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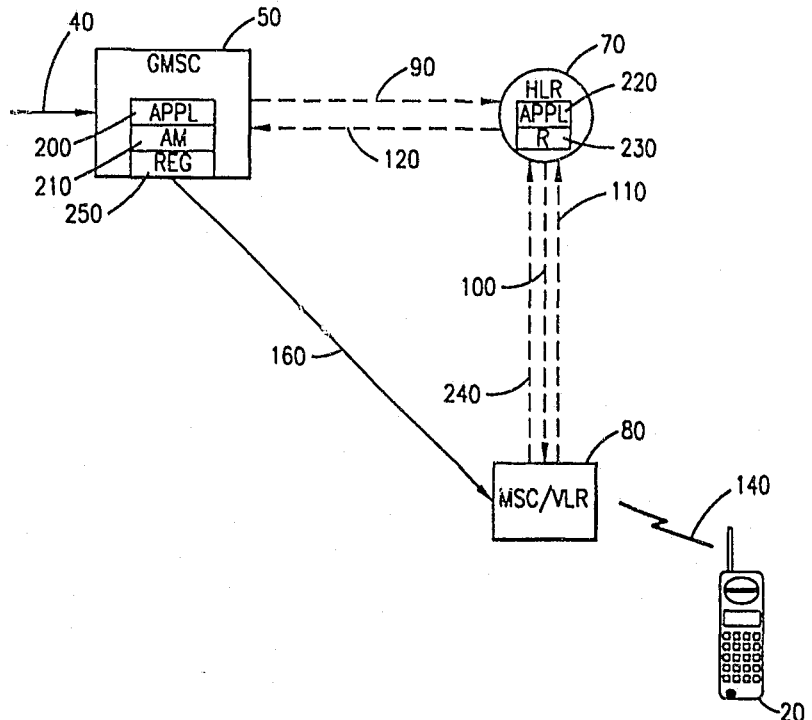
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<p>(51) International Patent Classification <sup>6</sup> :  <b>H04Q 7/22, H04M 15/28</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 98/54920</b>                  (43) International Publication Date: 3 December 1998 (03.12.98)</p>
<p>(21) International Application Number: PCT/US98/11034                  (22) International Filing Date: 28 May 1998 (28.05.98)                  (30) Priority Data:                  08/866,890 30 May 1997 (30.05.97) US                  (71) Applicant: ERICSSON INC. [US/US]; 7001 Development Drive, P.O. Box 13969, Research Triangle Park, NC 27709 (US).                  (72) Inventors: ALPEROVICH, Vladimir; 17418 Rain Dance Trail, Dallas, TX 75252 (US). VALENTINE, Eric; 1600 Brazos Trail, Plano, TX 75252 (US).                  (74) Agents: MOORE, Stanley, R. et al.; Jenkins &amp; Gilchrist, P.C., Suite 3200, 1445 Ross Avenue, Dallas, TX 75202 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b>                  With international search report.                  Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p>	

(54) Title: PROVIDING SELECTIVE REVERSAL BILLING WHEN CALLING ROAMING MOBILE SUBSCRIBERS

(57) Abstract

A home location register (HLR) (70) associated with a called party mobile station (20) determines that the mobile station (20) is currently roaming outside of its home mobile telecommunications network (60). In response to an incoming call connection (40), the HLR (70) instructs and associated gateway mobile switching center (GMSC) (50) to inform and to request the calling party subscriber (10) to be charged for rerouting the received incoming call connection from the GMSC (50) to a visited mobile switching center (MSC) (80B) located within the visited mobile telecommunications network (60B) and currently serving the called party mobile station (20). In response to an affirmative response (350) from the calling party subscriber, the call connection is rerouted (370) and accordingly charged to the calling party subscriber. Otherwise, the received incoming call connection is rejected (360).



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PROVIDING SELECTIVE REVERSAL BILLING WHEN  
CALLING ROAMING MOBILE SUBSCRIBERS

BACKGROUND OF THE INVENTION

5           Technical Field of the Invention

The present invention relates to a mobile telecommunications network and, in particular, to the provision of a reversal billing feature for an incoming call connection towards a mobile station roaming within a visited mobile telecommunications network.

