UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,
Petitioner

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IPR2025-01256
U.S. Patent No. 8,738,040

PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104

TABLE OF CONTENTS

PETITIONER'S EXHIBIT LIST 5
CLAIM LISTING 7
I. INTRODUCTION 12
II. GROUNDS FOR STANDING 12
III. NOTE 12
IV. SUMMARY OF THE '040 PATENT 13
V. PROSECUTION HISTORY 14
VI. EFFECTIVE PRIORITY DATE OF THE '040 PATENT 15
VII. LEVEL OF ORDINARY SKILL IN THE ART 15
VIII. CLAIM CONSTRUCTION 16
A. "*special operating means*" ([1.7], [11.2]) 16
B. "*observing means*" ([11.5], [13.1]) 18
C. "*processing means*" ([11.6]) 20
D. "*transmission means*" ([11.7]) 21
E. "*special area location monitoring means*" (claim 12) 24
IX. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF 25
X. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE 26
A. Challenged Claims 26
B. Statutory Grounds for Challenges 26
C. Ground 1: Claims 1-2, 5-8, and 10-14 are obvious under §103 over Kraufvelin, Hashimoto, and Andersson. 27
1. Kraufvelin 27
2. Hashimoto 28
3. Andersson 29
4. The Combination of Kraufvelin, Hashimoto, and Andersson 32
5. Reasons to Combine Kraufvelin, Hashimoto, and Andersson 33

6. Claim 1 39
7. Claim 2 72
8. Claim 5 73
9. Claim 6 75
10. Claim 7 76
11. Claim 8 78
12. Claim 10 79
13. Claim 11 79
14. Claim 12 86
15. Claim 13 87
16. Claim 14 89

D. Ground 2: Claims 3-4 are obvious under §103 over Kraufvelin, Hashimoto, Andersson, and Sundar. 90
1. Sundar 90
2. Reasons to Combine Sundar with Kraufvelin, Hashimoto, and Andersson 91
3. Claim 3 93
4. Claim 4 97

E. Ground 3: Claim 9 is obvious under §103 over Kraufvelin, Hashimoto, Andersson, and McNutt. 99
1. McNutt 99
2. Reasons to Combine McNutt with Kraufvelin, Hashimoto, and Andersson 100
3. Claim 9 101

XI. CONCLUSION 104
XII. MANDATORY NOTICES 105
A. Real party-in-interest 105
B. Related matters 105
C. Lead and back-up counsel and service information 105
CERTIFICATE OF WORD COUNT 107

CERTIFICATE OF SERVICE 108

PETITIONER'S EXHIBIT LIST

Ex.1001	U.S. Patent No. 8,738,040
Ex.1002	Prosecution History of U.S. Patent No. 8,738,040
Ex.1003	Declaration of Dr. R. Michael Buehrer under 37 C.F.R. § 1.68
Ex.1004	*Curriculum Vitae* of Dr. R. Michael Buehrer
Ex.1005	U.S. Patent No. 8,615,256 ("Putkiranta")
Ex.1006	U.S. Pub. No. 2006/0135174 ("Kraufvelin")
Ex.1007	U.S. Patent No. 6,230,017 ("Andersson")
Ex.1008	U.S. Pub. No. 2005/0070283 ("Hashimoto")
Ex.1009 to Ex.1013	Reserved
Ex.1014	U.S. Pub. No. 2001/0037211 ("McNutt")
Ex.1015 to Ex.1016	Reserved
Ex.1017	U.S. Pub. No. 2003/0134636 ("Sundar")
Ex.1018	3GPP TS 23.171, version 3.10.0 (Jun. 2003)
Ex.1019	3GPP TS 23.171, version 1.0.0 (Oct. 1999)
Ex.1020	Reserved
Ex.1021	3GPP TS 23.032, version 3.0.0 (May 1999)
Ex.1022	3GPP TS 23.271, version 6.4.0 (Jun. 2003)
Ex.1023 to Ex.1024	Reserved
Ex.1025	U.S. Pub. No. 2007/0167159 ("Ramesh")
Ex.1026	U.S. Pub. No. 2004/0203839 ("Ostberg")

Ex.1027	U.S. Pub. No. 2004/0235471 (“Madsen”)
Ex.1028	U.S. Pub. No. 2005/0285787 (“Delaveau”)
Ex.1029 to Ex.1034	Reserved
Ex.1035	U.S. Pub. No. 2006/0019669 (“Moon”)
Ex.1036	U.S. Patent No. 6,694,134 (“Lu”)
Ex.1037 to Ex.1068	Reserved
Ex.1069	U.S. Patent No. 6,978,143 (“Vialen”)
Ex.1070	U.S. Patent Publication No. 2005/0255850 (“Auterinen”)

CLAIM LISTING

Claim 1	
[1.0]	A method for monitoring the presence of a mobile station in one or more special areas associated with the mobile station, the method comprising:
[1.1]	(a) repeatedly transmitting from at least one radio communication defining device a radio distinctive defining signal in at least one channel that at least partially defines one of the special areas by its coverage,
[1.2]	(b) observing the channel and processing any received signal by the mobile station in order to determine whether or not it is receiving a defining signal,
[1.3]	(c) processing any received defining signal by the mobile station and the mobile station determines whether or not the defining signal received is a distinctive defining signal that at least partially defines one of the special areas, and determines whether or not the mobile station is present in one or more of the special areas,
[1.4]	(d) sending an updating signal from the mobile station to a mobile telephone network about the mobile station presence in one or more of the special areas,
[1.5]	where the updating signal sending is uncorrelated to any mobile station phone call establishment and is based on the last determination performed by the mobile station about its presence in each of the special areas,
[1.6]	and said updating signal being sent at least one of (i) periodically, (ii) when the mobile station enters into or exits from one of the special areas, and (iii) when the mobile station remains into a special area,
[1.7]	(e) routing the updating signal from the mobile telephone network to special operating means that adapt the value of at least one operating parameter taking into account the presence of the mobile station in each of the special areas,
[1.8]	(f) associating the special areas with the mobile station by transmitting a checking data to the mobile station,
[1.9]	this checking data being sent to any mobile station whose presence in the special areas is monitored and being used by the mobile station for determining whether or not the defining signal received is a distinctive defining signal that defines, alone or with other distinctive defining signals, one or more of the special areas associated with the mobile

	station.
Claim 2	
[2.0]	The method according to claim 1 further comprising, sending a deactivation signal from the mobile telephone network to the mobile station to stop the mobile station from recognizing a defining signal that defines the special area as a distinctive one in order to deactivate that special area for the mobile station.
Claim 3	
[3.0]	The method according to claim 1 further comprising, acknowledging the reception of the updating signal by the special operating means and transmitting an acknowledgement signal from the special operating means to the mobile station.
Claim 4	
[4.0]	The method according to claim 1, wherein at least one radio communication defining device is a wireless device whose radio distinctive defining signal is a distinctive wireless signal transmitted by the wireless device in a frequency range outside the frequency range allocated for the mobile telephone network, the distinctive wireless signal containing wireless device identification data and reliable information confirming that the wireless device is effectively located into a predetermined environment, and the checking data associated with this wireless device including the wireless device identification data.
Claim 5	
[5.0]	The method according to claim 1, wherein at least one radio communication defining device is a base station whose radio distinctive defining signal is a distinctive signal comprising a special mobile telephone network identification code, the checking data associated with this base station including this special mobile telephone network identification code.
Claim 6	
[6.0]	The method according to claim 1, wherein at least one radio communication defining device is a base station whose radio distinctive defining signal is a distinctive base station identity signal comprising an identification code of the base station, the checking data associated with this base station including this base station identification code.
Claim 7	

[7.0]	The method according to claim 1, wherein the special operating means comprise a parameters database linking the special area to the mobile station and to a set of one or more operating parameters; and a value of at least one operational parameter of this set is adapted when an updating signal signaling that the mobile station exits or enters the special area is received.
Claim 8	
[8.0]	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.
Claim 9	
[9.0]	The method according to claim 1, wherein the updating signal includes a request to access a service or multimedia content and the mobile telephone network routes this request to a part of the special operating means that allow or forbid the provision of this service or multimedia content depending on whether or not the mobile station is into the special area.
Claim 10	
[10.0]	The method according to claim 1 further comprising, receiving by the mobile station the checking data from the mobile telephone network or a signal of at least one radio device or from manual input.
Claim 11	
[11.0]	A mobile system for monitoring the presence of a mobile station in one or more special areas defined for this mobile station, said system comprising:
[11.1]	at least one radio communication defining device for repeatedly transmitting a radio distinctive defining signal that at least partially defines one of the special areas in at least one channel,
[11.2]	special operating means for adapting the value of at least one operating parameter taking into account the presence of the mobile station in each of the special areas, and
[11.3]	a mobile station, comprising:
[11.4]	storage for storing a checking data,
[11.5]	observing means for observing said at least one channel, and
[11.6]	processing means for processing any received signal in order to determine whether or not the signal received is a defining signal and, if

	the signal received is a defining signal, for determining based on the checking data whether or not the signal received is a distinctive defining signal and whether or not the mobile station is present in the special area,
[11.7]	and the mobile station further comprising transmission means for sending, at least one of (i) periodically, (ii) when the mobile station enters into or exits from one of the special areas, and (iii) when the mobile station remains into a special area an updating signal, that is uncorrelated to any mobile station phone call establishment, regarding the presence of the mobile station in one or more of the special areas from the processing means to the special operating means.
Claim 12	
[12.0]	The system according to claim 11, wherein the mobile system comprises special area location monitoring means for monitoring the correct location of at least a part of one or more of the special areas.
Claim 13	
[13.0]	A mobile station, comprising:
[13.1]	observing means to observe a channel and process any received signal in order to determine whether or not it is receiving a defining signal,
[13.2]	a processor to process any received defining signal and to determine, based on a previously obtained checking data, whether or not the defining signal received is a distinctive defining signal that at least partially defines a special area,
[13.3]	to determine whether or not it is present in one or more special areas, and
[13.4]	to send an updating signal at least one of (i) periodically, (ii) when the mobile station enters into or exits from one of the special areas, and (iii) when the mobile station remains into a special area to a mobile telephone network about its presence in one or more special areas, where said updating signal sending is uncorrelated to any mobile station phone call establishment and is based on the last determination performed by the mobile station about its presence in the special areas.
Claim 14	
[14.0]	A non-transitory computer readable medium storing computer readable program code for causing a computer to perform a method, the method comprising:
[14.1]	(a) observing a channel and processing any received signal by the mobile station in order to determine whether or not it is receiving a defining

	signal,
[14.2]	(b) processing any received defining signal by the mobile station and the mobile station determines, based on a previously obtained checking data, whether or not the defining signal received is a distinctive defining signal that at least partially defines one of the special areas, and determines whether or not the mobile station is present in one or more of the special areas,
[14.3]	(c) sending an updating signal from the mobile station to a mobile telephone network about the mobile station presence in one or more of the special areas, where the updating signal sending is uncorrelated to any mobile station phone call establishment and is based on the last determination performed by the mobile station about its presence in each of the special areas, and said updating signal being sent at least one of (i) periodically, (ii) when the mobile station enters into or exits from one of the special areas, and (iii) when the mobile station remains into a special area.

I. INTRODUCTION

U.S. Patent 8,738,040 (the "'040 patent," Ex.1001) relates to monitoring the presence of mobile devices (e.g., cellular phones) in particular areas. But functionality to monitor the location of mobile devices in cellular networks, and thus their presence in particular areas, was well known and even standardized—under the umbrella term "location services"—prior to the '040 patent. Ex.1003 ¶¶31-32 (citing Ex.1005, Ex.1006). There is nothing new or novel about the '040 patent.

Accordingly, pursuant to 35 U.S.C. §§311, 314(a), and 37 C.F.R. §42.100, Apple Inc. ("Petitioner") respectfully requests that the Board review and cancel as unpatentable under 35 U.S.C. §103 claims 1-14 (the "Challenged Claims") of the '040 patent.

II. GROUNDS FOR STANDING

Petitioner certifies the '040 patent is eligible for IPR and Petitioner is not barred or estopped from requesting IPR challenging the patent claims. 37 C.F.R. §42.104(a).

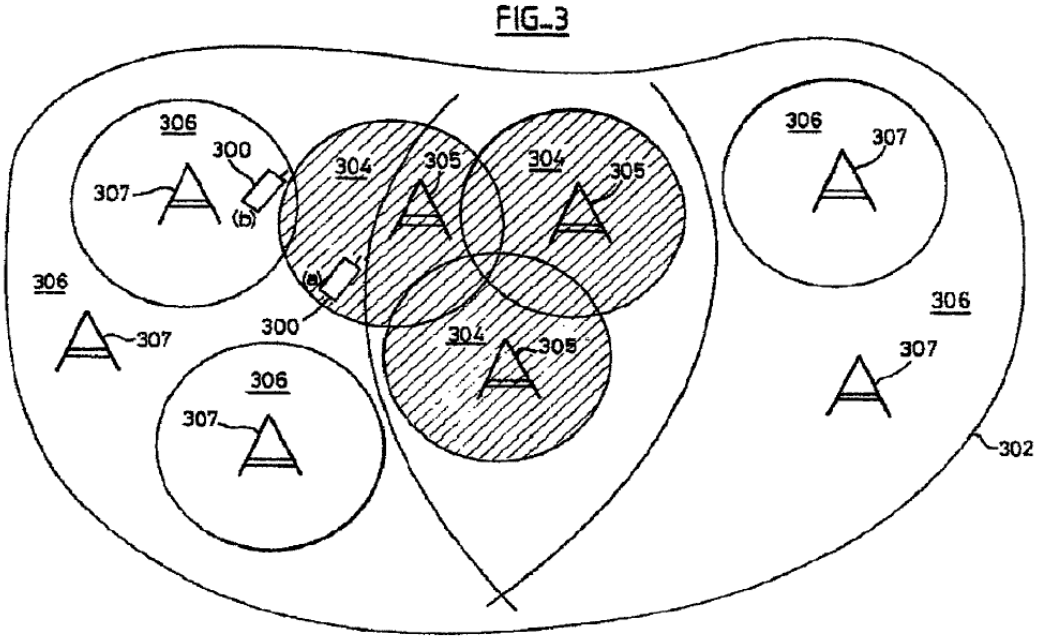
III. NOTE

Petitioner cites to exhibits' original page numbers. **Emphasis** in quoted material has been added. Claim terms are presented in *italics*.

IV. SUMMARY OF THE '040 PATENT

The '040 patent is generally directed to techniques for "monitoring the presence of a mobile station…in at least one special area," which the patent describes simply as a particular physical area in which the mobile station's presence is configured to be monitored. Ex.1001, Abstract. The patent describes that a mobile station may receive "defining signals" from "radio communication defining devices" such as "the base stations of a mobile telephone network[.]" Ex.1001, 15:5-10. The defining signal includes, for example, an identifier of the particular base station that enables a determination whether the mobile station is present in a "special area" configured by the operator of the network (*e.g.*, an area including the coverage area of a particular set of base stations). Ex.1001, 15:36-45. In response to receiving the defining signal, "the mobile station sends an updating signal to the mobile telephone network." Ex.1001, 15:54-56. Based on this updating signal, components in the mobile telephone network (*e.g.*, a server) can determine the approximate location of the mobile station (*e.g.*, based on the known location of the base station) and whether the mobile station is present in the configured special area (*e.g.*, based on whether the base station is included in the special area). Ex.1001, 15:54-16:29.

FIG. 3 of the ’040 patent illustrates a special area (304) comprising the coverage areas of three base stations (305), and a mobile station (300) present in the special area (304):



Ex.1001, FIG. 3

V. PROSECUTION HISTORY

The ’040 patent was originally filed as EP patent application 06111804 on March 28, 2006. Ex.1001, (30). The applicant filed a PCT application on March 27, 2007, and filed its U.S. national phase on April 12, 2010. Ex.1001, (22), (86).

During prosecution, the Office rejected the claims under various combinations of Lee (US 6,785,536), Muhonen (US 6,920,317), Linkola (US 6,516,910), and Atorf (US 2002/0094801). Ex.1002, 201, 147, 99. The Office allowed the claims, citing limitations [1.4], [1.5], [1.6], [1.8], [1.9], [11.4], [11.6],

[11.7], [13.2], [13.3], [14.b], and [14.c] below as allowable features over the prior art considered during prosecution. Ex.1002, 30-35. However, as shown in Section X below, these limitations are well known features taught by prior art not considered during prosecution of the ’040 patent.

VI. EFFECTIVE PRIORITY DATE OF THE ’040 PATENT

For purposes of this petition, Petitioner applies March 28, 2006, as the priority date of the ’040 patent, without conceding that the ’040 patent is entitled to that date. All the prior art identified below predates March 28, 2006.

VII. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) as of the earliest possible priority date of the ’040 patent (March 28, 2006) would have been knowledgeable and familiar with the use of location determination in the provision of location-based services in a wireless communications network (*e.g.*, a cellular telephone network or Wi-Fi network). Such a POSITA would have had a bachelor’s degree in electrical engineering, computer science, computer engineering, or a related field, and two years of experience relating to research, design, and development of wireless communications networks. Lack of professional experience may be remedied by additional education, and vice versa. Ex.1003 ¶¶24-26.

VIII. CLAIM CONSTRUCTION

All claim terms other than those identified below should be construed according to their "ordinary and customary meaning" to those of skill in the art. 37 C.F.R. §42.100(b).

Several claims of the '040 patent include "means" terms, presumed to recite means-plus-function terms under pre-AIA 35 U.S.C. §112 ¶6. *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580 (Fed. Cir. 1996). Petitioner identifies the function and corresponding structure of the following terms in compliance with 37 C.F.R. §42.104(b)(3). While "more than simply a general[-]purpose computer or microprocessor" is needed to satisfy the corresponding structure for means-plus-function terms, "an algorithm for performing the claimed function" would suffice. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1352 (Fed. Cir. 2015) (en banc in relevant part). "The algorithm may be expressed as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure." *Id*.

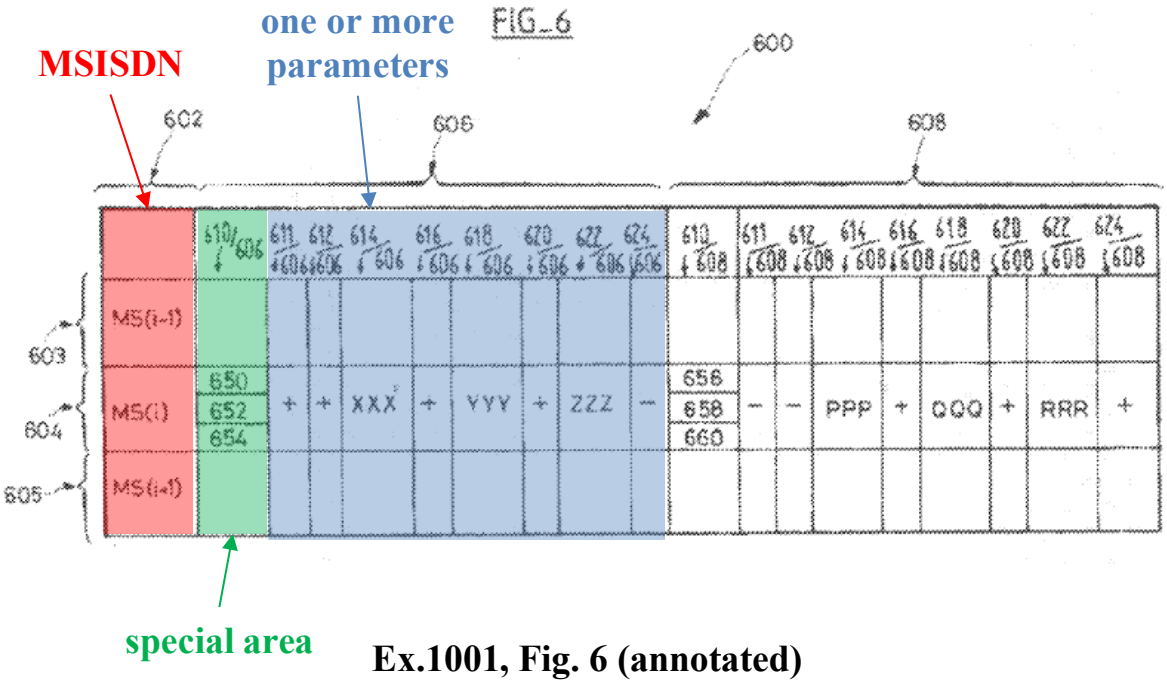
A. "*special operating means*" ([1.7], [11.2])

Function: adapting the value of at least one operating parameter taking into account the presence of the mobile station in each of the special areas. Ex.1003 ¶47.

Structure: at least one server storing a database linking a special area, a

mobile station, and one or more parameters. Ex.1001, 5:8-15, Fig. 6. The specification describes that the above-described function of the special operating means is performed by a server storing the above-described database and adapting at least one parameter. Ex.1001, 5:8-15, 17:54-19:19. The at least one parameter is adapted depending on information received from the mobile station. Ex.1001, 17:54-19:19; Ex.1003 ¶48.

The database stored on the at least one server is shown in Figure 6. Ex.1003 ¶49.



Ex.1001, Fig. 6 (annotated)

The database of Figure 6 links the mobile station (MSISDN number (column 602 in red), Ex.1001, 17:62-63) to the special areas (base station or wireless device ID codes (column 610/606 in green), Ex.1001, 18:1-15) and one or more

parameters (columns 611/606-624/606 in blue), Ex.1001, 18:28-19:4). Any of the one or more parameters, identified above, may be adapted, i.e., "enabled ('+') or disabled ('–')…depending on" information received from the mobile station. Ex.1001, 18:16-19:19; Ex.1003 ¶50.

The corresponding structure also includes equivalents of the disclosed structure. Ex.1003 ¶51.

B. "*observing means*" ([11.5], [13.1])

Function for [11.5]: observing at least one channel. Ex.1003 ¶52.

Structure for [11.5]: a processor that executes software for observing at least one channel. Ex.1003 ¶53.

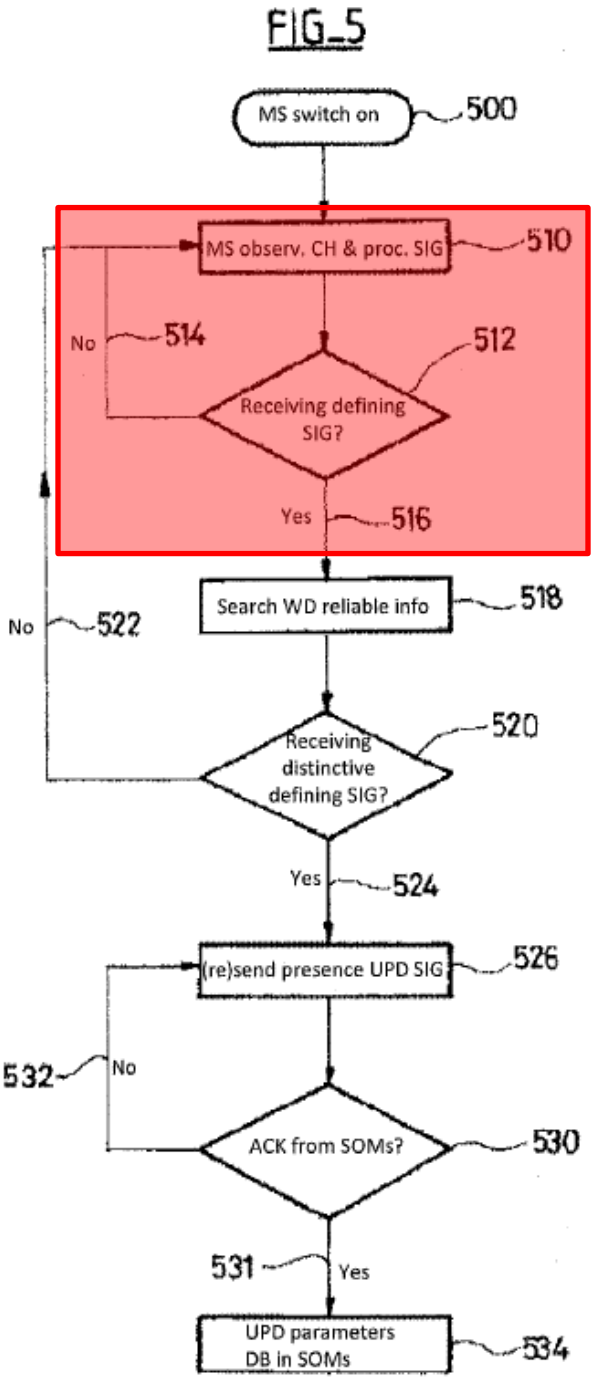
Function for [13.1]: observing a channel and processing any received signal to determine whether or not a defining signal is received. Ex.1003 ¶54.

Structure for [13.1]: a processor that executes software for observing a channel and processing any received signal to determine whether or not a defining signal is received. Ex.1003 ¶55.

The '040 patent describes that a mobile station has "a processor" that executes "special software" and "applications…available to the mobile station MS(i) when it is into the special area." Ex.1001, 19:38-53, 22:41-45, 12:31-40, 12:48-52, 12:55-60; Ex.1003 ¶56.

The mobile station's processor executes an algorithm for performing the

function of observing at least one channel and processing any received signal, as illustrated in steps 510, 512, 514, and 516 of Figure 5 below. Ex.1001, 15:5-10, 15:20-22, 12:31-40, 12:48-52, 12:55-60, 19:38-53, 22:41-45; Ex.1003 ¶57.



