as it moves through the network. Therefore, combining Kraufvelin’s and Putkiranta’s teachings ensures that, even as the network changes the base stations that cover particular areas, location-based services remain reliable and accurate.

66. Putkiranta teaches storing a list of “base station specific identifiers...in the mobile station” so that the mobile station can “compar[e] the received identifier with the list in memory” to “find[] out whether it is located in a certain localized service area.” Putkiranta, 5:1-8. Further, Putkiranta explains that, in some cases, the network changes the base station identifiers associated with a particular area. Putkiranta, 5:14-22. For example, Putkiranta explains that “the communications capacity of the localized service area [may be] increased by establishing a new base station in the area.” Putkiranta, 5:14-22. If the network changes, the list of identifiers stored in the mobile station may not accurately describe the area and, thus, will also need to be changed. Putkiranta, 5:14-22. Putkiranta explains that an updated list of identifiers is sent to the mobile station to accommodate for the network changes. Putkiranta, 5:14-22 (describing “send[ing] the identifier of the new base station to each mobile station to which the localized service area has been assigned”). However, Putkiranta leaves implementation details for this process of sending the updated list to the mobile station up to POSITAs.

67. A well-known way to provide such updates was to send updated lists from the source (e.g., Putkiranta’s service server) to every impacted mobile station. A POSITA would have understood that the network sending updates to a centralized server would reduce the burden on the network. Instead of the network sending updated cell identifiers for the area to each mobile station, the network sends the

updated cell identifiers to the centralized server, which can then carry out the process of updating the identifiers in each affected mobile station. Moreover, because Putkiranta's service server maintains service profiles for each subscriber that stores information regarding the identity of the mobile station and the localized service areas where the mobile station receives services, the service server stores the information necessary to identify the mobile stations affected by the network update. Thus, the service server would have updated its own records based on the network update and would have sent a message to the mobile station with the updated list of cell identifiers. A POSITA would have understood that this is an efficient and straightforward method for implementing changes to the network throughout the location-based services system.

68. Kraufvelin teaches an exemplary process by which a centralized server sends a new list of cell identifiers to a mobile station to update the list stored therein. Kraufvelin describes a system in which location services are provided to a mobile station. Kraufvelin, [0046] ("FIG. 1 also shows a location services (LCS) node 12 providing location services for different applications or clients 8. In general terms, the LCS node can be defined as a function or entity capable of providing information concerning the geographical location of a mobile station."). In particular, "a list of Cell Ids" is generated for a geographic area and "the list of cells may then be sent to the mobile station." Kraufvelin, [0054]-[0060]. Then, "as the subscriber is moving

the mobile station 1 will check the new Cell ID against the list” and determine “[i]f there is a match,” indicating the mobile station is in the geographic area where services are to be provided. Kraufvelin, [0060]-[0061].

69. Similar to Putkiranta, Kraufvelin explains that “operators tune their networks on a daily basis,” “mean[ing] that a cell-ID may no longer correspond with the intended geographical area.” Kraufvelin, [0108]. Thus, when the mobile station reports that it is in the geographical area, the network “compar[es] the current cell-IDs of the intended geographical area stored in the network with the cell-ID returned response from the terminal” (i.e., mobile station). Kraufvelin, [0110]. If the cell-IDs don’t match, the network server may “re-issue the deferred location request to the terminal with an updated cell list” or the service provider “may re-issue the original location request and the updated cell-ID information may be provided to the terminal.” Kraufvelin, [0110]-[0111]. This process “ensure[s] that the cell is still within the intended geographical area.” Kraufvelin, [0109]. Thus, Kraufvelin’s teachings provide a straightforward way to accomplish cell identifier updates, consistent with Putkiranta’s “simplest case” that stores cell identifiers in the mobile station’s memory. Putkiranta, 5:3-6.

70. A POSITA would have expected implementing Kraufvelin’s sending teachings with Putkiranta’s service server teachings to succeed, 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 (describing a "cellular radio system" in which the mobile station and service server operate), 6:6-21 ("the mobile station sends to the service server a message 203"), 7:17-20 ("the service server sends regularly or periodically to all mobile stations in a localized service area a short data message which must be acknowledged by the mobile stations"). Similarly, Kraufvelin teaches network elements (e.g., LCS node 12, GMLC 8) communicating location information with a mobile station. Kraufvelin, [0060] ("the message would be passed from the mobile station 1 to the GMLC 12"), [0107]-[0109] ("[T]he cell-ID returned by the terminal is verified by the translating entity (e.g. the SMLC, MSC/SGSN, or GMLC) to ensure that the cell is still within the intended geographical area.... Otherwise the network may either re-issue the deferred location request to the terminal with an updated cell list.").

71. 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] (explaining that the functionality of generating the list of Cell Ids associated with the service area "may be accomplished in any appropriate entity"),

[0085]-[0088] (describing examples in which the functionality is performed by different entities). 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.

E. Detailed Analysis of Claims

1. Claim 1

- a. **[1.0]** *A method associated with a provider of presence related services and a mobile station that stores in a memory first checking data and uses the first checking data to determine whether or not a defining signal received from a radio communication defining device is a distinctive defining signal, the distinctive defining signal at least partly defines a special area by its coverage, the method comprising:*

72. To the extent the preamble (limitation [1.0]) is limiting, it is met, in the combination, by Putkiranta.

73. First, Putkiranta discloses "a method...for making services provided by a network available to the user" based "on the location of the user" (*a method associated with...*). Putkiranta, 2:9-12.

74. Second, Putkiranta discloses a "service server" that "maintain[s] information about which mobile stations [*a mobile station*] are in which localized service areas and which services should be offered to them accordingly" and an

“application server” that provides the service to the user. Putkiranta, 6:22-26. These servers “may be maintained by...a service provider” (*a provider of presence related services*). Putkiranta, 3:31-33.

75. Putkiranta explains that the *mobile station* and the servers (*provider*) communicate with each other over the mobile network via one or more “base transceiver stations (BTS)” (*a radio communication defining device*). Putkiranta, 4:13-34 (“A mobile station (MS) 104 is connected via radio to at least one base transceiver station 101” and “a service server (SS) 108 and application servers (AS) 109 are also connected to the cellular radio network...via the public switched telephone network (PSTN).”). Fig. 1 below illustrates the communication of the mobile station and service and application servers via base stations of the network:

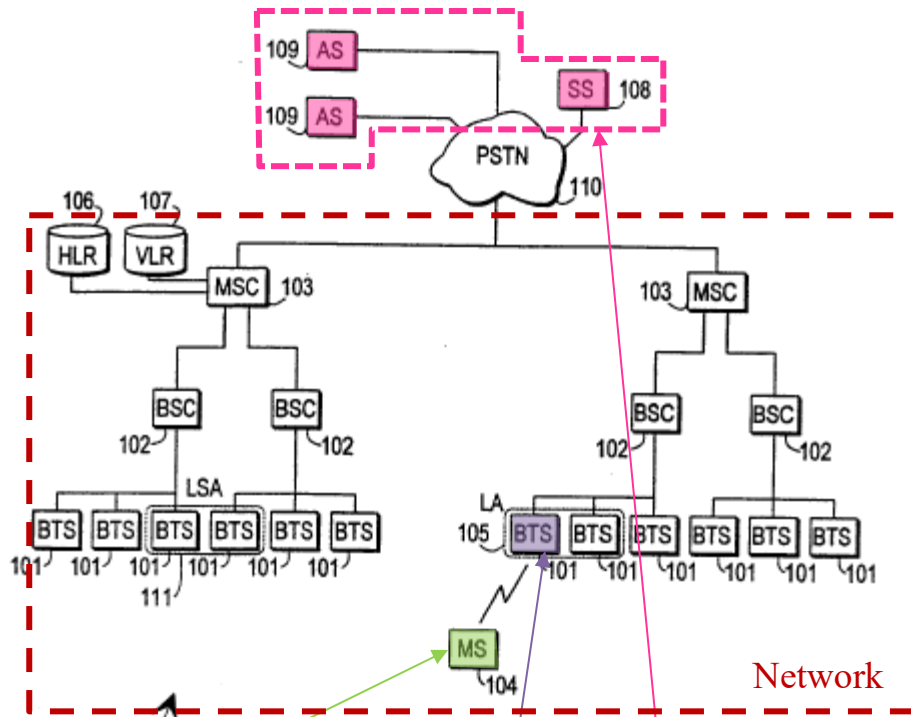
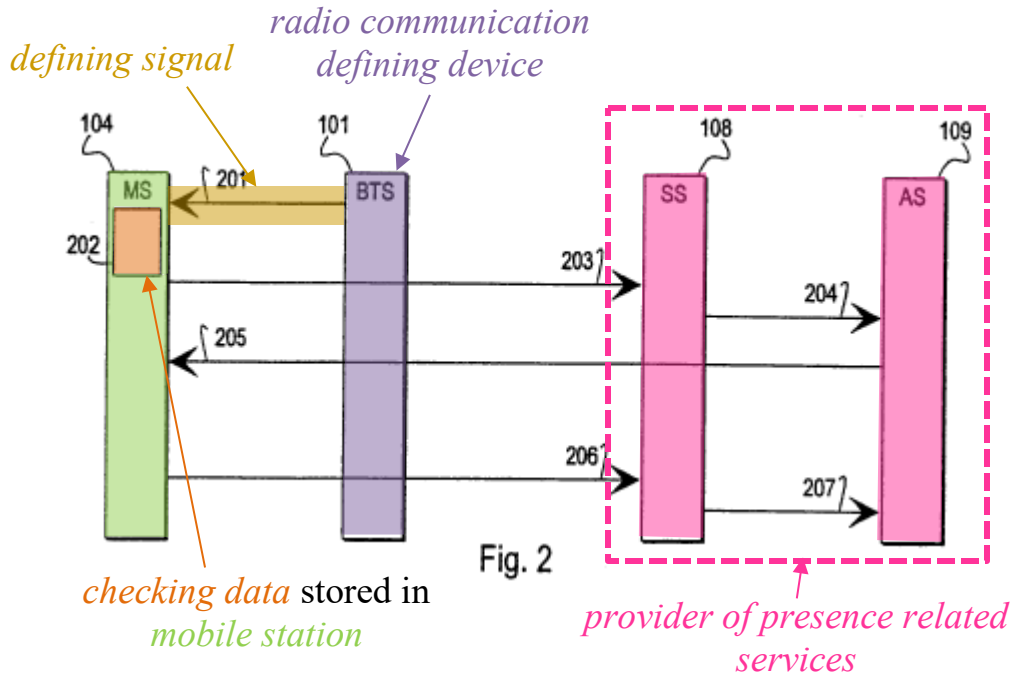


Fig. 1
mobile station
radio communication defining device
provider of presence related services
Network

Putkiranta, Fig. 1 (annotated)

76. **Third**, the base stations covering the current location of the mobile station send a “known general control information message [201]...to the mobile station, comprising a base station specific identifier” (*defining signal*). Putkiranta, 5:65-6:1. Fig. 2 below shows the mobile station receiving message 201 (*defining signal*) from the base station (*radio communication defining device*):



Putkiranta, Fig. 2 (annotated)

77. **Fourth**, Putkiranta explains that “the memory of the mobile station stores a list of the identifiers [*first checking data*] of the base transceiver stations” (*mobile station that stores in a memory first checking data*). Putkiranta, 5:1-6. As the mobile station moves through the network, it moves from the coverage of one base station to the coverage of another base station. The mobile station receives a general control information message 201 from the base station when the mobile station enters the coverage area of that base station. Thus, the base station identifier of the received general control message 201 changes as the mobile station moves from coverage area to coverage area. In other words, as it enters a new coverage area associated with a new base station identifier, the *mobile station* “compar[es] the received identifier [from the current base station] with the list in the memory” to

“find[] out whether it is located in a certain localized service area.” Putkiranta, 5:3-8. Accordingly, if the received identifier matches an identifier in the list, the mobile station determines that it is *distinctive* from the general control messages 201 received from base stations outside the localized service area (*mobile station...uses the first checking data to determine whether or not a defining signal received from a radiocommunication defining device is a distinctive defining signal*).

78. Fifth, Putkiranta teaches that, when the “mobile station (MS) 104 is connected via radio to at least one base transceiver station 101,” “the mobile station [is] 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. Accordingly, the “list of the identifiers of the base transceiver stations” (*first checking data*) stored in the memory of the *mobile station* defines “the cells [that] make a particular localized service area” (*special area*). Putkiranta, 5:1-8; *see also* 4:35-45 (“[A] service area always comprises a certain cell or certain cells.”).

79. Thus, because “the mobile station detects that it has arrived in a certain localized service area” (*special area*) by comparing the received identifier to the stored list of base station specific identifiers (*first checking data*), a base station specific identifier of a general control message 201 that matches an identifier in the list (*distinctive defining signal*) *at least partly defines* the localized service area (*special area*) *by its coverage*. Putkiranta, 6:3-6.

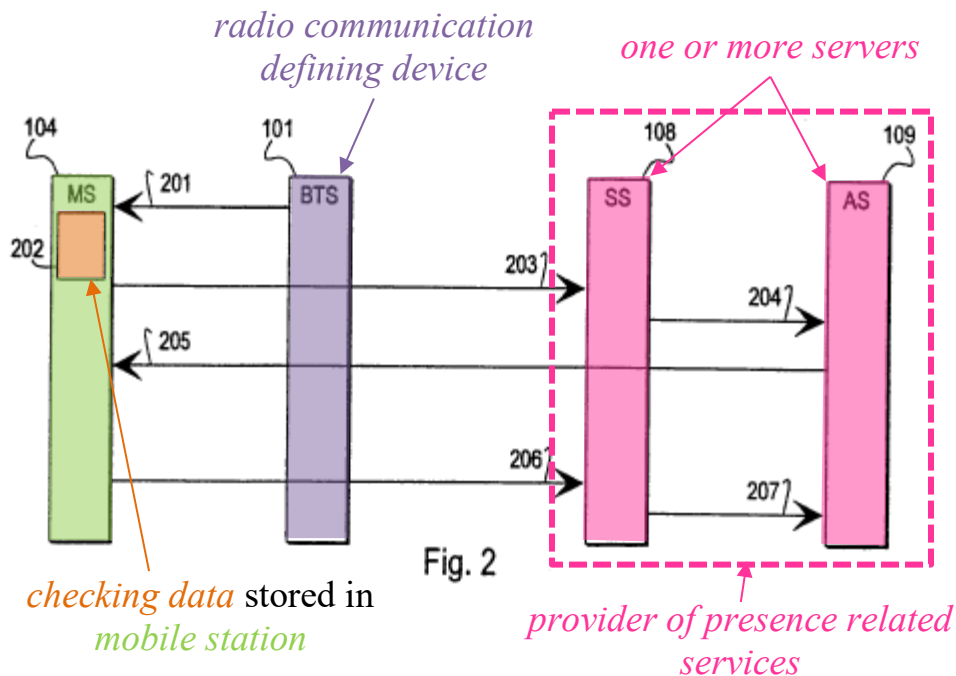
80. Therefore, the combination renders obvious *[a] method* (Putkiranta's method of providing location-based services) *associated with a provider of presence related services* (Putkiranta's service provider that operates the service and application servers) *and a mobile station* (Putkiranta's mobile station) *that stores in a memory first checking data* (Putkiranta's mobile station storing a list of cell identifiers) *and uses the first checking data to determine whether or not a defining signal received from a radio communication defining device is a distinctive defining signal* (Putkiranta's mobile station comparing the list of cell identifiers to the cell identifier in the general control information message received from the current base station to determine whether there is a match), *the distinctive defining signal at least partly defines a special area by its coverage* (Putkiranta's list of cell identifiers defining a localized service area such that, if the current cell identifier matches one in the list, it defines at least part of the localized service area).

b. **[1.1]** *one or more servers of a provider of presence related services receiving from the mobile station via a mobile telephone network an updating signal that identifies the mobile station's presence in the special area, the provider of presence related services being different than the mobile telephone network; and*

81. Limitation [1.1] is met, in the combination, by Putkiranta.

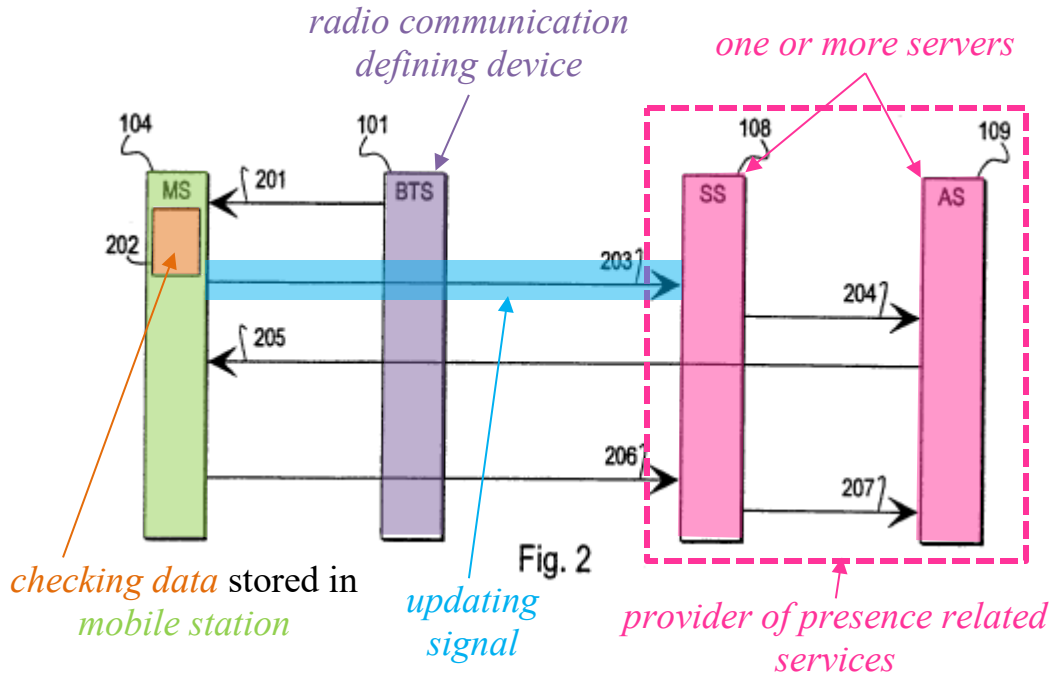
82. **First**, as demonstrated at limitation [1.0] above, in the combination, Putkiranta teaches that a service server (*provider of presence related services*) offers services to a user in localized service areas (*presence related services*) using the

service and application servers (*one or more servers of a provider*). Putkiranta, 6:22-26 (“The 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.”). The functions of the service and application servers “can be integrated in one device.” Putkiranta, 7:47-51 (“Above it was disclosed that the service server and application server are separate apparatuses. However, these functions can be integrated into a single device, whereby the communication between the servers as described above is reduced to communication internal to a server.”). Fig. 2 below illustrates the service and application servers (*one or more servers*) of the service provider (*provider of presence related services*):



Putkiranta, Fig. 2 (annotated)

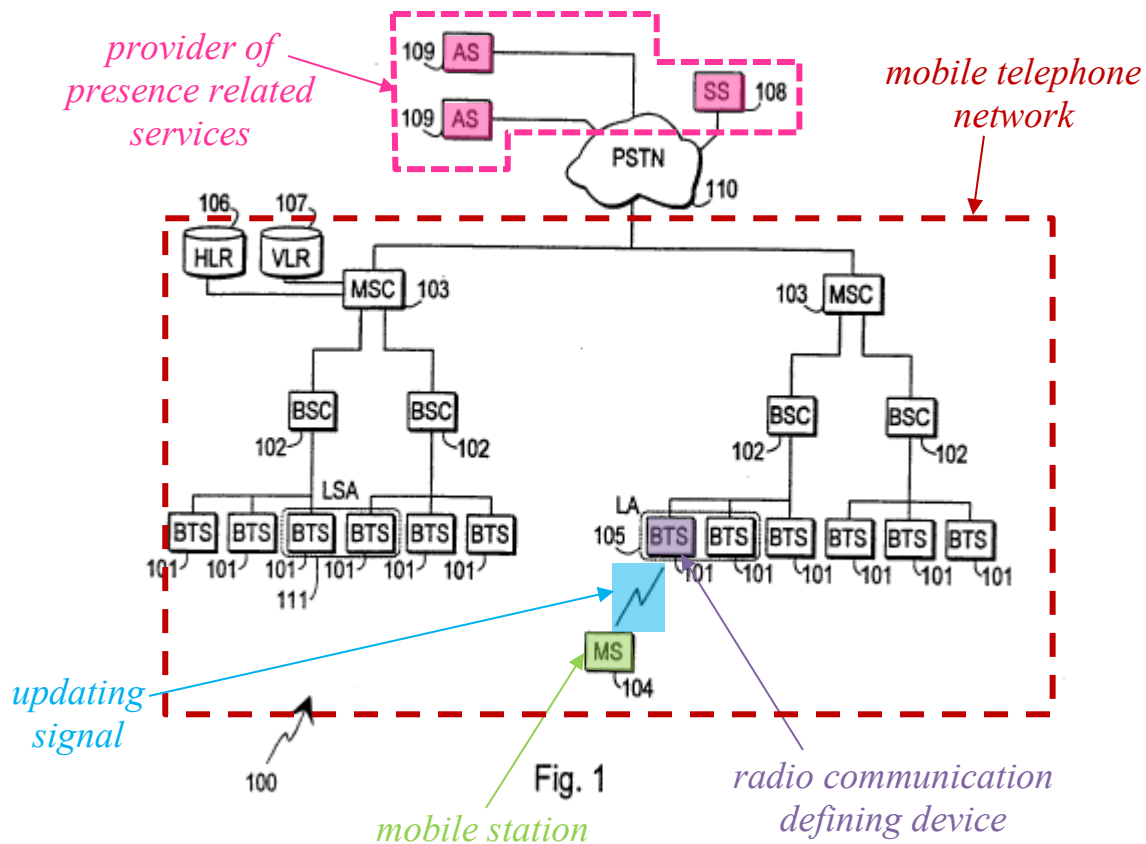
83. Second, as further demonstrated at limitation [1.0] above, Putkiranta’s mobile station (*mobile station*) determines it is in a “certain localized service area” (*special area*) by comparing the identifier received from the base station to a list of identifiers stored on the mobile device and determining that the identifier matches an identifier in the list. Putkiranta, 6:3-6 (“Block 202 refers to the comparison at the mobile station with an identifier list, or some other activity on the basis of which the mobile station detects that it has arrived in a certain localized service area.”). In response to “detect[ing] that it has arrived in a certain localized service area,” “the mobile station sends to the service server a message 203 [*updating signal*]” (*one or more servers...receiving from the mobile station...an updating signal*). Putkiranta, 6:3-9; *see also* 9:53-54, 2:34-41 (“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”). Fig. 2 below shows the mobile station (*mobile station*) sending message 203 (*updating signal*) to the service server (*one or more servers*):



Putkiranta, Fig. 2 (annotated)

84. After “[h]aving received message 203 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.” Putkiranta, 6:26-30. Thus, because message 203 is sent in response to the mobile station determining that it is in a localized service area and, in response to message 203, the service server determines the services to be provided in that localized service area and requests the services be provided by the application server, Putkiranta’s message 203 indicates that the mobile station is in the localized service area (*updating signal that identifies the mobile station’s presence in the special area*). Putkiranta, 6:3-9, 27-30.