10           Description of Related Art

With the advent of mobile telecommunications networks, a mobile subscriber is able to freely travel and utilize mobile service by way of a plurality of mobile switching centers (MSCs) each providing mobile service over a respective geographic area. While effectuating a call connection between a telecommunications terminal, such as a Public Switched Telephone Network (PSTN) terminal, and a traveling mobile station, three different types of call connections and associated charges are typically implicated. A first call connection between a calling party subscriber terminal and a gateway telecommunications node associated with the home mobile telecommunications network for the traveling mobile station is established and charged accordingly. The calling party subscriber is typically responsible for the charges incurred for this first call connection. A second call connection is thereafter established from the gateway telecommunications node to a mobile switching center (MSC) currently serving the traveling mobile station and associated with a visited mobile telecommunications network. For a mobile station traveling outside of its home mobile telecommunications network, the cost of rerouting such an incoming call connection from the home mobile telecommunications network to the visited mobile

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telecommunications network is typically charged to the traveling mobile station. Lastly, a radio connection between a serving base station and the traveling mobile station is further effectuated. Charges associated with such an "air time" connection are further levied against the traveling mobile station.

Unlike some European and Asian countries where mobile subscribers are assigned with distinguishably different mobile numbers (e.g., different prefixes), the United States, for example, uses the same E.164 numbering plan for both wireline and mobile (wireless) telecommunications terminals. Because of such a non-distinction, a calling party subscriber is not able to ascertain that an effectuated call connection is towards a mobile station. As a result, the mobile charges are typically charged to the called party mobile station. However, the costs of long-distance rerouting of an incoming call connection from the home network to a visited mobile telecommunications network serving a traveling mobile subscriber can be expensive. A mobile subscriber has no control over incoming call connections and has to undesirably incur mobile call associated charges for answering each incoming call connection. Especially when the mobile station is roaming outside of the home mobile telecommunications network, such charges for long-distance rerouting of an incoming call connection from the home mobile telecommunications network to the current visited mobile telecommunications network can be expensive.

A number of methods and systems have been introduced to alleviate some of the above mentioned problems. One such system bars incoming call connections when the called party mobile station is currently traveling outside of the home mobile telecommunications network. Other systems maintain a list of allowed directory numbers or access codes, and only incoming call connections from allowed subscribers and/or directory numbers are terminated towards the called party mobile station. However, such

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systems are either too restrictive or inconvenient. Furthermore, such systems do not provide the calling party subscriber with an option to pay for the rest of the call connection when the called party mobile subscriber refuses to pay for the incoming call connection.

Accordingly, there is a need for a mechanism to enable a calling party subscriber to pay for charges associated with establishing a call connection towards a roaming mobile subscriber.

#### SUMMARY OF THE INVENTION

A gateway mobile switching center (GMSC) associated with a home mobile telecommunications network serving a particular mobile station receives an incoming call connection towards that mobile station. The GMSC thereafter queries a home location register (HLR) associated with the mobile station for routing instructions. By evaluating previously stored location data associated with the called party mobile station, the HLR determines that the mobile station is currently roaming outside of the home mobile telecommunications network. Alternatively, the HLR may request a roaming number from a mobile switching center (MSC) currently serving the called party mobile station and make such a determination from evaluating the provided roaming number.

An appropriate indication is then returned to the requesting GMSC. The GMSC, in turn, provides another indication, such as an announcement message, over the received incoming call connection informing the calling party subscriber of an option to pay for the rerouting of the call connection from the home mobile telecommunications network to a visited mobile telecommunications network currently serving the roaming mobile station. In response to an affirmative determination, the GMSC reroutes the received incoming call connection to a mobile switching center (MSC) currently serving the roaming mobile station. Otherwise,

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the received incoming call connection is rejected by the GMSC and the call connection fails.

In one embodiment of the present invention, the HLR maintains a list of directory numbers, and in response to a determination that the mobile station is currently roaming outside of the home mobile telecommunications network, the HLR compares a calling party directory number with the maintained list and instructs the GMSC to request reversal charging from the calling party subscriber if there is a match. The calling party subscriber then has an option to pay for the rest of the mobile charges and effectuate the call connection towards the mobile station.

In another embodiment of the present invention, the HLR maintains a list of directory numbers, and in response to a determination that the mobile station is currently roaming outside of the home mobile telecommunications network, the HLR compares a calling party directory number with the maintained list and instructs the GMSC to request reversal charging from the calling party subscriber if there is no match. For a matched directory number, a conventional call termination towards the roaming mobile station is effectuated.

#### BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the method and apparatus of the present invention may be had by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a block diagram of a telecommunications network illustrating a calling party subscriber terminal establishing a call connection with a called party mobile station;

FIGURE 2 is a block diagram of a telecommunications network illustrating the different types of call connections and charges involved in establishing a speech connection with a called party mobile station;

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FIGURE 3 is a block diagram of a telecommunications network providing reversal charging in accordance with the teachings of the present invention; and

FIGURE 4 is a flowchart illustrating the steps performed by a mobile telecommunications network to provide reversal charging in accordance with the teachings of the present invention.

#### DETAILED DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a block diagram of a telecommunications network illustrating a calling party subscriber terminal 10 establishing a call connection with a called party mobile station 20. The calling party subscriber terminal 10 originates an outgoing call connection by dialing a directory number associated with the called party mobile station 20. A local exchange (LE) or end office 30 connected to the wireline calling party terminal 10, for example, then receives the dialed directory number and transmits a call setup signal over a connected telecommunications network 40. As an illustration, for a Signaling System No. 7 (SS7) based telecommunications network, an Integrated Service Digital Network User Part (ISUP) based Initial Address Message (IAM) is transmitted with the dialed directory number as the called party directory number (CdPn) and the directory number representing the calling party subscriber terminal 10 as the calling party number (CgPn). Utilizing the indicated CdPn as the destination address, the transmitted call setup signal is routed to a gateway mobile switching center (GMSC) 50 associated with the home Public Land Mobile Network (PLMN) 60. Each home location register (HLR) 70 is assigned with a series of directory numbers (NPA-NXX-XXXX series) and by dialing a particular directory number within the assigned series, the transmitted call setup signal is routed to the GMSC 50 associated with the appropriate HLR 60. As a result, a circuit connection between the local exchange 30 serving

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the calling party subscriber terminal 10 and the GMSC 50 associated with the HLR 60 serving the called party mobile station 20 is established.

5 Not knowing which mobile switching center / visitor location register (MSC/VLR) 80 is currently serving the called party mobile station 20, the GMSC 50 then sends a query signal requesting routing instructions to the associated HLR 70. For example, within a Global System for Mobile (GSM) communications network, a mobile  
10 application part (MAP) based Send Routing Information (SRI) signal 90 is transmitted from the GMSC 50 to the HLR 70. The HLR 70, in turn, retrieves the network address representing the MSC/VLR 80A currently serving the mobile station 20 and transmits another signal 100 thereto. As  
15 an illustration, the HLR 70 may transmit a Provide Roaming Number (PRN) signal 100 to the serving MSC 80A requesting a roaming number. In response, the serving MSC/VLR 80A provides the associated roaming number or address back to the requesting HLR via yet another MAP based signal 110.  
20 The HLR 70, in turn, forwards the received roaming number back to the GMSC 50 via another MAP based signal 120. Utilizing the received roaming number representing the serving MSC/VLR 80A, the GMSC 50 reroutes the received incoming call connection thereto. As a result, a second  
25 call connection 130 between the GMSC 50 and the serving MSC/VLR 80A is effectuated. The serving MSC/VLR 80A then pages the called party mobile station 20 and a radio interface 140 is effectuated therebetween.

30 When the mobile station has roamed out of the home PLMN 60 and into a visited (foreign) PLMN 60B (movement 150), the traveling mobile station 20 performs a location update with a new visited MSC/VLR 80B. The visited MSC/VLR 80B then informs the associated HLR 70 of the current location and further retrieves necessary  
35 subscriber information therefrom (not shown). As a result, the HLR is updated with the current location associated with the traveling mobile station. The HLR 70

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subsequently utilizes the location data to reroute incoming call connections 160 from the GMSC 50 to the serving MSC/VLR 80B in a similar manner as fully described above.