Ex.1001, Fig. 5 (annotated)

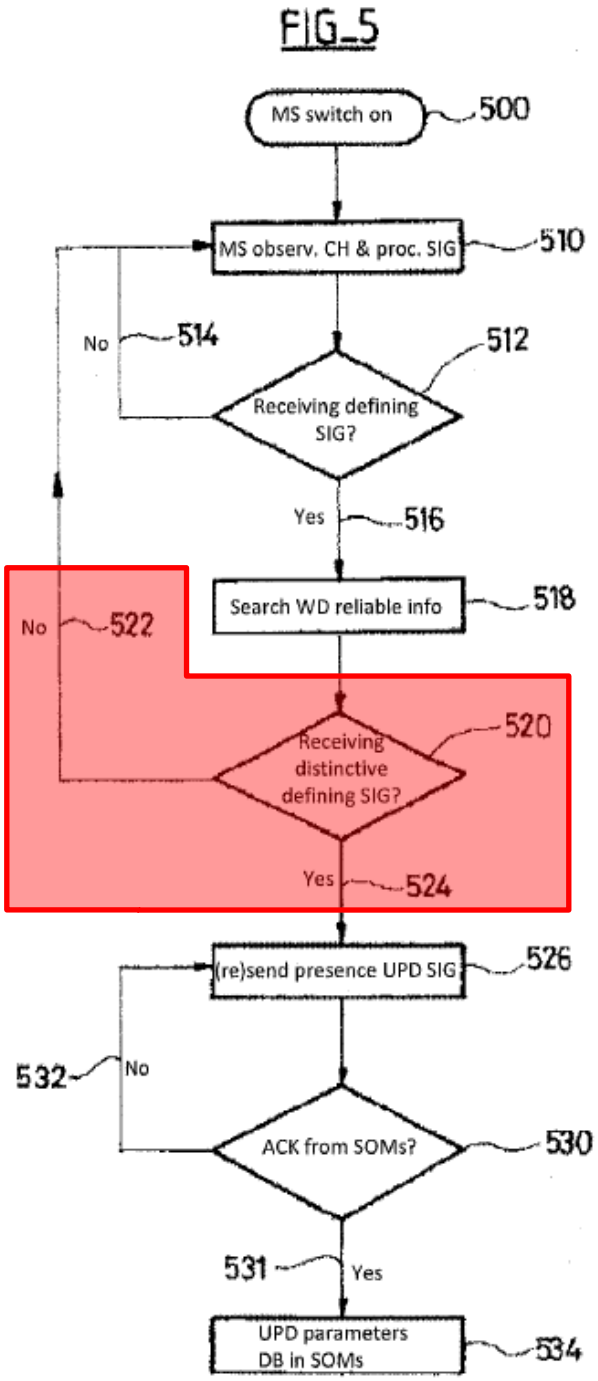
C. "*processing means*" ([11.6])

Function: processing any received signal in order to determine whether or not a signal received is a defining signal and determining based on checking data whether or not the signal received is a distinctive defining signal and whether or not the mobile station is present in a special area. Ex.1003 ¶58.

Structure: "a processor" that executes software for performing the above-described function. Ex.1003 ¶59.

The mobile station includes "a processor" that executes "special software" and "applications." Ex.1001, 22:41-45, 12:31-40, 12:48-52, 12:55-59, 19:38-45, 19:50-53; Ex.1003 ¶60.

The mobile station's processor executes an algorithm for performing the above-described function of the "processing means" as shown by steps 520, 522, and 524 of Figure 5 below. In these steps, "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." Ex.1001, 15:37-41, Fig. 5, 12:31-40, 12:48-52, 12:55-59, 15:37-41, 19:38-45, 19:50-53, 22:41-45 ; Ex.1003 ¶61.



Ex.1001, Fig. 5 (annotated)

D. "*transmission means*" ([11.7])

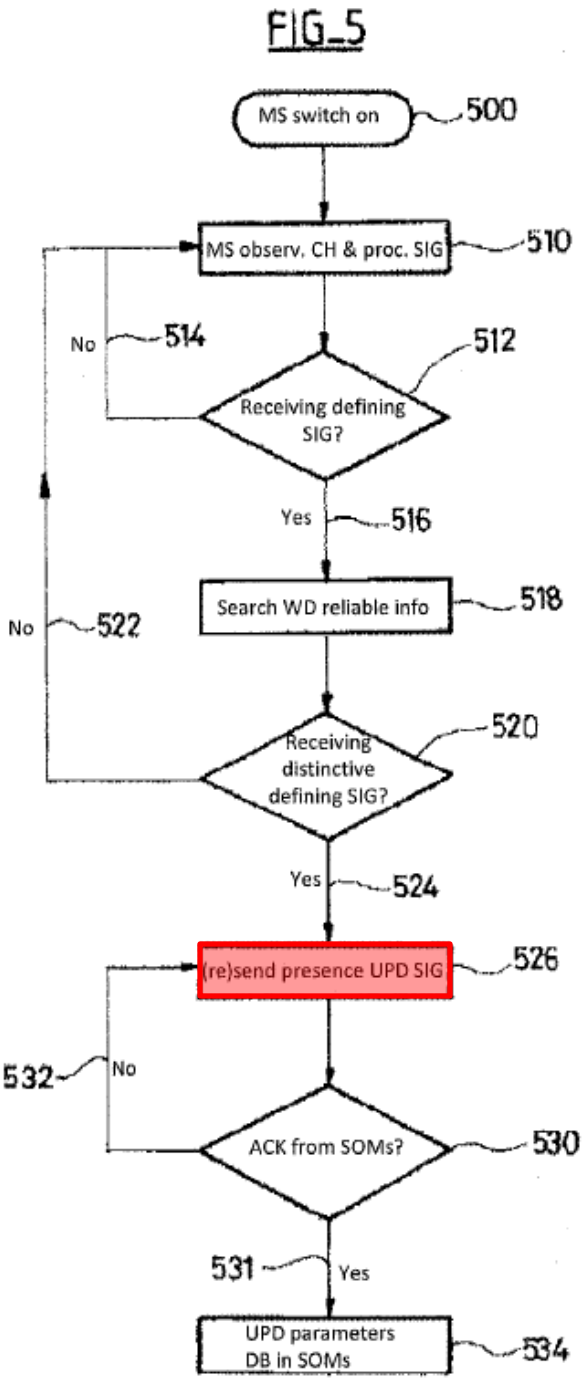
Function: sending, at least one of periodically, when the mobile station enters into or exits from a special area, and when the mobile station remains into a

special area an updating signal. Ex.1003 ¶62.

Structure: "a processor" that executes software for performing the above-described function and a transmitter. Ex.1003 ¶63.

The mobile station includes "a processor" that executes software as well as a transmitter. Ex.1001, 22:41-45, 12:31-40, 12:48-52, 12:55-59, 19:38-45, 19:50-53, Figs. 1-3 (illustrating antennas); Ex.1003 ¶¶64-65.

The mobile station's processor executes an algorithm for performing the function of sending an updating signal, as illustrated by step 526 of Figure 5 below: "the mobile station sends an[] updating signal to the mobile telephone network about its presence in the special area." Ex.1001, 15:54-56; Ex.1003 ¶66.



Ex.1001, Fig. 5 (annotated)

In addition, the algorithm executed by the processor may configure the mobile station to transmit the updating station when "the mobile station has recently entered or remains locating into the special area," "periodically." Ex.1001,

17:44-49, 15:57-61; Ex.1003 ¶67.

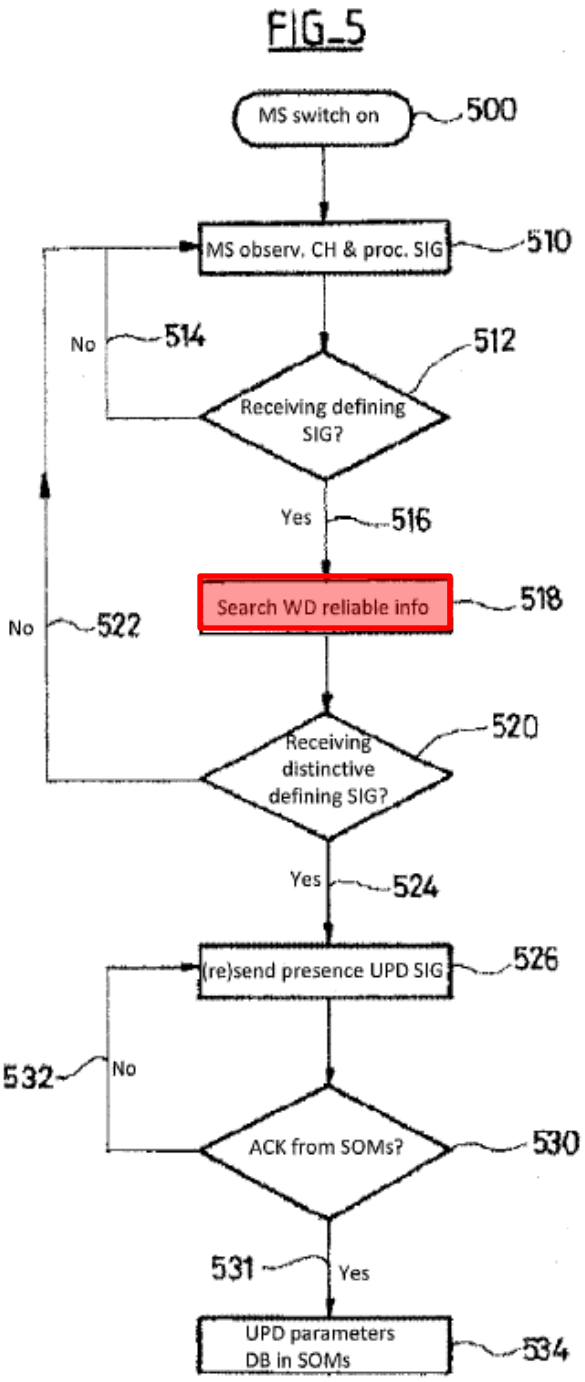
E. "*special area location monitoring means*" (claim 12)

Function: monitoring the correct location of at least a part of one or more special areas. Ex.1003 ¶68.

Structure: "a processor" that executes software for performing the above-described function. Ex.1003 ¶69.

The mobile station includes "a processor" that executes software. Ex.1001, 22:41-45, 12:31-40, 12:48-52, 12:55-59, 19:38-45, 19:50-53; Ex.1003 ¶70.

The mobile station's processor executes an algorithm for performing the function of monitoring the correct location of a special area by searching "reliable information" which confirms whether "the wireless device is effectively located into a predetermined environment." Ex.1001, 15:28-35, 5:19-24, 5:28-35; Ex.1003 ¶71.



Ex.1001, Fig. 5 (annotated)

IX. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF

Petitioner asks that the Board institute a trial for *inter partes* review and

cancel the Challenged Claims in view of the analysis below.

X. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

A. Challenged Claims

Petitioner challenges all claims of the '040 patent (1-14), of which claims 1, 3-4, and 7-14 are asserted in co-pending litigation.

B. Statutory Grounds for Challenges

Grounds	Claim(s)	Basis (pre-AIA §103)
#1	1-2, 5-8, 10-14	Kraufvelin, Hashimoto, and Andersson
#2	3-4	Kraufvelin, Hashimoto, Andersson, and Sundar
#3	9	Kraufvelin, Hashimoto, Andersson, and McNutt

U.S. Publication 2006/0135174 (Ex.1006, "**Kraufvelin**") was filed as PCT Application PCT/EP2007/052939 on October 3, 2003, in the English language, designating the U.S., and was published June 22, 2006, and is prior art under §102(e).

U.S. Publication 2005/0070283 (Ex.1008, "**Hashimoto**") published on March 31, 2005 and is prior art under §102(a).

U.S. Patent 6,230,017 (Ex.1007, "**Andersson**") issued May 8, 2001 and is prior art under §§102(a)-(b).

U.S. Publication 2003/0134636 (Ex.1017, "**Sundar**") published on July 17, 2003 and is prior art under §§102(a)-(b).

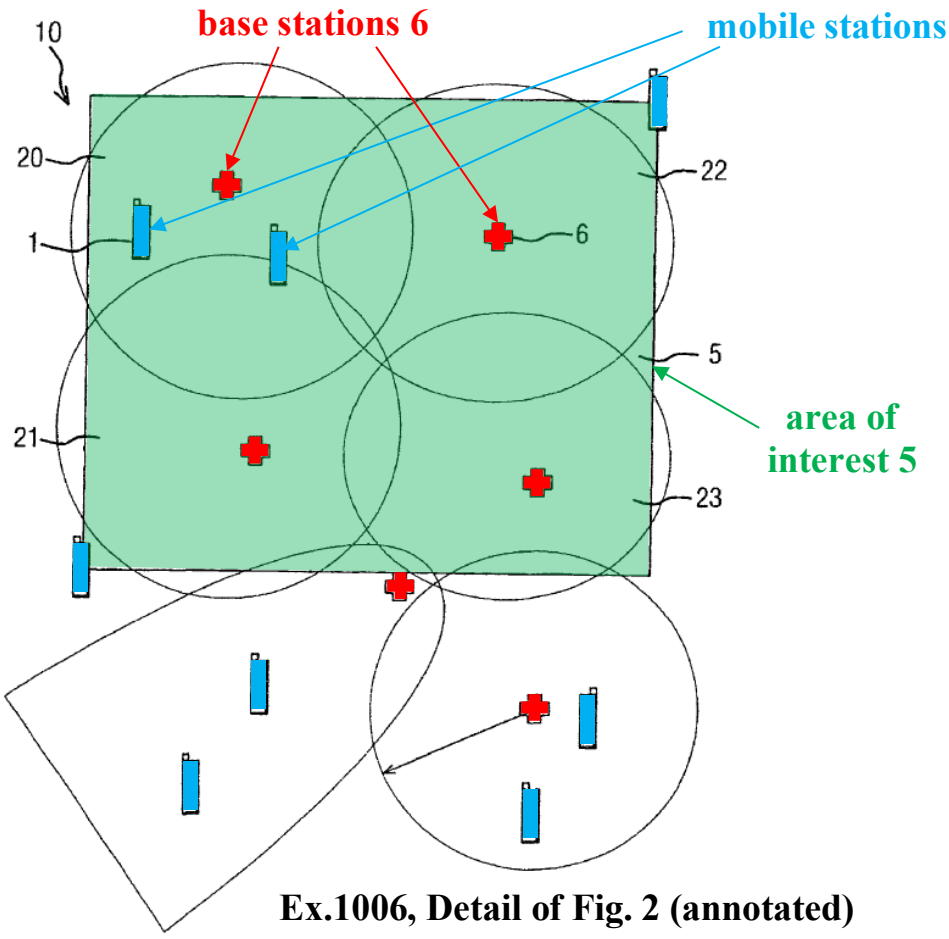
U.S. Publication 2001/0037211 (Ex.1014, "**McNutt**") published on

November 1, 2001 and is prior art under §§102(a)-(b).

C. Ground 1: Claims 1-2, 5-8, and 10-14 are obvious under §103 over Kraufvelin, Hashimoto, and Andersson.

1. Kraufvelin

Kraufvelin describes "monitoring…a change in the presence status of a target mobile station relative to an area of interest." Ex.1006 ¶23. Kraufvelin describes monitoring mobile stations with Figure 2 below. Mobile stations (blue) move through coverage areas of base stations 6 or cells (red). The base stations of cells 20-23 form an area of interest 5 (green). Ex.1006 ¶¶40-41, 53.



Ex.1006, Detail of Fig. 2 (annotated)

The area of interest 5 is chosen by a client 8 (Figure 1), which "makes a request…for information that concerns one or more of the mobile stations." Ex.1006 ¶48. "The request indicates a geographical area of interest and the target subscriber." Ex.1006 ¶55.

"The geographical area" is "translated into a list of Cell Ids." Ex.1006 ¶56. "In FIG. 2 the area 5 is shown to be covered by the cells 20 to 23. The IDs of these cells would thus be included in the list." Ex.1006 ¶56.

"The list of cells may then be sent to the mobile station 1." Ex.1006 ¶60. When the mobile station moves into a new cell, it receives the cell ID of the new cell and "check[s] the new Cell ID against the list." Ex.1006 ¶60. "If there is [a] match, the mobile station 1 sends a report back to the network." Ex.1006 ¶¶60, 79-80, 46 (sending "[a]n area event [location services] LCS report indicating" the mobile station's location).

Kraufvelin's methods of monitoring the location of a mobile station may be used to provide "[d]ifferent kinds of services" such as "various commercial and non-commercial services and similar applications" including "send[ing] information and/or offer[ing] services to a mobile station only in a particular defined geographic area." Ex.1006 ¶12.

2. Hashimoto

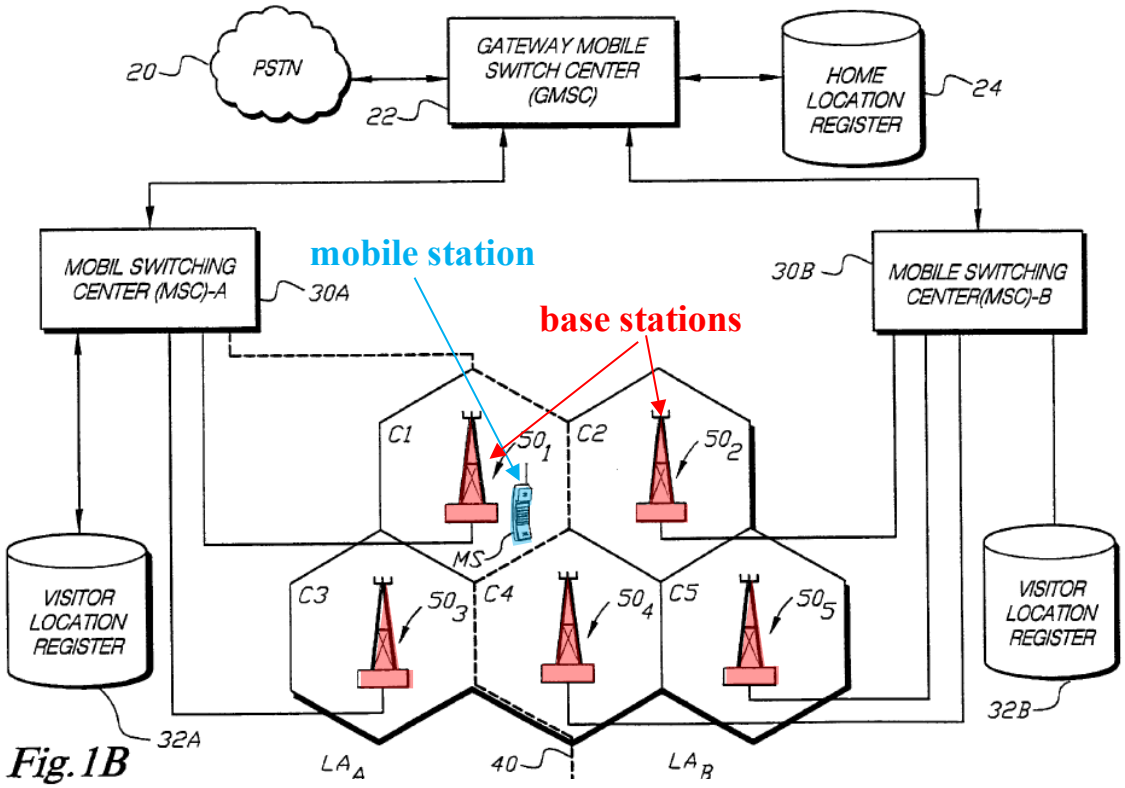
Hashimoto describes a mobile station that, when entering a new cell,

receives the new cell ID of the cell and "transmits a location updating request" to the network. Ex.1008, Abstract.

Hashimoto explains that base stations "periodically transmit[] system information called 'broadcast information' over a channel called 'BCCH'." Ex.1008 ¶135. The broadcast information includes "the identification information (ID) of a cell called 'Cell-ID.'" Ex.1008 ¶135.

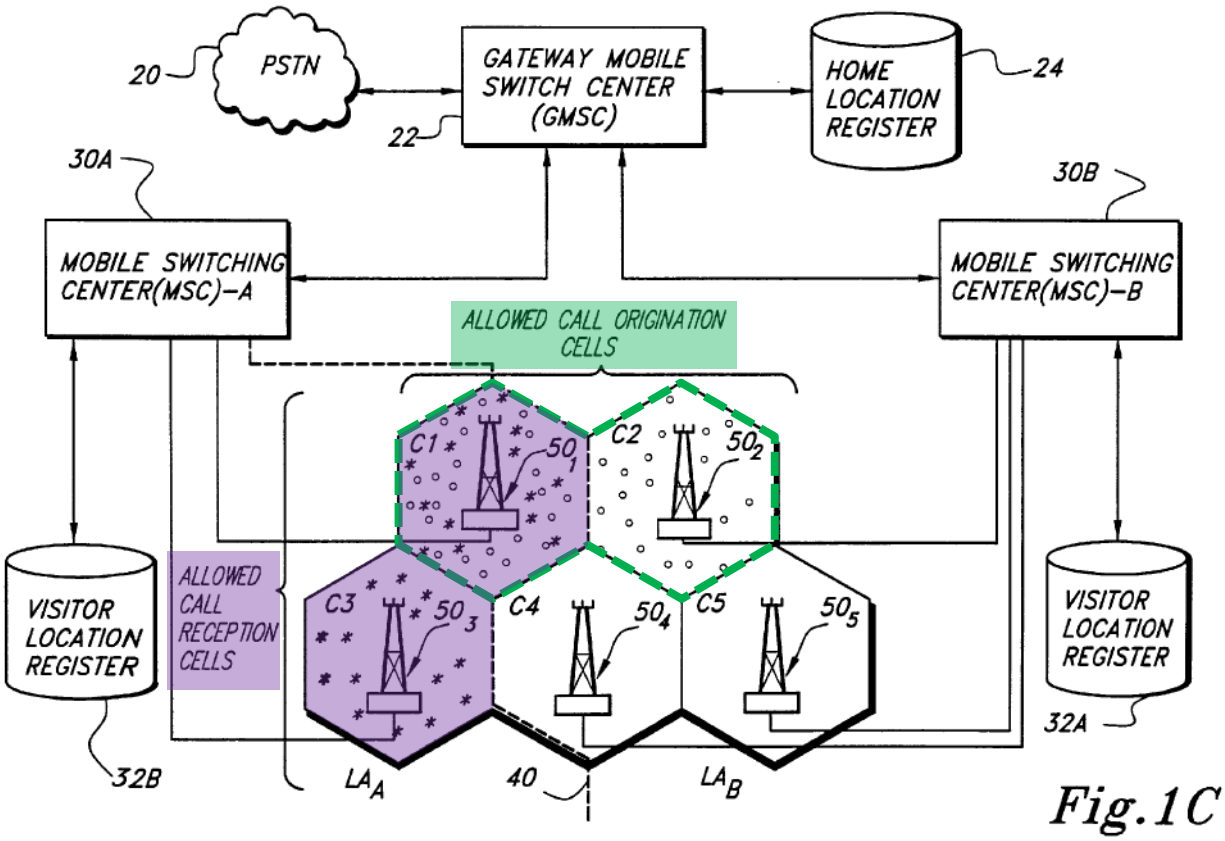
3. Andersson

Andersson describes monitoring the location of a mobile station (blue) as it moves between the coverage areas of different base stations, or cells (red) relative an area of interest. Ex.1007, Figs. 1A-1C, 2:52-57, 6:67-7:2.



Ex.1007, Fig. 1B (annotated)

Multiple areas of interest may be defined. For example, as shown in Figure 1C below, the mobile station may only place calls in cells C1 and C2 (green) and may only receive calls in cells C1 and C3 (purple). Ex.1007, 7:63-8:1. Andersson refers to this restriction as a "hard restriction." Ex.1007, 6:63-7:7. Andersson also describes a "soft restriction" in which different tariffs rates are applied to the mobile station in preconfigured areas. Ex.1007, 8:52-67.



Ex.1007, Fig. 1C (annotated)

Andersson also describes databases maintained by the network for monitoring the mobile station's location, and services or tariffs applied based on location. In Figure 2A, Andersson describes a "record 100A" indicating:

- the mobile station identity (MSISDN 102/IMSI 104),
- the mobile station location (current VLR address 106),
- the area of interest (allowed cells list 112), and
- the services authorized and/or tariffs applied to the mobile station in the area (restriction control 110). Ex.1007, 5:16-24, 5:45-57.