85. Third, Putkiranta teaches that the mobile station sends the message via the cellular radio network (*one or more servers...receiving from the mobile station via a mobile telephone network an updating signal*). Putkiranta “does not limit the form of message 203,” but suggests that message 203 may be “an SMS message” (which is a message sent via a cellular network) or “a free-form data message specified in many digital cellular radio systems.” Putkiranta, 6:13-21. Moreover, Putkiranta explains that “[a] mobile station (MS) 104 is connected via radio to at least one base transceiver station 101” of the “cellular radio system 100” and that “[c]onnections from the cellular radio network to servers 108 and 109 may be...routed via the public switched telephone network.” Putkiranta, 4:13-27 (mobile station connected to cellular radio network via base transceiver stations, the servers are connected to the network). Thus, both the mobile station and service and application servers communicate via the cellular radio network (*mobile telephone network*). Fig. 1 below illustrates the service and application servers (*one or more servers*) and mobile station (*mobile station*) as well as the elements of the cellular radio network (*mobile telephone network*):



Putkiranta, Fig. 1 (annotated)

86. Fourth, Putkiranta explains that “certain services are provided by an outside service provider ... and the services provided by said service provider are located physically elsewhere than at switching centers.” Putkiranta, 1:29-33, 3:31-52 (explaining that the apparatus that “provid[es] the services” (i.e., the service and application servers) “may be maintained...by a service provider” separate from the network operator). In particular, Putkiranta’s service and application servers are operated by an outside service provider (*provider of presence related services*) such that the servers are connected to the cellular radio network (*mobile telephone*

network) “via the public switched telephone network (PSTN) 110” instead of being part of the cellular network. Putkiranta, 4:28-34 (“**Connections from the cellular radio network to servers 108 and 109 may be either direct, in which case the servers are in away part of the cellular radio system, or routed via the public switched telephone network (PSTN) 110.** Direct connections will be used mainly when servers 108 and 109 are maintained by the same operator who is responsible for the operation of the cellular radio system.”). Thus, Putkiranta describes the service *provider as being different than the cellular radio network (mobile telephone network)*.

87. Therefore, the combination renders obvious *one or more servers (Putkiranta’s service and application servers) of a provider of presence related services (Putkiranta’s service provider that operates the servers) receiving from the mobile station (Putkiranta’s mobile station) via a mobile telephone network (Putkiranta’s cellular radio network) an updating signal that identifies the mobile station’s presence in the special area (Putkiranta’s message 203 sent in response to the mobile station determining that it is in a localized service area), the provider of presence related services being different than the mobile telephone network (Putkiranta’s disclosure of the service and application servers being separate and external to the cellular radio network)*.

- c. [1.2] *storing in the one or more servers a parameters database having an operating parameter whose value is determined at least in part by the updating signal received from the mobile station; and*

88. Limitation [1.2] is met, in the combination, by Putkiranta and Granberg.

89. **First**, in the combination, Putkiranta explains that the service server (*one or more servers*) “is arranged to maintain information concerning the location of mobile stations in localized service areas” and a “means for changing the service selection offered to a mobile station” when the mobile station indicates it is in a localized service area. Putkiranta, 2:22-32; *see also* 6:22-25 (“The role of the service server in the embodiment according to FIG. 2 is to maintain information about which mobile stations are in which localized service areas and which services should be offered to them accordingly.”). In Putkiranta, the information regarding the services available to the *mobile station* includes “a whole **service profile** defined for it in a localized service area.” Putkiranta, 6:42-44. Thus, it would have been obvious that the service profile stores the data related to the services and/or tariffs in pre-defined areas that are provided to a particular user. For example, each of these service profiles includes fields (*operating parameter[s]*) that correspond to various services including “call pricing,” “modulation method, data rate and/or connection quality...between the base station and mobile station,” “routing of incoming email messages,” “activation or inactivation of automatic call transfer and/or voice mail

service,” or “receiv[ing] messages periodically e.g. with regard to the weather, traffic, [or] stock exchange rates” provided to the user. Putkiranta, 6:42-56.

90. Accordingly, the service server “maintain[s] information concerning the location of mobile stations” (service profiles) and “chang[es] the service selection offered to mobile stations in response to receiving...mobile station generated messages describing the location of the mobile stations” (via the application server). Putkiranta, 6:22-30, 2:27-30, 2:52-53. Thus, Putkiranta teaches that the value of the field associated with the services offered (*value of the operating parameter*) is determined at least in part by the message 203 (*updating signal*) received from the mobile station.

91. Second, as explained above in Section IX.D.2, database structures are used to store related data, like that stored in Putkiranta’s service profiles in the service server, with Granberg disclosing an example of one of these well-known structures. Granberg teaches “**a database** that stores and manages subscriptions” (*parameters database*). Granberg, 6:3-4. Granberg explains 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. “[E]ach subscriber record may include **one or more network-specific indicators**” (*operating parameters*), including “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, “the flag is reset or otherwise deactivated.” Granberg, 7:53-54. Thus, because the flags associated with certain services can be activated or deactivated based on the network the subscriber is located in (i.e., the location of the mobile station), the flag’s *value is determined at least in part by* the location of the mobile station.

92. As explained above in Section IX.D.2, a POSITA would have been motivated to modify Putkiranta’s teachings according to Granberg’s teachings such that Putkiranta’s service server (*one or more servers*) maintains a database including each service profile (*storing in the one or more servers a parameters database*) that includes the services offered stored as a network-specific indicator (e.g. flag) (*parameters database having operating parameter[s]*). A POSITA would have known that, in the combined teachings, Putkiranta’s service server activates or deactivates the network-specific indicator (*operating parameter whose value is determined at least in part by*) based on the message 302 (*updating signal*) received from the mobile station indicating its presence in a localized service area.

93. Therefore, the combination renders obvious *storing in the one or more servers* (Putkiranta’s service and application servers) *a parameters database*

(Putkiranta's collection of service profiles, Granberg's database) *having an operating parameter* (field associated with Putkiranta's services and tariffs in each service profile, Granberg's network-specific indicator corresponding to network-based services) *whose value is determined at least in part by the updating signal received from the mobile station* (Putkiranta's service server changing the services offered in response to message 302, Granberg's network-specific indicator being activated and deactivated based on the location of the subscriber).

d. [1.3] *sending from the one or more servers to the mobile station second checking data different from the first checking data to modify the special area.*

94. Limitation [1.3] is met, in the combination, by Putkiranta and Kraufvelin.

95. First, as demonstrated at limitation [1.0], Putkiranta's mobile station (*mobile station*) stores a list of base station/cell identifiers (*first checking data*) that it compares to received cell identifiers from the current base station to determine whether it is in a localized service area:

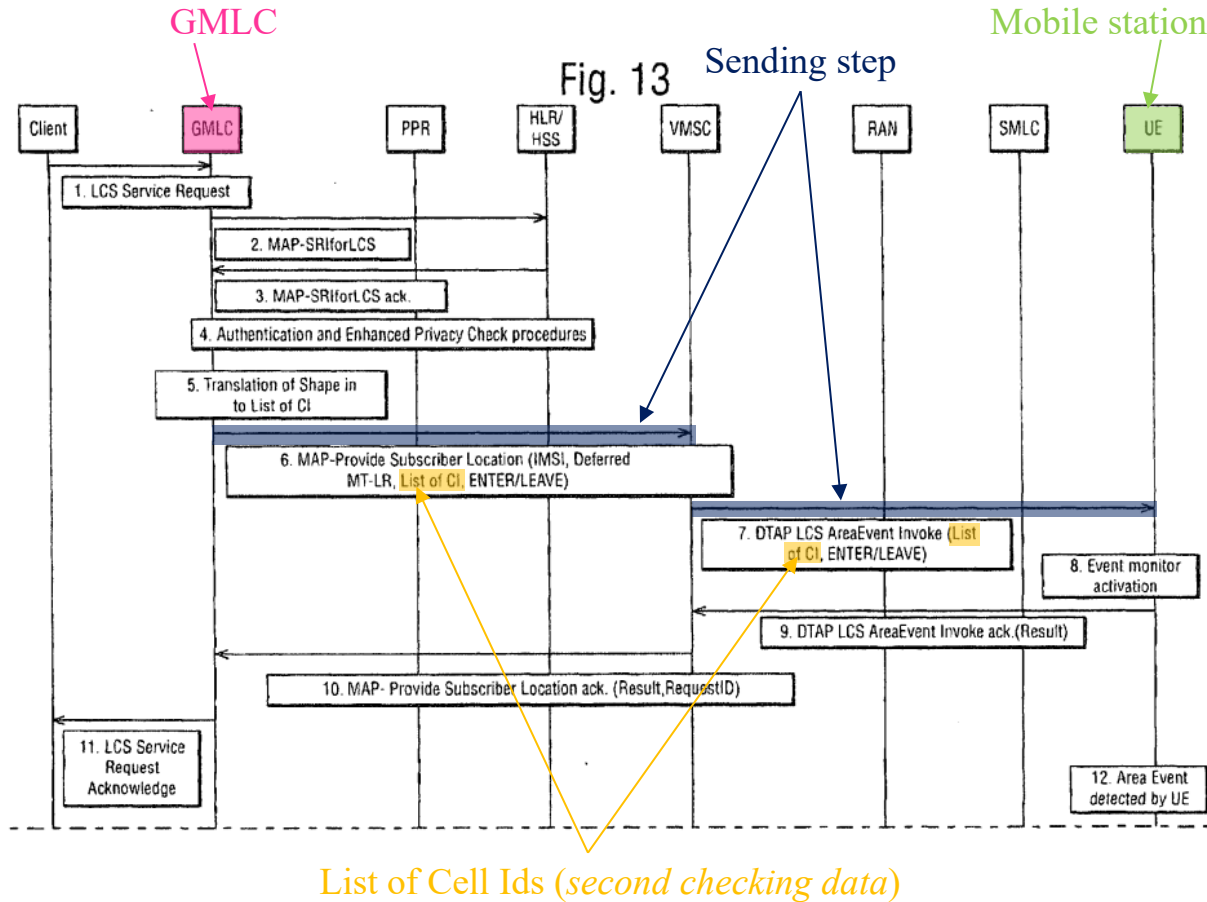
[T]he memory of the mobile station **stores a list of the identifiers** of the base transceiver stations the cells of which make a particular localized service area. By **comparing the received identifier with the list in the memory** the mobile station finds out whether it is located in a certain localized service area.

Putkiranta, 5:3-8.

96. Putkiranta explains that networks change the base stations associated with a particular localized service area (*special area*) by, for example, “establishing a new base station in the area.” Putkiranta, 5:14-22. Putkiranta teaches that the list of identifiers stored in the mobile station needs to be updated to accommodate these changes, and that one well-known way to do so was to “send the identifier of the new base station” to the appropriate mobile stations. Putkiranta, 5:14-22 (teaching sending a new/updated list of identifiers to the mobile station and a different embodiment that does not send identifiers). Because 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” (Putkiranta, 6:22-25), it would have been obvious to a POSITA that Putkiranta’s service server (*one or more servers*) sends base station identifier updates (*second checking data*) to the mobile station, as explained above in Section IX.D.3.

97. For example, Kraufvelin further demonstrates a process in which a centralized server sends updated information to a mobile station to accommodate for network changes. 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]. As a result, “a cell-ID may no longer correspond with the intended geographical area.” Kraufvelin, [0108]. The network or service

provider therefore “update[s] the predefined area definition in all mobiles” (e.g., when the Cell-ID reported by the mobile station does not match the new Cell-IDs associated with the area). Kraufvelin, [0111]. This update includes providing “the updated cell-ID information” to the mobile station. Kraufvelin, [0110] (“[T]he network may either re-issue the deferred location request to the terminal with an updated cell list, or an error message may be returned to the LCS Client. In the case of an error message the LCS Client may re-issue the original location request and the updated cell-ID information may be provided to the terminal.”); *see also* [0046], [0056]-[0060], [0080] (location services node operates in cooperation with network nodes like a gateway mobile location center (GMLC) to send/update cell IDs to mobile stations). Kraufvelin illustrates an example of sending cell IDs to the mobile station in Fig. 13 below:



Kraufvelin, Fig. 13 (annotated)

98. As explained above in Section IX.D.3, a POSITA would have been motivated to modify Putkiranta’s teachings according to Kraufvelin’s teachings such that when changes to the localized service area occur via, for example, changes to the network (e.g., addition of a base station, as taught by Putkiranta), the new or updated list of cell identifiers that corresponds to the localized service area after the network changes is sent from Putkiranta’s service server to the mobile station, as further confirmed and taught by Kraufvelin.

99. Therefore, the combination renders obvious *sending from the one or more servers* (Putkiranta's service server) *to the mobile station* (Putkiranta's mobile station) *second checking data different from the first checking data to modify the special area* (Putkiranta's teaching of sending new base station identifiers when the network changes, Kraufvelin's teaching of the network/service provider sending updated cell information to the mobile station when the stored cell information is different from the current cell information).

2. Claim 2

- a. **[2.0] *The method according to claim 1, 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.***

100. Limitation [2.0] is met, in the combination, by Putkiranta and Granberg.

101. As demonstrated at limitation [1.2], Putkiranta teaches a service server that stores fields associated with the services offered (*operating parameter*) for the mobile station in localized service areas. Putkiranta provides several examples of services or tariffs that are offered to the mobile station, including "call pricing" (*special tariff*) and several services like "call...prioritization," "modulation method, data rate and/or connection quality...between the base station and mobile station," "routing of incoming email messages," "activation or inactivation of automatic call transfer and/or voice mail service," or "receiv[ing] messages periodically e.g. with

regard to the weather, traffic, [or] stock exchange rates” (*service[s]*). Putkiranta, 6:42-56.

102. The service server “maintain[s] information concerning the location of mobile stations” in service profiles and “chang[es] the service selection offered to mobile stations in response to receiving...mobile station generated messages describing the location of the mobile stations” (via the application server). Putkiranta, 6:22-30, 6:42-44, 2:52-53. It would have been obvious for service server to store each of these tariffs or services specifically as a *tariff flag* or a *service flag* so that the tariffs/services offered can be changed (*enabled or disabled*), because it was well-known to use *tariff/service flag[s]* for storing information for location-based services.

103. Granberg provides an example of storing flags associated with particular services and enabling or disabling the flags based on the location of the subscriber. As demonstrated in limitation [1.2] above, in the combination, Putkiranta’s service server activates or deactivates “network-specific indicator[s]” (*operating parameter[s]*) associated with a “network-based service,” based on the teachings of Granberg. Granberg teaches that the “network-specific indicators” (*operating parameter[s]*) “corresponding to one or more network-specific services” may be “**one or more flags**” (*a service flag*). Granberg, 7:45-48 (“In accordance with the present invention, 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 further teaches that “[e]ach 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” and “[i]f that subscriber is not to receive the service, the flag is reset or otherwise deactivated.” Granberg, 7:49-54. Thus, Granberg discloses that the flag (*service flag*) activates (*enables*) or deactivates (*disables*) services (*service*) for the subscriber.

104. As explained above in Section IX.D.2, a POSITA would have been motivated to modify Putkiranta’s teachings according to Granberg’s teachings such that Putkiranta’s service server maintains a database for each service profile that includes Granberg’s network-specific indicators (*operating parameter[s]*) for the services offered stored as flags (*tariff flag or service flag*). A POSITA would have known that, in the combined teachings, the indicators would have been flags (*tariff flag or service flag*) stored in Putkiranta’s service server that activate or deactivate (*enable[] or disable[]*) the services (*service[s]*) such as Granberg’s network-specific service or Putkiranta’s routing of incoming emails, activation/inactivation of automatic call transfer, messages regarding traffic or weather (or any other services contemplated by Putkiranta). Further, it would have been obvious to a POSITA that the teachings would have been combined such that the Putkiranta’s call pricing (*special tariff*) would have been activated or deactivated (*enable[d] or disable[d]*)

by *tariff flag[s]*, based on Putkiranta's "call pricing" teaching with Granberg's flag teaching.

105. Therefore, the combination renders obvious *the operating parameter* (fields associated with Putkiranta's services and tariffs, Granberg's network-specific indicators corresponding to network-based services) *is a tariff flag or a service flag* (Granberg's flags) *that enables or disables* (Granberg's flags activating or deactivating services based on the location of the mobile station) *a special tariff* (Putkiranta's call pricing) *or a service* (Putkiranta's services, Granberg's network-based services) *for the mobile station* (Putkiranta's mobile station).

3. Claim 3

- a. **[3.0]** *A method associated with the use of a mobile station that stores and uses checking data to determine whether or not a defining signal received from a radio communication defining device is a distinctive defining signal, the distinctive defining signal at least partly defines a special area by its coverage, the method comprising:*

106. Limitation [3.0] is substantially similar to limitation [1.0], and, thus, the prior art renders limitation [3.0] obvious for the same reasons as discussed above.

- b. **[3.1]** *sending from the mobile station to at least one server of a provider of presence related services an updating signal via a mobile telephone network that identifies the mobile station's presence in the special area, the updating signal being indicative of the mobile station's presence in the special area, the provider of*

presence related services being different than the mobile telephone network; and

107. Limitation [3.1] is substantially similar to limitation [1.1], except that limitation [3.1] is from the mobile station's perspective and limitation [1.1] is from the server's perspective. Limitation [1.1] requires the *one or more servers of a provider of presence related services receive[] from the mobile station...an updating signal* whereas limitation [3.1] requires the *mobile station send[] to at least one server of a provider of presence related services an updating signal*.

108. Because the reasons shown at limitation [1.1] also include the mobile station sending the updating signal, the combination also meets limitation [3.1].

- c.** ***[3.2] receiving in the mobile station from the at least one server second checking data different from the first checking data to modify the special area.***

109. Limitation [3.2] is substantially similar to limitation [1.3], except that limitation [3.2] is from the mobile station's perspective and limitation [1.3] is from the server's perspective. Limitation [1.3] requires *the one or more servers send[] to the mobile station second checking data* whereas limitation [3.2] requires *receiving in the mobile station from the at least one server second checking data*.

110. Because the reasons shown at limitation [1.3] also include the mobile station receiving the checking data, the combination also meets limitation [3.2].

X. GROUND 2: CLAIMS 4 AND 6 ARE UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF PUTKIRANTA, GRANBERG, KRAUFVELIN, AND DUAN

A. Summary of Duan

111. Duan is directed to a “method for reporting location reports by target user equipment (UE) in Location Service (LCS).” Duan, Field of the Technology.

112. Duan discloses a process in which a network element that receives a location report from a UE (i.e., mobile station) indicating that it is in a location in which services/tariffs are to be offered sends an acknowledgement of the location report to the mobile station to confirm receipt of the location report. Duan, 7:13-24 (“A. the target UE receiving a location request initiated by an applicant, and reporting a location report to the LCS system after detecting the occurrence of an event triggering a location report; B. after receiving the location report reported by the target UE, the LCS system returning to the target UE a location report acknowledgement.”). Thus, “the target UE will not end its processing procedure after report[ing] a location report to [the network], but determine[s] the subsequent operations according to whether it has received a location report acknowledgement returned by the CN.” Duan, 9:20-24; *see also* 2:10 (“Core Network (CN)”).

113. Thus, “while reporting a location report to [the network], the target UE starts a timer designating a time period and waits for [the network] to return a location report acknowledgement within the designated time period.” Duan, 9:25-

27. Then, “[i]f [the network] returns a location report acknowledgement to the target UE within the designated time period, the target UE will stop the timer.” Duan, 9:27-10:1; 10:16-19 (“[A]fter detecting the occurrence of an event triggering a location report, the target UE report[s] the location report to [the network], starting the timer designating a time period at the same time, and waiting in the designated time period for [the network] to return a location report acknowledgement.”). Alternatively, “if [the network] does not return a location report acknowledgement to the target UE within the designated time period, the target UE will report the location report once again to [the network]” and restart the timer. Duan, 10:1-6; *see also* 11:3-9 (“[W]hen the timer designating a time period is time-out, the target UE reporting to [network] the location report once again, re-starting the timer designating the time period at the same time, and waiting in the designated time period for [network] to return a location report acknowledgement.”).

114. This process “reduces[s] errors in the reporting process of location reports and lower[s] the uncertainty in the implementation of LCS.” Duan, 7:13-16.

B. Reasons to Combine Putkiranta, Granberg, Kraufvelin, and Duan

115. A POSITA would have been motivated to combine the teachings of Putkiranta, Granberg, Kraufvelin, and Duan for several reasons as discussed further below. Combining Duan’s implementation details for network elements acknowledging the receipt of signals from mobile stations, or triggering

retransmission, with Putkiranta's updating signal and system teachings would have been obvious, beneficial, and predictable. Putkiranta describes the act of communicating between system entities, including mobile station and service server, as well as confirming receipt of messages therebetween. Putkiranta leaves implementation details for communication between the service server and mobile station up to a POSITA, motivating a POSITA to turn to Duan's teachings of well-known acknowledgement/non-acknowledgement operations.

1. Putkiranta, Granberg, Kraufvelin, and Duan are analogous art to the '032 patent.

116. As a threshold matter, like Putkiranta, Granberg, and Kraufvelin, Duan is also analogous art to the '032 patent because it is within the same field of endeavor as the '032 patent. As discussed in Section IX.D.1 above, the '032 patent, Putkiranta, Granberg, and Kraufvelin are directed to the field of providing services to a mobile station based on its location. Similarly, Duan is related to a "method for reporting location reports by target user equipment (UE) in Location Service (LCS)" system. Duan, Field of the Technology. Thus, Duan is within the field of providing services to a mobile station based on its location.

117. Further, Duan is reasonably pertinent to the problem that the '032 patent purports to address. As explained in Section IX.D.1 above, Putkiranta, Granberg, and Kraufvelin each address the '032 patent's stated problem of how to add special areas without modifying the base stations broadcasting in those areas.

Similarly, Duan describes a system in which the user equipment (i.e., mobile station) monitors whether it is in a particular location and reports its presence in that location to receive services applied therein. Duan, 7:13-22 (“A. the target UE receiving a location request initiated by an applicant, and reporting a location report to the LCS system after detecting the occurrence of an event triggering a location report”). Thus, Duan’s user equipment-based system solves the issues that the ’032 patent was attempting to solve.

118. Additionally, the ’032 patent describes using acknowledgement signals so that “the mobile station knows advantageously if the mobile telephone network receive the updating signal or not,” thereby attempting to address the problem of the mobile station sending a signal that is not received by the network. Ex.1001, 3:42-47 (“In a particular embodiment, the [server] acknowledge[s] the reception of the updating signal and transmit an acknowledgement signal to the mobile station. In this embodiment, the mobile station knows advantageously if the mobile telephone network received the updating signal or not.”); *see also* 17:20-37 (“The operator of the mobile telephone network has therefore a guarantee that the mobile telephone network will know at least a change on the presence of the mobile station in one or more special areas even if the radio communication link between the mobile station and the mobile telephone network is temporarily unavailable.”). Duan provides a well-known and well-implemented solution to this problem, by teaching a mobile

station waiting for the network “to return a location report acknowledgement within the designated time period” and retransmitting the location report if none is received. Duan, 9:25-10:6. Thus, a POSITA would have found Duan to be reasonably pertinent to this additional problem the ’032 patent attempts to address.

2. A POSITA would have been motivated to combine the teachings of Putkiranta, Granberg, and Kraufvelin with the teachings of Duan.

119. Putkiranta already contemplates using acknowledgments between the service server and mobile station to confirm receipt of a message. Putkiranta, 7:17-22 (“[W]hen the service server sends regularly or periodically to all mobile stations in a localized service area a short data message which must be acknowledged by the mobile stations; a failure to acknowledge the message indicates that the mobile station in question is no more in the localized service area.”). Putkiranta describes these acknowledgement (“ACK”) processes at a general level, leaving implementation details up to POSITAs.

120. Acknowledgments are commonly sent from the receiving element in a telecommunications system to the transmitting element, thus ensuring that messages are actually received. *See e.g.*, Ex.1042 (“Strong”), [0005] (“**Any controller that has been able to correctly receive the data message sends an acknowledgement bit** during the acknowledgement bit time, and the device transmitting the message checks for the presence of the acknowledgement bit.”); Ex.1049 (“Prasad”), 60 (“In

addition, all directed traffic uses immediate positive acknowledgment (ACK frame), where the sender schedules a retransmission if no ACK is received.”), 63-64 (“Upon receipt of a correct packet, the receiving station waits a SIFS interval and transmits a positive acknowledgment frame (ACK) back to the source station, indicating that the transmission was successful.”), 66-69 (“The destination station positively ACKs each successfully received fragment by sending a DCF ACK back to the source station. The source station maintains control of the channel throughout the transmission of the MSDU by waiting only a SIFS period after receiving an ACK and transmitting the next fragment. When an ACK is not received for a previously transmitted frame, the source station halts transmission and recontends for the channel. Upon gaining access to the channel, the source starts transmitting with the last unacknowledged fragment.”); Kraufvelin, [0076]-[0078] (message from mobile station to network that the request was successfully set-up), [0084] (GMLC acknowledging the receipt of report message). For example, Figs. 3.9 and 3.11 of Prasad below illustrate a receiving element sending an acknowledgement to the transmitting element:

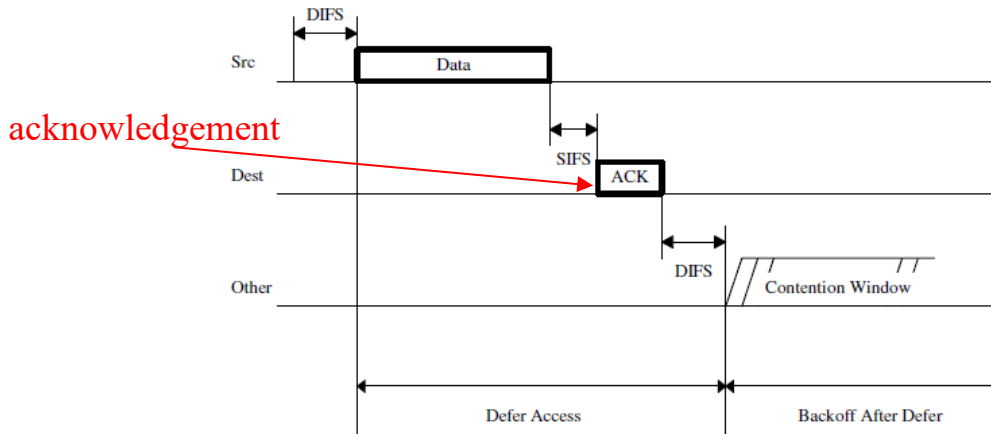


Figure 3.9 Transmission of a MPDU without RTS/CTS [1, 4] (reprinted with permission from IEEE 802.11-1999).

Prasad, Fig. 3.9 (annotated)

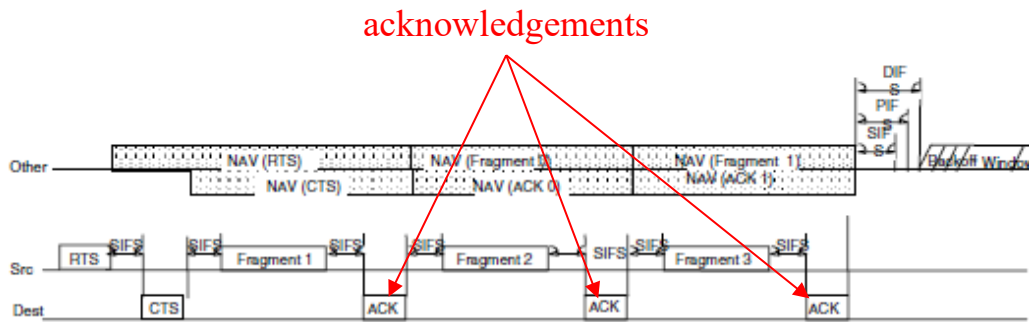


Figure 3.11 Transmission of fragmented MPDU [1, 4] (reprinted with permission from IEEE 802.11-1999).

Prasad, Fig. 3.11 (annotated)

121. If no acknowledgment process is used, when the mobile station sends a message to the network, the mobile station has no way of knowing whether the message was actually received by the intended recipient. In location-based services systems, a POSITA would have understood that, if the mobile station's message requesting location-based services be provided is not received by the appropriate recipient, the appropriate services likely will not be provided. A POSITA would

have understood that the message may not be received by the appropriate entity for a variety of reasons. For example, the propagation conditions may be temporarily poor due to the location of the mobile or multipath, interference from another cell may cause the signal to not be received properly, or the mobile may be disconnected from the network. *See e.g.*, Ex.1050 (“Goodman”), 95 (“In a mobile Radio system, the role of the data link is to ensure error-free transmission of information packets between mobile units and base stations. Rayleigh fading poses the main threat to accurate packet reception. When a packet encounters a fade, it is highly likely that transmission errors will occur and that the packet will have to be retransmitted. The data link provides error detection, acknowledgements of the quality of received packets, and retransmission of packets with errors.”). Thus, a POSITA would have understood that ACK processes were routinely used in communication systems to avoid this problem.

122. Accordingly, a POSITA would have known that these well-known ACK processes would have been implemented in location-based services systems, like those described in Putkiranta, to ensure that appropriate services are provided (or removed) when the mobile station enters (or exits) the designated area.

123. When implementing such ACK process, it was well-known that, if an acknowledgment is not received by the transmitting element, the transmitting element would have retransmitted the message to ensure receipt of the message. *See*

Strong, [0005] (“**if no acknowledgement** bit is detected, the device **re-transmits** the data frame.”); Prasad, 60, 66-69; Goodman, 95 (“The data link provides error detection, **acknowledgements of the quality of received packets, and retransmission of packets with errors.**”) (emphasis added). It would have been obvious to a POSITA that the mobile station would have retransmitted the message. If the mobile station did not receive the required acknowledgment, then the mobile station knows that its message was likely not received by the intended entity. Accordingly, if the mobile station does not resend the message, the mobile station would essentially be accepting that its message was not properly received without taking measures to remedy the situation. Although there may be other ways to ensure proper receipt, resending the message is the most straightforward way to accomplish this.

124. For these reasons, a POSITA would have known that the well-known, routinely used ACK process would have been used in Putkiranta’s system and, in particular, to confirm receipt of mobile station’s message 203 indicating it is in a localized service area.

125. Duan provides examples of these well-known ACK processes that are applied in a mobile station-based location-based services system similar to Putkiranta’s system. Duan provides a process for sending an acknowledgment message to the mobile station (i.e., user equipment) confirming receipt of a message

indicating the mobile station is in a particular location. Duan, 9:25- 10:6 (describing an exemplary ACK process). Duan explains that without ACK process, “the target UE is unable to learn whether the reported location report has been properly processed” by the network element, thereby “increasing the uncertainty in the implementation of the LCS” (location service). Duan, 6:17- 7:4; 6:3-7. Accordingly, Duan’s acknowledgement process requires the receiving network element send an acknowledgment to the mobile station when it receives a location report therefrom and, if the mobile station does not receive the acknowledgment, retransmit the location report. Duan, 10:16-11:9.

126. Therefore, a POSITA would have been motivated to implement Duan’s ACK process teachings with Putkiranta’s teachings to ensure that the service server receives the message indicating the mobile station is in the localized service area. This would have reduced the uncertainty in Putkiranta’s system and ensured that the appropriate services are provided to the mobile station, even in cases where, for example, the signal experiences a multipath fading.

127. As a result, Putkiranta’s service server teachings would be modified to include an acknowledgment to the mobile station upon receipt of the message, as taught by Duan. Duan, 9:25-10:6. If the acknowledgment is not received, Putkiranta’s mobile station would retransmit the message, as further taught by Duan. Duan, 10:16- 11:9.

128. A POSITA would have reasonably expected success combining Duan’s acknowledgment teachings with Putkiranta’s system teachings. Putkiranta discloses that the mobile station and the service server communicate with each other via the network, including acknowledgments from the mobile station to the service server. Putkiranta, 4:13-34 (describing a “cellular radio system” in which the mobile station and service server operate), 6:6-21 (“the mobile station sends to the service server a message 203”), 7:17-22 (“the service server sends regularly or periodically to all mobile stations in a localized service area a short data message which must be acknowledged by the mobile stations”). A POSITA would have understood that the reverse would also occur—the service server would send an acknowledgment to the mobile station confirming receipt of a message, as further supported by Duan. Duan’s acknowledgment teachings would have been a simple and conventional way to ensure that the message was received and improve the provision of services when a mobile station enters a localized service area.

C. Detailed Analysis of Claims²

1. Claim 6

- a. **[6.0] *The method according to claim 3, receiving in the mobile station from the at least one server of the provider of presence related services an acknowledgement of a reception of the updating signal.***

129. Limitation [6.0] is met by the combined teachings of Putkiranta, Granberg, Kraufvelin, and Duan.

130. As explained with respect to limitation [1.1], in the combination, Putkiranta teaches that the mobile station sends an updating message (message 203) to the service server to indicate that it is in a localized service area. Putkiranta, 6:3-9 (“Block 202 refers to the comparison at the mobile station with an identifier list, or some other activity on the basis of which the mobile station detects that it has arrived in a certain localized service area. In response to that observation the mobile station sends to the service server a message 203 in which it includes an identifier characteristic of the mobile station.”). Putkiranta further teaches generally that an acknowledgement is sent between the mobile station and the service server when one communication entity receives a message from the other. For example, after the

² Claim 6 is addressed before claim 4 because claim 6 describes the mobile station receiving an acknowledgement and claim 4 describes what happens when the mobile station does not receive the acknowledgment.

service server sends a message to the mobile station, the mobile station sends an acknowledgement back to the service server (if still in the localized service area) or fails to send an acknowledgment (if no longer in the area). Putkiranta, 7:17-22 (“the service server sends regularly or periodically to all mobile stations in a localized service area a short data message which must be acknowledged by the mobile stations”). Together, these disclosures in Putkiranta teach the service server likewise sends *an acknowledgement of a reception of the mobile station’s message 203 (the updating signal)* to the mobile station—e.g., based on Putkiranta’s combined teachings of the mobile station sending messages 203 regarding its location and sending acknowledgements between the service server and the mobile station. Indeed, sending acknowledgments was widely used to minimize communication errors by triggering retransmissions, as explained above in Section X.B.2.

131. For example, Duan, in the combination, discloses that the mobile station sends a “location report” to a network element when the mobile station is in a defined location. Duan, 10:16-17 (“after detecting the occurrence of an event triggering a location report, the target UE reporting the location report to CN”); 7:20-22 (“the target UE receiving a location request initiated by an applicant, and reporting a location report to the LCS system after detecting the occurrence of an event triggering a location report”). In response, the network element sends “a location report acknowledgement” to the mobile station confirming receipt of the

location report. Duan, 10:28-29 (“after receiving the location report reported by the target UE, CN returning to the target UE a location report acknowledgement”).

132. As explained above in Section X.B.2, a POSITA would have been motivated to modify Putkiranta’s teachings, in the combination, according to Duan’s teachings such that Putkiranta’s mobile station (*mobile station*) receiv[es] an *acknowledgement* from Putkiranta’s service server (*at least one server of the provider of presence related services*) confirming that the service server receives its message 203 indicating its presence in the localized service area (*updating signal*), according to Duan’s ACK process teachings.

133. Therefore, the combination renders obvious *receiving in the mobile station* (Putkiranta’s mobile station) *from the at least one server of the provider of presence related services* (Putkiranta’s service server) *an acknowledgement of a reception* (Putkiranta’s acknowledgement teachings, Duan’s ACK process teachings) *of the updating signal* (Putkiranta’s message 203).

2. Claim 4

- a. **[4.0]** *The method according to claim 3, further comprising the mobile station retransmitting the updating signal upon not receiving the acknowledgement from the at least one server.*

134. Limitation [4.0] is met by the combined teachings of Putkiranta, Granberg, Kraufvelin, and Duan.

135. As demonstrated at limitation [6.0] above, in the combination, Putkiranta, as modified based on Duan, teaches that Putkiranta's mobile station *receiv[es]* an *acknowledgment* from the service server (*at least one server*) confirming that it has received the message 203 indicating the mobile station is in the localized service area (*updating signal*).

136. It would have further been obvious to a POSITA for Putkiranta's mobile station to retransmit the message (*updating signal*) if it did not receive an acknowledgment from the service server in a certain period of time. It was well-known for the device transmitting a message to retransmit if no acknowledgment is received from the intended recipient to ensure that the message is correctly delivered, as described above in Section X.B.2.

137. For example, Duan teaches that the mobile station sends the location report again if it does not receive a location report acknowledgment from the network within a designated time period. Duan, 11:3-9 (“[W]hen the timer designating a time period is time-out, **the target UE reporting to [the network] the location report once again**”).

138. As explained above in Section X.B.2, a POSITA would have been motivated to modify Putkiranta's teachings, in the combination, according to Duan's teachings such that Putkiranta's mobile station *retransmit[s]* message 203 (*updating signal*) to the service server (*at least one server*) if it does not receive an

acknowledgement from the service server, as taught by Duan, thereby ensuring the service server knows that the mobile station is in the localized service area.

139. Therefore, the combination renders obvious *the mobile station* (Putkiranta's mobile station) *retransmitting the updating signal* (Putkiranta's message 302) *upon not receiving the acknowledgement* (Putkiranta's acknowledgement teachings, Duan's user equipment resending the location report if no acknowledgement report is received from the network) *from the at least one server* (Putkiranta's service server).

XI. GROUND 3: CLAIM 5 IS UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF PUTKIRANTA, GRANBERG, KRAUFVELIN, AND VIMPARI

A. Summary of Vimpari

140. Vimpari describes a method “for locating a mobile station,” which “is advantageously applied for defining call tariffs, or for defining available services on the basis of the location of the mobile station in question.” Vimpari, 1:4-8.

141. The mobile station monitors a particular frequency channel for signals that include an identity code associated with the mobile station. Vimpari, 5:20-30. When the mobile station identifies its own identity code in the signal, the mobile station determines that it is in a home area and “sends to the network a message to that effect.” Vimpari, 6:9-14.

142. Thus, if the mobile station is in its home area, the network “sets lower tariffs for said mobile station.” Vimpari, 6:9-18. When the mobile station is outside the home area, the network “returns to normal tariffs for said mobile station.” Vimpari, 6:21-29. “Normal tariffs are returned also if the mobile station is switched off, or its connection to the base station is interrupted for some other reason” instead of the lower tariffs applied in the home area. Vimpari, 6:29-31.

B. Reasons to Combine Putkiranta, Granberg, Kraufvelin, and Vimpari

143. A POSITA would have been motivated to combine the teachings of Putkiranta, Granberg, and Kraufvelin with the teachings of Vimpari for several reasons as discussed further below. Combining Vimpari’s implementation details about how to handle situations when the mobile station is off with Putkiranta’s location-based service teachings would have been obvious, beneficial, and predictable. Putkiranta describes providing different services, including different pricing, depending upon mobile station location, leaving implementation details up to a POSITA regarding how to handle situations when the mobile station is off. Thus, a POSITA would have been motivated to turn to Vimpari’s teachings for an example addressing this situation.

1. Putkiranta, Granberg, Kraufvelin, and Vimpari are analogous art to the '032 patent.

144. As a threshold matter, Vimpari is also analogous art because it is within the same field of endeavor as the '032 patent. As discussed in Section IX.D.1 above, the '032 patent, Putkiranta, Granberg, and Kraufvelin are directed to the field of providing services to a mobile station based on its location. Similarly, Vimpari is related to “defining call tariffs, or for defining available services on the basis of the location of the mobile station in question.” Vimpari, 1:4-8. Thus, Vimpari is directed to the same field as the '032 patent and the cited prior art references.

145. Vimpari is also reasonably pertinent to the problem that the '032 patent purports to address. As explained in Section IX.D.1 above, Putkiranta, Granberg, and Kraufvelin each address the '032 patent's stated problem of how to add special areas without modifying the base stations broadcasting in those areas. Similarly, Vimpari describes a system in which the mobile station monitors whether it is in a particular location and reports its presence in that location so that a lower tariff can be applied therein. Vimpari, 2:17-27 (“A mobile station detects its own identity code in the channel used by the transmitters sends a signal message to the mobile system. The message announces that the mobile station is ‘at home’. The system advantageously uses this information so that at least for the mobile originated calls there is set a lower tariff.”). Thus, Vimpari's mobile station-based system solves the issues that the '032 patent was attempting to solve.

146. The '032 patent states that one of the problems it was facing was how to deal with situations where the mobile station is switched off. Ex.1001, 4:22-28 (“In case the mobile station will be switch off, the mobile network operator will decide whether or not the values of the operating parameters associated to the presence of the mobile station into special operating areas remain unchanged or are disabled into the database containing the set of operating parameters as consequence of the switching off process.”), 15:21-27 (“In an embodiment, the mobile telephone network sets the values of the operating parameters managed in the parameters database to a set of initial values when the mobile station is switched off (as at that time it is not present in any special area) in order to start operating the mobile station when it is just switched on.”). Vimpari provides a well-known and well-implemented solution to this problem, by teaching to apply “[n]ormal tariffs...if the mobile station is switched off, or its connection to the base station is interrupted for some other reason” instead of the lower tariffs applied in the home area. Vimpari, 6:29-31.

2. A POSITA would have been motivated to combine the teachings of Putkiranta, Granberg, and Kraufvelin with the teachings of Vimpari.