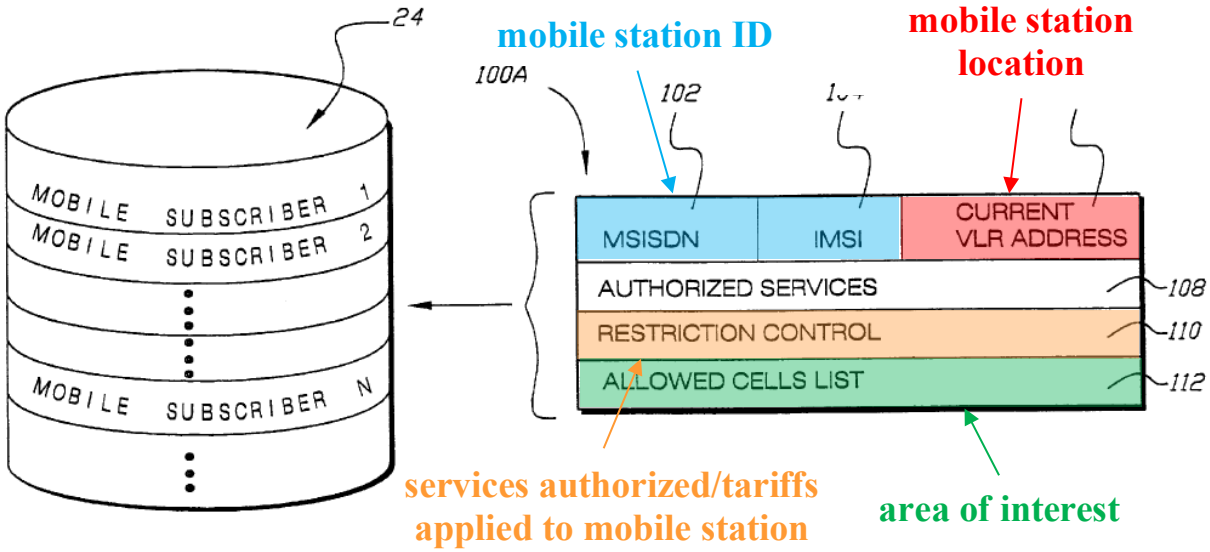


Fig.2A

Ex.1007, Fig. 2A (annotated)

In Figures 2A-2D, Andersson adds that the restriction control 100 includes a "flag" that "indicates that mobile subscriber N is to be accorded a low tariff" when in the special areas listed in allowed cells list field 112. Ex.1007, 5:49-60, 8:52-67, Fig. 2A, 2D.

4. The Combination of Kraufvelin, Hashimoto, and Andersson

a) Implementing transmission of cell IDs by base stations in Kraufvelin's system based on Hashimoto

Kraufvelin's mobile station determines if it has entered an area of interest by receiving a new cell ID from the base station and checking whether the new cell ID is included in the stored list of cell IDs corresponding to the area of interest. Ex.1006 ¶¶79-80. While Kraufvelin provides a general description of this process, Hashimoto provides conventional implementation details, explaining that each base station "periodically transmits" its cell ID in the "BCCH" channel of a cellular network. Ex.1008 ¶135. In the combination, Kraufvelin's system implements the conventional technique of base stations periodically transmitting their cell IDs based on Hashimoto's teachings. Ex.1003 ¶¶87-88.

b) Storing mobile station presence information in the Kraufvelin-Hashimoto system based on Andersson

The Kraufvelin-Hashimoto combination describes obtaining information regarding a mobile station's presence by transmitting cell IDs to mobile stations, providing this information to a client, and providing services to the mobile station based on the location. Ex.1006 ¶¶12, 79-80; Ex.1008 ¶135. Andersson describes how the location information is stored, describing databases storing parameters linking a mobile station to a special area and adapting the parameters based on the mobile station location. Ex.1007, Figs. 2A-2D, 5:20-45. In the combination, the

Kraufvelin-Hashimoto system implements the conventional technique of storing parameters linking a mobile station to a special area and adapting the parameters, based on the teachings of Andersson. Ex.1007, Figs. 2A-2D, 5:20-45; Ex.1003 ¶89.

5. Reasons to Combine Kraufvelin, Hashimoto, and Andersson

It would have been obvious to a POSITA to combine the teachings of Kraufvelin, Hashimoto, and Andersson as described above. §X.C.4; Ex.1003 ¶90.

a) Kraufvelin, Hashimoto, and Andersson are analogous art

Kraufvelin, Hashimoto, and Andersson are analogous to the '040 patent and in the same field of endeavor (i.e., monitoring the location of a mobile station relative to a geographical area). The '040 patent relates to "monitoring the presence of a mobile station…in at least one special area." Ex.1001, Abstract. Kraufvelin describes "monitoring…a change in the presence status of a target mobile station relative to an area of interest." Ex.1006 ¶23. Hashimoto monitors the location of a mobile station based on transmitted cell IDs. Ex.1008, Abstract (describing "location updating request"). Andersson describes monitoring a mobile station's location and providing location-based services and/or reduced tariffs. Ex.1007, Figs. 2A-2D, 8:52-67; Ex.1001, Abstract, 6:56-65; Ex.1003 ¶91.

Kraufvelin, Hashimoto, and Andersson are reasonably pertinent to a

particular problem with which the inventor was involved (monitoring the location of a mobile station and providing services based on the determined location). Ex.1001, 1:65-2:3; Ex.1006 ¶¶56-60, 12; Ex.1008, Abstract, ¶135; Ex.1007, Figs. 2A-2D, 8:52-67; Ex.1003 ¶92.

b) Implementing transmission of cell IDs by base stations in Kraufvelin's system based on Hashimoto

Kraufvelin suggests that each base station repeatedly broadcasts its cell ID because "[w]hen the UE performs a cell handover," it "check[s] the details of the new serving cell, including the cell ID" and "compare[s] the current cell ID or similar against one or more, target cell Ids in the list received." Ex.1006 ¶79. To the extent Kraufvelin does not explicitly describe that each base station repeatedly broadcasts its cell ID, this is a conventional implementation detail taught by Hashimoto. Ex.1008 ¶135. A POSITA would have recognized that cellular base stations repeatedly transmit their assigned cell ID in the BCCH channel because each mobile station that enters a new cell uses the cell ID to identify the new cell, as taught by Hashimoto. Ex.1008 ¶135; Ex.1003 ¶93.

Hashimoto's teachings of repeatedly transmitting a cell ID in a BCCH channel was a conventional implementation detail of cellular networks described by both Kraufvelin and Hashimoto. Both Kraufvelin and Hashimoto are implementations of the 3G cellular standard. Ex.1006 ¶43 (describing "[t]he third generation (3G) systems" including Kraufvelin's "base station 6") ¶¶46, 54-55

(incorporating by reference several 3G standard documents); Ex.1008 ¶13 (listing several 3G standard documents as prior art relevant to Hashimoto); Ex.1003 ¶94.

Both Kraufvelin and Hashimoto teach that multiple mobile stations enter and exit different cells as they move throughout a network. Ex.1006, Fig. 2 ¶¶47-48 ("one **or more** of the mobile stations"); Ex.1008, Figs. 1-2 (illustrating mobile stations moving through multiple cells BTS11, BTS12, BTS21, BTS31, BTS41, and BTS42). When mobile stations enter a new cell, the cell ID is repeatedly transmitted or broadcast to allow each newly-entered mobile station to connect to the base station and recognize the cell identity/location. Ex.1008 ¶135. If the cell ID is not repeatedly broadcast, mobile stations entering the cell could not identify cells and, therefore, send a location update. Ex.1006 ¶¶60, 79-80; Ex.1008, Abstract ("location updating request"); Ex.1003 ¶95.

Thus, a POSITA would have been motivated to implement functionality based on Hashimoto's teachings of base stations repeatedly broadcasting cell identities in Kraufvelin's system to ensure that mobile stations entering a new cell would receive the cell ID of the new cell so they can determine their location and send an updating signal as Kraufvelin describes. Ex.1006 ¶¶56-60, 79-83. Accordingly, the Kraufvelin-Hashimoto combination would have been the combination of prior art elements (Kraufvelin's monitoring the location of a mobile station and Hashimoto's base stations repeatedly transmitting a cell ID in a

BCCH channel) according to known methods (receiving a cell ID of an area of interest and finding a match within a prestored list of cell IDs) to yield the predictable result of a mobile station determining its location and sending a location update, according to conventional standards. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007); Ex.1003 ¶96.

Further, a POSITA would have had a reasonable expectation of success in combining Hashimoto's teachings of repeatedly transmitting cell IDs from base stations in a cellular network with Kraufvelin. When a mobile station enters a new cell, it receives the cell ID from the base station of the new cell. Ex.1006 ¶¶79, 56, 60, 39. Hashimoto describes the same feature and explains that this process occurs repeatedly so that each terminal may receive "various parameters" of the new cell, such as the "Cell-ID," among others. Ex.1008 ¶135. In addition, both Kraufvelin and Hashimoto describe standardized cellular network components and signals. Ex.1006 ¶¶43, 46, 54-55; Ex.1008 ¶13. For all these reasons, a POSITA would have been motivated to combine Hashimoto with Kraufvelin. Ex.1003 ¶¶97-98 (citing Ex.1018, 32; Ex.1019, 9-10, 20; Ex.1022, 30; Ex.1069, 1:35-38, Ex.1070 ¶20), ¶¶31-32 (citing Ex.1019, Ex.1021).

c) Storing mobile station presence information in the Kraufvelin-Hashimoto system based on Andersson

A POSITA would have recognized that Andersson's teachings of storing parameters in a database and adapting these parameters based on mobile station

location were conventional implementation details and would have been motivated to combine Andersson with the Kraufvelin-Hashimoto combination for several reasons. Ex.1003 ¶99. For example, storing mobile station location-related parameters within a database, as described by Andersson, would advantageously provide centralized management of data, as well as redundancy ensuring against loss of data due to single network node failure. Ex.1007, 4:48-51. In addition, storing these parameters in a database would encourage standardization of data, such that more clients would receive and use the data with minimal processing and Andersson specifically identifies ensuring compatibility "with conventional signaling standards." Ex.1007, 11:64-67. Storing the data within a database as taught by Andersson would also enable access control if needed, ensuring that only clients or certain entities within the location monitoring system had access to the location-based data, ensuring privacy. Ex.1006 ¶84; Ex.1003 ¶99.

In addition, Kraufvelin is directed to providing location-based services. Ex.1006 ¶12. Kraufvelin focuses on the steps of provisioning the mobile device with the information to identify its location relative to the area of interest, but does not explicitly describe how the network stores information and what services are provided. These conventional implementation details are described by Andersson. Ex.1003 ¶100.

In addition to the above-identified advantages of storing parameters in a

database, a POSITA would also have recognized that Andersson's teachings of a database were conventional implementation details for multiple reasons. Both Kraufvelin and Andersson describe monitoring the location of a mobile station, sending updating signals from the mobile station to a network, and providing location-based services. Ex.1006 ¶¶79-83, 12; Ex.1007, 5:41-48, 8:35-56; Ex.1003, 101. Thus, a POSITA would have been motivated to combine Andersson with Kraufvelin and Hashimoto in the manner described above. §X.C.4. Accordingly, the Kraufvelin-Hashimoto-Andersson combination would have been the combination of prior art elements (Kraufvelin and Hashimoto's teachings of monitoring the location of a mobile station via repeatedly transmitted and stored cell IDs and Andersson's teachings of storing a database including parameters that are adapted based on the location of the mobile station) according to known methods (receiving a cell ID of an area of interest and finding a match within a prestored list of cell IDs to determine a mobile station location) to yield the predictable result of providing different services or tariff rates, as described by Andersson (Ex.1007, Figs. 2C-2D, 5:49-60, 8:45-56), to a mobile station based on its location in a special area. *KSR*, 550 U.S. at 416; Ex.1003 ¶101.

Further, a POSITA would have had a reasonable expectation of success in modifying Kraufvelin to store and update parameters in a database, as taught by Andersson. Kraufvelin describes data regarding the presence of the mobile station

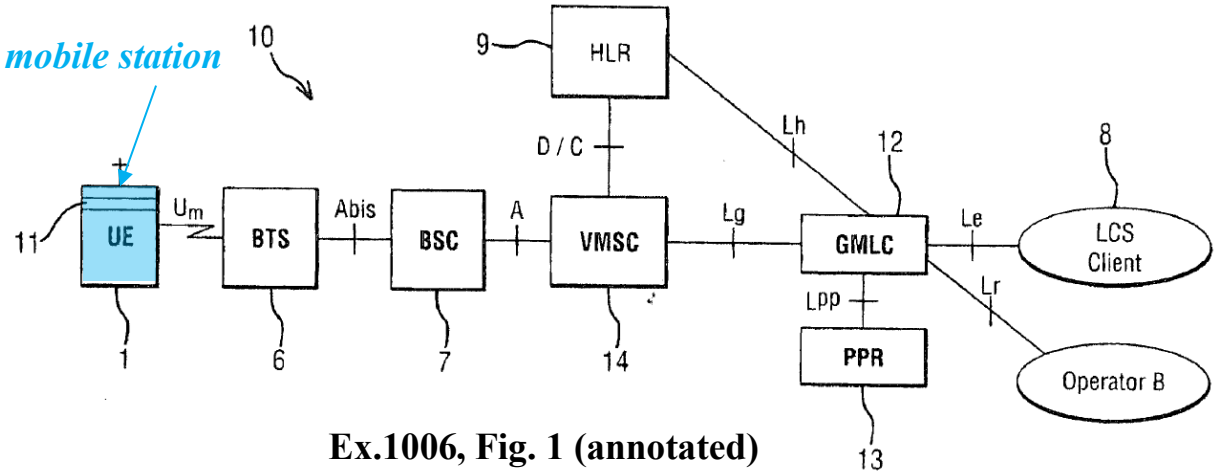
in a special area. Ex.1006 ¶¶79-82 (contents of updating signal). Kraufvelin also describes providing location-based services. Ex.1006 ¶12. Kraufvelin does not provide details regarding how this information is stored and updated, e.g., in a database. Andersson describes the same procedures as Kraufvelin (monitoring the location of a mobile station based on the cell ID of the cell in which the mobile station is positioned, Ex.1007, 2:46-57) but adds additional details regarding storage and adapting parameters in a database to provide services. Ex.1007, Figs. 2A-2D, 8:35-57. The Kraufvelin-Hashimoto system would utilize Andersson's database technique as intended and in the same context. For all these reasons, a POSITA at the time would have been motivated to combine Andersson with Kraufvelin-Hashimoto. Ex.1003 ¶102.

6. Claim 1

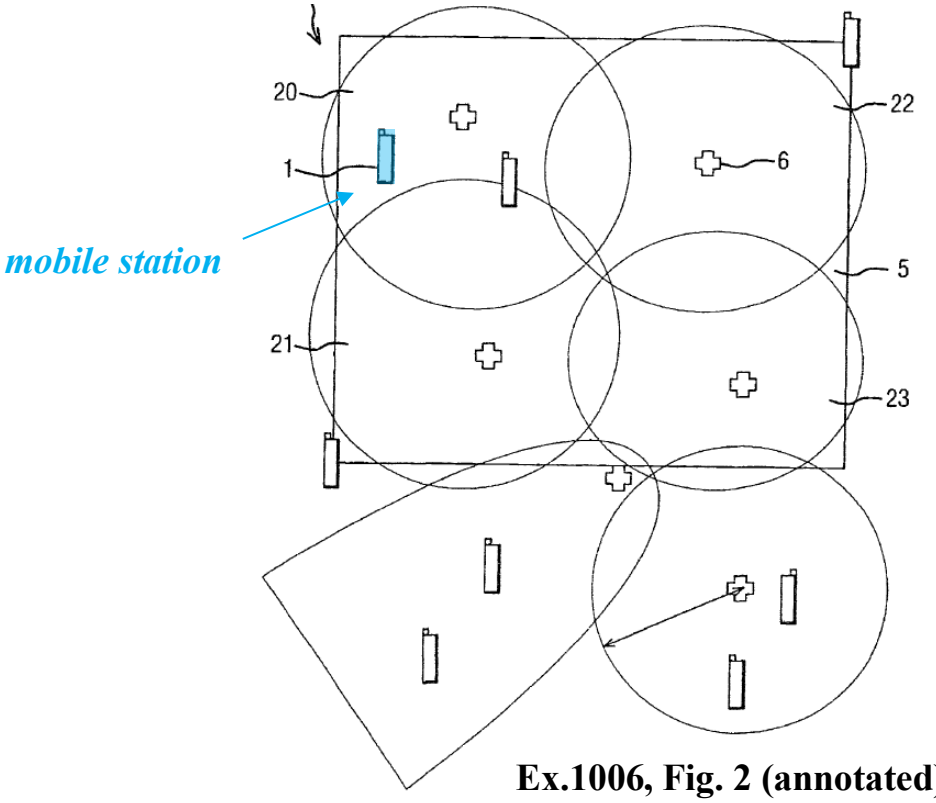
[1.0] ***A method for monitoring the presence of a mobile station in one or more special areas associated with the mobile station, the method comprising:***

First, Kraufvelin "provide[s] a system and method [that] provide information regarding the presence status of a mobile station relative a geographical area of interest" (*[a] method for monitoring the presence of a mobile station in one or more special areas associated with the mobile station*) Ex.1006 ¶¶29, 53; Ex.1003 ¶103.

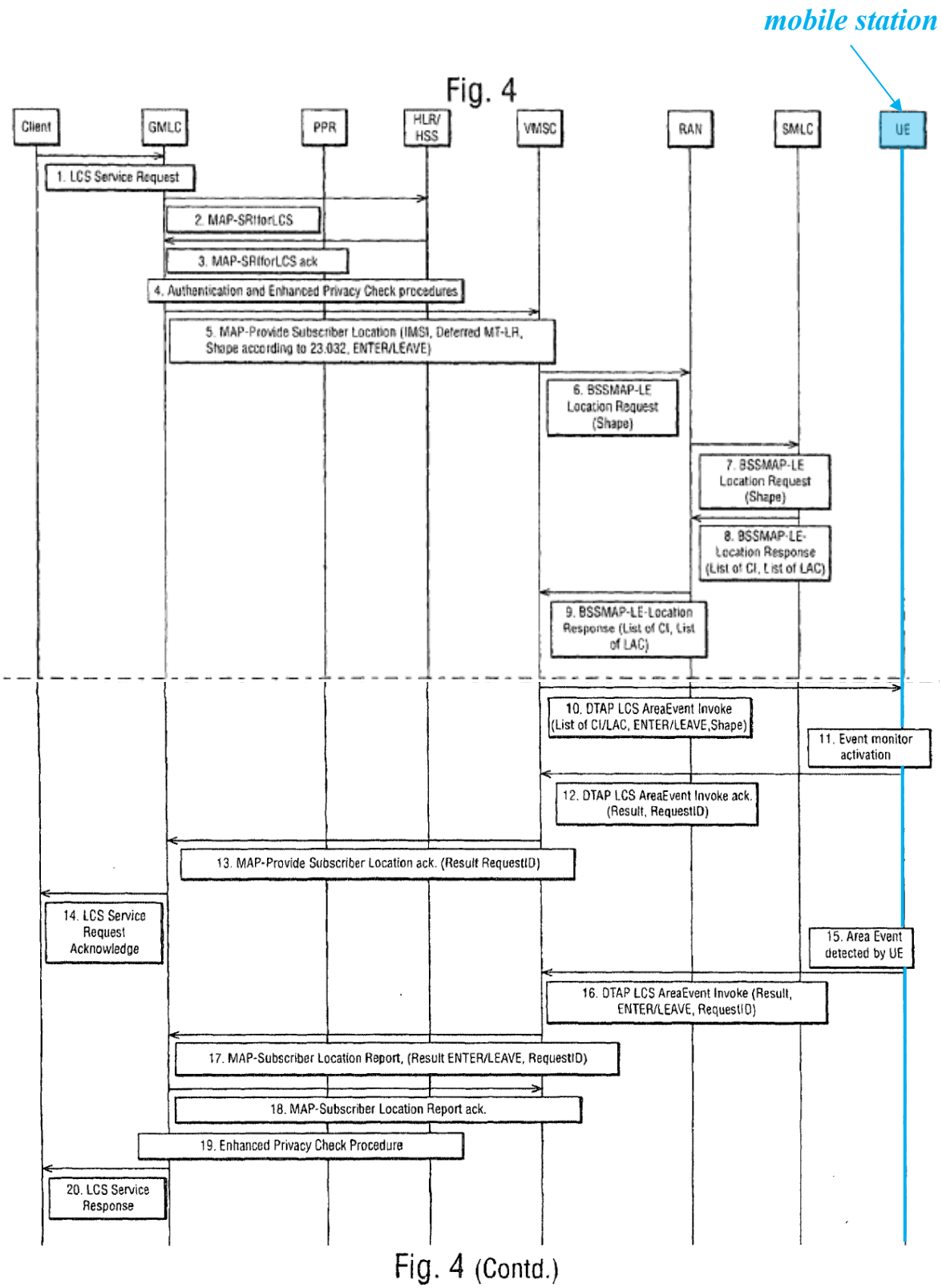
Kraufvelin's "mobile station 1," or "user equipment" (UE), is illustrated in Figures 1, 2, and 4. Ex.1006 ¶¶48, 41; Ex.1003 ¶104.



Ex.1006, Fig. 1 (annotated)

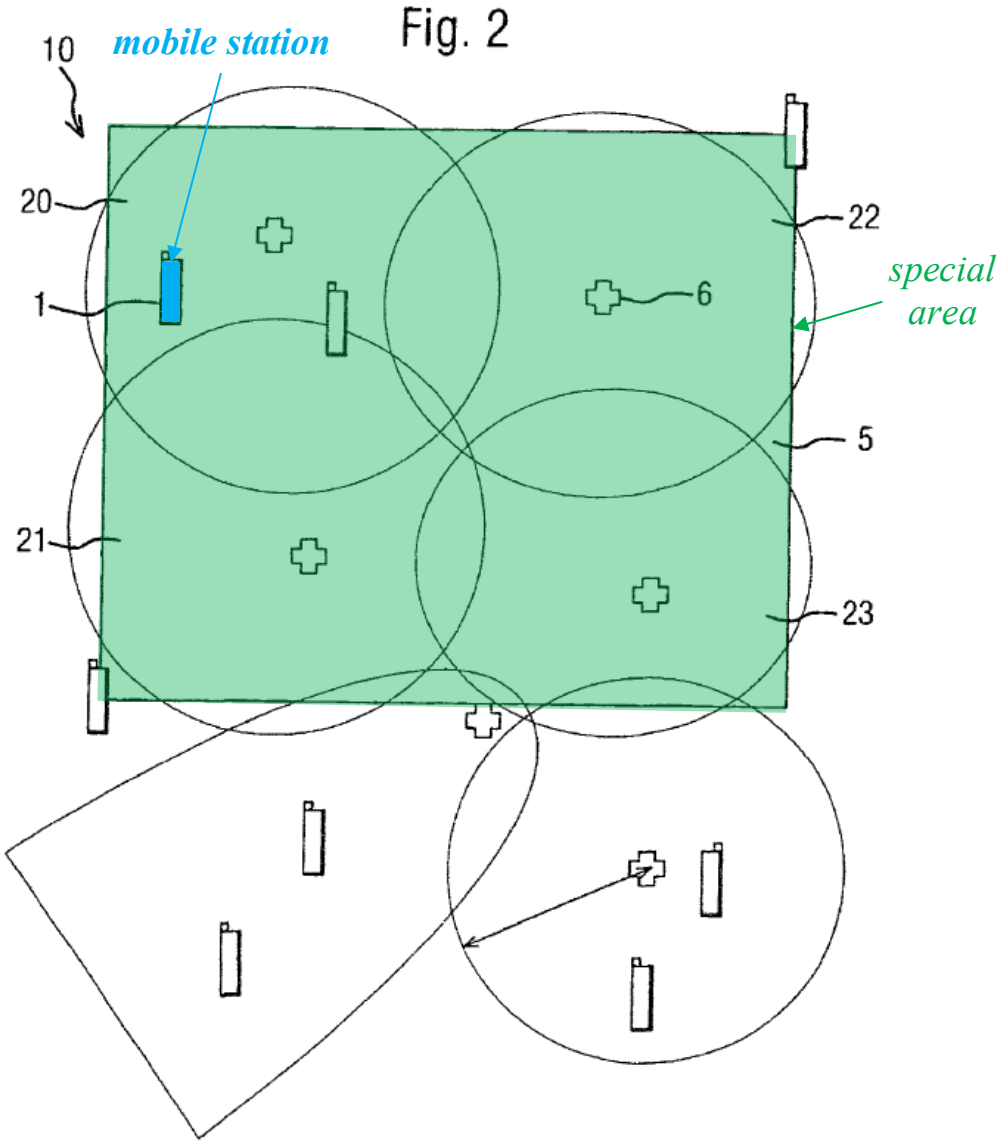


Ex.1006, Fig. 2 (annotated)



Ex.1006, Fig. 4 (annotated)

The mobile station 1's location is monitored in "an area of interest 5" (*one or more special areas*) shown, below. Ex.1006 ¶17; Ex.1003 ¶105.



Ex.1006, Fig. 2 (annotated)

Second, Kraufvelin's area of interest 5 is *associated with* the mobile station 1 by a "request" for location monitoring services made by a client. Ex.1006 ¶48. Kraufvelin's system is designed to acquire location-monitoring information for an

"LCS client 8" which may be any "logical functional entity that makes a request to the GMLC node 12 for information that concerns one or more of the mobile stations." Ex.1006 ¶48. The LCS Client 8 "sends a location request…indicat[ing] a geographical area of interest and the target subscriber." Ex.1006 ¶¶55, 63 ("The location request…contains the identity of the target user equipment" and "a shape."); Ex.1003 ¶106.

This request is illustrated at step 1, below. Ex.1003 ¶107.

LCS Client request *associating* mobile station 1 with area of interest 5

Fig. 4

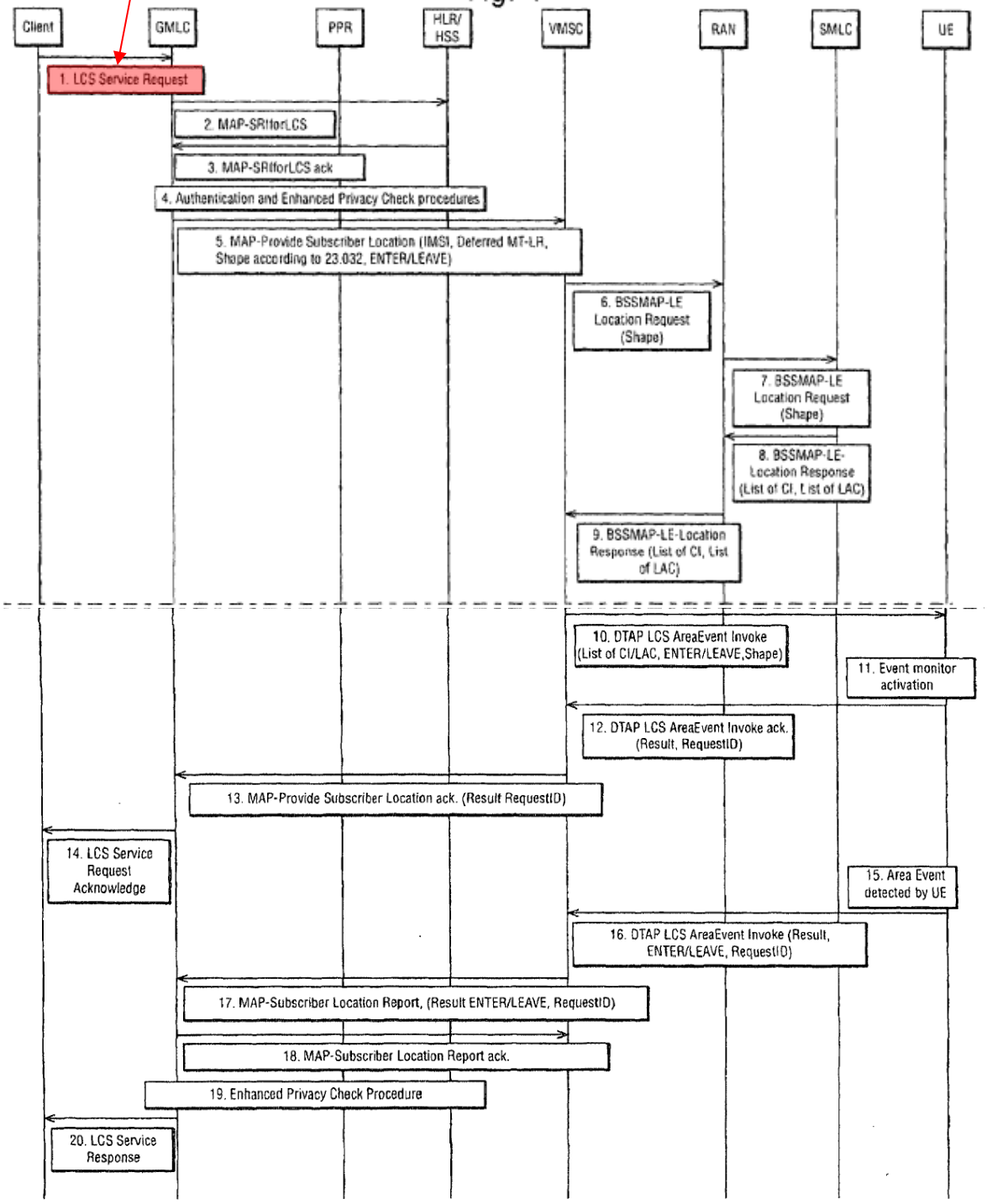


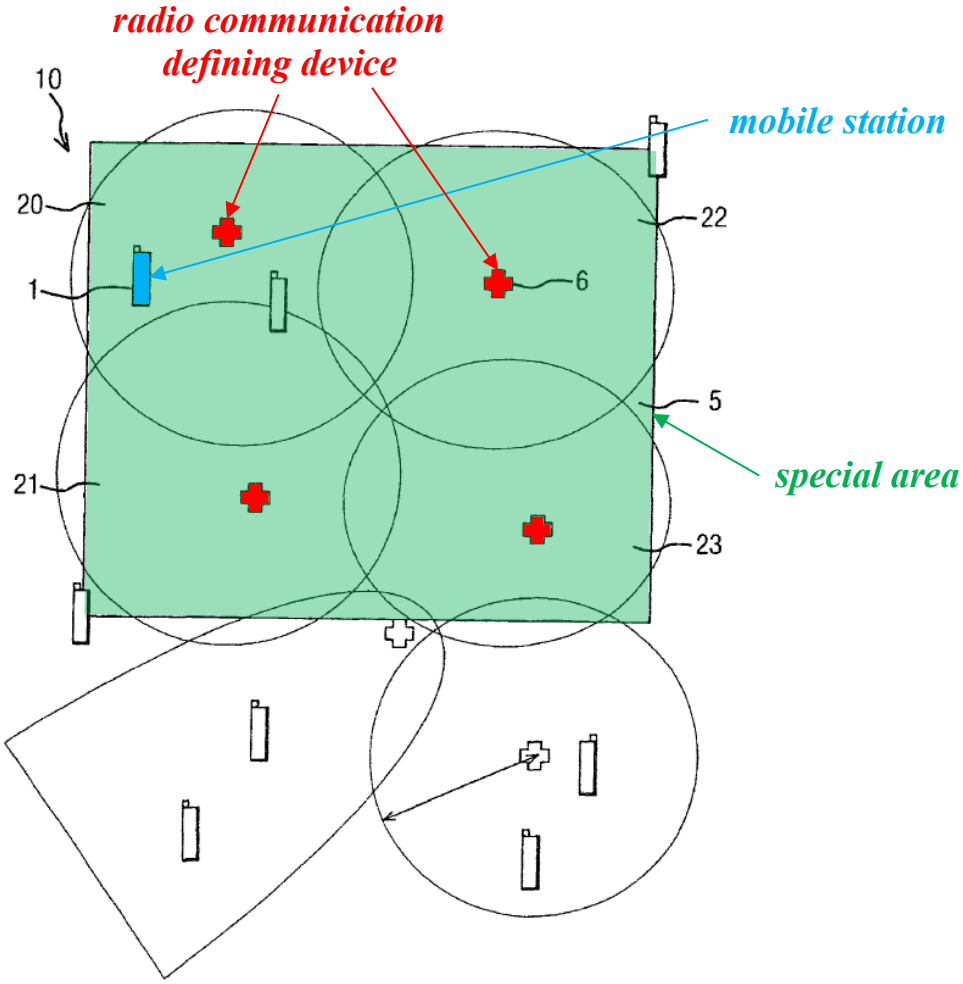
Fig. 4 (Contd.)

Ex.1006, Fig. 4 (annotated)

Thus, Kraufvelin renders obvious *[a] method* ("method") *for monitoring the presence of a mobile station* ("provid[ing] information regarding the presence of a mobile station") *in one or more special areas* ("relative a geographical area of interest") *associated with the mobile station* ("location request…indicates a geographical area of interest and the target subscriber"). Ex.1003 ¶108.

[1.1] ***(a) repeatedly transmitting from at least one radio communication defining device a radio distinctive defining signal in at least one channel that at least partially defines one of the special areas by its coverage,***

First, Kraufvelin describes "a base station 6," or "base transceiver station (BTS)" (*radio communication defining device*), in Figure 2 below. Ex.1006 ¶¶39, 4; Ex.1003 ¶109.



Ex.1006, Fig. 2 (annotated)

Second, each base station servicing a cell broadcasts a unique "cell ID." Ex.1006 ¶¶9, 56, 60. A broadcast cell ID is *a radio distinctive defining signal* if its respective base station is in the special geographical area 5: "The geographical area 5 may be translated into **a list of Cell I[D]s**. In FIG. 2 the area 5 is shown to be covered by the **cells 20 to 23**. **The IDs of these cells would thus be included in the list [of Cell IDs]**." Ex.1006 ¶56. This list is then "sent to the mobile station 1" so the mobile station can "check the new Cell ID against the list" to determine if it

is within the area of interest 5. Ex.1006 ¶60. Each cell ID broadcast by a base station in the list of Cell IDs is *a radio distinctive defining signal*. For example, each cell ID of base stations within cells 20 to 23 is *a radio distinctive defining signal*, because "cells 20 to 23" define the area of interest 5. Ex.1003 ¶110.

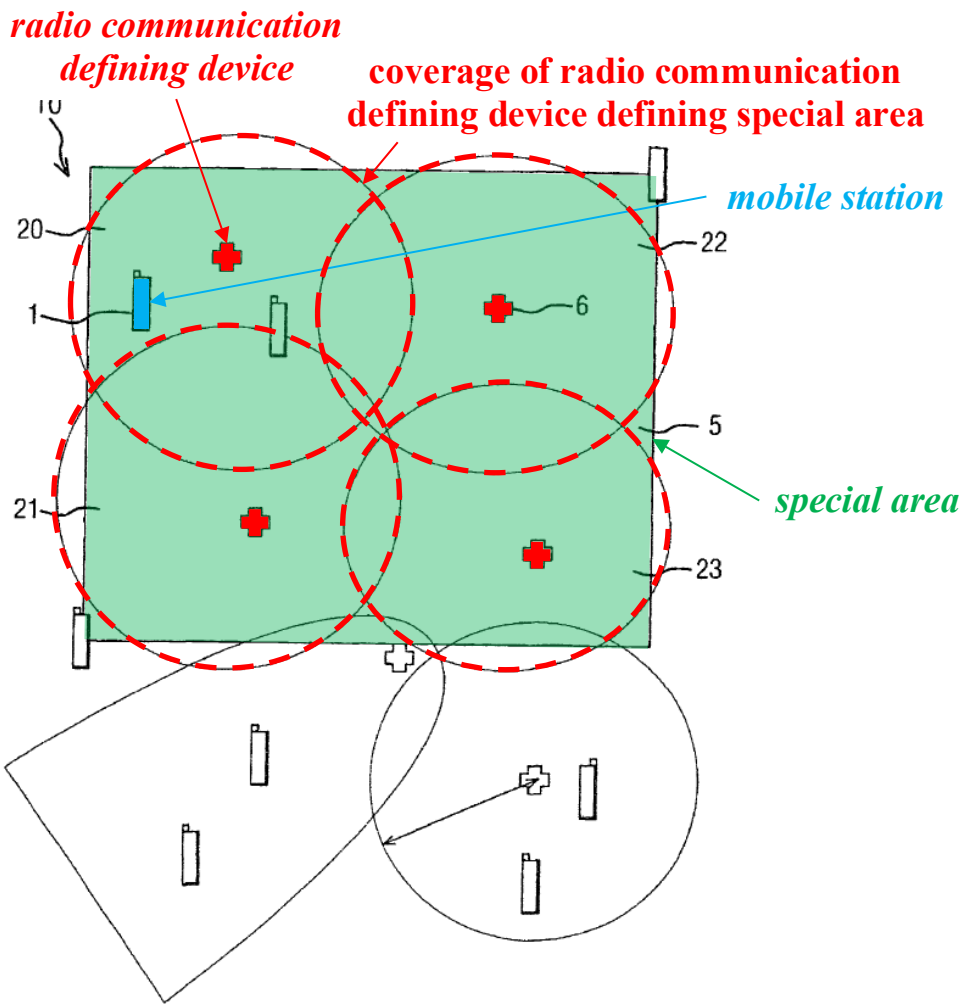
Third, Kraufvelin describes that "[w]hen the UE performs a cell handover," it "check[s] the details of the new serving cell, including the cell ID." Ex.1006 ¶79. Because multiple mobile stations enter and exit the range of a base station 6, and each receives the cell ID of the base station 6, Kraufvelin's base stations 6 *repeatedly transmit* their respective cell IDs. Ex.1003, 113. To the extent it is argued that Kraufvelin does not explicitly teach that each base station repeatedly broadcasts its cell ID, this is a conventional implementation detail taught by Hashimoto. Ex.1008 ¶135; Ex.1003 ¶111.

Hashimoto explains that cellular base stations "inform the terminal of various parameters" including "identification information (ID) of a cell called '**Cell-ID**'" by "**periodically transmit[ting]** system information called 'broadcast information.'" Ex.1008 ¶135, Fig. 17. "**[P]eriodically transmit[ting]**" a cell ID renders obvious *repeatedly transmitting* because periodically means an action is performed multiple times (*repeatedly*). Ex.1003 ¶112.

Fourth, Hashimoto explains that a base station transmits its cell ID in the "BCCH" channel, which is *at least one channel*. Ex.1008 ¶135. This channel is

used "**to inform the terminal** of various parameters (such as **the identification information (ID) of a cell** called "**Cell-ID**." Ex.1008 ¶135; Ex.1003 ¶113.

Fifth, Kraufvelin's area of interest 5 (*a special area*) is defined by the coverage of multiple cells. Ex.1003 ¶116. The LCS Client 8 defines the area of interest 5, which is then converted to a list of cell IDs. Ex.1006 ¶¶55 ("**location request**…**indicat[ing] a geographical area of interest** and the target subscriber."), 63, Fig. 4 (step 1), 39-40, 58-59 (describing "a mapping function" that "maps the defined area to cells."), 56, 70-71. The cells included within the list define the area of interest 5 by their coverage, as shown in Figure 2, below. Ex.1006 ¶¶53 ("[T]he area of interest [5] may" be "defined [by the] **radius or distance from a certain point (e.g. base station location…**)"), 62; Ex.1003 ¶114.



Ex.1006, Fig. 2 (annotated)

In the example shown in FIG. 2 above, the coverage area of cells 20 to 23 define the area of interest 5. Ex.1006 ¶56; Ex.1003 ¶115.

Thus, the Kraufvelin-Hashimoto-Andersson combination renders obvious *repeatedly transmitting* ("periodically transmit[ting]") *from at least one radio communication defining device* (from a "base station 6") *a radio distinctive defining signal* ("cell-ID" of base station within area of interest 5) *in at least one channel* ("BCCH" channel) *that at least partially defines one of the special areas*

by its coverage (defining the area of interest 5 by the coverage of multiple base stations 6). Ex.1003 ¶116.

[1.2] ***(b) observing the channel and processing any received signal by the mobile station in order to determine whether or not it is receiving a defining signal,***

First, Kraufvelin explains that "[w]hen the UE performs a cell handover the **monitoring entity (ME) shall check the details of the new serving cell, including the cell ID,** step 15 [of Fig. 4]." Ex.1006 ¶79. This disclosure renders obvious this limitation. Ex.1003 ¶117.

Second, the process of a UE observing the base station signal and determining the cell ID (*defining signal*) was well known. Hashimoto explains that the signal with details of the new serving cell, including Cell ID, is periodically transmitted in the BCCH channel. Ex.1008 ¶135. As explained below, this combination also renders obvious *observing the channel*. Ex.1006 ¶79; Ex.1003 ¶118.

When the mobile station receives the list of Cell IDs, it sends an acknowledgment indicating that it is "waiting for a trigger event." Ex.1006 ¶76; claims 1-2 ("activating monitoring for an event indicative of a change in the presence status of the mobile station relative to said area of interest"); Ex.1003 ¶119.

This acknowledgment is illustrated at step 12 below, with step 11 illustrating mobile station monitoring. Ex.1003 ¶119.

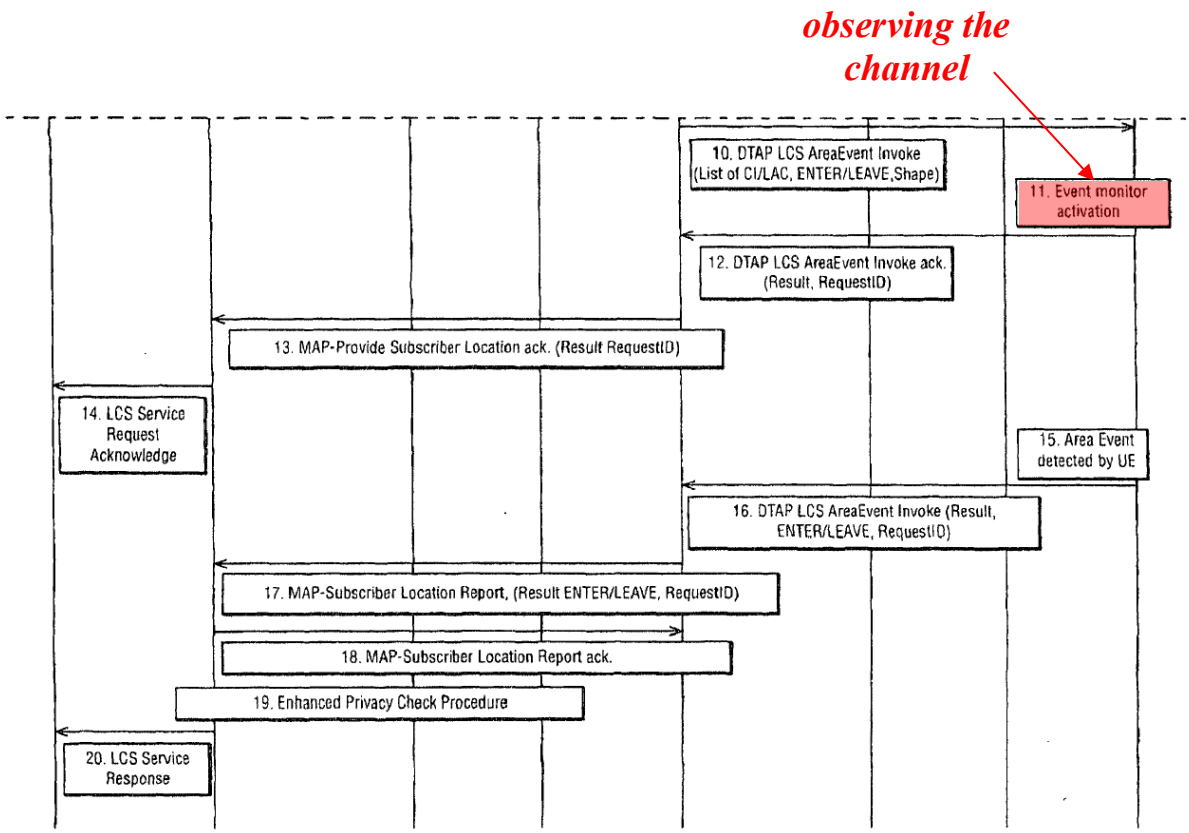


Fig. 4 (Contd.)

Ex.1006, Fig. 4 (annotated)

In the combination, Kraufvelin's mobile station receives broadcast information via the BCCH channel. Ex.1008 ¶135; [1.1]; Ex.1003 ¶120. Mobile stations receive multiple signals, including voice, SMS, or data signals. Ex.1006 ¶¶13, 112, 119. As explained in [1.1], in the combination, cell identification information is received by the mobile station via the BCCH channel. Ex.1008 ¶135. Receiving and identifying a signal as being sent over the BCCH channel (and specifically the SCH channel within the BCCH channel) renders obvious *processing any received signal by the mobile station in order to determine whether*

or not it is receiving a defining signal. Ex.1003 ¶124. The mobile station would recognize a cell ID received in the SCH channel within the BCCH channel, described by Hashimoto, as a defining signal because cell IDs repeatedly transmitted from base stations are defining signals and it was known that the SCH channel conveys base station identification information, like a cell ID. Ex.1008 ¶135; Ex.1025 ¶7 ("**The SCH allows identification of the cell**."); Ex.1026 ¶9 ("Primary Synchronization CHannel (P-**SCH**)" is "**used by the mobile terminal to find and detect a cell**."). It was also known that the SCH channel is part of the BCCH channel. Ex.1027 ¶36 ("controlling information" is "sent in the part of the BCCH known as the Synchronization Channel SCH"); Ex.1028 ¶206 (describing "the synchronization signal SCH included in the BCCH channel"); Ex.1003 ¶121.

Thus, Kraufvelin-Hashimoto-Andersson renders obvious *observing the channel* (UE "monitoring entity (ME)" monitoring the BCCH channel) *and processing any received signal by the mobile station in order to determine whether or not it is receiving a defining signal* (determining that data received in the SCH channel of the BCCH channel includes a cell ID). Ex.1003 ¶122.

[1.3] ***(c) processing any received defining signal by the mobile station and the mobile station determines whether or not the defining signal received is a distinctive defining signal that at least partially defines one of the special areas, and determines whether or not the mobile station is present in one or more of the special areas,***

First, Kraufvelin describes *processing any received defining signal* and

determin[ing] whether or not the defining signal received is a distinctive defining signal. In Ex.1006, "[w]hen the UE performs a cell handover the monitoring entity (ME) shall **check the details of the new serving cell, including the cell ID**" and "**compare the current cell ID or similar against one or more, target cell Ids in the list received from the network**." Ex.1006 ¶¶79, 60; Ex.1003 ¶123.

The mobile station *determines whether or not the defining signal* (cell ID) it has received is a *distinctive defining signal* because the mobile station determines whether the received cell ID is one of the cell IDs corresponding to the area of interest 5 in the stored list. Ex.1006 ¶¶79-80; Ex.1003 ¶124.

In Kraufvelin, the concept of comparing the received cell ID to the stored list of cell IDs renders obvious *processing any received defining signal by the mobile station*. As explained at [1.1], the cell IDs of the base stations 6 within an area of interest 5 in Kraufvelin render obvious *a radio distinctive defining signal that at least partially defines one of the special areas by its coverage* because each cell ID of base stations within cells 20 to 23 define the area of interest 5. Ex.1006 ¶¶56-60. Therefore, when the mobile station identifies a match between a received cell ID and the stored list, this step also renders obvious *the mobile station determines whether or not the defining signal received is a distinctive defining signal that at least partially defines one of the special areas* because if the received cell ID (*defining signal*) is within the list of stored cell IDs, the mobile station

determines that it is one of the cell IDs defining the area of interest 5 (*distinctive defining signal*). Ex.1006 ¶¶56-60; Ex.1003 ¶125.

Second, based on determining that there is a match between the cell ID received and a cell ID in the stored list, the mobile station then also determines whether it has entered the area of interest 5. Specifically, the mobile station generates a report including: "a) An area event LCS report **indicating a positive match** with the target cells, i.e. **the subscriber is ENTERing the area**." Ex.1006 ¶80. In this way, the mobile station *determines whether or not the mobile station is present in one or more of the special areas*. Ex.1006 ¶¶79-80; Ex.1003 ¶126.

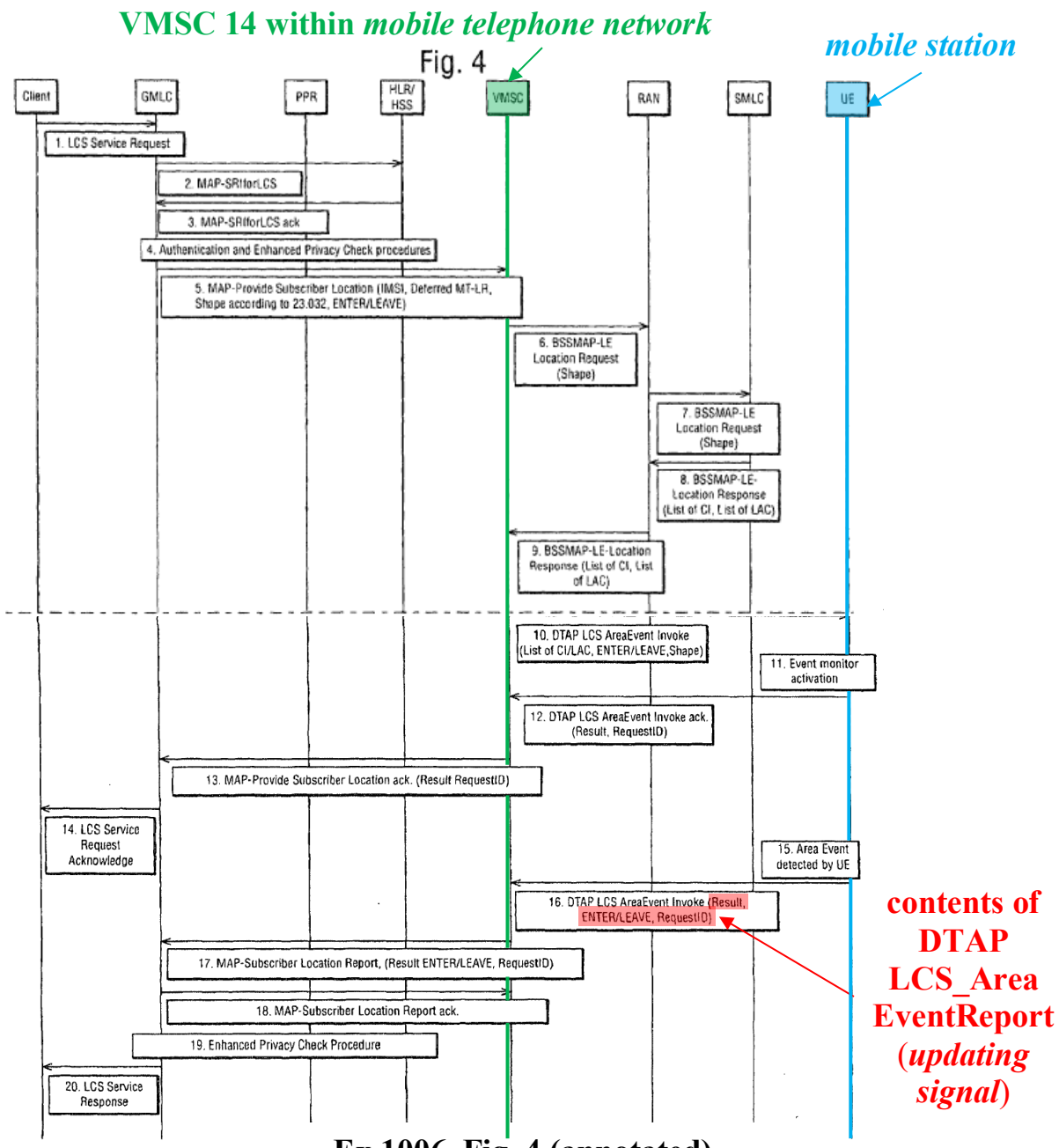
Kraufvelin also explains that the determination performed by the mobile station may also be made based on comparing a GPS location with a shape of the area of interest 5. Ex.1006 ¶114; Ex.1003 ¶127.