147. Putkiranta explains that, when the mobile station is not in a localized service area, the services that were provided in that area are terminated. Putkiranta, 6:64-7:2 (“the mobile station leaves the localized service area in accordance with

controlled cell reselection in which case it sends to the service server a notification 206 about its departure from the service area. In response to the departure message the service server sends to the application server a request 207 to terminate the service.”). Putkiranta further teaches that services should also be terminated when the mobile station does not respond to a message from the service server. Putkiranta, 7:17-22 (“[W]hen the service server sends regularly or periodically to all mobile stations in a localized service area a short data message which must be acknowledged by the mobile stations; a failure to acknowledge the message indicates that the mobile station in question is no more in the localized service area.”). Putkiranta leaves implementation details for the various scenarios in which the mobile station does not respond up to POSITAs.

148. A POSITA would have been motivated to turn to Vimpari for such implementation details with respect to tracking the status of services, and terminating them as appropriate, based on the mobile station being unavailable/nonresponsive when switched off. For example, Vimpari teaches how to set initial values for a tariff for a mobile station when the mobile station is switched off. Vimpari teaches that, instead of a lower tariff that is applied in, for example, a home area, “[n]ormal tariffs are returned [] if the mobile station is switched off.” Vimpari, 6:13-31. In fact, Vimpari teaches that the case in which the mobile station is switched off and the case in which the mobile station stops

communicating with the network (which is similar to the case in Putkiranta) are treated similarly. Vimpari, 6:29-31 (“Normal tariffs are returned also if the mobile station is switched off, **or if its connection to the base station is interrupted for some other reason.**”).

149. A POSITA would have had a reasonable expectation of success applying Vimpari’s teachings to Putkiranta’s teachings. Putkiranta explains that 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.” Putkiranta, 6:22-25. Putkiranta further explains that services are terminated when the mobile station does not response to a message from the service server sent to a localized service area. Putkiranta, 6:64-7:22. Implementing Putkiranta’s teachings in such lack-of-response scenarios in situations where the mobile station is turned off, as taught by Vimpari, would provide the same result envisioned by each prior art reference: the setting of a default/initial value for that non-responsive mobile station.

150. Indeed, a POSITA would have understood that one of the scenarios in which the mobile station does not respond is when the mobile station is switched off. Thus, a POSITA would have understood that, as in the case in Putkiranta where the mobile station no longer responds to the service server, a mobile station would also not respond to the service server if it is switched off. It would have been obvious

to a POSITA that a mobile station that is switched off or otherwise disconnected from the network should not be provided with services or a discounted tariff rate. As a result, when the service provider or network determines that the mobile station is not responding (e.g., is turned off), a POSITA would have known that the parameter associated with the services and/or tariffs provided to the mobile station would desirably have been set to a default value. This is exactly what Vimpari teaches doing.

151. Moreover, setting a default or initial value/condition, such as a normal tariff rate or no services, as taught by Vimpari, would have made it easier for the service provider (e.g. Putkiranta's service server) to handle the mobile station when it is turned on again. If tariffs/services are applied based on the location of the mobile station, when the mobile station is turned on again, it may take time to determine its location. Thus, if Putkiranta's service server stores an initial or default value for the tariffs/services (as Vimpari teaches), when the mobile station reports its location after turning on again, the service server will provide the initial/default services until the location is reported. Because an initial/default value has been set, Putkiranta's service server is able to easily change the initial tariffs/services to the new tariffs/services based on the mobile station's location. Accordingly, setting initial/default values for services/tariffs (per Vimpari) beneficially allows the service

provider (e.g., Putkiranta's) to start from the same default value for switched off mobile stations, adding uniformity to its provision of location-based services.

152. A POSITA would have further been motivated to turn to Vimpari for the benefit of resource preservation. In cases where a particular service has limited resources, it would have been a waste of these resources to reserve such service resources to a switched-off mobile station because it is not being used by the user. Thus, by setting a default or initial value for the service for mobile stations that are switched off (as taught by Vimpari), Putkiranta's service provider would know that that mobile station does not need the service and would instead provide those services to a mobile station in operation, resulting in an improved allocation of resources. Accordingly, a POSITA would have been motivated to implement Vimpari's teachings with Putkiranta's service server teachings such that parameters associated with services/tariffs are set to a default, initial value when the service server determines that a mobile station is not responding (e.g. if the mobile station is switched off).

153. Indeed, Vimpari simply confirms that it would have been obvious to discontinue services or remove a discounted tariff rate for a mobile station that does not respond because it is switched off. Vimpari particularly confirms that the mobile station being switched off is tantamount to the mobile station no longer responding, as Putkiranta describes. Indeed, it would be a waste of resources to provide services

or a discounted tariff rate to a mobile station that is switched off. Accordingly, when Putkiranta's system determines that a mobile station is not responding (e.g., because it is switched off per Vimpari's teachings), Putkiranta's service server would set the services/tariffs to an initial value to indicate that the mobile station is not receiving services/tariffs.

154. Applying Vimpari's teachings of setting an initial value when a mobile station is unresponsive, such as occurs when the mobile station is switched off to Putkiranta's service server and system teachings is nothing more than the implementation of a known technique (location-based services, including call pricing) to improve a similar method in the same way (setting an initial value when mobile station is unresponsive, including when it is switched off).

C. Detailed Analysis of Claims

1. Claim 5

- a. **[5.0] *The method according to claim 1, further comprising: determining when the mobile station is switched off; and upon determining that the mobile station is switched off setting the value of the operating parameter to an initial value.***

155. As demonstrated at limitation [1.2], the combination, and in particular the combined teachings of Putkiranta and Granberg, renders obvious Putkiranta's service server (*server*) storing service profiles including network-specific indicators (*operating parameter[s]*) associated with services/tariffs offered to a mobile station in each localized service area.

156. With respect to conditions where the mobile station is switched off, the '032 patent discusses the mobile station being switched off in terms of not being detected in any special area: “the mobile telephone network sets the values of the operating parameters managed in the parameters database to a set of initial values when the mobile station is switched off (as at that time it is not present in any special area) in order to start operating the mobile station when it is switched on.” Ex.1001, 15:21-27; *see also* 4:22-28 (“In case the mobile station will be switch off, the mobile network operator will decide whether or not the values of the operating parameters associated to the presence of the mobile station into special operating areas remain unchanged or are disabled into the database containing the set of operating parameters as consequence of the switching off process.”).

157. Putkiranta teaches a similar concept to that in the '032 patent. Putkiranta teaches determining whether the mobile station is responsive and providing different services/not providing services in response to whether the mobile station responds to messages or not. That is, the server determines that services should not be provided to the mobile station if the mobile station does not respond. Putkiranta, 7:17-22. A POSITA would have understood that the mobile station being switched off is merely a specific situation where the mobile station would not respond. Thus, when Putkiranta teaches terminating the service due to nonresponse, Putkiranta teaches the service server *determining when the mobile station is switched*

off and enabling or disabling a service, according to Granberg's teachings of updating the fields in the zone database. Therefore, limitation [5.0] is obvious over the combination of Putkiranta, Granberg, and Kraufvelin alone.

158. Limitation [5.0] is further obvious in view of Vimpari. Vimpari explains that "if the mobile station is switched off," "[n]ormal tariffs" are applied instead of the "lower tariffs" that are available to the mobile station in a defined geographic area (e.g., a home area). Vimpari, 6:13-31. In combination, therefore, Putkiranta's service server would provide a normal tariff (call pricing, *set[] to an initial value*) instead of a lower tariff in response to a lack of response from the mobile station, due, for example, to the mobile station being *switched off* (as Vimpari teaches). Thus, the combined teachings including those of Vimpari, describe the process of *determining when the mobile station is switched off* consistent with how the '032 patent itself contemplates the concept.

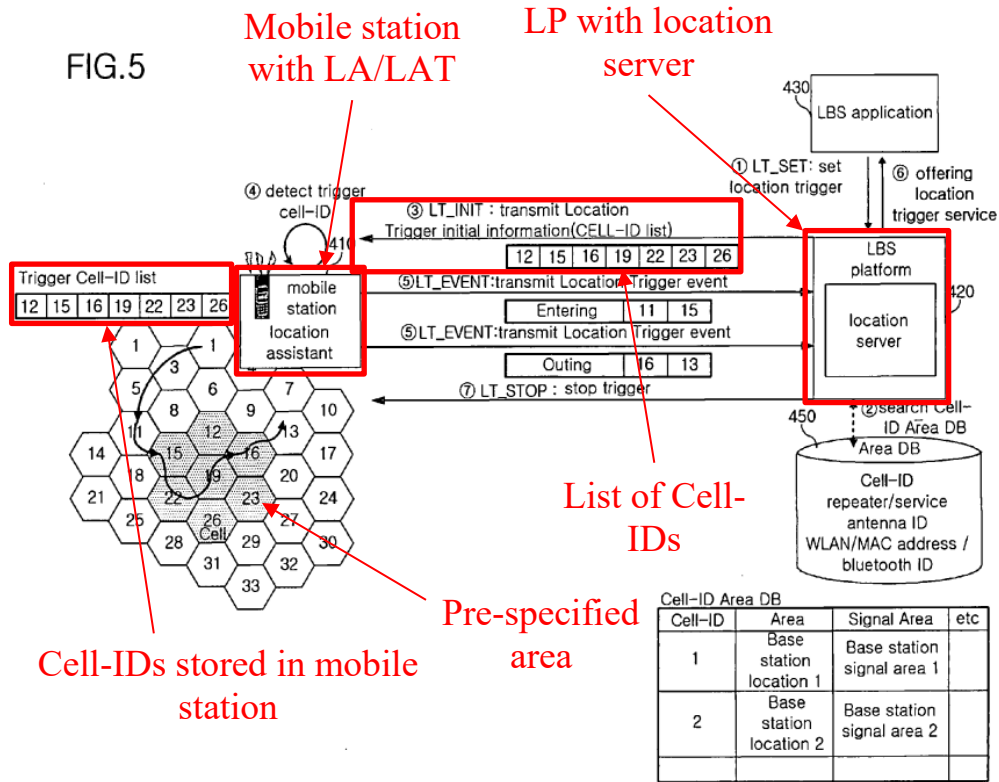
159. Therefore, the combination renders obvious *determining when the mobile station* (Putkiranta's mobile station) *is switched off* (Putkiranta's service server determining when a mobile station is non-responsive, Vimpari's teachings of determining that the mobile station is switched off); *and upon determining that the mobile station is switched off setting the value of the operating parameter* (fields associated with Putkiranta's tariffs/services, Granberg's network-specific indicator) *to an initial value* (Putkiranta's service server terminating tariffs/services to non-

responsive mobile station, Vimpari setting normal tariff rates to mobile stations that are switched off or non-responsive).

XII. GROUND 4: CLAIMS 1-3 AND 5 ARE UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF NAM AND NOLDUS

A. Summary of Nam

160. Nam relates to “a location trigger system for a location-based service” that uses a location server, a mobile network, and a mobile station that receives the location-based services via the network from the location server. Nam, Abstract. The location server is embedded within a location-based services platform, an “LBS platform (LP) 420.” Nam, [0085]. The mobile station has a “location agent,” or “LA,” and location assistant (LAT) embedded within it, used for “location trigger detection.” Nam, [0083]-[0084]; *see also* Fig. 5:



Nam, Fig. 5 (annotated)

161. The mobile station uses “trigger information including a Cell-ID and regional information” to invoke trigger events as the mobile station enters and exits different cells within a network. Nam, [0080]-[0081] (“Exemplary embodiments of the present invention describe an MS-based or MS-assisted system configuration and a method of the same to support a location trigger function, which is a main function in the LBS. According to the embodiments of the present invention, trigger assisted information including a Cell-ID and regional information on the trigger specified area is transmitted to the MS, and a location trigger function is processed by associated events invoked based on the trigger assist information.”). After the

mobile station has been configured with a list of Cell-IDs associated with one or more “pre-specified area[s],” the mobile station “monitors whether the MS enters the pre-specified area and transmits a corresponding trigger event to the LP” to trigger location-based services. Nam, [0091].

162. When the mobile station detects a trigger event, the mobile station (e.g., the LAT of the mobile station) sends an “LT_EVENT...message...to the LP” that includes the “trigger ID” and “Cell-ID” of the cell that the mobile station is entering or leaving. Nam, [0105]. In response, the LP sends a location trigger action (“LT_ACTION”) that “provides the LA 430 [of the mobile station] with a corresponding location trigger service.” Nam, [0106], [0111].

B. Summary of Noldus

163. Noldus similarly discloses methods and systems tracking mobile station presence in dedicated service areas and providing location-based services to the mobile station in those areas. Noldus, [0001] (“The present invention relates generally to mobile telecommunications systems, comprising mobile communication terminals and a radio network infrastructure, fixed communication terminals, application nodes and a transport network. More particularly, the present invention facilitates a method and a system for establishing presence of a mobile station in at least one dedicated service area, delivering information to users of mobile communication terminals receiving service from a dedicated service area,

and services and facilities provided by the communications system in a dedicated service area.”).

164. Noldus’s system includes a cellular network, mobile stations that move throughout cells of those networks and receive location services, and “a zone server (20), connected to a zone database (21)” maintaining a “record for each defined zone per PLMN per IMSI of a mobile station.” Noldus, [0060]. These records maintain a state of presence of the mobile station in the zones, with fields including a zone record identification, a mobile station identifier, a state of presence, a zone, and “list of cells that build-up the zone.” Noldus, [0060] (“The zone server is also connected to mobile stations (28) via access points (27) and gateway (26). Both connections provide the zone server with information in which geographical area a mobile station resides. The zone database contains one record for each defined zone per PLMN per IMSI of a mobile station. Each record maintains a state of presence of the mobile station in the defined zone.”), [0069] (“A second group is a zone table (41) with zone records (42). Zone record fields comprise: ID (Zone record identification). IMSI (mobile station identification, STATE (State of presence), PLMN (Home PLMN in which the zone resides), VLR (VLR-SA in which the zone resides), LSA (LSA in which the zone resides), Zone (Name of the zone as displayed on user terminal), Cells (list of cells that build-up the zone).”).

165. When the mobile station moves into different cells, an application on the mobile station sends a “cell change message” to the zone server, which updates the relevant database record. Noldus, [0134] (“When the zone application is in the standby state and a change to cell update message (M6) is received, the zone application changes (L103) to the cell update state (U). With a change to standby mode message (M8) the zone application returns (L104) to the standby state. In the cell update state the zone application sends a cell change message (M9) each time it moves into another cell or changes from access point.”), [0140] (“The zone application changes to the cell update state. It now starts to send cell change message (M9) to the zone server. If the identification in a cell change message matches on of the cells of a zone, the zone server sets the zone states field to zone and sends a notification message (M7) to the zone application notifying the user of the presence in the zone. In the meantime the zone application continues to send cell change messages. As long as they all match with the zone definition the zone state remains zone.”); *see also* [0060] (“Both connections provide the zone server with information in which geographical area a mobile station resides. The zone database contains one record for each defined zone per PLMN per IMSI of a mobile station. Each record maintains a state of presence of the mobile station in the defined zone.”).

166. When the mobile station is in a “dedicated service area,” the mobile station receives “dedicated services” from the network. Noldus, Abstract (“If present

in a dedicated service area, the mobile station automatically receives dedicated services to which the mobile unit is entitled to.”). The zone server updates the database records when any record is “edit[ed], delet[ed] or creat[ed]...in the zone database,” including the zone definition. Noldus, [0062], [0127] (“When requesting editing zone definitions, the operator as a user is prompted to enter an IMSI on which the maintenance handler reads in the zone database from the zone table all records with matching IMSI. This list is provided to the user that can select one zone definition from the list to delete, to edit or not selecting any and create a new zone definition.”). The zone server “performs the required updates” to the zone database, including the list of cell identifiers that define the changed zone, and synchronizes the zone definition with the mobile station. Noldus, [0127], [0069] (“Zone record fields comprise:...Cells (list of cells that build-up the zone).”), [0133] (“When switching on the mobile terminal inside a PLMN covered by the zone server a version check message (M1) is sent to the mobile terminal. The mobile terminal replies with a version messages (M2) stating the version of the zone application resident in the mobile terminal....When no zone application is resident in the mobile terminal or it is not a correct version then the zone server sends a package message (M3) that contains a correct version of the zone application.”). In some cases, the mobile terminal’s “zone application remains in the standby state till the terminal enters the VLR containing the shadow zone” and “[t]he zone server is notified of

such.” Noldus, [0144]. In response, “[t]he zone server now sends a change to cell alarm mode message with the identifications of access points and cells making up the shadow zone.” Noldus, [0145]. Thus, “the zone application continuously checks if a match exists” between the serving cell and the received list of cells making up the zone to determine whether the mobile terminal is in the zone. Noldus, [0145].

C. Reasons to Combine Nam and Noldus

167. A POSITA would have been motivated to combine the teachings of Nam with the teachings of Noldus for several reasons as discussed further below. Combining Noldus’s implementation details for a common, practical, and useful database to handle location services at a server with Nam’s location server (“LP”) teachings would have been obvious, beneficial, and predictable. Nam describes operations related to the LP receiving a location event trigger from a mobile station and providing location services in response, leaving implementation details of how the LP internally manages the information up to POSITAs. Thus, a POSITA would have been motivated to turn to Noldus’s teachings of well-known database and information management teachings for implementing Nam’s LP.

1. Nam and Noldus are analogous art to the ’032 patent.

168. As a threshold matter, Nam and Noldus are analogous art to the ’032 patent because they are in the same field of endeavor as the ’032 patent. The ’032 patent is directed to “a method for monitoring the presence of a mobile station in at

least one special area.” Ex.1001, 1:25-29. Similarly, Nam “relates to Location-Based Services” and, in particular, “separately process[ing] location trigger detection from the [mobile station], thereby setting various user customized services.” Nam, [0032]. Moreover, Noldus is directed to a “method...for establishing presence of a mobile station in at least one dedicated service area [and] delivering information to users of mobile communication terminals receiving service from a dedicated service area.” Noldus, [0001]. Thus, the ’032 patent, Nam, and Noldus are each directed to the same field of providing services to a mobile station based on its location.

169. Moreover, Nam and Noldus are analogous art to the ’032 patent because they are reasonably pertinent to the problem that the ’032 patent purports to address. The ’032 patent states that one problem it attempts to solve is how to add special areas without modifying the network’s base stations broadcasting in those areas. Ex.1001, 2:6-11 (“However, this last technical solution does not allow the mobile network, to add for a mobile station one or more special areas wherein the presence of a mobile station is monitored without having to at least modify one or more guide units broadcasting in such areas. It lacks therefore of flexibility.”). Nam solves this problem by “provid[ing] an MS-Assisted location trigger system and a service method thereof by having a location assistant embedded in an MS to separately process location trigger detection from the MS, thereby setting various user customized services without causing an overload in base station equipment (i.e.,

HLR).” Nam, [0032]. Similarly, Noldus “provide[s] an improved method for establishing whether a mobile station is present in a dedicated service area or zone of a mobile communications system, not posing an undue load on existing administrative functions or nodes of a mobile communications system” by “triggering the mobile station to provide location information relating to the presence of the mobile station at a location receiving service from the service area comprising the or each dedicated service area.” Noldus, [0014], [0020]. Thus, in my opinion, both Nam and Noldus provide the types of solutions that are reasonably pertinent to problems identified by the ’032 patent.

2. A POSITA would have been motivated to combine the teachings of Nam with the teachings of Noldus.

170. First, Nam discloses a location-based service (LBS) platform (LP) that includes a location server having multiple databases that store information relevant to providing a service/tariff to the mobile station. Nam, [0148]-[0149] (disclosing a “location trigger [database]” and a “Location Trigger Operation Log [database]”). Nam leaves implementation details regarding such databases up to POSITAs.

171. A POSITA would have known that a database is a straightforward way to store and maintain information for providing location-based services to a mobile station. The term “database” refers to a variety of structures that store a collection of related data. *Fundamentals of Database Systems*, 4-5; *Introduction to Databases*, 4 (“If the data is a collection of related facts about some enterprise (eg. a business, an

organisation, an activity, etc), then it is called a database.”). Well before the priority date of the '032 patent, databases were ubiquitous and would have been a fundamental concept for a POSITA. *See e.g.* Andersson, 2:24-39 (describing storing “geographical restriction information” for a “mobile subscriber” in a “database”); 4:61-5:4 (describes storing the current location of a mobile subscriber in a “database”); Liao, 3 (“Collecting and analyzing information using computers is facilitated by current Database Technology, **a relatively mature technology** which is the subject of this book.”) (emphasis added). Thus, because several pieces of information would have needed to be stored in association to provide location-based services to a mobile station, a POSITA would have found it obvious to use a database to store the information in Nam’s location server.

172. A POSITA would have been motivated to turn to Noldus because it describes an example of one of these well-known databases for storing related information necessary for providing location-based services. For example, Noldus discloses a “Zone Server (20) [that] uses the zone database (21) for storing administrative and operational data,” including “a zone table (41) with zone records (42).” Nam, [0067], [0069]. The “zone records” include various fields such as “IMSI (mobile station identification, STATE (State of presence [of the mobile station]),...[and] Cells (list of cells that build-up the zone).” Nam, [0069]. Noldus explains that the record/field for the current location of the mobile station is updated

as the mobile station enters/exits defined zones so that the database maintains the presence of the mobile station in the zone. Noldus, [0060] (“The zone server is also connected to mobile stations (28) via access points (27) and gateway (26). Both connections provide the zone server with information in which geographical area a mobile station resides. The zone database contains one record for each defined zone per PLMN per IMSI of a mobile station. Each record maintains a state of presence of the mobile station in the defined zone.”), [0076] (“The zone server consists of 3 sections (I, II, III). Section 1 (I) keeps track of mobile stations presence in geographically areas.”), [0083] (“The state sequencer writes (104), after execution of the routines, the next state back in the zone record in the zone database indicated by the ID in the modified zone record.”).