Thus, Kraufvelin renders obvious *processing any received defining signal by the mobile station* (comparing a received cell ID against the list of cell IDs of the area of interest 5) *and the mobile station determines whether or not the defining signal received is a distinctive defining signal* (determining that the new cell ID matches a cell ID within the list) *that at least partially defines one of the special areas* (each cell ID of cells 20-23 partially define the area of interest 5)*, and determines whether or not the mobile station is present in one or more of the special areas* (determining whether mobile station 1 entered or exited area of

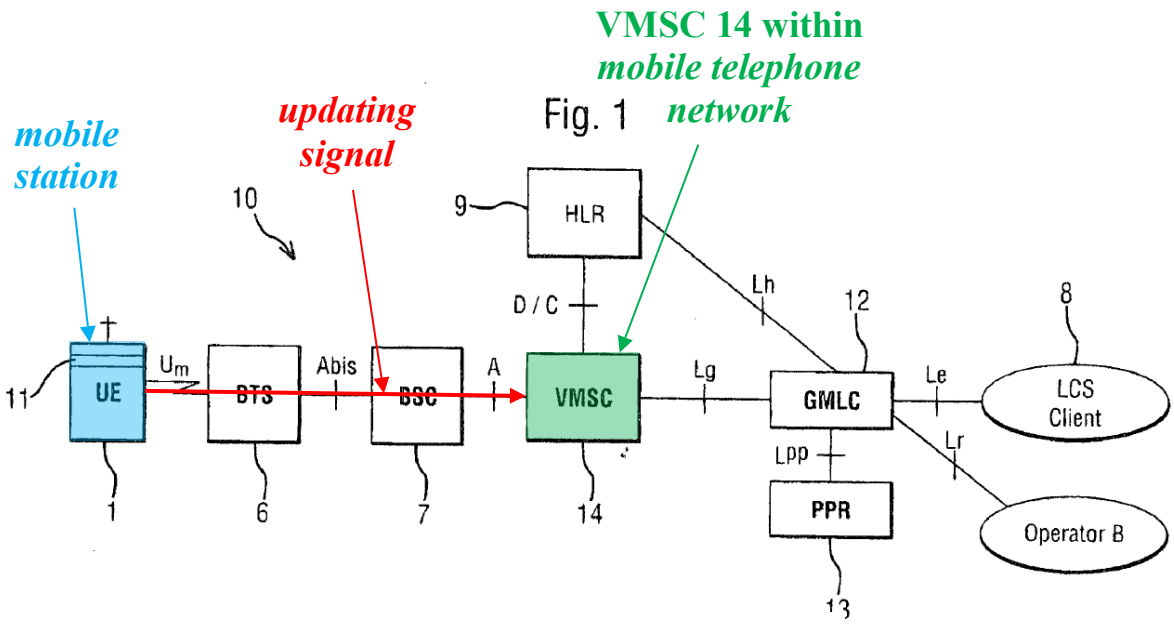
interest 5 based on cell ID comparison). Ex.1003 ¶128.

[1.4] ***(d) sending an updating signal from the mobile station to a mobile telephone network about the mobile station presence in one or more of the special areas,***

First, in the Kraufvelin-Hashimoto-Andersson combination, Kraufvelin describes *sending an updating signal from the mobile station to a mobile telephone network.* In Kraufvelin, if the mobile station determines that it has entered a cell of the area of interest 5, it sends "a DTAP LCS-AreaEventReport…to the MSC/SGSN, see step 16." Ex.1006 ¶82. The DTAP LCS-AreaEventReport "may include the original LDR reference, the GMLC address, the time that the event occurred and the current serving cell ID. Information relating to the area event or UE status may optionally be included in this report." Ex.1006 ¶82. In Figure 4, below, the DTAP LCS-AreaEventReport includes the "**Result, ENTER/LEAVE**," indicating whether the mobile station entered or left the area of interest 5, and the "Request ID." Ex.1006 ¶80, Fig. 4. Any or all of the contents of the DTAP LCS-AreaEventReport render obvious *an updating signal*. This report is sent from the mobile station to the VMSC 14, which is part of the *mobile telephone network*. Ex.1003 ¶129.



Ex.1006, Fig. 4 (annotated)



Ex.1006, Fig. 1 (annotated)

Second, in Kraufvelin, the contents of the DTAP LCS_AreaEventReport (*updating signal*) are information *about the mobile station presence in one or more of the special areas*. Ex.1006 ¶82. The "time that the event occurred" and "current serving cell ID" in Kraufvelin indicates whether the mobile station has entered or exited the area of interest 5 because the cell ID corresponds to one of the cell IDs of the area of interest 5. Ex.1006 ¶82. This information coupled with the "Result ENTER/LEAVE" indicates whether the mobile station entered or left the area of interest 5. Ex.1006 ¶80; Ex.1003 ¶130.

Thus, in the combination, Kraufvelin renders obvious *sending an updating signal* (contents of "LCS-AreaEventReport") *from the mobile station* ("mobile station 1") *to a mobile telephone network* (VMSC 14 and GMLC 12) *about the*

mobile station presence in one or more of the special areas (contents of LCS report include current cell ID, time mobile station entered, etc.). Ex.1003 ¶131.

[1.5] ***where the updating signal sending is uncorrelated to any mobile station phone call establishment and is based on the last determination performed by the mobile station about its presence in each of the special areas,***

First, in the combination, Kraufvelin renders obvious *the updating signal sending is uncorrelated to any mobile station phone call establishment*. As described at [1.6], below, the LCS report in Kraufvelin is sent at various times such as "every 10-15 minutes," when the mobile station enters or leaves the area of interest, or "after it has been camping on" the area of interest. Ex.1006 ¶¶80, 101. Therefore, the sending of the LCS report, which includes *the updating signal*, is not based on the mobile station making a call, i.e., *uncorrelated to any mobile station phone call establishment*. Ex.1006 ¶¶80, 101; Ex.1003 ¶138. Accordingly, Kraufvelin's process may be performed when the mobile station is idle. Ex.1006 ¶97 ("A mobile terminal changes cells quite often **in idle mode.**") ¶¶98-106. This process is performed "**independent from the network operators**." Ex.1006 ¶93; Ex.1003 ¶132.

Second, Kraufvelin explains that the contents of the LCS report (*the updating signal*) *is based on the last determination performed by the mobile station about its presence in each of the special areas*. The LCS report is sent after the mobile station enters or exits the area of interest 5, Ex.1006 ¶80, and relates to the

just entered cell, such as the "the current serving cell ID," the "time that the event occurred," and "Result ENTER/LEAVE," Ex.1006 ¶82, Fig. 4; Ex.1003 ¶133.

Thus, in the combination, Kraufvelin renders obvious *where the updating signal sending is uncorrelated to any mobile station phone call establishment* (sending the LCS report even when the mobile station is in an idle mode) *and is based on the last determination performed by the mobile station about its presence in each of the special areas* (LCS report indicating the cell ID of the new cell and time of entrance). Ex.1003 ¶134.

[1.6] ***and said updating signal being sent at least one of (i) periodically, (ii) when the mobile station enters into or exits from one of the special areas, and (iii) when the mobile station remains into a special area,***

(i) periodically

If the mobile station is stationary for an extended period of time, "[i]n the case of permanent area event reporting," the mobile station will send the LCS-AreaEventReport at "**a predetermined time interval**, e.g., **every 10-15 minutes**, **24 hours**." Ex.1006 ¶101; Ex.1003 ¶135.

(ii) when the mobile station enters into or exits from one of the special areas,

Kraufvelin's mobile station may also send the report when it enters or exits the area of interest 5, including "[a]n area event LCS report indicating a positive match…i.e. the subscriber is **ENTERing the area**" or "indicating a negative match…i.e. the subscriber is **LEAVEing the area**." Ex.1006 ¶80; Ex.1003 ¶136.

(iii) when the mobile station remains into a special area,

The mobile station may generate and send the report not immediately after entering a cell of the area of interest, but **"after it has been camping on, or using, the relevant cell for a predetermined time period, e.g. 2 minutes**." Ex.1006 ¶101; Ex.1003 ¶137.

These timing configurations are used when "the mobile changes cells quite frequently" and "may be advantageously used to prevent the mobile or SIM card from reporting area changes too frequently." Ex.1006 ¶99; Ex.1003 ¶138.

[1.7] ***(e) routing the updating signal from the mobile telephone network to special operating means that adapt the value of at least one operating parameter taking into account the presence of the mobile station in each of the special areas,***

First, as shown in FIG. 4 below, after the VMSC 14 (part of the *mobile telephone network*, [1.4]) receives the contents of the LCS_AreaEventReport (*updating signal*), it compiles it into the "MAP-SUBSCRIBER-LOCATION-REPORT," and sends it to the GMLC 12. Ex.1006 ¶83. Kraufvelin's GMLC 12, HLR 9 and/or LCS Client 8, in view of Andersson's database techniques, renders obvious *special operating means*. As shown below, the LCS_AreaEventReport ("LCS report") contents are included in the MAP-SUBSCRIBER-LOCATION-REPORT ("MAP report") and forwarded to the GMLC 12. Ex.1003 ¶139.

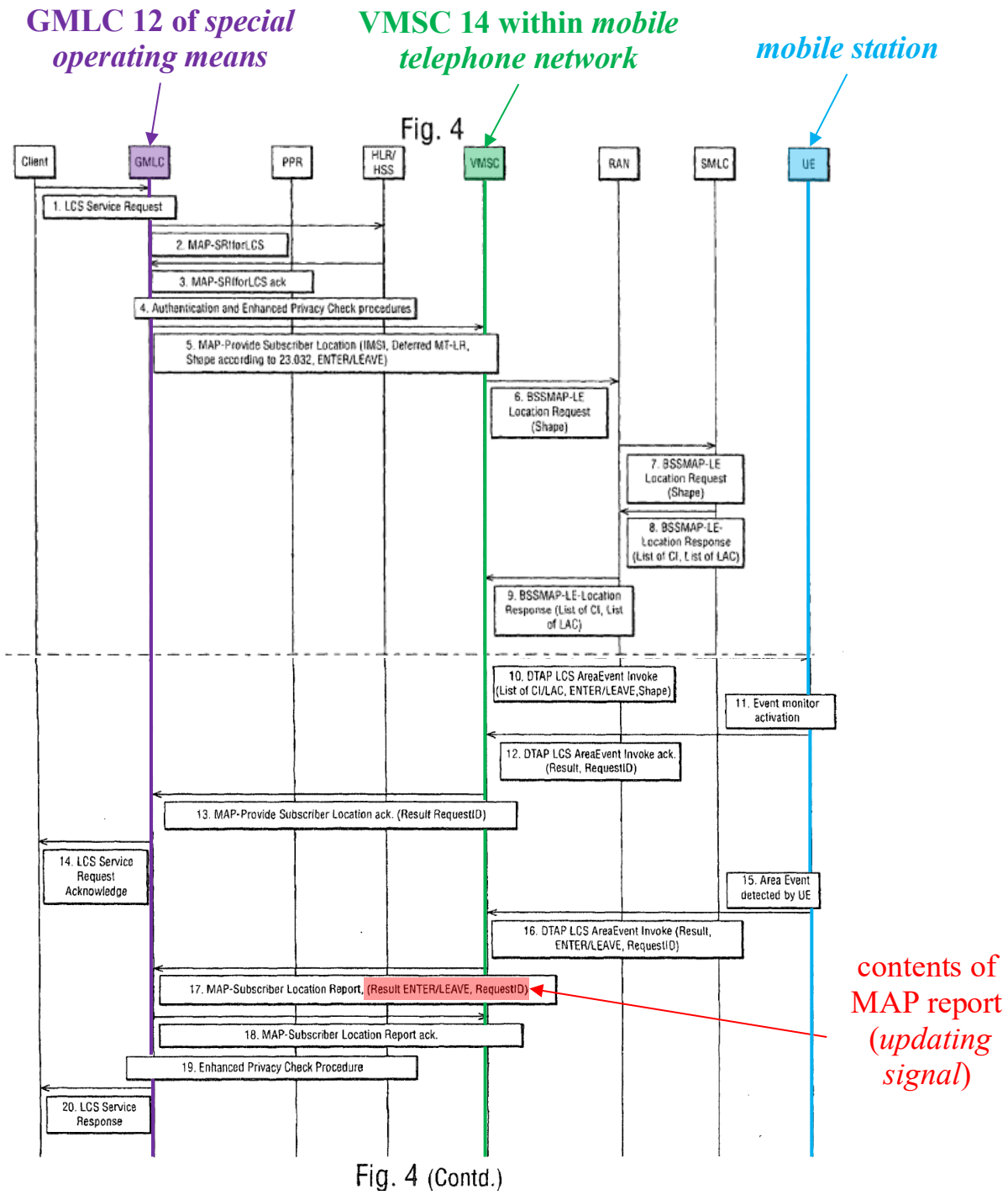


Fig. 4 (Contd.)

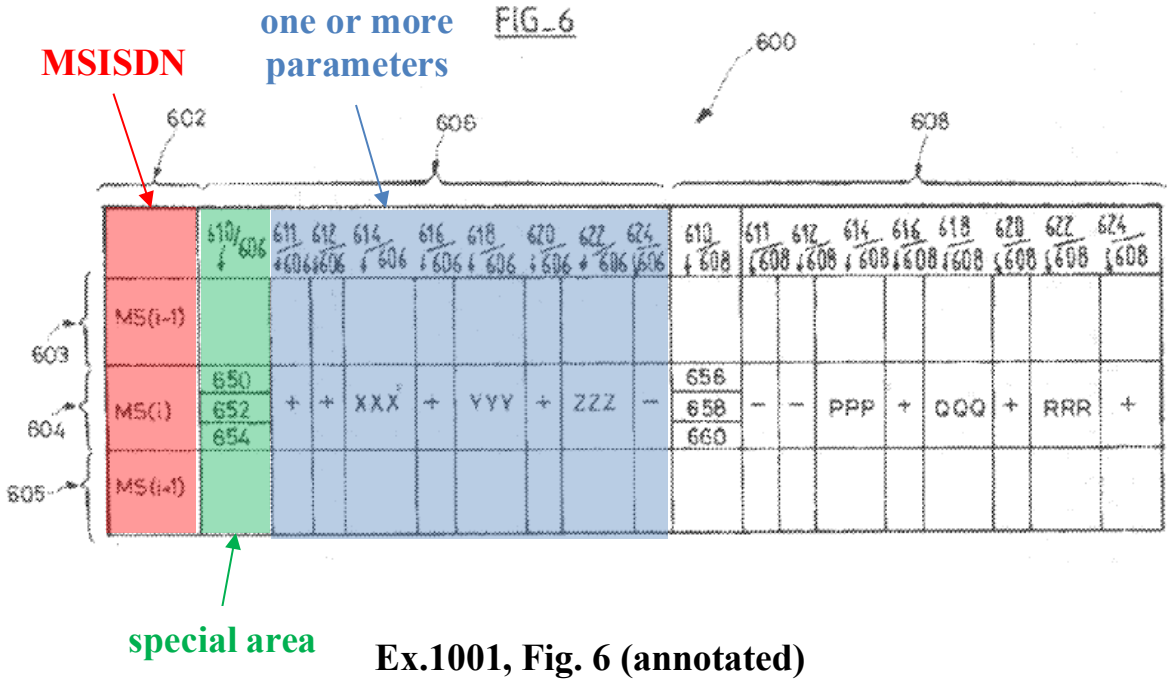
Ex.1006, Fig. 4 (annotated)

Second, The Kraufvelin-Hashimoto-Andersson combination renders obvious the structure of *special operating means*. The structure of *special*

operating means disclosed in the '040 patent specification includes at least one server storing a database linking a special area, a mobile station, and one or more parameters, where the one or more parameters are adapted depending on information received from the mobile station. §VIII.A; Ex.1001, 5:8-15, 17:54-19:19, Fig. 6; §X.C.6 ([1.4]); Ex.1005 ¶¶80, 82-83; Ex.1007, 6:1-7; Ex.1003 ¶140.

Kraufvelin describes multiple servers, including the GMLC 12, HLR 9, and LCS Client 8. Ex.1006, Fig. 1 ¶104. The GMLC 12, HLR 9, and LCS Client 8, together or separately, describes at least one server storing information related to the presence of the mobile station. Ex.1003 ¶141.

In the combination, Andersson teaches a database storing the same data as the '040 patent's database. Figure 6 of the '040 patent shows a database linking the mobile station (MSISDN number (column 602 in red), Ex.1001, 17:62-63) to the special areas (base station or wireless device ID codes (column 610/606 in green), Ex.1001, 18:1-15) and one or more parameters (columns 611/606-624/606 in blue, Ex.1001, 18:28-19:4). Ex.1003 ¶142.



Ex.1001, Fig. 6 (annotated)

Andersson's database includes these same data elements, including an MSISDN identifying the mobile station (in red), a list of allowed cells of a special area (in green), and one or more parameters (authorized services flags and/or restriction control flags, in blue). Ex.1003 ¶143.

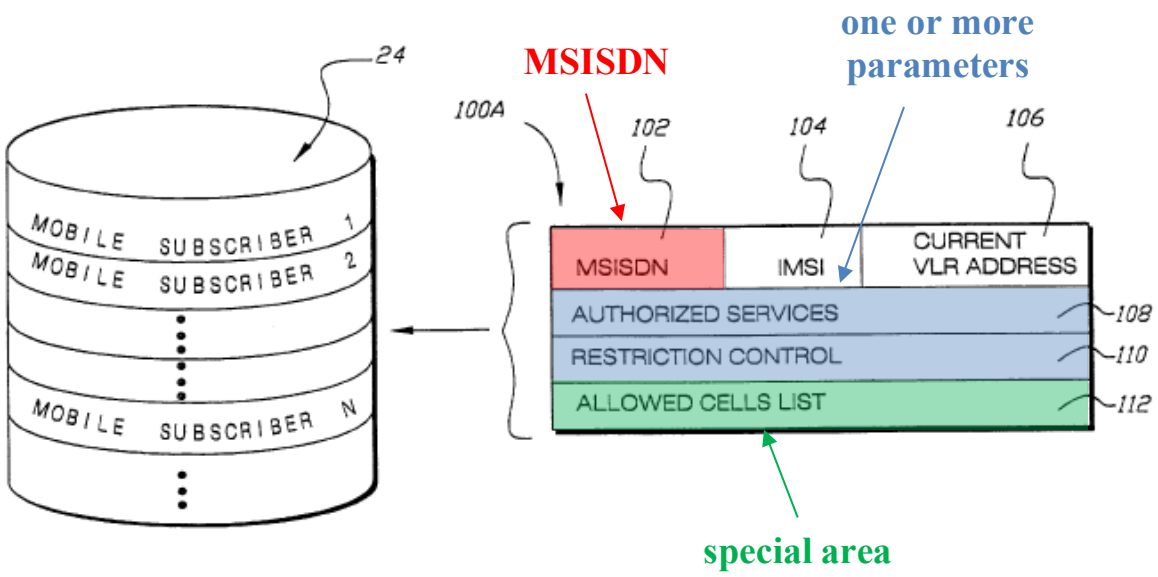


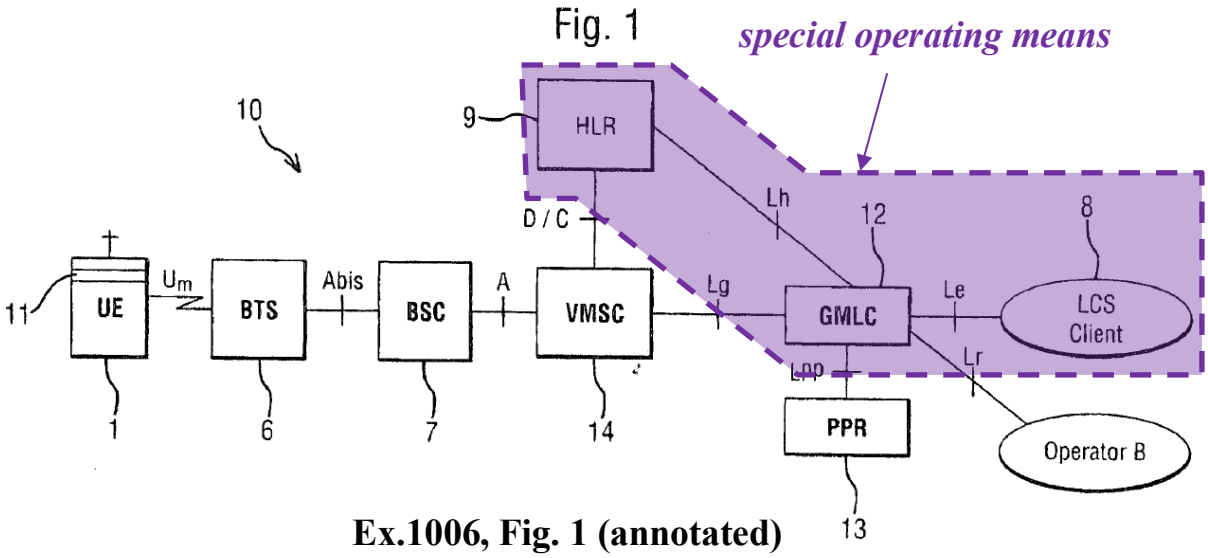
Fig.2A

Ex.1007, Fig. 2A (annotated)

In the combination, as described in §X.C.4, Kraufvelin's HLR 9 stores a database of the type taught by Andersson, separately or in conjunction with the GMLC 12 and/or LCS Client 8. As explained in more detail below regarding the function of the *special operating means*, the one or more parameters are adapted. Ex.1007, 8:35-52 (applying different "tariff rates, as indicated by fields 120D, 122D, and 124D" with a "flag in restriction control field 110D"), 5:41-45 (parameters "must be updated as the mobile station MS moves"). In addition, the parameters are adapted depending on information received from the mobile station. Andersson teaches that these parameters are adapted based on the location of the mobile station. Ex.1007, 5:41-45 ("updated as the mobile station MS moves"), 6:1-24, 8:45-56. In the combination, the location of the mobile station is included in

the *updating signal* sent from the mobile station to the network. Limitation [1.6]; Ex.1003 ¶144.

Accordingly, in the combination, Kraufvelin's GMLC 12/HLR 9/LCS Client 8 stores a database linking the mobile station, the special area, and one or more operating parameters, as taught by Andersson, which renders obvious the structure of *special operating means*. Ex.1003 ¶145.



Ex.1006, Fig. 1 (annotated)

Third, the **GMLC 12, HLR 9,** and **LCS Client 8** (*special operating means*) of Kraufvelin perform the function of the *special operating means* described by the '040 patent (§VIII.A) and claimed in [1.7], explained below. Ex.1003 ¶146.

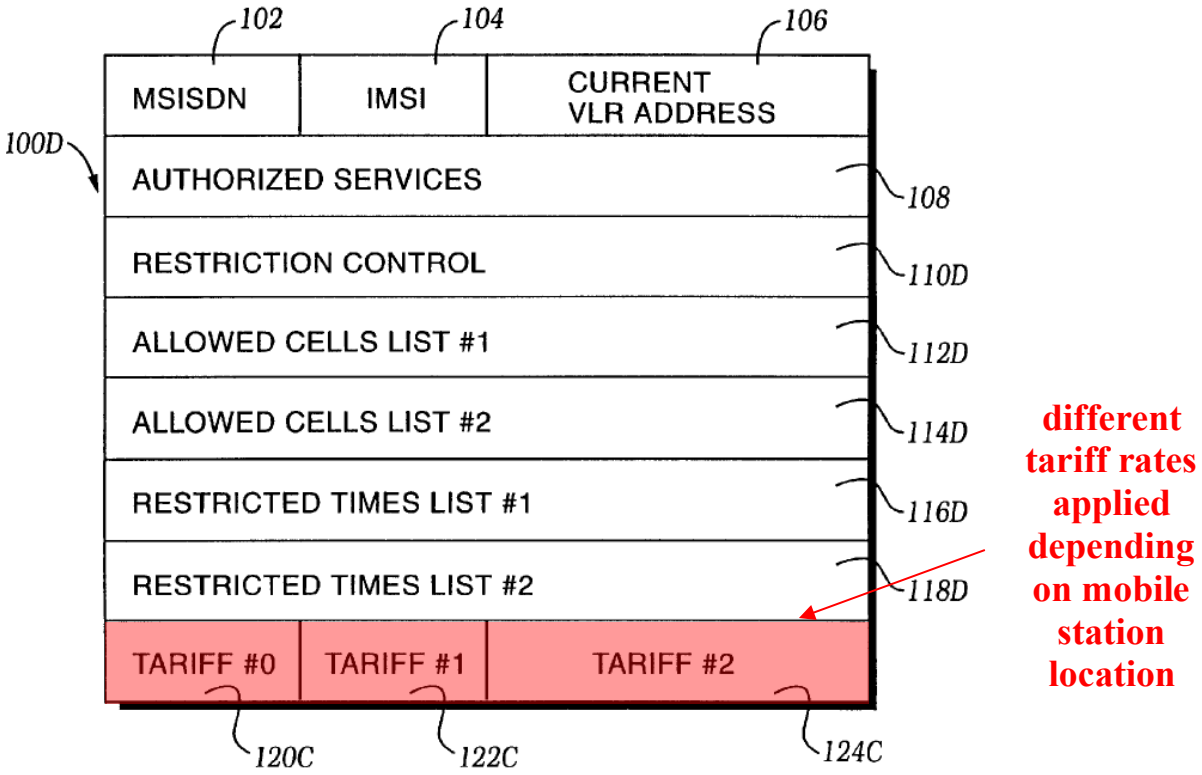
Kraufvelin's GMLC 12 receives the contents of the MAP report (*updating signal*) from the VMSC 14 (*mobile telephone network*) and performs some actions, such as a "privacy check[]" or providing "[d]ifferent kinds of services," such as "various commercial and non-commercial services and similar applications."