173. A POSITA would have been motivated to combine Noldus’s database teachings with Nam’s location server teachings, because Noldus discloses a simple and convenient way of storing information relevant to providing location-based services, such as those taught by Nam, in record fields of a database and updating those fields in response to messages indicating the presence of a mobile station. Noldus, [0134], [0140]. Indeed, Nam’s location server already teaches recording information regarding performance of the service/tariff in a database responsive to a message from the mobile station indicating its presence in a defined area. Nam, [0148]-[0149]. Using Noldus’s database teachings with Nam’s LP teachings would

therefore have predictably improved Nam's ability to maintain up-to-date information for providing service/tariffs to the mobile station.

174. A POSITA would have had a reasonable expectation of success applying Noldus's database teachings to Nam's location server teachings. Nam already teaches using a database for location area information in a system that provides location-based services. Nam, [0148]-[0149]. Noldus similarly teaches storing presence-related information in a location database to facilitate the provision of location-based services. Noldus, [0001], [0060], [0069], [0134], [0140]. Thus, Nam's and Noldus's systems were already compatible, and Noldus's teachings regarding the zone database are merely implementation details consistent with Nam's overall system.

175. Indeed, Nam-Noldus is merely the combination of known elements (e.g., Nam's location system teachings, Noldus's zone database teachings to track location information), according to known methods (Nam's signaling and Noldus's storing/updating the database) to yield predictable results (e.g., Nam's LP updating database records in response to receiving location messaging from mobile stations).

176. Second, a POSITA would have been further motivated to combine Noldus's teaching of sending updated lists of cell identifiers to mobile stations with Nam's teachings of setting and handling location triggers and related messaging. Nam teaches the concept of setting trigger-defining cell identifiers for specific areas,

including sending those for initialization. In Nam, the LP (including a location server) “set[s]” a location trigger defining the Cell-ID (or Cell-IDs) associated with a pre-specified area and “transmits a Cell-ID associated with a pre-specified area to the MS 410.” Nam, [0091]. For example:

The LT_INIT is a message that the LP sends to the LAT to set the location trigger in formats of a trigger-ID [and] allocation event list.... For example, the LT_INIT message is LT_INIT(“00101”, <ENTERING<Cell-IDO3412), Cell-ID(3413)>>, Evented, null, null). In this case, “00101” represents a trigger-ID, <ENTERING-Cell-IDO3412), Cell-ID(3413)>> represents a location event list, and Evented represents a trigger report mode.

Nam, [0103]; *see also* [0110] (“The LP 420 sends an LT_INIT to the LAT of the MS 410 so as to transmit initial information on the location trigger, including a trigger Cell-ID list.”).

177. Using these Cell-IDs, Nam’s “MS 410 monitors whether the MS enters the pre-specified area and transmits a corresponding trigger event to the LP to invoke the location trigger.” Nam, [0091]; *see also* [0110] (“The LAT of the MS 410 checks the Cell-IDs.”), [0111] (“The LAT of the MS 410 sends an LT_EVENT to the LP 420 once a location trigger event starts.”). Nam also teaches the desirability of updating the location trigger status. Nam, [0111] (“[T]he LP 420 sends an LT_STOP to the LAT of the MS 410 to stop the trigger event.”), [0107] (“The

LT_ACTIVATION is a request message to stop a trigger event in the activation mode between the LP, LA, and LAT, in a format of LT_ACTIVATION(Trigger-ID, Mode). Herein, the Mode includes START activating the trigger event, REMOVE permanently removing the trigger event, and SLEEP temporarily halting the trigger event.”).

178. Noldus demonstrates the obviousness of a location server sending an updated list of Cell-IDs to the mobile station at various times beyond original initialization. Noldus teaches dynamically managing zones in which certain services are provided. In particular, Noldus’s zone server maintains records that include a list of cell identifiers for each zone and provides mechanisms for editing that list. Noldus, [0062] (“The zone server has also a connection to a terminal (29) for editing, deleting or creating new zone records in the zone database.”), [0067] (“The Zone Server (20) uses the zone database (21) for storing administrative and operational data.”), [0069] (“Zone record fields comprise:...Cells (list of cells that build-up the zone).”).

179. When a zone is modified, the updated list of cell identifiers is sent to the mobile station as an update to the zone application stored on the mobile station, ensuring that the mobile station has the current definition of the zone. *See e.g.*, Noldus, [0133] (“When no zone application is resident in the mobile terminal or it is not a correct version then the zone server sends a package message (M3) that

contains a correct version of the zone application. The package is self-installing and generates a ready message (M4) when installation is completed. Upon receiving the ready message the zone server sends the activation message. Installing a version includes removal of other versions of the zone application.”), [0144] (“The zone application remains in the standby state till the terminal enters the VLR containing the shadow zone. The zone server is notified of such by the administrative functions in a home PLMN of the mobile terminal. The zone server now sends a change to cell alarm mode message with the identifications of access points and cells making up the shadow zone.”).

180. Because Nam already describes initiating a location trigger and stopping a location trigger, it would have been obvious to a POSITA to set a subsequent location trigger after stopping a previous location trigger, as Noldus further confirms. This may occur when the service provider or user changes the area where the services are to be provided. For example, the location trigger may monitor whether the mobile station is in the user’s home area and may apply lower tariff rates for the mobile station when it enters this area. *See e.g.*, Nam, [0169]-[0173] (describing examples of a “location-sensitive mobile telephone charge discount service”). In another example, the location trigger may determine when the user enters a store so that it can receive messages regarding sales or promotions that the store is providing to users. *See e.g.*, Nam, [0163] (“provid[ing] a specific zone

alerting service in a shopping mall or a theme park, etc.”), [0008] (describing examples of location-based services), [0178] (describing examples of location-based services). If the user moves to a new home or if the store moves to a new location or expands its current location, the service provider or user may want to update the location trigger so that the tariffs or services can be provided in the user’s new home location or the stores’ new or expanded location. This would involve updating the list of Cell-IDs stored on the mobile station so that it covers the new location, as Noldus expressly teaches.

181. Noldus’s teaching of a zone server updating the zone application of the mobile station and sending new identifications of the cells to the mobile station was a mere implementation detail in support of Nam’s location-based system teachings. Noldus’s approach to updating the MS with new cell identifier lists would be a natural enhancement to ensure the continued accuracy and reliability of Nam’s location-based services as the network evolves. For example, the network may add or remove base stations, may change the size/shape of the base station’s coverage, or may assign new Cell-IDs to base stations. Any of these changes may affect the list of Cell-IDs corresponding to the pre-specified areas stored in the mobile station in which it is to receive tariffs or services.

182. Indeed, a POSITA would have recognized that telecommunications networks often change the coverage of their base stations due to reconfiguration,

optimization, or changes in service requirements. *See e.g.*, Ex.1047 (“Raith”), 2:55-63 (“[I]f the operator of a public system changes the cell layout by introducing more cells, the mobile unit will not detect the stored characteristics of the public cell in which a private system is located. Thus the memory contents of the mobile unit must be updated, for example, by a user, in order to account for changes in the public system made by the operator so that the private system can still be reached.”), Ex.1048 (“Ahmadi”) 14:60-15:1 (“The topology information provided by the network operator at network set-up time about neighboring relationships between base stations is subject to change through time. Such changes may be due to various reasons: base stations may be physically moved, their emitted power may be modified thus changing the size of the coverage area (i.e., cell), or radio frequency propagation conditions may change due for instance to modifications made to the building where the wireless LAN is installed.”); Kraufvelin, [0108]-[0111] (“It is not possible to be 100% sure that the subscriber is in the area intended, as operators tune their networks on a daily basis. This means that a cell-ID may no longer correspond with the intended geographical area due to operator changes to the radio network after registration of the area trigger with the terminal and before the trigger has fired.”).

183. Thus, in each of the exemplary cases just noted, the list of Cell-IDs stored in the mobile stations may not accurately reflect the current location in which

tariffs/services are provided or the current network topology. Accordingly, it would have been obvious to a POSITA that Nam's location server would have stopped a previous location trigger associated with outdated Cell-IDs and initiated a new location trigger so that the location server sends updated Cell-IDs to the mobile station to ensure accurate and reliable location-based services, as Noldus confirms. Without such updates, the MS could operate on outdated information, leading to incorrect services/tariffs being provided to the mobile station.

184. Third, a POSITA would have been further motivated to turn to Noldus's teachings for handling scenarios in which the mobile station is switched off. A POSITA would have understood that the service provider or network would have detected that the mobile station is disconnected from the network. A POSITA would have known that a mobile station would have been disconnected from the network for a number of reasons, including, for example, that the mobile station is switched off or the mobile station has exited the network, among other reasons. A POSITA would have known that, to a service provider or network, the scenarios when the mobile station is disconnected would have been treated the same way, per Noldus's teachings.

185. Noldus provides a solution to scenarios where a mobile station is switched off, involving tracking that status via the dynamically-updated database. When the mobile station is "switched off," "the status field of the zone record is

OUT,” and, when the mobile station “switches on,” the zone server “changes the state field of the zone record.” Noldus, [0139]. A POSITA would have therefore been motivated to turn to Noldus’s teaching for beneficially tracking power status via the database, so that discounted tariffs and services are set to an initial value when the relevant mobile station is off.

186. Indeed, it would have been obvious to a POSITA that a mobile station that is switched off or otherwise disconnected from the network would not be able to even receive services or a discounted tariff rate. Thus, a POSITA would have desirably set parameters associated services and/or tariffs to a default or initial value/condition when the service provider or network determines that the mobile station is not responding, e.g. is turned off. Setting a default or initial value/condition, such as a normal tariff rate or no services, would have made it easier for the service provider (e.g. Nam’s location server) to handle the mobile station when it is turned on again. If tariffs/services are applied based on the location of the mobile station, when the mobile station is turned on again, it may take time to determine its location. Thus, if the service server stores an initial or default value for the tariffs/services (as Noldus teaches), when the mobile station reports its location after turning on again, the location server will provide the initial services until the location is reported. Moreover, the location server will be able to easily change the initial tariffs/services to the new tariffs/services based on the mobile station’s

location. This allows the service provider to start from the same default value for switched off mobile stations, adding uniformity to its provision of location-based services.

187. Accordingly, a POSITA would have been motivated to turn to Noldus's teaching of setting parameters associated with services and/or tariffs when the mobile station is unresponsive (e.g., when it is switched off). As a result, Nam's location server would have set the parameters associated with services/tariffs offered to the mobile station to an initial value, according to Noldus's teachings. For example, Nam describes an embodiment in which the service provider "offers a mobile-telephone charge discount service in a particular area." *See* Nam, [0169]-[0171]. A POSITA would have understood that, if the mobile station is switched off, the location server would have set an initial value for the discounted tariff service (e.g., 0 or OFF) as taught by Noldus. Moreover, when the mobile station is turned on again, normal charges would initially be applied to the mobile station instead of a discounted charge until the mobile station reports that it is in the area where the discounted charge is applied. This would prevent the location server from storing a discounted tariff rate for a turned-off mobile station, thereby avoiding applying a discounted charge if the mobile station is switched off in an area where the discounted charge is applied (e.g., the user's home) and is turned on outside this particular area (e.g., the user's work).

188. A POSITA would have had a reasonable expectation of success combining the teachings of Nam and Noldus. Both Nam's and Noldus's systems are designed to process such information on the MS to trigger location-based events. In particular, Nam explains that it provides "an MS-Assisted [mobile station-assisted] trigger...method" in which "a location assistant embedded in an MS [] separately process[es] location trigger detection from the MS, thereby setting various user customized services without causing an overload in base station equipment (i.e., HLR)." Nam, [0032]; *see also* [0043] ("the MS in which the LA is embedded detects the location trigger; d) the MS transmits information on events invoked based on the location trigger to the LP; and e) the LP processes the location trigger referring to the event information."), [0081] ("MS-based...system"), [0142] ("an MS-Based LT" is when the "LAT-based structure...is embedded in MSs 1010 that are capable of independent event detection and performance"), [0117] (describing solving the problems of excessive load and cost" "by extending the functionality of the MS"). Moreover, in Noldus "the location information is provided by a mobile station," which makes the method "very flexible to implement in plurality of services operated internally or externally of a mobile communications system." Noldus, [0022]; *see also* [0014] (Noldus's "object [is] to provide an improved method for establishing whether a mobile station is present in a dedicated service area or zone of a mobile communications system, not posing an undue load on existing

administrative functions or nodes of a mobile communications system.”), [0019] (method includes “determining whether the mobile station receives service from a service area comprising the or each dedicated service area and, in the affirmative”).

189. Moreover, both Nam and Noldus rely on the transmission of area-defining information (such as cell identifiers) from a central server to the mobile station. Nam explains that the LP 420 having a location server “transmits a Cell-ID associated with a pre-specified area to the MS 410, and the MS 410 monitors whether the MS enters the pre-specified area and transmits a corresponding trigger event to the LP to invoke the location trigger.” Nam, [0091]; *see also* [0103] (initialization message includes the Cell-IDs), [0110] (“The LP420 sends an LT_INIT to the LAT of the MS 410 so as to transmit initial information on the location trigger, including a trigger Cell-ID list.... The LAT of the MS 410 checks the Cell-IDs.”). Similarly, Noldus explains that the list of cells comprising a particular zone are sent from the zone server to the mobile station. Noldus, [0133]-[0134] (“When no zone application is resident in the mobile terminal or it is not a correct version then the zone server sends a package message (M3) that contains a correct version of the zone application.... In the cell update state the zone application sends a cell change message (M9) each time it moves into another cell or changes from access point.”), [0144]-[0145] (“The zone server now sends a change to cell alarm mode message with the identifications of access points and cells making up the shadow zone.... In

this state the zone application continuously checks if a match exists. If so a cell alarm message (M12) is sent to the zone server.”).

190. Additionally, the communication protocols and data structures described in Nam are compatible with the mechanisms described in Noldus for sending updated zone definitions. In particular, Nam discloses sending messages between the location server of the LP and the mobile station that carry cell identifier lists, such as LT_INIT and location trigger (LT_EVENT) messages. *See e.g.*, Nam, [0034] (“The LP transmits location trigger assisted information on a location trigger area to the MS, and processes the location trigger in accordance with events invoked on the basis of the location trigger assisted information. The LA sets the location trigger to obtain location based information of the MS. The LBSA is connected to the LP, and receives a customized LBS based on the location information in accordance with the location trigger. The location trigger is distribution-processed by the MS and the LP.”), [0103] (LT_INIT message), [0105] (LT_EVENT message). Noldus also describes sending messages between the zone server and the mobile station that contain a list of cells. Noldus, [0133] (“When no zone application is resident in the mobile terminal or it is not a correct version then the zone server sends a package message (M3) that contains a correct version of the zone application.”), [0144] (“The zone server now sends a change to cell alarm mode message with the identifications of access points and cells making up the shadow

zone” to the mobile station.). The underlying mobile network infrastructure, messaging capabilities, and database management techniques are well established in the art.

191. For example, Nam’s system uses standard wireless communication network equipment, including base stations, mobile positioning centers, home location registers, and visitor location registers for communication between the location server of the LP and the mobile station. Nam, [0038] (“The plurality of communication apparatuses comprises a Mobile Positioning Center (MPC), a Home Location Register (HLR)/Mobile Switching Center (MSC)/Visitor Location Register (VLR), and a Position Determination Entity (PDE).”), [0083]-[0086] (describing the mobile station and LP communicating via a cellular network comprising standard elements). Noldus also describes using standard wireless communication network equipment, including base stations and visiting location registers. Noldus, [0009] (“For purposes of handling a multitude of Mobile Stations, a PLMN is geographically divided in one or more VLR-SA (Visitor Location Register “VLR’ Service Area ‘SA’). Typically, a VLR-SA may, in turn, comprise one or more LSA (Location Service Area). The division in VLR-SA is valid for all users (Mobile Stations). The LSA may only provide different access rights to a user. In general, a service area is subdivided into a plurality of smaller geographical areas, called

service cells.”), [0058]-[0060] (describing the mobile station and the zone server communicating via a communication system comprising standard elements).

192. Therefore, because Nam and Noldus describe compatible systems and methods, a POSITA would have reasonably expected that combining aspects of Noldus’s zone server and zone database with Nam’s location server and location-based service methods would have been successful.

D. Detailed Analysis of Claims

1. Claim 1

- a. **[1.0]** *A method associated with a provider of presence related services and a mobile station that stores in a memory first checking data and uses the first checking data to determine whether or not a defining signal received from a radio communication defining device is a distinctive defining signal, the distinctive defining signal at least partly defines a special area by its coverage, the method comprising:*

193. To the extent the preamble (limitation [1.0]) is limiting, it is met, in the combination, by Nam.

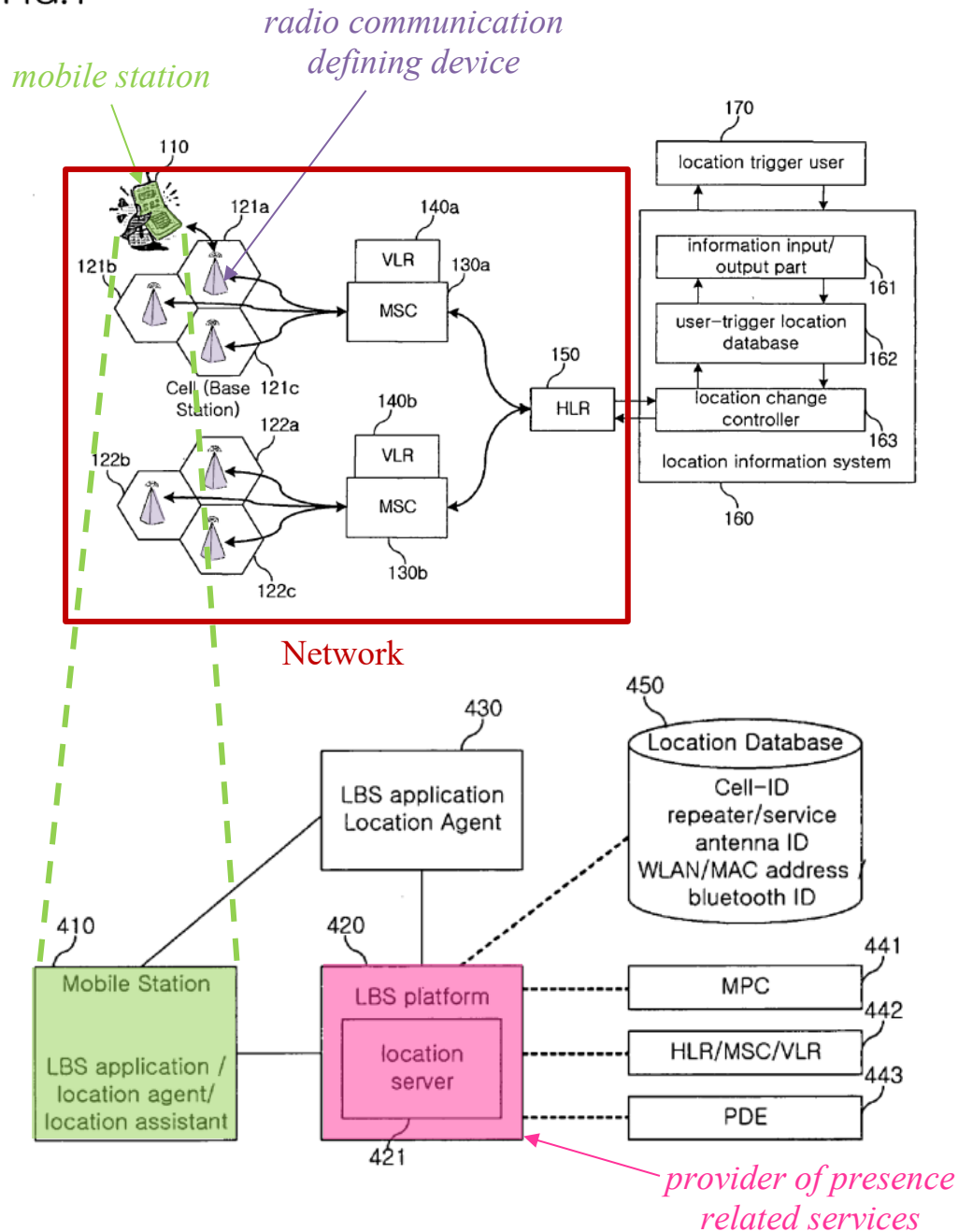
194. First, Nam discloses methods that includes “monitor[ing] a current location of [a mobile station] in a communication network, and notif[y]ing the [mobile station] of entering in, being in, or outing (*sic*) from a pre-specified area, and provides user-customized services” (*A method associated with...*). Nam, [0079]-[0080].

195. Second, Nam discloses a mobile station (MS, *a mobile station*) that is “a mobile network-enabled device.” Nam, [0078]. Nam’s system further includes a location-based service (LBS) platform (LP) (*a provider of presence related services*) that includes “a user management system” for providing location-based services to the MS according to Nam’s methods. Nam, [0085]; *see* [0008] (describing various services that can be provided by the network provider (e.g., “SK Telecom”) or an external service provider (via a “CRM server”)), [0056] (“[T]he LP processes the location trigger using the transmitted information and transmits an associated short message service (SMS) to the MS.”), [0175]-[0176] (the LP “offer[s] location-based services” to the mobile station when it enters/leaves a particular area).