Ex.1006 ¶52, Fig. 4 (step 19) ¶12; Ex.1003 ¶147.

With respect to the claimed "*at least one operating parameter*," Andersson provides additional details regarding how location-based services are provided, including how parameters are stored and *adapted* based on the mobile station location. Ex.1007, Figs. 2B-2D (illustrating parameters adapted based on mobile station location). Like the '040 patent, Ex.1001, 1:30-39 (offering "different rates" based on "the instantaneous location of a mobile station"), Andersson provides services at "**a first (e.g., reduced) tariff**" for "calls originated and received in cells listed in a geographical restriction field" while "calls to or from other cells" are given "**a second (e.g., standard) tariff**." Ex.1007, 2:40-45, 8:35-67. To provide variable location-based tariffs, Andersson's system updates and applies (*adapts*) a current tariff (*operating parameter*) to calls originated and received by the mobile station based on the mobile station's location. Ex.1007, 8:45-67, Figs. 2A, 2D; Ex.1003 ¶148.

Referring to FIG. 2D, Andersson illustrates "contents of a record for a…mobile subscriber." Ex.1007, 3:33-35. FIG. 2D illustrates different "tariff rates, as indicated by fields 120D, 122D, and 124D." Ex.1007, 8:35-38; Ex.1003 ¶149.

Fig. 2D



Ex.1007, FIG. 2D (annotated)

As the mobile station moves into a new cell, "a location update operation must occur" and the contents of the mobile subscriber record are updated. Ex.1007, 1:37-44. Specifically, the system ensures that the HLR and/or VLR storing the contents of the subscriber record "have **appropriate <u>current</u> information** about the mobile station." Ex.1007, 1:37-44. To do so, the contents of the mobile subscriber record "**<u>must be updated</u> as mobile station MS moves**." Ex.1007, 5:41-45; Ex.1003 ¶150.

To apply different tariffs as the mobile station moves, Andersson explains that a "flag in restriction control field 110D indicates that the mobile subscriber is…entitled to **lower tariffs when calls are originated or received in the cells specified in one or more of the allowed cells lists** (e.g., fields 112D and/or 114D)." Ex.1007, 8:48-52. In FIG. 2D, "record 100D shows tariff fields 120D, 122D, and 124D wherein are stored tariff #0, tariff #1, and tariff #2, respectively." Ex.1007, 8:58-60. These three rates ("tariff #0", "tariff #1", "tariff #2") are selectively applied if a call occurs while the mobile station is in a geographic area associated with that tariff rate which renders obvious *adapt[ing] the value of at least one operating parameter taking into account the presence of the mobile station in each of the special areas*. Ex.1007, 8:61-67, 5:49-60; Ex.1003 ¶151.

In more detail, Andersson explains that as a mobile station enters an area of interest, "**a first (e.g., reduced) tariff is applied** to calls originated and received in cells listed in a geographical restriction field of the subscriber's record in the home location register." Ex.1007, 2:40-45. Outside of the area, "calls to and from other cells" are "permitted at **a second (e.g., standard) tariff**." Ex.1007, 2:40-45. Thus, Andersson describes adapting the currently applied tariff between the "first (e.g., reduced) tariff" in the area of interest and the "second (e.g., standard) tariff" outside the area of interest. Ex.1007, 2:40-45. To determine the value of this currently applied tariff, its system uses "the information for geographically

restricting operation…for determining in what cells the mobile station can be paged and from what cells the mobile station can originate calls at a first tariff rate" and "a second tariff rate." Ex.1007, 13:63-14:2; Ex.1003 ¶152.

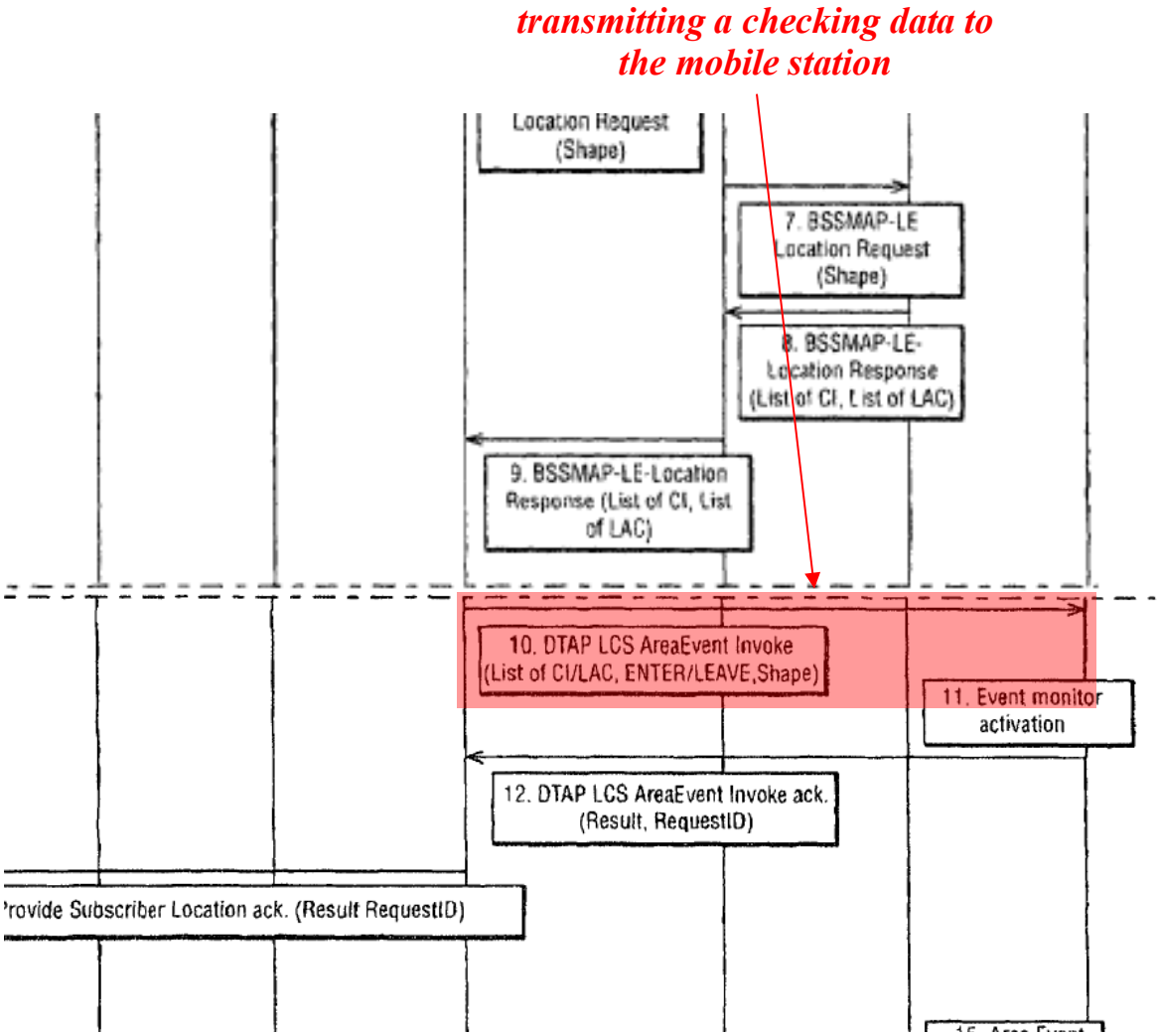
Andersson thus renders obvious updating (*adapting*) a currently applied tariff rate (*the value of at least one operating parameter*) to calls originated or received by a mobile station based on whether the mobile station is present in particular geographic areas associated with special tariff rates (*taking into account the presence of the mobile station in each of the special areas*). Ex.1007, 8:48-67, 2:40-45, 13:63-14:2, FIG. 2D; Ex.1003 ¶153.

Therefore, the Kraufvelin-Hashimoto-Andersson combination renders obvious *routing the updating signal from the mobile telephone network to special operating means* (sending the contents of the LCS report in a MAP report to the GMLC 12, HLR 9, and/or LCS Client 8) *that adapt the value of at least one operating parameter taking into account the presence of the mobile station in each of the special areas* (updating the currently applied tariff rate as the mobile station enters a new cell). Ex.1003 ¶154.

[1.8] ***(f) associating the special areas with the mobile station by transmitting a checking data to the mobile station,***

Kraufvelin describes transmitting a list of cell IDs corresponding to the area of interest 5 to the mobile station 1. "The geographical area 5 may be translated into a list of Cell Ids." Ex.1006 ¶56. "**The list of cells may then be <u>sent to the</u>**

mobile station 1. Ex.1006 ¶¶60, 66-73 (describing steps 7-10 of Figure 4, transmitting list of cell IDs to mobile station). These steps are illustrated as steps 7-10 in Figure 4, below. Ex.1003 ¶155.



Ex.1006, Fig. 4 (annotated)

Thus, Kraufvelin describes *associating the special areas with the mobile station by transmitting* ***a checking data*** *to the mobile station* (sending **the list of cell IDs of the area of interest 5** to the mobile station). Ex.1003 ¶156.

[1.9] ***this checking data being sent to any mobile station whose presence in the special areas is monitored and being used by the mobile station for determining whether or not the defining signal received is a distinctive defining signal that defines, alone or with other distinctive defining signals, one or more of the special areas associated with the mobile station.***

First, when the LCS client 8 requests that the location of a mobile station be monitored, it may indicate multiple mobile stations, i.e., "one **or more** of the mobile stations of the cellular system." Ex.1006 ¶¶48, 47 (receiving "predefined information concerning the location of the mobile **stations**"). If the LCS client 8 identifies multiple mobile stations, the list of cell IDs (*checking data*) for the corresponding area of interest is sent to all mobile stations identified in the request. Ex.1006 ¶55; Ex.1003 ¶157.

Therefore, the list of cell IDs corresponding to the area of interest 5 would be sent to any or all the mobile stations of the "one or more…mobile stations" that are to be monitored, rendering obvious *this checking data being sent to any mobile station whose presence in the special areas is monitored*. Ex.1003 ¶158.

Second, as explained in [1.3], Kraufvelin explains that the mobile station uses the list of cell IDs it receives (*checking data*) to determine if it is receiving a cell ID within that list from a base station (*a distinctive defining signal*). Ex.1006 ¶¶79-80, 56-60. A cell ID transmitted by each base station is a *defining signal*. [1.2]. A cell ID of one of the cells of the area of interest 5 is also a *radio distinctive defining signal*, because it at least partially defines the area of interest 5. [1.1];

Ex.1003 ¶159.

In Kraufvelin, when a mobile station enters a new cell, it receives a new cell ID (*defining signal*) and compares it to the stored list of cell IDs. If there is a match, it determines that the new cell ID (*defining signal*) is a cell ID of one of the base stations of the area of interest (a *radio distinctive defining signal*). Ex.1006 ¶¶79-80; Ex.1003 ¶160.

Thus, Kraufvelin describes *this checking data being sent to any mobile station whose presence in the special areas is monitored* (including multiple mobile stations in a location monitoring request and sending cell IDs to all identified mobile stations) *and being used by the mobile station for determining whether or not the defining signal received is a distinctive defining signal that defines, alone or with other distinctive defining signals, one or more of the special areas associated with the mobile station* (comparing new cell ID of new cell to the list of cell IDs corresponding to the area of interest 5 to determine if it is included in the list). Ex.1003 ¶161.

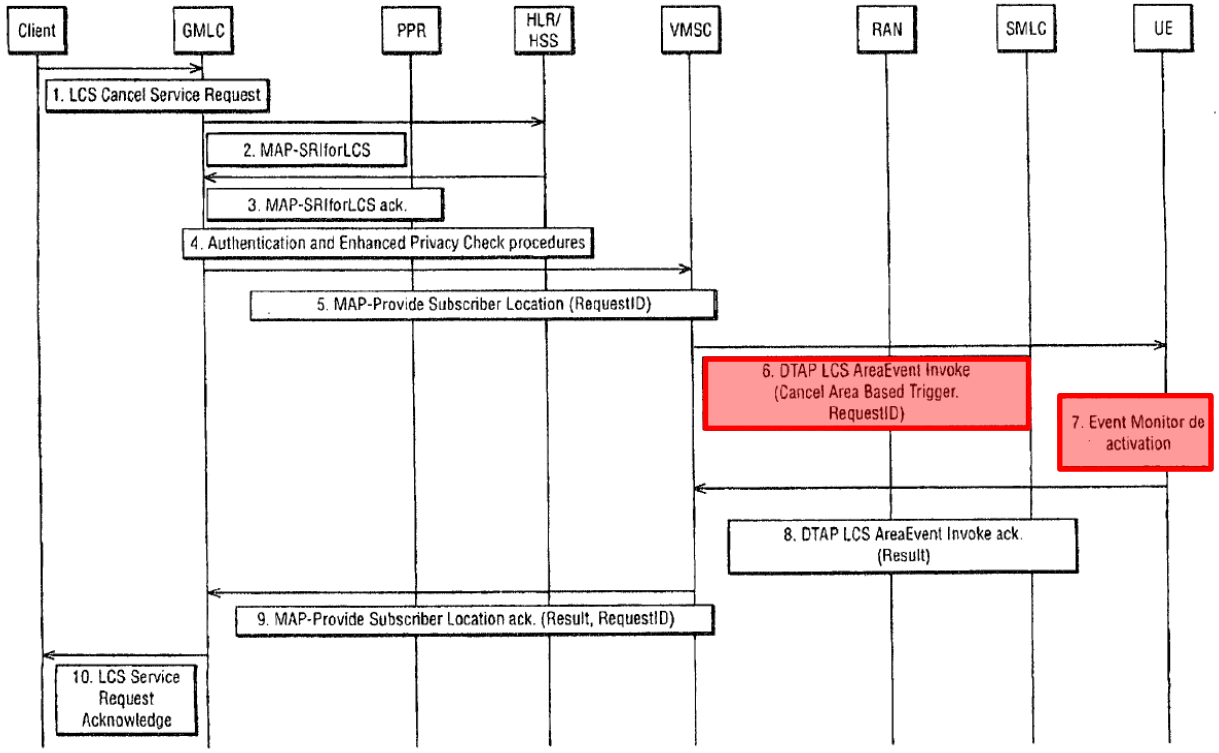
7. Claim 2

Kraufvelin describes a request for location-monitoring as a "deferred location request." Ex.1006 ¶62. Figure 15 "illustrates…**cancelling** a Deferred Location Request." Ex.1006 ¶89; Ex.1003 ¶162.

At step 6, "[t]he MSC may…send…**an indication that the corresponding**

Deferred Location Request is cancelled." Ex.1006 ¶91, Fig. 15 (a "Cancel Area Based Trigger"). Ex.1003 ¶163.

Fig. 15



Ex.1006, Fig. 15 (annotated)

At step 7, the UE performs "Event Monitor de activation," which "de-activates the monitoring and purges the corresponding list of CGIs, LACs and Shape." Ex.1006, Fig. 15 ¶91. This *stop*[s] *the mobile station from recognizing a defining signal that defines the special area as a distinctive one*, because it no longer recognizes cell IDs from the area of interest. Ex.1006 ¶91; Ex.1003 ¶164.

8. Claim 5

First, as at [1.1], Kraufvelin's base stations are *radio communication*

defining device[s]. Ex.1006 ¶39. In one embodiment, the base station's cell ID (*radio distinctive defining signal*) defines area of interest 5. In other embodiments, "the area may be defined based on Cell Group Identities (CGI), Service Area identities (SAI), Location Areas Codes (LAC), Routing Area (RAC) and so on." Ex.1006 ¶57. These identification codes render obvious *a special mobile telephone network identification code*. Ex.1006 ¶79; [1.1]; Ex.1003 ¶165.

Second, as at [1.8]-[1.9], a "DTAP LCS-AreaEventInvoke message" is transmitted to Kraufvelin's mobile station that carries the list of identification codes that defines the area of interest 5 (*checking data*). Ex.1006, Fig. 4 (step 10) ¶¶11, 25, 56-60, 66-70. This list may include "CGIs, SAIs, RACs or LACs and so on" depending on how the area of interest 5 is defined. Ex.1006 ¶72, Fig. 4 (step 10), Fig. 9; Ex.1003 ¶166.

Third, in Kraufvelin's embodiment in which a base station transmits "CGIs, SAIs, RACs or LACs and so on," these identification codes are *associated with* the transmitting base station. Ex.1006 ¶72. Just as Cell IDs are associated with base stations to define an area of interest by their coverage area, Ex.1006 ¶¶40, 53, "the area may be defined based on Cell Group Identities (CGI), Service Area Identities (SAI), Location Area Codes (LAC), Routing Area (RAC) and so on." Ex.1006 ¶¶56, 70-73. Thus, the base stations within an area of interest may additionally or alternatively have an associated CGI, SAI, RAC or LAC—a *special mobile*

telephone network identification code. Ex.1003 ¶167.

Thus, Kraufvelin describes *wherein at least one radio communication defining device is a base station* (base station 6 associated with area 5) *whose radio distinctive defining signal is a distinctive signal comprising a special mobile telephone network identification code* (CGI, SAI, LAC, or RAC)*, the checking data associated with this base station including this special mobile telephone network identification code* (Cell ID of base station 6 and CGI, SAI, LAC, and RAC stored on mobile station)*.* Ex.1003 ¶168.

9. Claim 6

First, as at [1.1], Kraufvelin's base stations are *radio communication defining device[s]* and the signal transmitted from base stations within area 5 is *a radio distinctive defining signal*. Ex.1006 ¶¶39, 79; Ex.1003 ¶169.

Second, a cell ID from a base station within the area of interest is *a distinctive base station identity signal comprising an identification code of the base station*. Ex.1003 ¶170.

Third, as at claim 5 and [1.1], because the cell IDs and/or "CGIs, SAIs, RACs or LACs," Ex.1006 ¶72, of base stations within the area of interest 5 are *radio distinctive defining signal[s]*, and because these cell IDs are stored in the list (*checking data*), they are *associated* with their respective base stations. Ex.1003 ¶171.

Thus, Kraufvelin describes *wherein at least one radio communication defining device is a base station* (base station 6 associated with area 5) *whose radio distinctive defining signal is a distinctive base station identity signal comprising an identification code of the base station* (transmitting cell ID of area 5)*, the checking data associated with this base station including this base station identification code* (Cell ID of base station 6 included within list corresponding to area 5 stored on mobile station). Ex.1003 ¶172.

10. Claim 7

First, as at [1.7], Kraufvelin's GMLC 12, HLR 9, and LCS Client 8 in view of Andersson's database renders obvious *special operating means*. [1.7]; Ex.1003 ¶173.

In Andersson's Figure 2A, the HLR 24 is *a parameters database* because it is described as a database and stores parameters. Ex.1007, 4:48-51 ("Home Location Register (HLR) 24 **is a data base**"). The allowed cells list 112 indicates *the special area*. Ex.1007, 2:40-67 ("geographical restriction field" is a list of cells with a reduced tariff). Ex.1003 ¶174.

The MSISDN 102 and/or IMSI 104 indicate *the mobile station*. Ex.1007, 5:25-29 ("The MSISDN field 102…**uniquely identifies a mobile telephone subscription**."), 5:30-35 (The IMSI field 104 of record 100A…is a **unique identity allocated to each subscriber**"). Ex.1003 ¶175.

The currently applied tariff rate is *at least one operational parameter* that is *adapted* as the mobile station enters an area of an allowed cells list, indicated by sending *an updating signal*. Ex.1007, 2:40-45, 8:35-67, 1:37-44, 5:41-45, 13:63-14:2. As explained at [1.7], "a flag set in restriction control field 110 indicates that mobile subscriber N is to be accorded a low tariff…in the allowed cells which are stored in the allowed cells list field 112." Ex.1007, 5:52-57. The currently applied tariff rate renders obvious an *operational parameter*. Ex.1003 ¶176.

Figures 2A-2D illustrate additional *operating parameter[s]*. Ex.1007, Figs. 2B-2D (Restricted times list #1 and #2, Tariffs #0, #1, and #2); Ex.1003 ¶177.

Second, Andersson's operational parameters are *adapted*. For example, "the contents of the current VLR address field 106 **must be updated as the mobile station MS moves**." Ex.1007, 5:38-45. Likewise, the currently applied tariff rate is changed as the mobile station moves into or out of geographical areas. For example, the "flag" in the "restriction control field 110B" is "set," i.e., *adapted*. Ex.1007, 7:30-37. Andersson explains that the contents of the subscriber record, shown in FIG. 2D must be updated so that the currently serving HLR/VLR has "**appropriate <u>current</u> information** about the mobile station." Ex.1007, 1:37-44. As a mobile station enters an area of interest, "**a first (e.g., reduced) tariff is applied**" whereas "calls to and from other cells" are "permitted at **a second (e.g., standard) tariff**." Ex.1007, 2:40-45. As the mobile station moves, Andersson's

system "determin[es] in what cells the mobile station can be paged and from what cells the mobile station can originate calls at a first tariff rate" and "a second tariff rate." Ex.1007, 13:63-14:2; Ex.1003 ¶178.

Kraufvelin's mobile station sends an updating signal when it enters or exits an area of interest. Ex.1006, Fig. 4 (steps 11-14). In the combination, this updating signal causes the GMLC 12/HLR 9/LCS Client 8 to *adapt[]* an *operational parameter* (currently applied tariff) taught by Andersson. Ex.1007, 8:45-52; Ex.1003 ¶179.

Thus, the Kraufvelin-Hashimoto-Andersson combination renders obvious *wherein the special operating means* (GMLC 12/HLR 9/LCS Client 8) *comprise a parameters database* (HLR 24) *linking the special area* (allowed cells list) *to the mobile station* (MSISDN/IMSI) *and to a set of one or more operating parameters* (currently applied tariff rate, allowed cells list, restricted times, etc.)*; and a value of at least one operational parameter of this set is adapted when an updating signal signaling that the mobile station exits or enters the special area is received* (updating currently applied tariff based on location of mobile station). Ex.1003 ¶180.

11. Claim 8

As explained at claim 7, Andersson's mobile subscriber record includes tariff flags indicating "particular tariff rates" based on the mobile station's

location. Ex.1007, 8:35-57, 5:49-60. "[A] **flag set** in restriction control field 110 indicates that mobile subscriber N **is to be accorded a low tariff** in exchange for mobile subscriber N agreeing to use mobile station MS only in the allowed cells which are stored in the allowed cells list field 112 of record 100A." Ex.1007, 5:49-60, 8:35-57 ("**The same or another flag** in restriction control field 110D indicates that the mobile subscriber is also entitled to **lower tariffs when calls are originated or received in the cells specified in one or more of the allowed cells lists** (e.g., fields 112D and/or 114D).") Ex.1007, 8:35-57; Ex.1003 ¶181.

Because the currently applied tariff indicates a standard rate outside the special area or a reduced rate when within the special area, it renders obvious *a tariff flag…that enables or disables a special tariff…for the mobile station*. Ex.1003 ¶182.

12. Claim 10

As discussed at [1.9], and illustrated in Figure 4, Kraufvelin's mobile station receives *checking data* (i.e., list of cell IDs corresponding to area 5) *from the mobile network*. Ex.1006 ¶¶60, 66-73, Fig. 4; Ex.1003 ¶183.

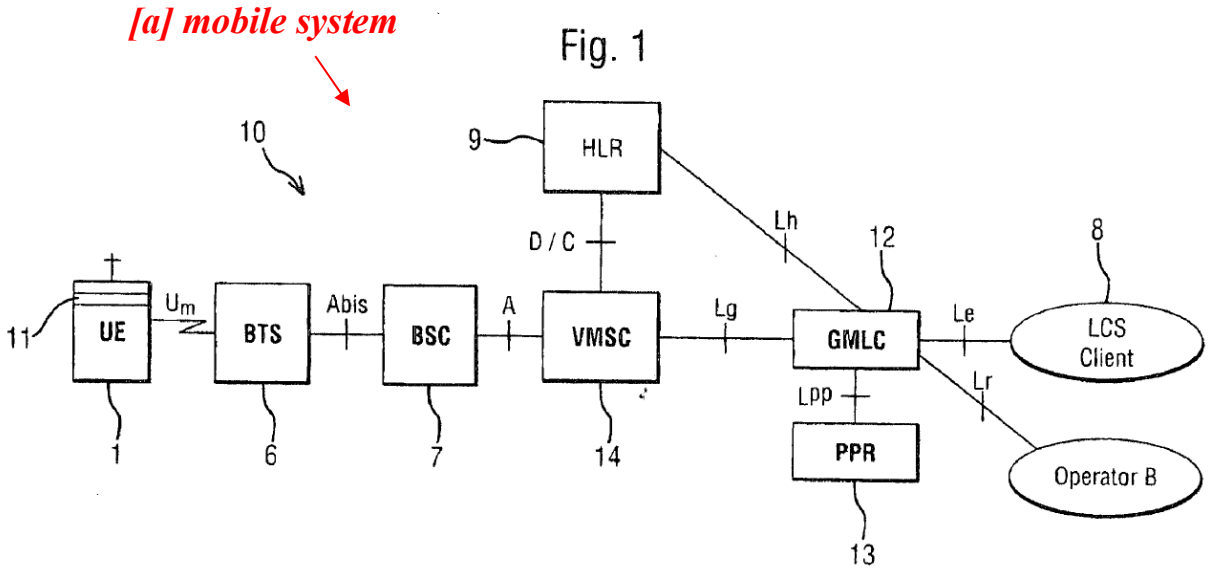
13. Claim 11

[11.0]

[11.0] is similar to [1.0]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [11.0] for the same reasons described at [1.0] and

those presented below. Ex.1003 ¶184.