196. The mobile station and the LP communicate with each other over the mobile network via one or more “base stations” (*a radio communication defining device*), including the mobile station “continuously receiv[ing] signals from the base station to maintain mobility” (*a defining signal received from a radio communication defining device*). Nam, [0091]-[0092] (“[T]he LP 420 searches a Cell-ID DB 450 in the base station and transmits a Cell-ID associated with a pre-specified area to the MS 410, and the MS 410 monitors whether the MS enters the pre-specified area and transmits a corresponding trigger event to the LP to invoke the location trigger. Herein, an MS receives a signal from a base station to identify locations.”). Further, Nam illustrates exemplary cellular networks including multiple

base stations (*radio distinctive defining device*) with coverage areas through which the MS (*mobile station*) traverses, as shown in, for example, Fig. 1 of Nam below. Fig. 4 illustrates Nam's location-based services system, including the MS (*mobile station*) and the LP 420 (*provider of presence related services*):

FIG. 1



Nam, Figs. 1, 4 (annotated)

197. **Third**, Nam teaches *storing* in a mobile station’s *memory first checking data*. The LP sends a “Cell-ID” (i.e., service antenna ID) or a “location list” of Cell-IDs (*first checking data*) to the MS, where the Cell-IDs are respectively “associated

with a pre-specified area.” Nam, [0091], [0102]. The Cell-IDs are “saved in the LAT [location assistant] of the MS to process a location trigger.” Nam, [0176], [0103] (“The LT_INIT is a message that the LP sends to the LAT to set the location trigger” having “a location event list” (e.g., “<ENTERING<Cell-ID03412, Cell-ID(3413>>represents a location event list”)); *see also* [0084] (The “location assistant (LAT)...represents software for actual location trigger detection” in the mobile station.). Thus, Nam teaches storing *checking data* in a mobile station.

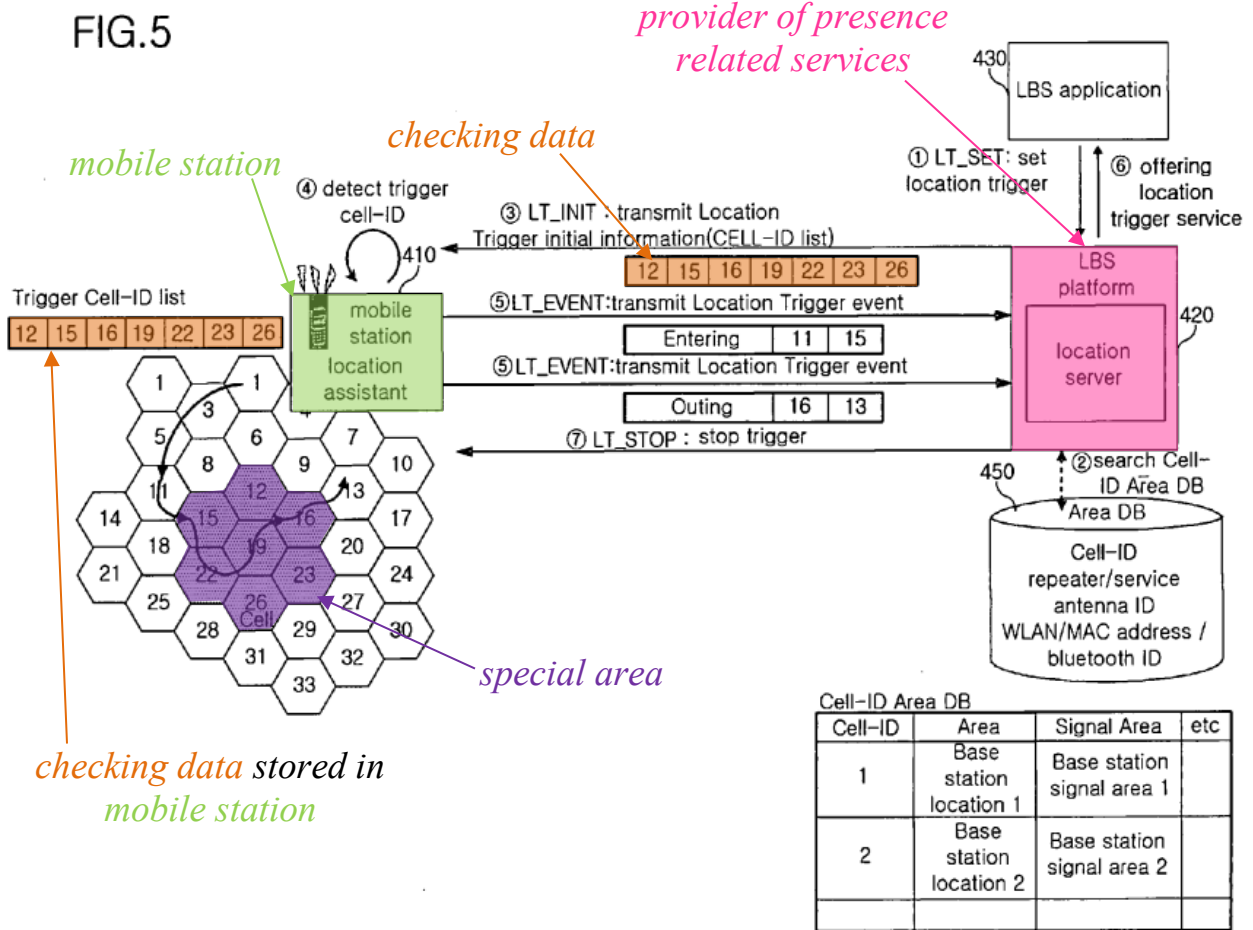
198. It would have been obvious that the Cell-IDs are saved in a *memory* of the mobile station. It was fundamentally well known that a mobile station includes a memory, and particularly that such memories store information related to location-based services, including cell identifiers. *See e.g.*, Ex.1043 (“Gray”), 4:1-23, 4:41-46 (The radiotelephone receives ZNID/LRID codes from land stations to determine whether it is in a particular billing zone.), 4:41-46 (The radiotelephone includes a “data storage element 306 [that] may store up to eight ZNID codes and eight LRID codes” for comparing to the received ZNID/LRID codes.); Ex.1044 (“Jokimies”), 3:27-44 (The mobile station stores data regarding the home area so that it can determine whether it is in the home area so that lower tariff rates can be applied.), 4:37-45 (The mobile station includes “a memory 14 for storing programs.”). Indeed, Nam’s mobile station later uses the information it had received when the “MS receives a signal from a base station to identify locations,” by comparing the Cell-

ID stored in the MS to the Cell-ID transmitted in the signal received from the base station. Nam, [0091]-[0092] (“[T]he LP 420...transmits a Cell-ID associated with a pre-specified area to the MS 410, and the MS 410 monitors whether the MS enters the pre-specified area.”); [0110] (“The LP 420 sends an LT_INIT to the LAT of the MS 410 so as to transmit initial information on the location trigger, including a trigger Cell-ID list.... The LAT of the MS 410 checks the Cell-IDs.”).

199. Fourth, Nam teaches that when the mobile station enters a cell in which the Cell-ID matches a Cell-ID in the list, then “a location trigger event starts” in which “a corresponding location trigger service” is provided to the MS. Nam, [0111]. Because the “Cell-ID” is extracted from a signal from a base station (*defining signal*), if the current signal received from the base station contains a Cell-ID that matches a Cell-ID in the list, thereby starting a location trigger event, that current signal (*defining signal*) constitutes a *distinctive defining signal*.

200. In one example described in Nam, “Cell-IDs in the list are respectively 12, 15, 16, 19, 22, 23, and 26 as shown in FIG. 5” provided below. Nam, [0110]. Thus, if, for example, “the MS 410 is entering Cell-ID 15 from Cell-ID 11,” a location trigger event starts because Cell-ID 15 is in the list of Cell-IDs stored in the MS and, thus, the signal (*defining signal*) received from the base station (*radio communication defining device*) is a *distinctive defining signal*. Nam, [0111].

201. Finally, Nam teaches that each *distinctive defining signal at least partly defines a special area by its coverage*. Nam explains that location triggers are set by “transmit[ting] **a Cell-ID associated with a pre-specified area** to the [mobile station] 410,” which the mobile station then uses to “monitor[] whether the MS enters the pre-specified area.” Nam, [0091]. Nam recognizes that “[i]n a conventional location trigger using Cell-IDs, location triggers are set in base station signal coverage areas.” Nam, [0114]. Fig. 5 illustrates exemplary coverage areas (illustrated using hexagons) of multiple cells, as specified by the “trigger Cell-ID list” (Nam, [0109]-[0110], Fig. 5):



Nam, Fig. 5 (annotated)

202. Fig. 5 further clarifies that each “[b]ase station location” (i.e., base station location 1, 2,...) has a corresponding “[b]ase station signal area” (i.e., base station signal area 1, 2,...), as shown in the exemplary portion of the “Cell-ID Area DB [database],” which includes all relevant base station locations and their corresponding signal areas. Nam, Fig. 5, [0091].

203. Therefore, the list of trigger Cell-IDs corresponds to the pre-specified area (*special area*), which is illustrated in Fig. 5 by the shaded cells (and which I highlighted in purple), with the area of each cell’s coverage corresponding to a

different identified cell-ID from the list. In Nam's example, the pre-specified area (in purple above) is formed by the coverage area of base stations 12, 15, 16, 19, 22, 23, and 26. Nam, [0110].

204. Nam, therefore, recognized and taught the well-known concept that each base station has a coverage area. Thus, Nam teaches that any base station signal having a Cell-ID in the list associated with a location trigger (*distinctive defining signal*) would *at least partly define* the pre-defined area in which the location trigger event starts (*special area*) *by its coverage*. Indeed, as Nam further teaches, it was "conventional" for Cell-IDs to define an area for location event triggers using the "base station signal coverage areas." Nam, [0114].

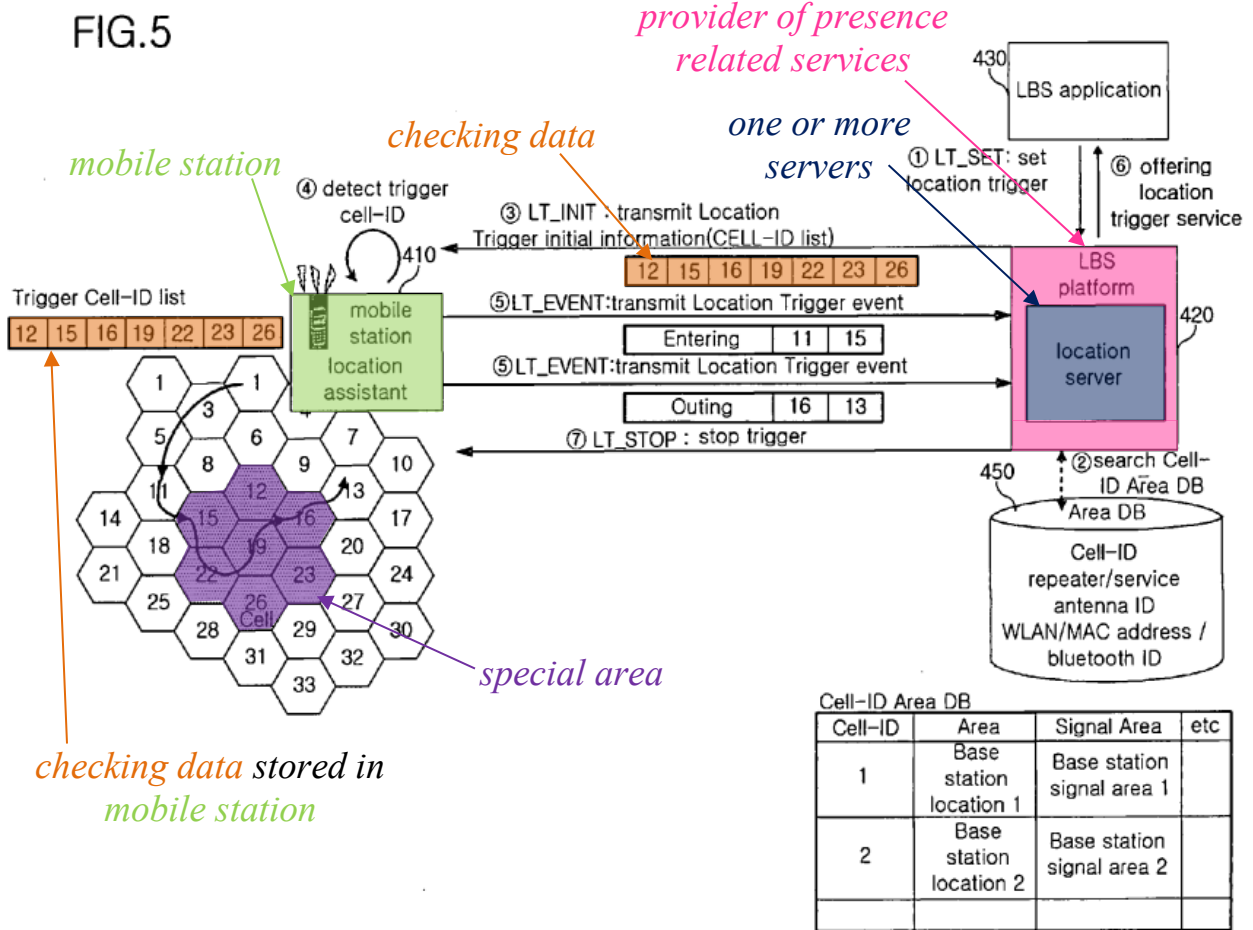
205. Therefore, the combination renders obvious *[a] method* (Nam's method of providing location-based services) *associated with a provider of presence related services* (the service provider using Nam's LP) *and a mobile station* (Nam's mobile station) *that stores in a memory first checking data* (Nam's mobile station storing a list of Cell-IDs) *and uses the first checking data to determine whether or not a defining signal received from a radio communication defining device is a distinctive defining signal* (Nam's mobile station monitoring the received base station signals containing the Cell-ID to determine whether a received Cell-ID that matches a Cell-ID in the list), *the distinctive defining signal at least partly defines a special area by*

its coverage (Nam’s list of Cell-IDs defining a pre-specified area such that, if the current Cell-ID matches one in the list, it defines at least part of the pre-defined area).

- b. [1.1] *one or more servers of a provider of presence related services receiving from the mobile station via a mobile telephone network an updating signal that identifies the mobile station's presence in the special area, the provider of presence related services being different than the mobile telephone network; and*

206. Limitation [1.1] is met, in the combination, by Nam.

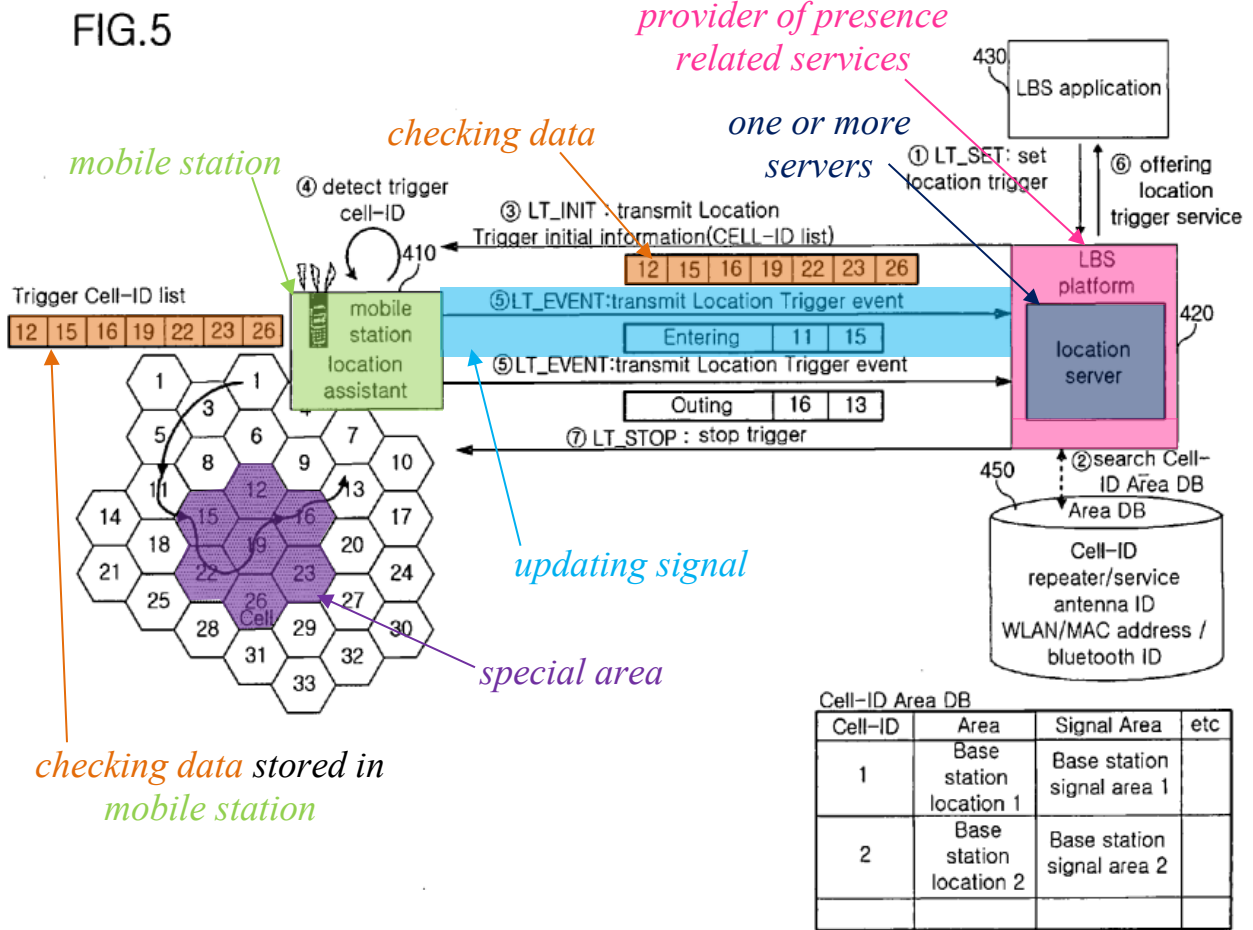
207. **First**, Nam discloses that the *provider of presence related services* includes *one or more servers*. Nam’s “location trigger system further comprises a **location server** installed to the LP [LBS platform].” Nam, [0040]. The LP “represents a software platform ... and embeds a location server (LS) 421,” and is used for “performing the location trigger.” Nam, [0085]. Fig. 5 shows the location server (*one or more servers*) of the LP (*provider of presence related services*) (*see also* Figs. 4, 11):



Nam, Fig. 5 (annotated)

208. **Second**, Nam further discloses that the location server LS (*server*) *receiv[es]* an *updating signal that identifies the mobile station's presence in the special area*. As explained above at limitation [1.0], the LP sets a location trigger in the mobile station by sending the list of Cell-IDs to the mobile station so that it can determine when it enters a pre-specified area. Thus, during normal operation, when the mobile station enters a different cell, the mobile station “monitors whether the MS enters the pre-specified area **and transmits a corresponding trigger event to the LP to invoke the location trigger.**” Nam, [0091]. Fig. 5 illustrates sending of

the trigger event to the server of the LP (*an updating signal that identifies the mobile station's presence in the special area*):



Nam, Fig. 5 (annotated)

209. The “LT_EVENT is a message” that the mobile station sends to the LP when a trigger event occurs, and includes “a trigger ID, a positioning method, an invoked event, assisted information.” Nam, [0105]. For example, if the mobile station enters a special area (detected by cell-ID), the mobile station sends the LT_EVENT message (*updating signal*) with the cell-ID for the area entered. Nam, [0105] (“For example, when the message is LT_EVENT(“00101”, Cell-ID,

Entering(<Cell-ID(3412)>), “From Cell-ID(3411)”, “00101” is a trigger ID, and the Cell-ID is an identifier of a particular location. Entering(<Cell-ID(3412)>) is an event invoked when the MS enters Cell-ID 3412, and ‘From Cell-ID(3411)’ is the assisted information informing that the MS leaves Cell-ID 3411.”).

210. Third, Nam discloses that the *server[]* receives an *updating signal via a mobile telephone network*. In Nam, the mobile station operates “on a network,” and, specifically, is “a **mobile network-enabled device**.” Nam, [0039], [0078]. Indeed, Nam’s system focuses on “a current location of an MS [mobile station] **in a communication network**.” Nam, [0080]. Additionally, the “MCP 441, the HLR/MSCNLR 442, and the PDE 443 **are communication equipment forming**” the communication network “**that the LP accesses** to obtain[] location information.” Nam, [0086].

211. Because it operates as a “mobile network-enabled device,” and operates within the mobile network/communication network, Nam’s mobile station would have transmitted its LT_EVENT (trigger event) message (*updating signal*) via the communication network (*mobile telephone network*) it was operating within. That is, the MS “transmits a corresponding trigger event to the LP” (*provider*) as a “message.” Nam, [0091], [0105] (“The LT_EVENT is a message that an event or the LT sends to the LP.”); *see also* [0175] (The MS “transmits a monitoring result to the LP.”). Because the MS is a network-enabled device, that message is sent via

the base station of the “communication network” (e.g., that also includes the MCP, HLR/MSCNLR, PDE, etc.). Nam, [0086], [0016] (“the HLR and VLR of the base station in a mobile network for supporting a roaming service.”), [0038] (“The plurality of communication apparatuses comprises a Mobile Positioning Center (MPC), a Home Location Register (HLR)/Mobile Switching Center (MSC)/Visitor Location Register (VLR), and a Position Determination Entity (PDE).”). Because both the MS and LP communicate via the network, it would have been obvious to a POSITA that Nam’s mobile station would have transmitted the trigger event message (*updating signal*) to the LP (*provider*) via the communication network (*mobile telephone network*).