[11.0] recites *[a] mobile system*. Kraufvelin renders obvious "a communication system" or "cellular communication system," below. Ex.1006, Abstract, Fig. 1; Ex.1003 ¶185.



Ex.1006, Fig. 1 (annotated)

[11.0] also recites *one or more special areas defined for this mobile station*. As explained at [1.0], area 5 is associated with the mobile station because the LCS Client request "indicates a geographical area of interest and the target subscriber." Ex.1006 ¶¶55, 63; Ex.1003 ¶186.

[11.1]

[11.1] is similar to [1.1]. As explained at [1.1], Kraufvelin's base stations 6 render obvious *at least one radio communication defining device*. Kraufvelin describes transmitting cell IDs (*radio distinctive defining signal*) from base stations

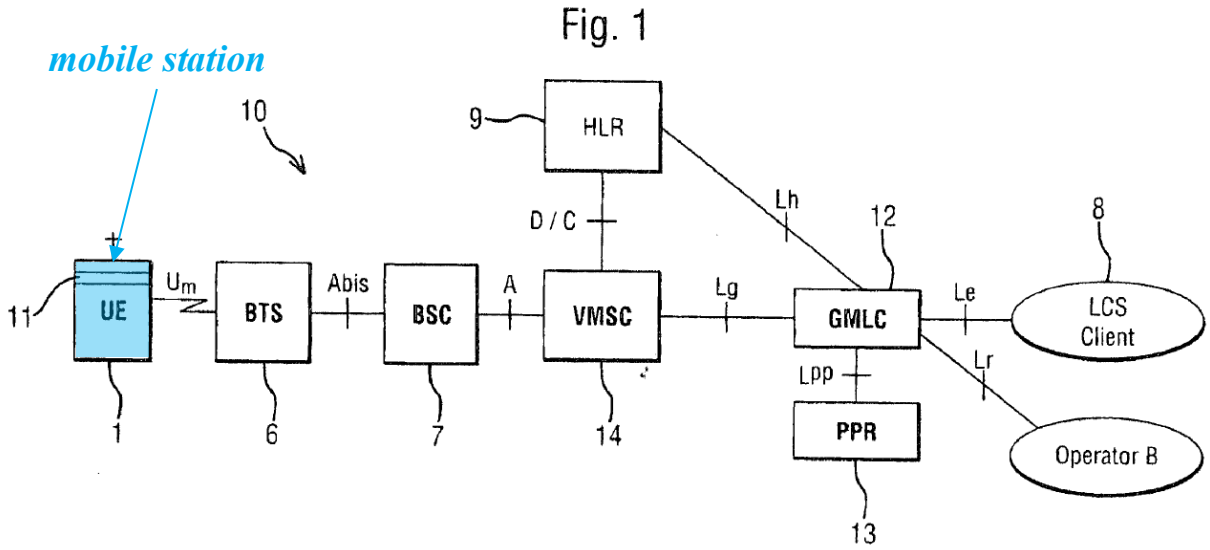
6 within area 5 *at least partially defin[ing] one of the special areas*. The cell ID is transmitted in the BCCH channel (*in at least one channel*). X.A.5.[1.1]; Ex.1003 ¶187.

[11.2]

[11.2] is substantially similar to [1.7]. The Kraufvelin-Hashimoto-Andersson combination renders [11.2] obvious for the same reasons described at [1.7]. Ex.1003 ¶188.

[11.3]

As explained at [1.0], Kraufvelin's "mobile station 1" is illustrated in Figures 1, 2, and 4. Ex.1006 ¶¶48, 41; Ex.1003 ¶189.



Ex.1006, Fig. 1 (annotated)

[11.4]

The list of cell IDs renders obvious *checking data*. [1.8]-[1.9]. It is stored in

storage of the mobile station. Ex.1006 ¶11 ("Information…for the area definition is stored at the mobile station."). The mobile station "**stores the list of CGIs**, and other possible information **to the memory thereof**." Ex.1006 ¶¶73, 60, 79, Fig. 4 (steps 7-11); Ex.1003 ¶190.

[11.5]

[11.5] is similar to [1.2] (*observing the channel*). The Kraufvelin-Hashimoto-Andersson combination renders obvious [11.5] for the same reasons described at [1.2] and those described below. The Kraufvelin-Hashimoto-Andersson combination describes both the function and corresponding structure of *observing means*. Ex.1003 ¶191.

The Kraufvelin-Hashimoto-Andersson combination describes *observing the channel*, which renders obvious "observing at least one channel." [1.2]; VIII.B; Ex.1003 ¶192.

The mobile station includes a "monitoring entity (ME)." Ex.1006 ¶79. After the mobile station receives the list of cell IDs to monitor (*checking data*) it "wait[s] for a trigger event." Ex.1006 ¶76, Fig. 4 (step 11); Ex.1003 ¶193.

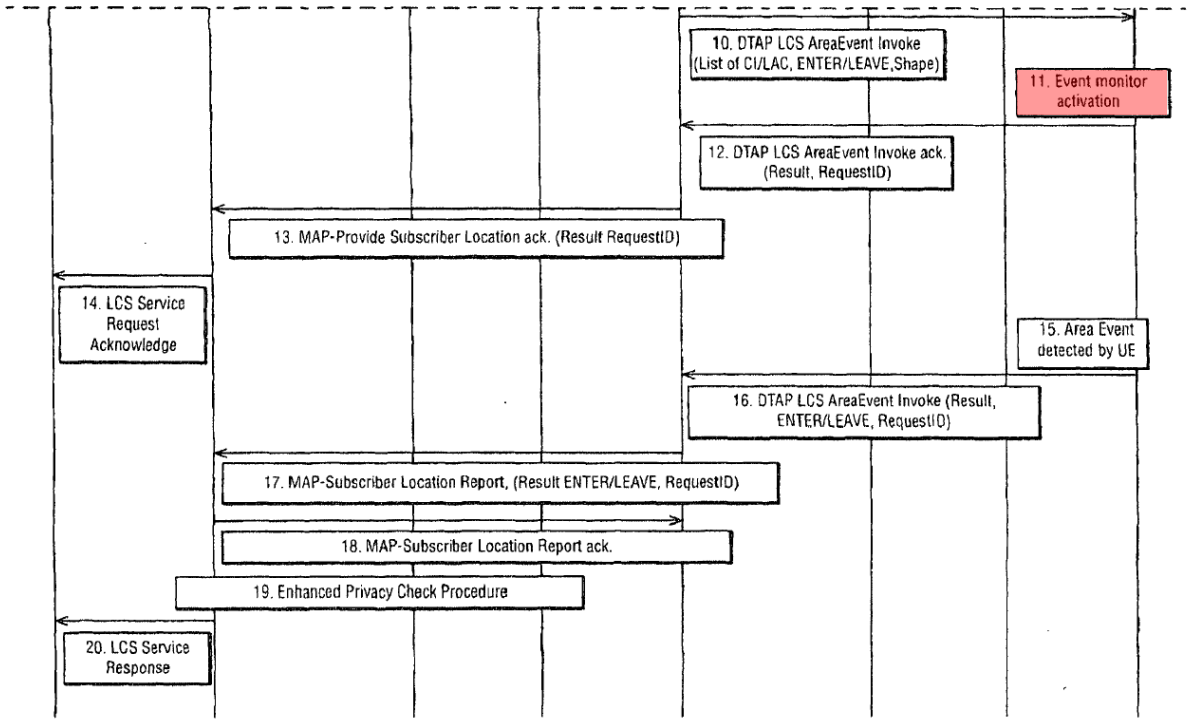


Fig. 4 (Contd.)

Ex.1006, Fig. 4 (annotated)

Kraufvelin also describes the corresponding structure, including a processor executing software that performs the function above. "The user equipment such as the mobile station 1 may be provided with…a processor unit." Ex.1006 ¶¶42, 94; Ex.1003 ¶194.

This processor executes multiple applications and/or software that perform the described functionality. For instance, an "application…run[s] in the Subscriber Identity Module (SIM) of the mobile station." Ex.1006 ¶13. Kraufvelin describes an "area event monitoring application" that enables or disables itself to perform the observing function. Ex.1006 ¶82. "**The monitoring functionality** required on the

mobile station side may be implemented in the terminal itself" and "could be **an application running in the controller means of the mobile station**." Ex.1006 ¶¶93, 22 ("monitoring means"); 79 ("monitoring entity (ME)"); Ex.1003 ¶195.

[11.6]

[11.6] is similar to [1.3]. Kraufvelin renders obvious [11.6] for the same reasons described at [1.3] and those provided below. Kraufvelin renders obvious both the function and corresponding structure of *processing means*. Ex.1003 ¶196.

The function of *processing means* is recited in the language of [11.6]. For the reasons described at [1.3], Kraufvelin renders obvious this function. Ex.1003 ¶197.

Kraufvelin also describes the corresponding structure. The mobile station includes a processor. Ex.1006 ¶42 ("user equipment" includes "a processor unit"); 94. "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 a match**, the mobile station 1 sends a report back to the network." Ex.1006 ¶60. The algorithm that performs this checking is executed by the mobile station's processor. Ex.1006 ¶¶42, 94; Ex.1003 ¶198.

[11.7]

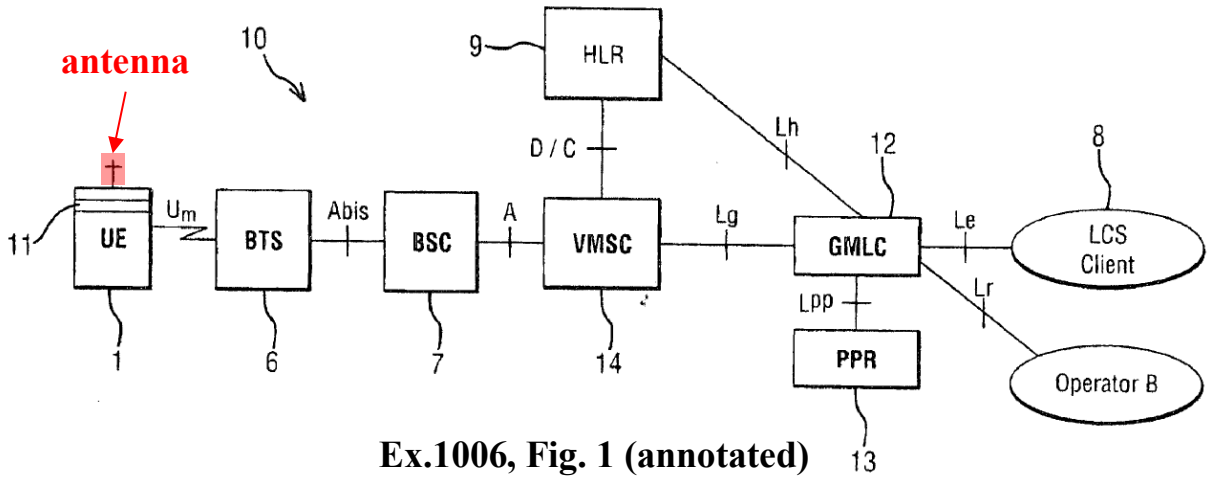
[11.7] is similar to [1.4]-[1.6]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [11.7] for the same reasons described at [1.4]-[1.6]

and those provided below. Kraufvelin renders obvious both the function and corresponding structure of *transmission means*. Ex.1003 ¶199.

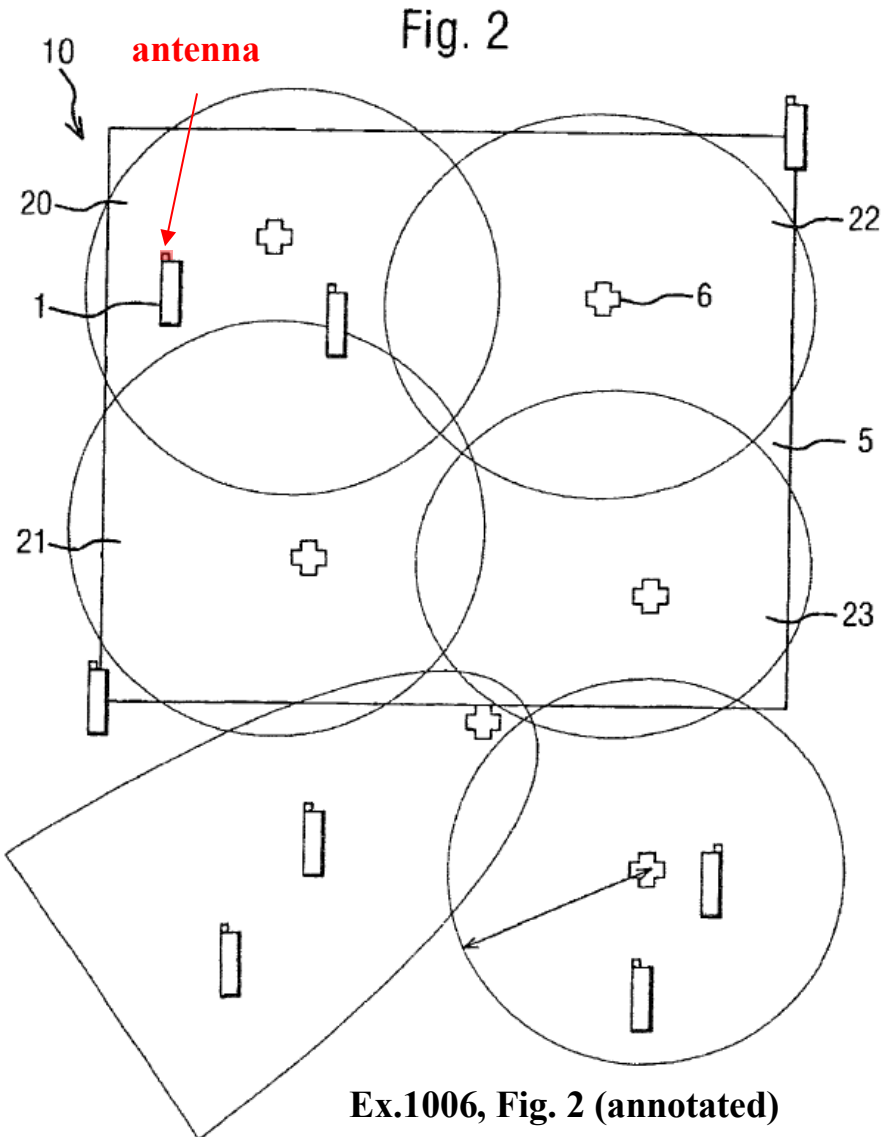
The recited function of *transmission means*, including sending an updating signal, is recited in the language of [11.7]. For the reasons described at [1.4]-[1.6], Kraufvelin renders obvious this function. Ex.1003 ¶200.

Kraufvelin also describes the structure, including "a processor unit" that executes various software to perform the recited functionality. Ex.1006 ¶¶42, 94, 13; Ex.1003 ¶201.

Kraufvelin describes a transmitter—an "antenna." Ex.1006 ¶40; Figs. 1-2; Ex.1003 ¶202.



Ex.1006, Fig. 1 (annotated)



Ex.1006, Fig. 2 (annotated)

14. Claim 12

[S]pecial area location monitoring means is construed as a means-plus-function term. Kraufvelin describes the function and corresponding structure. Ex.1003 ¶203.

As explained regarding claim 4, in addition to sending the list of cell IDs to the mobile station, "the shape" of area 5 "may be conveyed." Ex.1006 ¶95. The

mobile station can verify whether it is within area 5 and monitor whether the list of cell ID corresponds to *the correct location of…the special areas* to perform "a verification—or 'sanity' check—of the response from the terminal" to "**be sure that the terminal is actually in the geographical area as intended**." Ex.1006 ¶¶107-109, 11; Ex.1003 ¶204.

Kraufvelin also describes a processor that executes software that performs the recited function. Ex.1006 ¶¶42, 94; Ex.1003 ¶205.

15. Claim 13

[13.0]

[13.0] is identical to [11.3]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [13.0] for the reasons at [11.3]. Ex.1003 ¶206.

[13.1]

[13.1] is similar to [1.2]. The Kraufvelin-Hashimoto-Andersson combination renders [13.1] obvious for the reasons at [1.2]. Ex.1003 ¶207.

As explained at [11.5], Kraufvelin and Hashimoto describe *observing means to observe a channel*. [1.2]; [11.5]; VIII.B; Ex.1006 ¶¶76, 79, Fig. 4 (step 11); Ex.1003 ¶208.

Kraufvelin's mobile station additionally *process[es] any received signal in order to determine whether or not a defining signal is received*, as explained at [1.2] above. [1.2]; VIII.B; Ex.1003 ¶209.

Kraufvelin's mobile station receives multiple signals (voice, SMS, and data). Ex.1006 ¶¶13, 112, 119. As explained at [1.1], cell identification information is received in the BCCH channel. Ex.1008 ¶135. Receiving and identifying a signal as sent over BCCH/SCH renders obvious *processing any received signal by the mobile station in order to determine whether or not it is receiving a defining signal*. [1.2]; Ex.1025 ¶7; Ex.1026 ¶9; Ex.1027 ¶36; Ex.1028 ¶206; Ex.1003 ¶210.

Kraufvelin and Hashimoto render obvious the structure of *observing means* for the reasons described at [11.5]. Ex.1003 ¶211.

[13.2]

[13.2] is similar to [1.3]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [13.2] for the same reasons provided at [1.3], and those below. Ex.1003 ¶212.

First, Kraufvelin describes *a processor*. Ex.1006 ¶¶42, 94; Ex.1003 ¶213.

Second, Kraufvelin describes *determin[ing]…whether or not the defining signal received is a distinctive defining signal that at least partially defines a special area* is ***based on a previously obtained checking data***. As at [1.3], the MS determines whether a defining signal received (cell ID from base station 6) is a distinctive defining signal (one of the cell IDs on the list corresponding to the area of interest 5) by comparing the received cell ID to the list to check if there is a match. Ex.1006 ¶¶60, 79-80. The list of cell IDs is *checking data*. [1.8]-[1.9]. It is

obtained before the mobile station performs the comparison described. Ex.1006, Fig. 4 (steps 1-10, generating list of cell IDs and transmitting to mobile station, occur before step 11, monitoring). Ex.1003 ¶214.

[13.3]

[13.3] is substantially similar to [1.3]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [13.3] for the same reasons described at [1.3]. Ex.1003 ¶215.

[13.4]

[13.4] is substantially similar to [1.4]-[1.6]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [13.4] for the same reasons described at [1.4]-[1.6]. Ex.1003 ¶216.

16. Claim 14

[14.0]

As explained at [11.4], Kraufvelin's mobile station 1 includes a memory (*a non-transitory computer readable medium*). Ex.1006 ¶¶11, 73; Ex.1003 ¶217.

As explained at [11.5], Kraufvelin's mobile station executes software (*computer readable program code for causing a computer to perform a method*). Ex.1006 ¶¶13, 51, 82, 93; Ex.1003 ¶218.

[14.1]

[14.1] is substantially similar to [1.2] and the Kraufvelin-Hashimoto-

Andersson combination render [14.1] obvious for the reasons described at [1.2]. Ex.1003 ¶219.

[14.2]

[14.2] is substantially similar to [1.3]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [14.2] for the reasons described at [1.3]. Kraufvelin renders obvious *based on a previously obtained checking data* for the reasons described at [13.2]. Ex.1003 ¶220.

[14.3]

[14.3] is identical to [1.4]-[1.6]. The Kraufvelin-Hashimoto-Andersson combination renders obvious [14.3] for the reasons described at [1.4]-[1.6]. Ex.1003 ¶221.

D. Ground 2: Claims 3-4 are obvious under §103 over Kraufvelin, Hashimoto, Andersson, and Sundar.

1. Sundar

Sundar describes methods "for internetworking WWAN" (cellular networks) "and WLAN" (WiFi networks). Ex.1017, Abstract. Mobile stations were capable of "communicat[ing] according to **a[]…**WLAN logic or according to **a…**WWAN logic." Ex.1017, Abstract.

Like Kraufvelin/Hashimoto/Andersson, Sundar's mobile station stores a list of cell IDs defining a special area and compares new cell IDs to the list. Ex.1017 ¶23. Sundar's mobile station may perform this same process using SSIDs of WiFi

devices, instead of cell IDs of cellular base stations. Ex.1017 ¶¶62-63 (comparing "SSID with a list of SSIDs" to check for "a match").

2. Reasons to Combine Sundar with Kraufvelin, Hashimoto, and Andersson

The Kraufvelin-Hashimoto-Andersson combination describes location by storing a cell ID list and checking new cell IDs against this list. Ex.1006 ¶¶79-80; Ex.1008 ¶135. Location data is stored in a database. Ex.1007, Figs. 2A-2D, 5:1-57, 8:52-67. While Kraufvelin's methods are described for 3G cell systems, its principles "are also applicable to any other cellular communication system." Ex.1006 ¶119. A POSITA would have been motivated to apply Kraufvelin's teachings to WiFi systems, with the coverage area of WiFi access points forming "cell[s]" (i.e., a "cellular system"), as explained below. Ex.1006 ¶119; Ex.1017 ¶14; Ex.1003 ¶224.

First, Sundar is analogous to the '040 patent and within the same field of endeavor—monitoring the location of a mobile station. Ex.1017 ¶¶17, 67; Ex.1001, Abstract. Sundar is reasonably pertinent to a particular problem with which the inventor was involved (tracking mobile station location). Ex.1001, 1:65-2:3; Ex.1017 ¶3; Ex.1003 ¶225.

Second, a POSITA would have been motivated to include WiFi access points in Kraufvelin's system, so Kraufvelin's location monitoring techniques would apply to both cellular base stations and WiFi access points. Kraufvelin's

methods are not limited to WWAN networks. Ex.1006 ¶119. Sundar shows that comparing a transmitted ID to a stored list may be used with SSIDs of WiFi access points. A mobile station receives "a SSID" in "the beacon frame." Ex.1017 ¶62. "The mobile station 310 compares this SSID with a list of SSIDs" and determines "if there is a match." Ex.1017 ¶¶62-63; Ex.1003 ¶226.

Applying Kraufvelin's location monitoring techniques to WiFi access points using SSIDs would provide multiple advantages. WiFi access points may have smaller coverage areas than cellular base stations, so location-accuracy would be improved. Kraufvelin's LCS Client 8 would advantageously provide services based on the mobile station location within range of a WiFi access point, such as the user's home, work, or other location. In addition, some WiFi coverage areas may be outside of cellular service. Including WiFi access point SSIDs would allow Kraufvelin's LCS Client 8 to monitor the mobile station location in these locations. Ex.1003 ¶227.

The Kraufvelin-Hashimoto-Andersson-Sundar combination would have been the combination of prior art elements (monitoring the MS location via cellular or WiFi networks) according to known methods (storing list of SSIDs on MS) to yield the predictable result of a mobile station identifying its location based on receiving and comparing an SSID to the prestored list. *KSR*, 550 U.S. at 416; Ex.1003 ¶228.

Further, a POSITA would have had a reasonable expectation of success. Sundar shows that mobile stations can communicate via both network types. Ex.1017, Abstract. Kraufvelin and Sundar both describe updating signals regarding the MS location. Ex.1006 ¶¶79-83; Ex.1017 ¶12 ("an update of the location of the handset may occur"). Therefore, a POSITA would have been motivated to combine Sundar with Kraufvelin-Hashimoto-Andersson. Ex.1003 ¶¶229-230.

3. Claim 3

Kraufvelin describes sending *an updating signal* (contents of LCS report and MAP report, [1.4]-[1.7]) from the mobile station to the network, illustrated below. Ex.1003 ¶231.