212. Fourth, Nam teaches that the LP (*provider*) is *different than the mobile telephone network*. Nam teaches that “the MCP [*sic*] 441, the HLR/MSCNLR 442, and the PDE 443 are communication equipment forming a network **that the LP accesses** to obtain[] location information.” Nam, [0086]; *see also* [0014] (Prior art systems “extend[ed] the functionality of a Mobile Services Switching Center (MSC)/Home Location Register (HLR)”), [0031]-[0032] (Nam’s system avoids “directly modifying base station equipment, such as an HLR and a VLR supporting an MS roaming service” or “direct modification of exchange software (herein, the MSC)”), [0090] (Nam’s LP and LA of the mobile station “enabl[e] a user customized location trigger without adding extra base station equipment such as an HLR,” thus

describing the base stations as part of the network). Thus, because the LP must access the network, a POSITA would have understood that the LP (*provider*) is *different than* the communication network (*mobile telephone network*).

213. Additionally, Nam explains that location-based services can be provided by the operator of the network or an outside service provider who accesses the network via, for example, “a CRM server” and describes various services an outside service provider may offer to users. Nam, [0008] (“As examples of the LBS, SK Telecom provides their Mobile Zone service, and KTF provides information on traffic.... The public zone service reports entrance/exit from a restricted area of the MS by a short message service (SMS) or an e-mail, and provides various services in cooperation with a CRM server. The point meeting service provides on-line chatting and off-line meeting with another MS (or its user) located in the vicinity through a blind date service and wireless Internet. Further, a location-sensitive billing service provides an MS (or its user) with a selective payment method depending on a current location of the MS (i.e., home, work, shopping zone, etc.).”). Thus, Nam teaches that the LP would be external to the communications network and would have been operated by a service provider *different than* the network operator. This was a well-known way in which to implement such providers. *See also, e.g.*, Duan, 1:19-2:7 (“Applicant 101 may comprise applicants and LCS clients. The said LCS client refers to software or hardware entity for obtaining the location information of one or

more target UEs 103, which is interfaced with Network 102 containing LCS system. The said applicant refers to an LCS application client for requesting the location information of a target UE, such as an agency or an individual, which is the initiator of a location request.”).

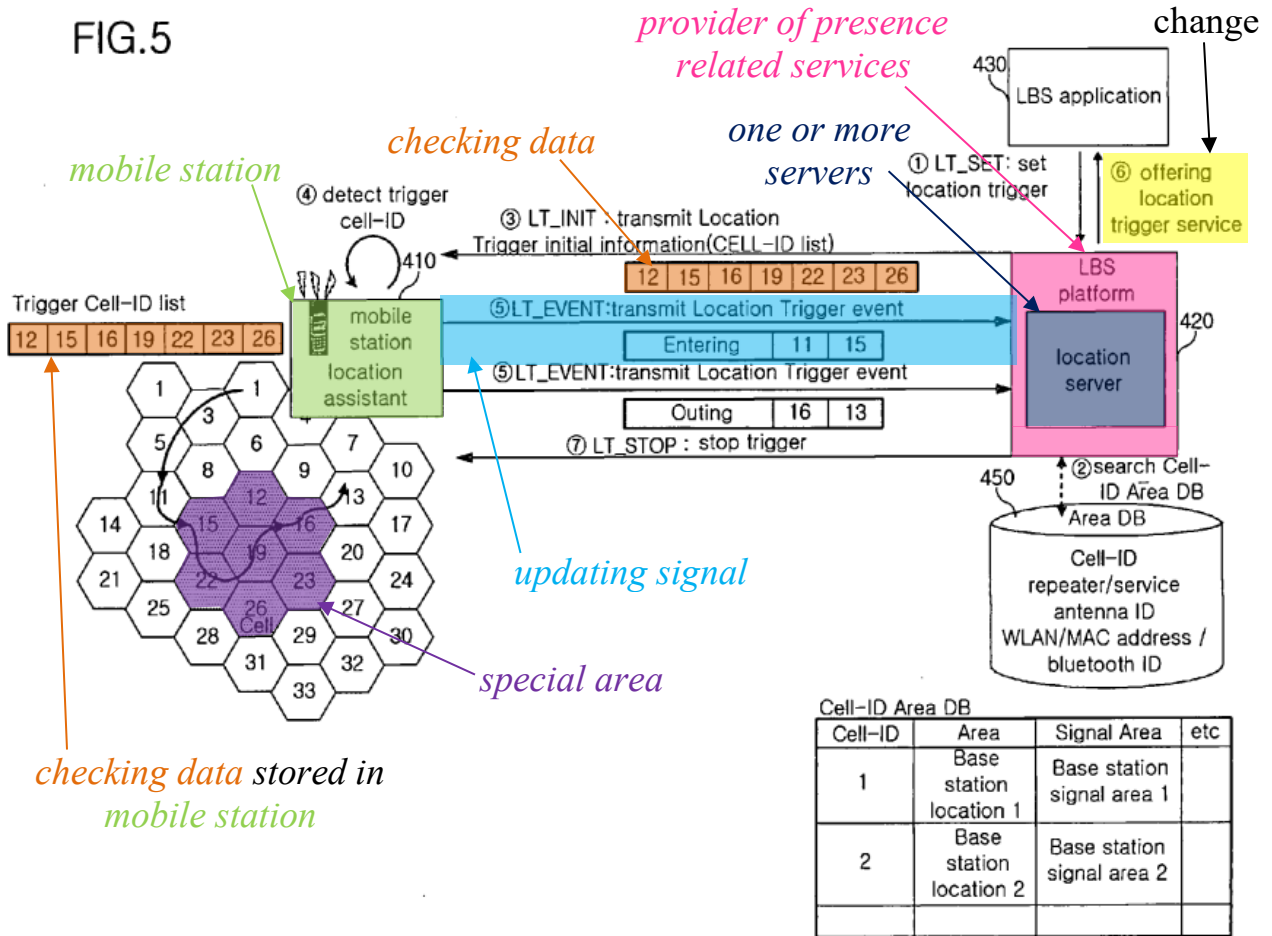
214. Therefore, the combination renders obvious *one or more servers* (location server of Nam’s LP) *of a provider of presence related services* (the service provider using Nam’s LP) *receiving from the mobile station* (Nam’s mobile station) *via a mobile telephone network* (Nam’s communications network) *an updating signal that identifies the mobile station's presence in the special area* (Nam’s LT_EVENT message (trigger event message) sent to the LP after the MS determines it has entered a pre-defined area), *the provider of presence related services being different than the mobile telephone network* (Nam’s disclosure that the LP accesses the communications network and that service providers are external to the network).

- c.** **[1.2]** *storing in the one or more servers a parameters database having an operating parameter whose value is determined at least in part by the updating signal received from the mobile station; and*

215. Limitation [1.2] is met by the combination of Nam and Noldus.

216. First, as explained at limitation [1.1], Nam teaches that the LP (*provider*) receives a trigger event (LT_EVENT) message (*updating signal*) from the MS (*mobile station*) when the mobile station determines that it has entered a pre-defined area. Nam, [0091] (“[T]he MS 410 monitors whether the MS enters the pre-

specified area and transmits a corresponding trigger event to the LP to invoke the location trigger.”), [0111] (“The LAT of the MS 410 sends an LT_EVENT to the LP 420 once a location trigger event starts.”). In response, the LP “**provides** the LA [location agent] 430 with **a corresponding location trigger service in accordance to the [message].**” Nam, [0111]; *see* [0085] (“[T]he LS 421 is a kind of software performing the location trigger and obtaining an approximate location.”). That is, Nam teaches the location server (*one or more servers*) of the LP makes a change in response to the trigger event message (*updating signal*) *received from the mobile station*. This change is shown in yellow in Fig. 5 of Nam below:



Nam, Fig. 5 (annotated)

217. The location server includes various databases that are updated when the location server receives the trigger event message from the MS. *See* Nam, [0148]-[0149] (In response to the trigger event message, “the location trigger event processor 1111 [of the location server] executes the associated trigger event [service/tariff] using the executor 1112. The executor 1112 operates an LBSA 1113 by executing the event, and an operation result of the LBSA 1113 is recorded in a Location Trigger Operation Log DB 1118.”), [0178] (listing examples of services that the location trigger event may provide). Thus, the databases (*parameters*

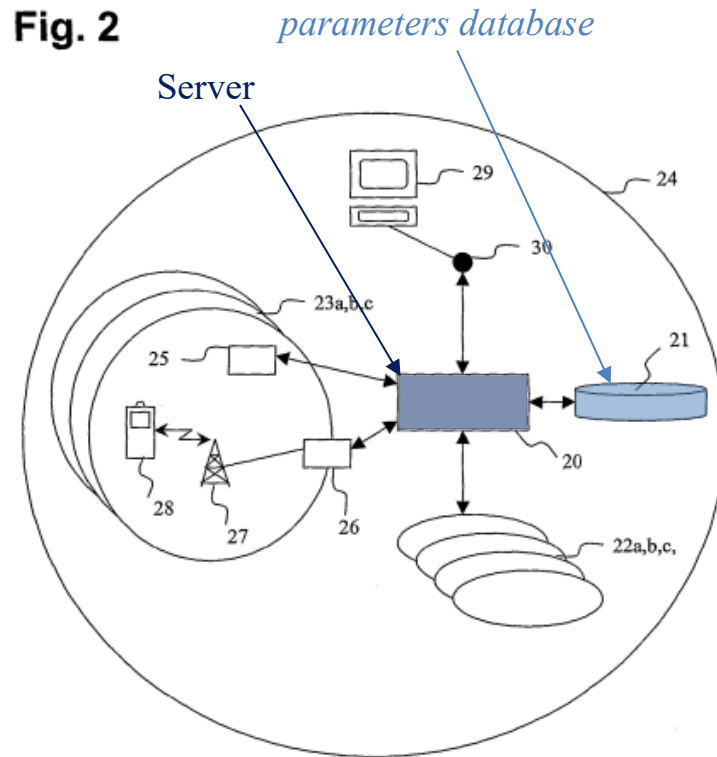
database[s]) of the location server (*one or more servers*) collectively store information used in determining the services/tariffs (*operating parameter[s]*) provided to the MS in the pre-defined area indicated by the trigger event message (*updating signal*) and the fields corresponding thereto (*operating parameter[s]*) are updated in response to the message.

218. Second, Nam further teaches using the location-based services to charge different amounts based on mobile station location. In one example, the “location trigger” (*operating parameter*) is a “mobile-telephone charge discount service.” Nam, [0169]-[0172] (“The use of the MS-Assisted LT enables a user customized mobile telephone charge discount service. For example, the TTL Zone service is limited to an area pre-specified by a mobile communication service provider, but the location-sensitive mobile-telephone charge discount service according to the embodiment of the present invention is available in base stations where users are predetermined and thus a special rate is offered to the predetermined users in the area by using the MS-Assisted LT.”), Fig. 16. When the mobile station enters a discounted area, specified by a “trigger-specified Cell-ID area,” the “discount charge area flag [is set] to 1, and the flag is set to 0 when the MS leaves the discount charge area.” Nam, [0171].

219. Although the flag is stored in the MS itself in this example, Nam expressly teaches that “[t]he mobile-telephone charge discount service can be

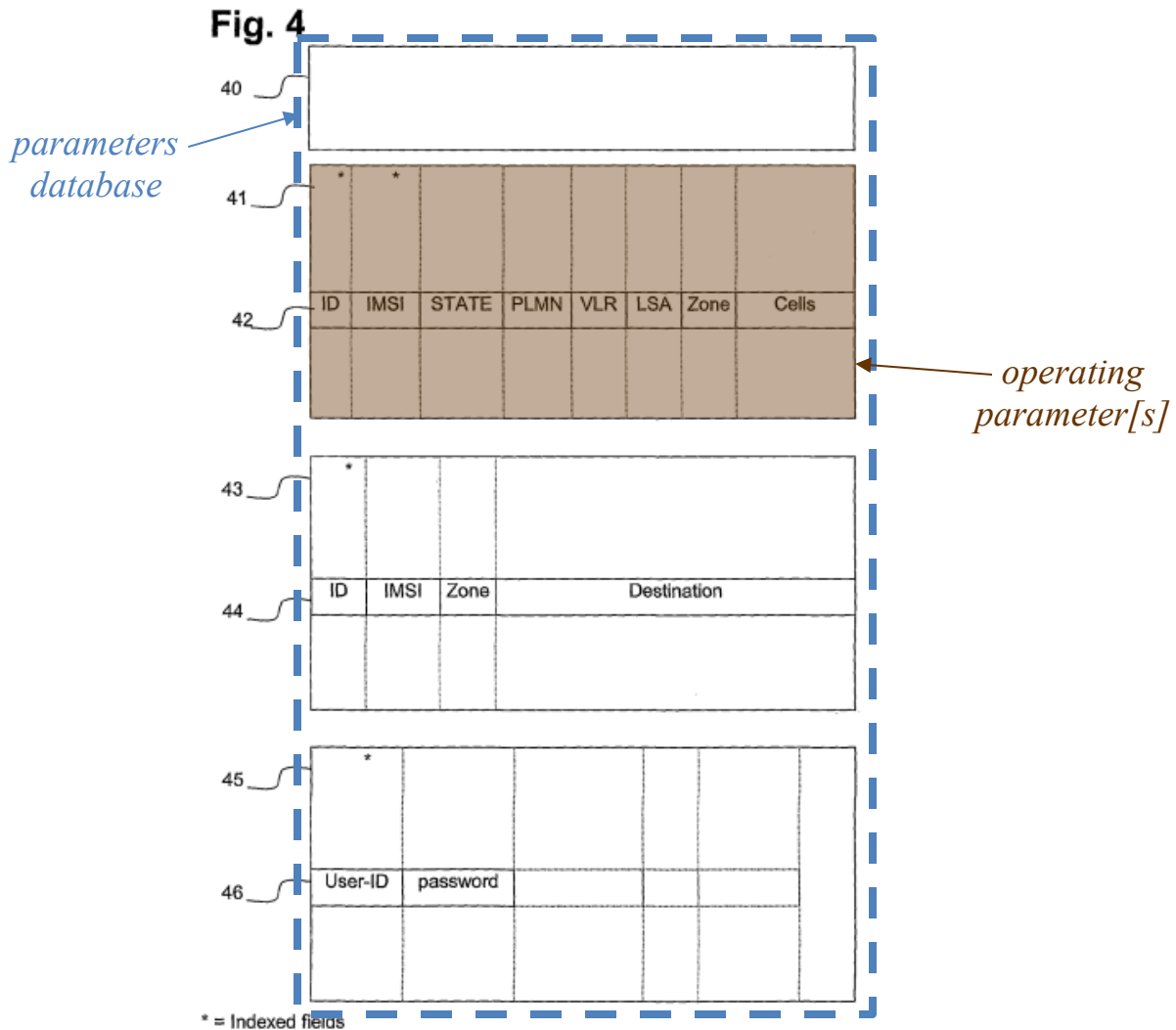
provided without using the discount area flag.” Nam, [0173]. Instead, the MS sends the location trigger message to the LP “when the MS enters a discount charge area, and the user is offered the discount service and pays a discounted mobile-telephone bill.” Nam, [0173], Fig. 17. It would have been obvious that, in this case, the location server’s database would maintain fields associated with the discount service (*operating parameter*) and change the discount service in response to (*determined by*) the location trigger message (*updating signal*). For example, based on Nam’s combined server and flag teachings, it would have been obvious to a POSITA that the discount area flags would have been stored in the databases of the location server rather than in the memory of the MS. Thus, a POSITA would have understood that the server would have changed one or more flags (*value[s]*) at the server to implement Nam’s teaching of the server offering the discounted service. For example, the flag would have been set to 1 when the MS enters the pre-specified area and the discounted service is provided and set to 0 when the MS exits the pre-specified area and normal tariffs are applied.

220. Third, while Nam alone teaches limitation [1.2], this would have been further obvious in combination with Noldus. In Noldus, a “zone server” maintains a “zone database (21) for storing administrative and operational data.” Noldus, [0067]. Fig. 2 of Noldus illustrates the zone server and the zone database (*parameters database*):



Noldus, Fig. 2 (annotated)

221. Noldus’s zone database includes multiple “zone records,” where each record includes fields (*operating parameter[s]*) that store a mobile station identifier, a “list of cells that build-up the zone,” and current location (zone) of the mobile station. Noldus, [0069] (“A second group [of the zone database] is a zone table (41) with zone records (42). Zone record fields comprise:...Cells (list of cells that build-up the zone).”). Fig. 4 of Noldus illustrates the content of the zone database (*parameters database*), including various fields (*operating parameter[s]*) storing information necessary for providing location-based services (Noldus, [0067]):



Noldus, Fig. 4 (annotated)

222. The zone server communicates with a zone application in a “mobile terminal[]” (i.e., mobile station) such that, when the mobile station moves into or exits a defined zone, the mobile station “sends a cell change message” to the zone server. Noldus, [0131] (“The zone server communicates with a zone application in mobile terminals.... [T]he zone server is in control of the version of the zone application and that the zone server can update the zone application when needed.”),

[0134] (“In the cell update state the zone application sends a cell change message (M9) each time it moves into another cell or changes from access point.”), [0140] (The mobile station “send[s] cell change message (M9) to the zone server” and, “[i]f the identification in a cell change message matches on of the cells of a zone, the zone server sets the zone states field to Zone and sends a notification message (M7) to the zone application notifying the user of the presence in the zone.”). The zone server updates the zone record in the zone database by storing the current location so that “[e]ach record maintains a state of presence of the mobile station in the defined zone.” Noldus, [0083] (“The state sequencer writes (104), after execution of the routines, the next state back in the zone record in the zone database indicated by the ID in the modified zone record.”), [0060] (“The zone database contains one record for each defined Zone per PLMN per IMSI of a mobile station. Each record maintains a state of presence of the mobile station in the defined zone.”).

223. As explained above in Section XII.C.2, a POSITA would have been motivated to modify Nam’s teachings according to Noldus’s teachings such that the databases of Nam’s location server (*one or more servers*) are implemented according to Noldus’s zone database (*parameters database*) teachings such that the services/tariffs offered to each mobile station are stored as flags in the fields (*operating parameters*) of a database record such that they can be updated when the trigger event (LT_EVENT) message (*updating signal*) is received by the location

server to provide those services/tariffs. Specifically, when the location server receives the trigger event message, the current location field of the database is updated to the Cell-ID in the message and the server determines what localized service area the Cell-ID is in (saved in the field containing the list of cells that make up the area) and updates the service flag (e.g. Nam's discount service flag) associated with that localized service area.

224. The combination therefore renders obvious *storing in the one or more servers* (Nam's location server) *a parameters database* (the databases of Nam's location server, Noldus's zone database) *having an operating parameter* (Nam's discount service flags, Noldus's fields of the zone record) *whose value is determined at least in part by the updating signal received from the mobile station* (Nam's teaching of the location server making a change in response to receiving the trigger event (LT_EVENT) message, Noldus's zone database including zone records with fields that are updated in response to zone change messages from the mobile station).

d. **[1.3]** *sending from the one or more servers to the mobile station second checking data different from the first checking data to modify the special area.*

225. Limitation [1.3] is met by the combination of Nam and Noldus.

226. **First**, as demonstrated at limitations [1.0]-[1.1], Nam teaches that the LP (*provider*), which includes a location server (*one or more servers*), sends a trigger Cell-ID list (*checking data*) to the MS (*mobile station*) that defines a pre-defined

area (*special area*). Nam, [0091] (“[T]he LP 420...transmits a Cell-ID associated with a pre-specified area to the MS 410, and the MS 410 monitors whether the MS enters the pre-specified area and transmits a corresponding trigger event to the LP to invoke the location trigger.”). This is done by Nam’s LP sending an initialization message (LT_INIT) to the MS “to transmit initial information on the location trigger, including a trigger Cell-ID list.” Nam, [0110].

227. As explained above in Section XII.C.2, the boundary of the predetermined area may change for a variety of reasons. Moreover, telecommunications networks frequently change the coverage of the base stations by, for example, adding or removing base stations or changing coverage area boundaries associated with the base stations. *See e.g.*, Raith, 2:55-63; Ahmadi, 14:60-15:1; Kraufvelin, [0108], [0110], [0111]. Thus, it would have been obvious to a POSITA that, when the list of Cell-IDs that defines the pre-defined area changes, Nam’s server would send another initialization message containing the updated list of Cell-IDs to the MS, in view of Nam’s teaching of sending initial information. This alone renders obvious limitation [1.3].

228. Second, Nam further in combination with Noldus also renders obvious limitation [1.3]. Noldus teaches that the zone server allows an operator to “edit[], delete[] or creat[e] new zone records in the zone database.” Noldus, [0062]. For example, to edit a zone definition, Noldus explains that the server retrieves records

associated with the mobile station and allows the operator to select a zone definition to edit. Noldus, [0127] (“When requesting editing zone definitions, the operator as a user is prompted to enter an IMSI on which the maintenance handler reads in the zone database from the zone table all records with matching IMSI. This list is provided to the user that can select one zone definition form the list to delete, to edit or not selecting any and create a new zone definition.”). In response, the server “performs the required updates,” including changing the list of cell identifiers that define the zone. *See* Noldus, [0127], (The zone server “performs the required updates in the zone table” in response to the editing of zone definitions.), [0069] (explaining that the “zone record fields comprise:...Cells (list of cells that build-up the zone).”).