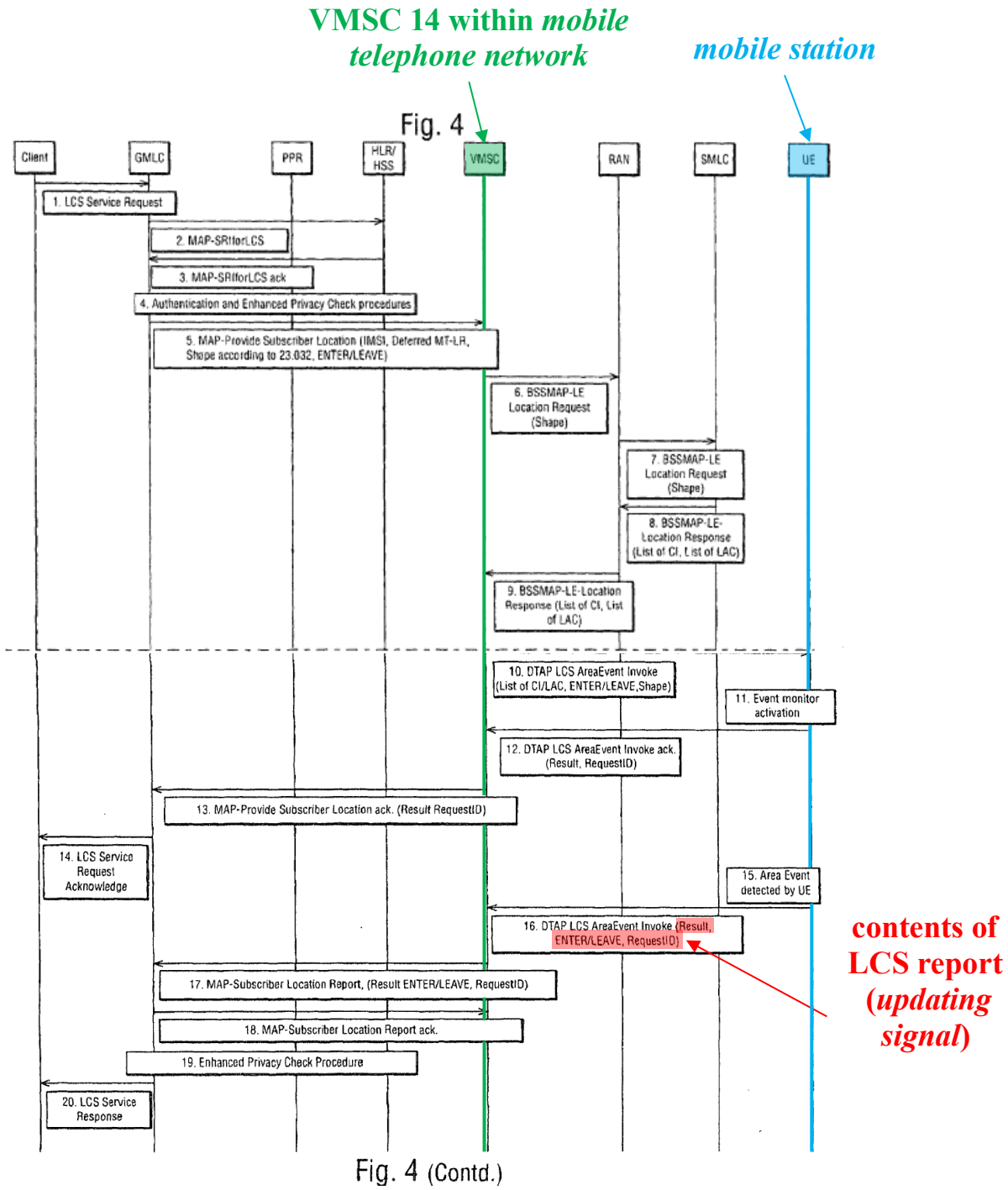


Fig. 4 (Contd.)

Ex.1006, Fig. 4 (annotated)

While Kraufvelin does not describe an acknowledgement indicating reception of the updating signal, this was a well known, conventional step.

Sundar's mobile station sends a location update when it enters a new cell. "The BSC 106 transmits 904 a Location Update message to its serving MSC 110." Ex.1017 ¶75; Ex.1003 ¶232.

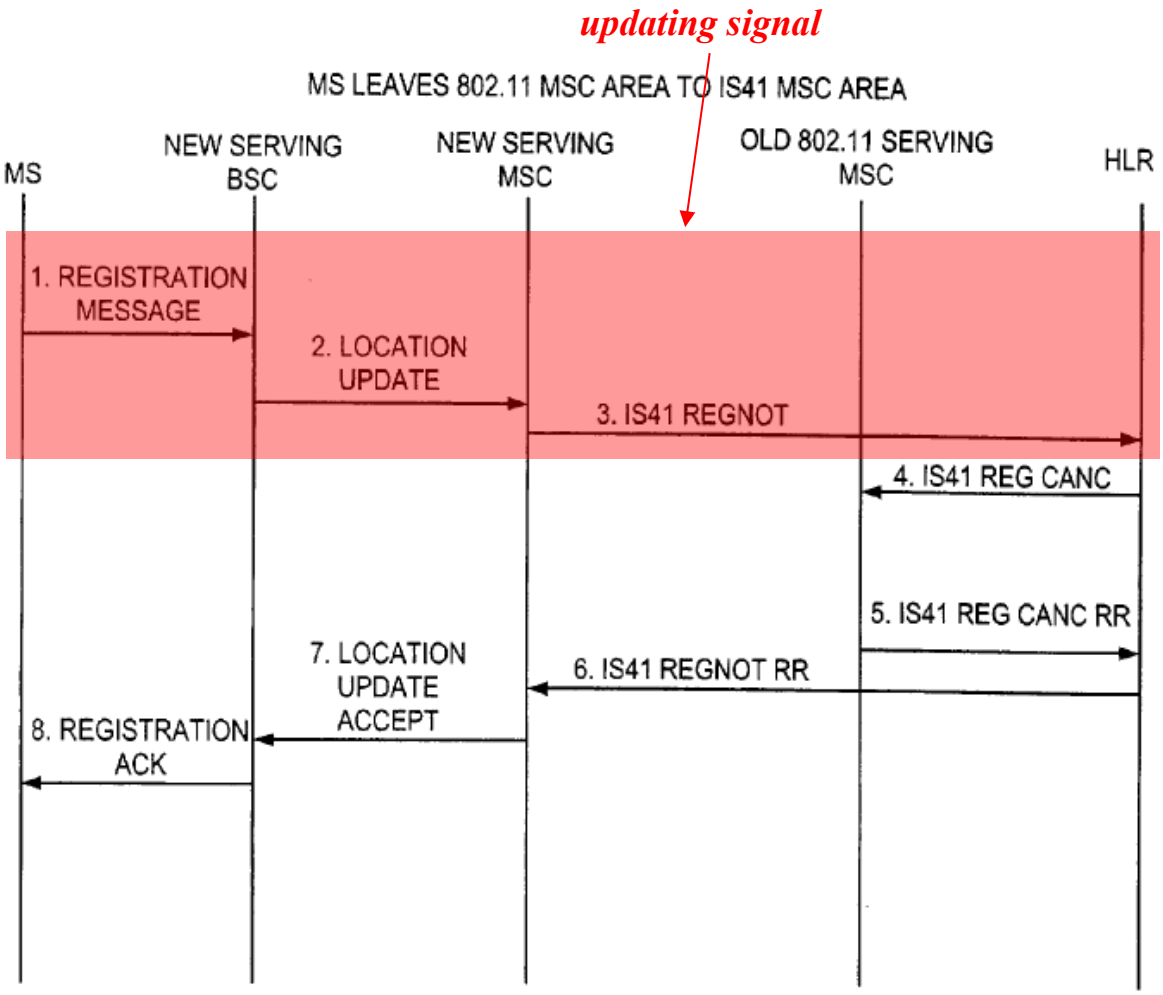


FIG. 10

Ex.1017, Fig. 10 (annotated)

Then, "[t]he BSC 106 **acknowledges** 918 the registration." Ex.1017 ¶75; Ex.1003 ¶233.

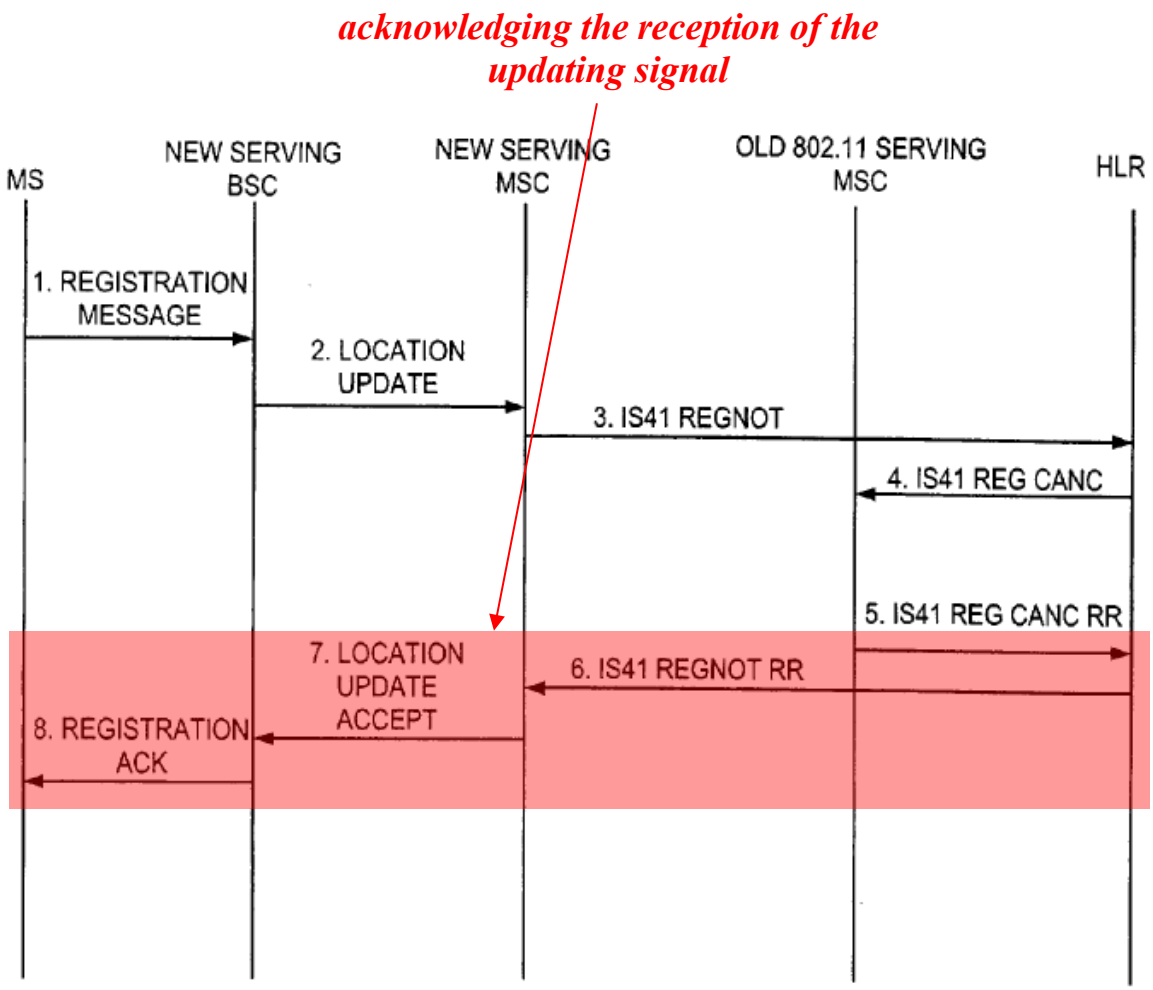


FIG. 10

Ex.1017, Fig. 10 (annotated)

A POSITA would have found it obvious, and would have been motivated, to include a registration ACK as taught by Sundar with Kraufvelin's system to improve data integrity and system efficiency. Ex.1003 ¶253. By receiving an ACK, Kraufvelin's mobile station would recognize that the updating signal was successfully received in its entirety and would not attempt to retransmit the signal, saving network bandwidth and battery power. Ex.1003 ¶234.

4. Claim 4

First, as explained at [1.1], Kraufvelin's area 5 is defined by multiple cellular base stations (cells 20-23). Ex.1006, Fig. 2, ¶¶53, 56, 58, 62. The cell IDs are stored within the mobile station. Ex.1006 ¶¶56, 58, 60, Fig. 4 (step 10), 79-80; Ex.1003 ¶235.

A POSITA would have found it obvious for Kraufvelin's system to additionally include radio communication defining devices in the form of WiFi devices. In such a modified system, the area of interest 5 may also be defined by the coverage area of multiple base stations, WiFi access points, or a combination. This combination would be obvious because Sundar's mobile station stores lists of cell IDs and lists of SSIDs and compares received cell IDs and SSIDs to these lists exactly as Kraufvelin describes its stored lists. Ex.1017 ¶¶23, 62-63; Ex.1006 ¶¶56-60, 79-80. Sundar's WiFi access point is an "AP 204," which transmits "a 'beacon frame'…at regular intervals." Ex.1017 ¶¶14, 17. Just as Kraufvelin's base stations repeatedly transmit cell IDs, "the AP sends a SSID…that identifies the AP 204." Ex.1017 ¶62; Ex.1003 ¶236.

Sundar's "mobile station 310 **compares this SSID with a list of SSIDs**." Ex.1017 ¶62. It "is **a priori provisioned with the valid list of SSIDs**." Ex.1017 ¶63; Ex.1003 ¶237.

Kraufvelin's description of comparing a newly received cell ID to the stored

list of cell IDs is compatible with Sundar's teachings of comparing a newly received SSID to a stored list of SSIDs. §X.D.2. In the Kraufvelin-Hashimoto-Andersson-Sundar combination, *at least one radio communication defining device* is also rendered obvious by a WiFi access point with an SSID within the list of SSIDs prestored on the mobile station. Ex.1017 ¶¶14, 62-63. The *radio distinctive defining signal* is rendered obvious by the SSID of the WiFi access point. Ex.1017 ¶¶14, 62-63; Ex.1003 ¶238.

In the Kraufvelin-Hashimoto-Andersson-Sundar combination, the SSID (*radio distinctive defining signal*) is sent *in a frequency range outside the frequency range allocated for the mobile telephone network* because WiFi access points utilize a different frequency range than cellular base stations. Ex.1035 ¶22 ("[T]he WLAN system and the cellular mobile communication system provide services **using different frequency bands**."); Ex.1036, 1:41-62 ("802.11" and "a cellular network" "operate in vastly different frequency ranges"); Ex.1003 ¶239.

Second, an SSID from a WiFi access point within the predefined list renders obvious a *radio distinctive defining signal*. An SSID is *wireless device identification data* because it "identif[ies] an access point." Ex.1017, claims 4-5; Ex.1003 ¶240.

Third, Kraufvelin's mobile station also receives "the shape used in the request" for verification purposes. Ex.1006 ¶95. The MS determines whether its

"calculated position" is within "the submitted shape." Ex.1006 ¶¶95-96, 107-109, 11. In Sundar, GPS data is sent to the mobile station to confirm that the WiFi access point is within the area of interest. Ex.1017 ¶¶24, 70, 66. This information is sent in any suitable way, such as SMS, SCP, or "by modifying the HLR or using a Proxy HLR entity." Ex.1017 ¶72. Accordingly, in the Kraufvelin-Hashimoto-Andersson-Sundar combination, the shape and/or GPS data (*reliable information*) is included within the *radio distinctive defining signal*. Ex.1006 ¶¶95-96; Ex.1017 ¶¶24, 66-72; Ex.1003 ¶241.

Fourth, Sundar's SSID is *wireless device identification data* because it identifies the associated WiFi access point. Ex.1017, claims 4-5; Ex.1003 ¶242.

E. Ground 3: Claim 9 is obvious under §103 over Kraufvelin, Hashimoto, Andersson, and McNutt.

1. McNutt

McNutt describes "an interactive wagering application that restricts wagering access." Ex.1014, Abstract. Because "wagering is prohibited" in some locations, McNutt's system "verif[ies] that the user equipment is in a location where wagering is permitted" before "provid[ing the user] with wagering access." Ex.1014, Abstract. McNutt's system determines the MS location in any suitable way. Ex.1014 ¶¶7-8.

2. Reasons to Combine McNutt with Kraufvelin, Hashimoto, and Andersson

The Kraufvelin-Hashimoto-Andersson combination describes monitoring mobile station location and storing information in a database. Ex.1006 ¶¶79-80; Ex.1008 ¶135; Ex.1007, Figs. 2A-2D, 5:1-57, 8:52-67. These techniques allow "[d]ifferent kinds of services" to be provided based on location. Ex.1006 ¶12. A POSITA would have been motivated to combine McNutt's teachings regarding wagering services with the combination's location monitoring methods. Ex.1003 ¶244.

First, McNutt is analogous to the '040 patent and within the same field of endeavor. Ex.1014 ¶7 ("an interactive wagering application may determine user equipment location"); Ex.1001, Abstract. McNutt is reasonably pertinent to a particular problem with which the inventor was involved (i.e., monitoring location to provide location-based services). Ex.1001, 1:65-2:3; Ex.1014, Abstract; Ex.1003 ¶245.

Second, a POSITA would have been motivated to implement McNutt's teachings with Kraufvelin's. Kraufvelin describes location-based services. Ex.1006 ¶12. McNutt describes a service—wagering—that is regulated by location, but leaves open how its system obtains location information. Ex.1014, Abstract, ¶¶4-8. Applying the service of McNutt to Kraufvelin's system advantageously expands the types of services offered to Kraufvelin's users. McNutt's teachings also

advantageously account for various location-related regulations on services provided. Ex.1014, Abstract, ¶100; Ex.1003 ¶246.

Accordingly, the Kraufvelin-Hashimoto-Andersson-McNutt combination would be the combination of prior art elements (Kraufvelin's teachings of monitoring location and McNutt's teachings of location-based services) according to known methods (comparing a received cell ID to a pre-stored list) to yield the predictable result of providing access to a wagering service based on location. *KSR*, 550 U.S. at 416; Ex.1003 ¶247.

Further, a POSITA would have had a reasonable expectation of success. Kraufvelin does not limit the types of services provided. Ex.1006 ¶12. McNutt's methods for determining location are left open. Ex.1014 ¶¶7-0008. Therefore, a POSITA would have been motivated to combine McNutt with Kraufvelin-Hashimoto-Andersson. Ex.1003 ¶248.

3. Claim 9

First, Kraufvelin's and Andersson's techniques of location monitoring provide various services or multimedia to the station. Ex.1006 ¶12 ("Different kinds of services are possible."); Ex.1007, 5:49-60, 8:18-56. Providing these services describes *access*[ing] *a service*. Providing "advertisements" renders obvious *multimedia content*. Ex.1006 ¶12. McNutt describes providing services in response to *a request*. Ex.1003 ¶249.

McNutt describes providing "wagering access" based on "local rules" and in response to a request. Ex.1014, (54) (Title) ¶¶4, 100. "At step 710, the user may attempt to access a wagering feature of the interactive wagering application." Ex.1014 ¶99; Ex.1003 ¶250.

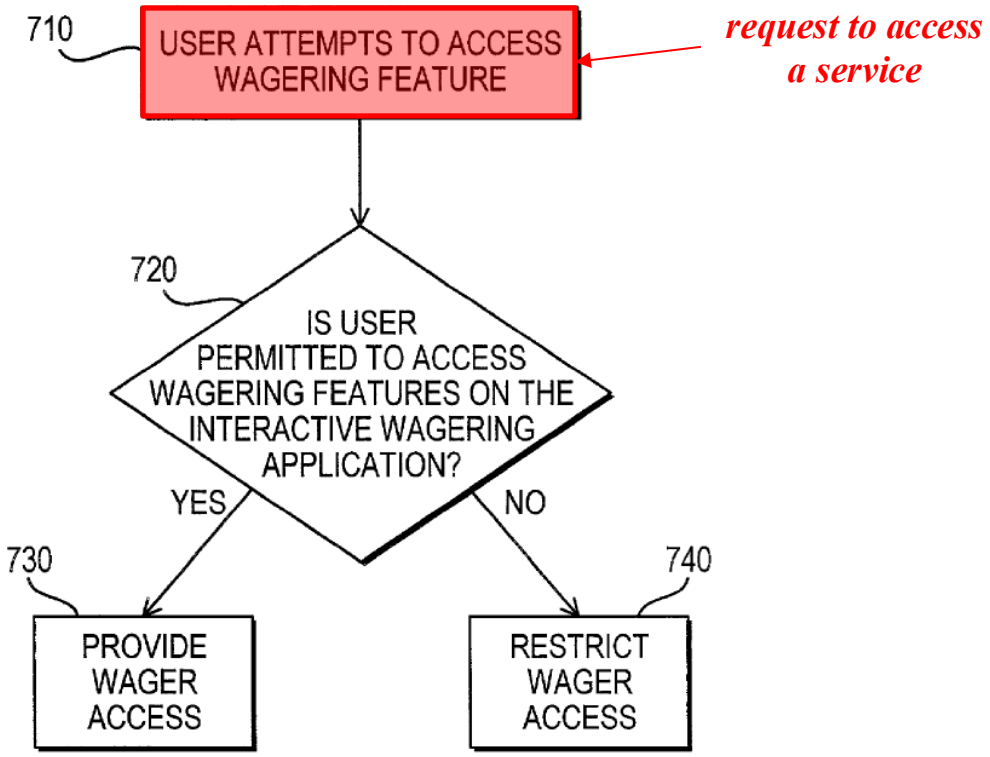


FIG. 7

Ex.1014, Fig. 7 (annotated)

Second, as at [1.4]-[1.7], the updating signal is sent from the mobile station to the GMLC 12, HLR 9, and LCS Client 8 (*special operating means*). In the Kraufvelin-Hashimoto-Andersson-McNutt combination, this updating signal would include the request to access a service because a user would desire to have

access to all location-dependent services when they entered the area of interest and/or because providers of services may want to inform the user of available services when the user enters the area. Ex.1014, Fig. 7 (step 710). McNutt describes allowing or forbidding access to the service at steps 720-740. Ex.1014, Fig. 7; Ex.1003 ¶251.

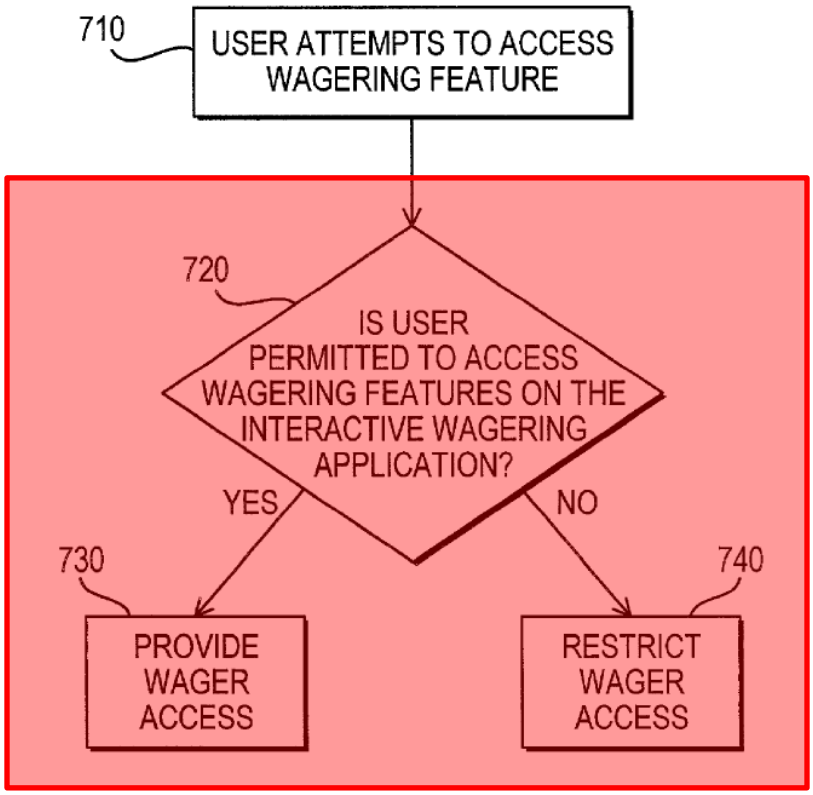


FIG. 7

Ex.1014, Fig. 7 (annotated)

XI. CONCLUSION

Petitioner has established a reasonable likelihood that the Challenged Claims are unpatentable.

Respectfully submitted,

Dated: September 11, 2025
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XII. MANDATORY NOTICES

A. Real party-in-interest

Pursuant to 37 C.F.R. §42.8(b)(1), Petitioner certifies that the real party-in-interest is Apple Inc.

B. Related matters

Pursuant to 37 C.F.R. §42.8(b)(2), to the best knowledge of the Petitioner, the '040 patent is or was involved in the following cases:

Case Heading	Number	Court	Filed
Avant Location Technologies LLC v. Apple Inc.	2-24-cv-00757	EDTX	Sep. 13, 2024
Avant Location Technologies LLC v. Fibar Group SA et al.	2-24-cv-00165	EDTX	Mar. 8, 2024
Avant Location Technologies LLC v. Samsung Electronics Co., Ltd. et al.	2-24-cv-00133	EDTX	Feb. 23, 2024
Avant Location Technologies LLC v. Ecobee Technologies ULC d/b/a Ecobee	2-24-cv-00354	EDTX	Jul. 31, 2023

C. Lead and back-up counsel and service information

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Please address all correspondence in this proceeding to lead and back-up counsel. Petitioner consents to service in this proceeding by email at the addresses above.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Petitioner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,981. Pursuant to 37 C.F.R. §42.24(d), this word count excludes the table of contents, table of authorities, mandatory notices under §42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

Dated: September 11, 2025

/Scott T. Jarratt/
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CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. §42.6(e) and 37 C.F.R. §42.105, service was made on Patent Owner as detailed below.

Date of service	September 11, 2025
Manner of service	Priority Mail Express
Documents served	Petition for *Inter Partes* Review Under 35 U.S.C. §312 and 37 C.F.R. §42.104 of U.S. 8,738,040; Petitioner's Power of Attorney; Petitioner's Exhibit List; Exhibits 1001-1008, 1014,1017-1019, 1021-1022, 1025-1028, 1035-1036, and 1069-1070.
Persons served	Venable LLP P.O. Box 34385 Washington, DC 20043-9998

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