229. Once the zone server has updated the list of cell identifiers for a zone, the zone server communicates these changes to the mobile station. The zone server checks the version of the “zone application” and determines whether it is the correct version. Noldus, [0133] (“When switching on the mobile terminal inside a PLMN covered by the zone server a version check message (M1) is sent to the mobile terminal. The mobile terminal replies with a version messages (M2) stating the version of the zone application resident in the mobile terminal.”). “[W]hen [the zone application] is not a correct version,” then “the zone server sends a package message (M3) that contains a correct version of the zone application” which installs on the

mobile station. Noldus, [0133]; *see also* [0135] (“In the cell alarm state the zone application will generate a cell match message (M12) if an identity of an access point connected to or a cell the mobile terminal resides in, matches one mentioned in the string of identifications of access points or cells. The cell match message contains the identity of the matching cell or access point.”). For example, the zone server “sends a change to the cell alarm mode message with the identifications of access points and cells making up the shadow zone” to the mobile station when it enters the “shadow zone” so that the mobile station’s “zone application continuously checks if a match exists.” Noldus, [0144]. Thus, Noldus teaches sending updated identifications of the cells defining the particular zone when the version is incorrect or when it enters the particular zone.

230. It would have been obvious, based on Noldus’s combined teachings, that when the definition of the zone (by cells, *see* Noldus, [0058] (“Inside an LSA (I) one or more zones (II) reside, comprising the geographical area covered by cells.”)) in the zone server is edited, then the zone definition no longer matches the version of the zone definition stored in the mobile station. Thus, the version of the zone application would be incorrect. Accordingly, it would have been obvious that the zone server sends an update to the zone application of the mobile station when the zone is edited so that the updated zone definition is sent to the mobile station.

231. As explained above in Section XII.C.2, a POSITA would have been motivated to modify Nam's teachings according to Noldus's teachings such that, Nam's pre-defined area (*special area*) associated with a trigger event is edited via the location server (*one or more servers*), as taught by Noldus, and the location server sends an updated trigger Cell-ID list (*second checking data*) to the MS (*mobile station*). The updated trigger Cell-ID list would have been *different than* the previously-stored trigger Cell-ID list (*first checking data*), as further taught by Noldus, thereby *modify[ing]* the pre-defined area (*special area*) in the MS.

232. Therefore, the combination renders obvious *sending from the one or more servers* (Nam's location server) *to the mobile station* (Nam's mobile station) *second checking data different from the first checking data to modify the special area* (Nam's teaching of initiating a new trigger event by sending an LT_INIT message with a list of Cell-IDs to the mobile station, Noldus's teachings of editing the zone definitions, updating the zone application, and sending a message to the mobile station identifying the cells defining the zone).

2. Claim 2

- a. **[2.0]** *The method according to claim 1, 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.*

233. Limitation [2.0] is met by the combined teachings of Nam and Noldus.

234. As explained in limitation [1.2], in the combination, Nam teaches databases that store information necessary for determining the services/tariffs provided to the MS in pre-defined areas, and flags for different purposes including a “discount service” where a “discount charge area flag [is set] to 1, and the flag is set to 0 when the MS leaves the discount charge area.” Nam, [0171]. Further, instead of using the flags at the mobile station, Nam further teaches implementing the charge discount service via the LP supporting the discount. Nam, [0173].

235. Based on these combined teachings, it would have been obvious that the discount service offered by the LP (instead of the mobile) would include changing one or more flags (*operating parameter is a tariff flag or a service flag*) in support of the discount service, responsive to the *updating signal* (trigger event message), as demonstrated at limitation [1.2]. For example, it would have been obvious based on Nam’s combined server (LP) and flag teachings noted above for the LP to change one or more flags to implement the discount service offering by the LP’s server. Accordingly, Nam alone renders obvious claim 2.

236. Additionally, it was well-known for a server (like Nam’s location server of the LP) to implement changes in databases, as further demonstrated by Noldus. Noldus teaches that the zone server receives messages from the mobile station indicating its current location and updates the associated record in the zone database to maintain current presence information for the mobile station. *See* Noldus, [0060]

(“The zone database contains one record for each defined zone per PLMN per IMSI of a mobile station. Each record maintains a state of presence of the mobile station in the defined zone.”), [0062] (“The zone server has also a connection to a terminal (29) for editing, deleting or creating new zone records in the zone database.”), [0083] (describing process for editing zone definition in zone record).

237. As explained above in Section XII.C.2, a POSITA would have been motivated to modify Nam’s flag teachings such that the flags (*a tariff flag or a service flag*) are implemented at the location server instead of at the mobile station and modified Nam’s database teachings according to Noldus’s teachings such that the fields of the database records can be edited/updated at the location server.

238. Therefore, the combination renders obvious *the operating parameter* (Nam’s discount service flags, Noldus’s fields of the zone record) *is a tariff flag or a service flag* (Nam’s discount service flags, Noldus’s teachings of editing fields of the zone database records) *that enables or disables a special tariff or a service for the mobile station* (Nam’s teachings of changing the flags to 1 or 0 and the various services and tariffs offered, Noldus’s teachings of editing fields of the zone database records).

3. Claim 3

- a. **[3.0] *A method associated with the use of a mobile station that stores and uses checking data to determine whether or not a defining signal received from a radio communication defining device is a distinctive defining***

signal, the distinctive defining signal at least partly defines a special area by its coverage, the method comprising:

239. Limitation [3.0] is substantially similar to limitation [1.0], and, thus, the prior art renders limitation [3.0] obvious for the same reasons as discussed above.

- b. ***[3.1] sending from the mobile station to at least one server of a provider of presence related services an updating signal via a mobile telephone network that identifies the mobile station's presence in the special area, the updating signal being indicative of the mobile station's presence in the special area, the provider of presence related services being different than the mobile telephone network; and***

240. Limitation [3.1] is substantially similar to limitation [1.1], except that limitation [3.1] is from the mobile station's perspective and limitation [1.1] is from the server's perspective. *See also* Section IX.E.3.b. Because the reasons shown at limitation [1.1] also include the mobile station sending the updating signal, the combination also meets limitation [3.1].

- c. ***[3.2] receiving in the mobile station from the at least one server second checking data different from the first checking data to modify the special area.***

241. Limitation [3.2] is substantially similar to limitation [1.3], except that limitation [3.2] is from the mobile station's perspective and limitation [1.3] is from the server's perspective. *See also* Section IX.E.3.c. Because the reasons shown at limitation [1.3] also include the mobile station receiving the checking data, the combination also meets limitation [3.2].

4. Claim 5

- a. **[5.0]** *The method according to claim 1, further comprising: determining when the mobile station is switched off; and upon determining that the mobile station is switched off setting the value of the operating parameter to an initial value.*

242. Limitation [5.0] is met by the combined teachings of Nam and Noldus.

243. As demonstrated at limitation [1.2], Nam discloses a location server with databases that, combined with Noldus's database teachings, store flags/fields (*operating parameter[s]*) associated with the services/tariffs for each mobile station in certain pre-defined areas that are updated based on location updates from the mobile station.

244. Additionally, Noldus describes how the zone database handles mobile stations that are switched off in a similar manner to how the '032 patent describes the concept. Noldus, [0138] ("FIG. 7 describes interaction between zone server and zone application for a case where the mobile terminal switches on."); Ex.1001, 15:21-27 ("the mobile telephone network sets the values of the operating parameters managed in the parameters database to a set of initial values when the mobile station is switched off (as at that time it is not present in any special area) in order to start operating the mobile station when it is switched on."); *see also* 4:22-28. Noldus describes monitoring the state of the mobile station such that "[w]hen [the mobile station is] switched off or not present in the PLMN containing the zone the status

field of the zone record is OUT." Noldus, [0138]-[0139]. Then, "[w]hen the mobile terminal switches on or enters the PLMN," "the zone server sends the version check message (M1) and changes the state field of the zone record" from "OUT" to the current status. Noldus, [0139]. Noldus treats the scenarios where the mobile station is switched off and the scenario where the mobile station is outside the communications network (the PLMN where the zone is located) in the same way. A POSITA would have understood that in both scenarios, the mobile station is not in communication with the network. Thus, the zone server determines that the mobile station is switched off by determining that the mobile station is not in communication with the network.

245. As explained above in Section XII.C.2, a POSITA would have been motivated to modify the databases of Nam's location server such that the fields associated with the services/tariffs offered are set to *an initial value* (e.g., "OUT," or none) when the location server *determin[es] that the mobile station is switched off*. For example, the location server may determine that the mobile station is switched off when it is not in communication with the network.

246. Therefore, the combination renders obvious *determining when the mobile station is switched off* (Noldus's teachings of the status in the zone record being set to OUT when the mobile station is switched off or not in communication with the network); *and upon determining that the mobile station is switched off*

setting the value of the operating parameter to an initial value (Nam's teaching of the relevant information being stored on databases in the location server and discount service flags, Noldus's teachings of setting a field in the zone record to OUT when the mobile station is switched off).

XIII. GROUND 5: CLAIMS 4 AND 6 ARE UNPATENTABLE AS OBVIOUS OVER THE COMBINATION OF NAM, NOLDUS, AND DUAN

A. Reasons to Combine Nam, Noldus, and Duan

247. A POSITA would have been motivated to combine the teachings of Nam and Noldus with the teachings of Duan for several reasons as discussed further below. Combining Duan's implementation details for network elements acknowledging the receipt of signals from mobile stations, or triggering retransmission, with Nam's trigger event message and system teachings would have been obvious, beneficial, and predictable. Nam describes the act of communicating between system entities, including mobile station and LP (LBS platform), leaving details of how to implement this communication up to a POSITA. Thus, a POSITA would have been motivated to turn to Duan's teachings of well-known ack/nack operations when implementing Nam's location-based services method and, in particular, the sending of the trigger event message from the mobile station to the LP when it determines it is in a pre-defined area in which services/tariffs are provided.

1. Nam, Noldus, and Duan are analogous art to the '032 patent.

248. As a threshold matter, Duan is analogous art because it is in the same field of endeavor as the '032 patent. As discussed in Section XII.C.1 above, the '032 patent, Nam, and Noldus are directed to the field of providing services to a mobile station based on its location. Similarly, Duan is related to a “method for reporting location reports by target user equipment (UE) in Location Service (LCS)” system. Duan, Field of the Technology. Thus, Duan is directed to the same field as the '032 patent. Further, Duan is reasonably pertinent to the problem that the '032 patent purports to address, as discussed above in Section X.B.1 (Ground 2).

2. A POSITA would have been motivated to combine the teachings of Nam and Noldus with the teachings of Duan.

249. Nam explains that “Location-Based Services (LBS) utilize a geographical location of a mobile station (MS) and provide location-specific services,” “[t]he LBS provid[ing] more accurate information” for providing those services. Nam, [0005]-[0006]. Further, Nam sought to improve upon prior systems where modifying network elements resulted in various problems including “communication interruption” that interfered with proper service provision. *See* Nam, [0031] (“However, there are problems to be solved in the foregoing conventional technologies. The MSC performs a main role in the communication network and is implemented by directly modifying base station equipment, such as an HLR and a VLR supporting an MS roaming service. Further, direct modification

of exchange software (herein, the MSC) is also required, and communication interruption occurs when trigger location function is overly activated, thereby inducing the exchange to be overloaded.”). Nam left some implementation details up to a POSITA, including the use of ack/nack to minimize lost data from any communication interruptions.

250. Acknowledgments are commonly sent from the receiving element in a telecommunications system to the transmitting element, thus ensuring that messages are actually received. *See e.g.*, Strong, [0005] (“**Any controller that has been able to correctly receive the data message sends an acknowledgement bit** during the acknowledgement bit time, and the device transmitting the message checks for the presence of the acknowledgement bit.”); Prasad, 60 (“In addition, all directed traffic uses immediate positive acknowledgment (ACK frame), where the sender schedules a retransmission if no ACK is received.”), 63-64 (“Upon receipt of a correct packet, the receiving station waits a SIFS interval and transmits a positive acknowledgment frame (ACK) back to the source station, indicating that the transmission was successful.”), 66-69 (“The destination station positively ACKs each successfully received fragment by sending a DCF ACK back to the source station. The source station maintains control of the channel throughout the transmission of the MSDU by waiting only a SIFS period after receiving an ACK and transmitting the next fragment. When an ACK is not received for a previously transmitted frame, the

source station halts transmission and recontends for the channel. Upon gaining access to the channel, the source starts transmitting with the last unacknowledged fragment.”), Fig. 3.9 (illustrating ACK), Fig. 3.11 (illustrating ACK for fragmented signal); Kraufvelin, [0076]-[0078] (message from mobile station to network that the request was successfully set-up), [0084] (GMLC acknowledging the receipt of report message). In fact, Noldus contemplates using an ACK process: in one embodiment, the mobile station acknowledges receipt of a message from Noldus’s server. Noldus, [00143] (“[T]he zone server orders the zone application to become active and go to the standby state. The zone application acknowledges with the standby message (M13).”).

251. It would have been obvious to a POSITA that, if no ACK process is used, when the mobile station sends a message to the network, the mobile station has no way of knowing whether the message was actually received by the intended recipient. In location-based services systems, a POSITA would have understood that, if the mobile station’s message requesting location-based services be provided is not received by the appropriate recipient, the appropriate services likely will not be provided. A POSITA would have understood that the message may not be received by the appropriate entity for a variety of reasons. For example, the propagation conditions may be temporarily poor due to the location of the mobile or multipath, interference from another cell may cause the signal to not be received

properly, or the mobile may be disconnected from the network. *See e.g.*, Goodman, 95 (“In a mobile radio system, the role of the data link is to ensure error-free transmission of information packets between mobile units and base stations. Rayleigh fading poses the main threat to accurate packet reception. When a packet encounters a fade, it is highly likely that transmission errors will occur and that the packet will have to be retransmitted. The data link provides error detection, acknowledgements of the quality of received packets, and retransmission of packets with errors.”). Thus, a POSITA would have understood that ACK processes were routinely used in communication systems to avoid this problem. *See* Section X.B (Ground 2) *supra*.

252. Accordingly, a POSITA would have known that these well-known ACK processes would have been implemented in location-based services systems, like those described in Nam, to ensure that appropriate services are provided (or removed) when the mobile station enters (or exits) the pre-defined area.

253. When implementing such ACK process, it was well-known that, if an acknowledgment is not received by the transmitting element, the transmitting element would have retransmitted the message to ensure receipt of the message. *See* Strong, [0005] (“**if no acknowledgement** bit is detected, the device **re-transmits** the data frame.”)); Prasad, 60, 66-69; Goodman, 95 (“The data link provides error detection, **acknowledgements of the quality of received packets, and**

retransmission of packets with errors.”) (emphasis added). It would have been obvious to a POSITA that the mobile station would have retransmitted the message. If the mobile station did not receive the required acknowledgment, then the mobile station knows that its message was likely not received by the intended entity. Accordingly, if the mobile station does not resend the message, the mobile station would essentially be accepting that its message was not properly received without taking measures to remedy the situation. Although there may be other ways to ensure proper receipt, resending the message is the most straightforward way to accomplish this. *See* Section X.B.2 (Ground 2) *supra*.

254. For these reasons, a POSITA would have known that this well-known, routinely used ACK process would have been used in Nam’s system and, in particular, to confirm receipt of mobile station’s trigger event message indicating that it is in a pre-defined trigger event area.

255. Duan provides examples of these well-known ACK processes that are applied in a mobile station-based location-based services system similar to Nam’s system. Duan provides a process for sending an acknowledgment message to the mobile station (i.e., user equipment) confirming receipt of a message indicating the mobile station is in a particular location. Duan, 9:25- 10:6 (describing an exemplary acknowledgement process). Duan explains that without acknowledgment process, “the target UE is unable to learn whether the reported location report has been

properly processed” by the network element, thereby “increasing the uncertainty in the implementation of the LCS” (location service). Duan, 6:17-7:4; 6:3-7. Accordingly, Duan’s acknowledgment process requires the receiving network element send an acknowledgment to the mobile station when it receives a location report therefrom and, if the mobile station does not receive the acknowledgment, retransmit the location report. Duan, 10:16-11:9.

256. Therefore, a POSITA would have been motivated to implement Duan’s acknowledgment process teachings with Nam’s teachings to ensure that the location server receives the trigger event message indicating the mobile station is in the pre-defined area. This would have reduced the uncertainty in Nam’s system and ensured that the appropriate services are provided to the mobile station, even in cases where, for example, the signal experiences a multipath fading.

257. As a result, Putkiranta’s location server teachings would have been modified to include an acknowledgment to the mobile station upon receipt of the trigger event message, as taught by Duan. Duan, 9:25-10:6. If the acknowledgment is not received, Nam’s mobile station would have retransmitted the message, as further taught by Duan. Duan, 10:16- 11:9.

258. A POSITA would have had a reasonable expectation of success implementing Duan’s acknowledgment teachings with Nam and Noldus’s combined teachings. Nam explains that the location server and mobile station send messages

to one another. Nam, [0110]-[0111] (“The LP 420 sends an LT_INIT to the LAT of the MS 410.... The LAT of the MS 410 sends an LT_EVENT to the LP 420.”), [0091] (similar). Noldus, similarly, teaches the server and mobile station sending messages to each other. Noldus, [0139]-[0143] (“Based on the received version messages (M2) the zone server either sends directly the activation message (M5) or it first sends the package message (M3) and waits for receiving the ready message (M4) from the zone application.... [The mobile station] now starts to send cell change message (M9) to the zone server.”). Noldus also discloses sending acknowledgement messages from the mobile station to the server. Noldus, [0139]-[0143]. A POSITA would have understood that the reverse would also occur—the server sending an acknowledgment to the mobile, as confirmed by Duan. This would have been a simple and conventional way to ensure that the message was received and improve the provision of services when a mobile station enters a pre-defined area/zone.

B. Detailed Analysis of Claims

1. Claim 6

- a. [6.0] *The method according to claim 3, receiving in the mobile station from the at least one server of the provider of presence related services an acknowledgement of a reception of the updating signal.***

259. Limitation [6.0] is met by the combined teachings of Nam, Noldus, and Duan.

260. As explained above at limitation [1.1], in the combination, Nam teaches that the MS (*mobile station*) sends a trigger event (LT_EVENT) message (*updating signal*) to the location server (*one or more servers*) of the LP indicating that the MS is in a pre-defined area. Nam, [0091], [0105]. Further, Noldus explains that the mobile station “acknowledges” receipt of a message from the zone server. Noldus, [0143]. It would have been obvious, based on Nam’s communication teachings and Noldus’s acknowledgement teachings, for the LP to likewise send acknowledgements to the mobile station. Indeed, sending acknowledgments was widely used to minimize communication errors by triggering retransmissions, as explained above in Section XIII.A.2.

261. For example, Duan, in the combination, discloses that the mobile station sends a “location report” to a network element and the element sends “a location report acknowledgement” to the mobile station confirming receipt of the location report. Duan, 10:28-29 (“after detecting the occurrence of an event triggering a location report, the target UE reporting the location report to CN”); 7:20-22 (“the target UE receiving a location request initiated by an applicant, and reporting a location report to the LCS system after detecting the occurrence of an event triggering a location report”). In response, the network element sends “a location report acknowledgement” to the mobile station confirming receipt of the

location report. Duan, 10:28-29 (“after receiving the location report reported by the target UE, CN returning to the target UE a location report acknowledgement”).

262. As explained above in Section XIII.A.2, a POSITA would have been motivated to modify Nam’s teachings, in the combination, according to Duan’s teachings such that Nam’s mobile station (*mobile station*) *receiv[es]* an *acknowledgement* from Nam’s location server of the LP (*at least one server of the provider of presence related services*) confirming that the location server receives its trigger event message indicating its presence in the pre-defined area.

263. Therefore, the combination renders obvious *receiving in the mobile station* (Nam’s mobile station) *from the at least one server of the provider of presence related services* (Nam’s location server of the LP) *an acknowledgement of a reception of the updating signal* (Nam’s trigger event message sent from the mobile station to the location server, Duan’s ACK process teachings).

2. Claim 4

- a.** **[4.0]** *The method according to claim 3, further comprising the mobile station retransmitting the updating signal upon not receiving the acknowledgement from the at least one server.*

264. Limitation [4.0] is met by the combined teachings of Nam, Noldus, and Duan.

265. As demonstrated at limitation [6.0] above, in the combination, Nam, as modified based on Duan, teaches that Nam’s mobile station *receiv[es]* an

acknowledgment from the location server (*at least one server*) confirming that it has received the trigger event message indicating the mobile station is in the pre-defined area (*updating signal*).

266. It would have further been obvious to a POSITA for Nam's mobile station to retransmit the message (*updating signal*) if it did not receive an acknowledgment from the service server in a certain period of time. It was well-known for the device transmitting a message to retransmit if no acknowledgment is received from the intended recipient to ensure that the message is correctly delivered, as described above in Section XIII.A.2.

267. For example, Duan teaches that the mobile station sends the location report again if it does not receive a location report acknowledgment from the network within a designated time period. Duan, 11:3-9 (“[W]hen the timer designating a time period is time-out, **the target UE reporting to [the network] the location report once again**”).

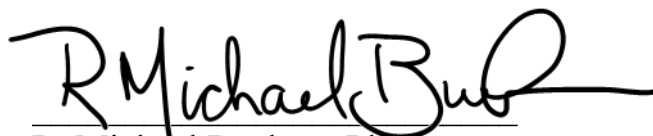
268. As explained above in Section XIII.A.2, a POSITA would have been motivated to modify Nam's teachings, in the combination, according to Duan's teachings such that Nam's mobile station *retransmit[s]* the trigger event message (*updating signal*) to the location server (*at least one server*) if it does not receive an *acknowledgement* from the location server, as taught by Duan, thereby ensuring the location server knows that the mobile station is in the pre-defined area.

269. Therefore, the combination renders obvious *the mobile station* (Nam's mobile station) *retransmitting the updating signal* (Nam's trigger event message) *upon not receiving the acknowledgement from the at least one server* (Nam's teachings of sending the trigger event message from the mobile station to the location server, Duan's user equipment resending the location report if no acknowledgement report is received from the network).

XIV. CONCLUSION

270. 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.