5           Reference is now made to FIG. 2 which is a block diagram of a telecommunications network illustrating the different types of call connections and charges associated with establishing a speech connection with a called party mobile station. When a mobile station 20 is traveling  
10 outside of its home PLMN, basically three different types of call connections and associated charges are involved while effectuating a speech connection with a calling party subscriber terminal. A first call connection 40 exists between a local exchange 30 serving the calling party subscriber terminal 10 and a gateway mobile switching center (GMSC) 50 associated with the home PLMN. Typically, the calling party subscriber 10 is responsible for charges incurred associated with the first call connection 40. The GMSC 50, in response to the receipt  
15 of a roaming number representing a visited MSC/VLR 80 located within a visited PLMN, then forwards the received incoming call connection to the visited MSC/VLR 80. As a result, a second call (circuit) connection 160 is established therebetween. Since the calling party subscriber 10 has no control over where the called party mobile subscriber 20 is located or traveling, the called party mobile subscriber is responsible for charges associated with the second call connection 160. Lastly, the visited MSC/VLR 80 pages the roaming mobile station  
20 20, and upon receiving a response, allocates a traffic channel (TCH) and effectuates a radio interface 140 therebetween. The called party mobile subscriber is therefore charged "air time" for effectuating such a radio interface 140.

35           FIGURE 3 is a block diagram of a telecommunications network providing reversal charging in accordance with the teachings of the present invention. An incoming call



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connection 40 is received by a gateway mobile switching center (GMSC) 50 associated with a called party mobile station 20 as fully described above. The GMSC 50 then transmits a MAP based query signal 90, for example, to an associated HLR 70 for routing instructions. While transmitting the connection-less MAP based query signal 90, the GMSC 50 further includes the calling party directory number and called party directory number associated with the incoming call connection therein. The HLR 70 then transmits another MAP based signal 100 requesting a routing address, also known as a roaming number, to an MSC/VLR 80 currently serving the traveling mobile station 20. The MSC/VLR 80 then appropriately returns the roaming number to the requesting HLR 70 using yet another connection-less signal 110.

Alternatively, the serving MSC/VLR 80 may have already updated the HLR 70 with such a roaming number when the MSC/VLR 80 and the mobile station 20 performed the location update process 240. An application module 220 associated with the HLR 70 then evaluates the provided roaming number and determines that the mobile station is currently being served by a mobile switching center located outside of the home PLMN.

In response to such a determination, the application module 220 then includes an appropriate return code instructing the GMSC 50 to perform reversal billing within a signal 120 transmitted to the GMSC 50. The return signal 120 further contains the requesting roaming. An application module 200 associated with the GMSC 50 receives the return signal 120 containing the roaming number and the return code and determines that the traveling mobile subscriber is refusing to accept the incoming call connection unless the calling party subscriber is willing to pay for the rest of the call connection. The application module 200 then transmits such an indication to the calling party subscriber terminal over the already established incoming call

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connection 40. As an illustration, the application module 200 instructs an announcement machine 210 to play an appropriate announcement message over the incoming call connection 40. An associated recognizer (REC) 250 then receives acknowledgment or consent from the calling party subscriber over the incoming call connection 40 and accordingly informs the application module 200. For example, the calling party subscriber may indicate whether the subscriber is willing to pay for the rest of the call connection by inputting a dual tone multi frequency (DTMF) signal. A DTMF recognizer 250 then receives the transmitted DTMF signal and informs the application module 200 of the associated response.

In response to an indication that the calling party subscriber is willing to pay for the long-distance rerouting of the incoming call connection from the serving GMSC 50 to the visited MSC/VLR 80, the GMSC 50 transmits yet another call setup signal with the received roaming number as the new called party number (CdPn). Since the necessary roaming number has already been received from the associated HLR 70, there is no need for the GMSC 50 to communicate MAP messages therewith. As a result, a second call connection 160 is established therebetween. In contrast to the conventional charging method, a produced billing statement, such as a toll ticket (TT), then indicates that the calling party subscriber is responsible for the second call connection 160.

Alternatively, without sending the MAP based signal 100 to the serving MSC/VLR 80, the HLR 70 is able to determine that the called party mobile station is currently roaming within a visited mobile telecommunications network by evaluating a network address associated with the serving MSC/VLR 80 and previously updated during the last location update procedure. The HLR 70 then instructs the GMSC 50 to inform the calling party subscriber of the mobile station's refusal to accept the call and requests the calling party subscriber to pay for

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the rest of call connection related charges. In response to an affirmative determination, the GMSC then informs the HLR, which in turn, transmits the MAP signal 100 requesting a roaming number to the serving MSC/VLR 80. Upon receiving the requested roaming number from the MSC/VLR 80, the HLR 70 then forwards the roaming number to the GMSC 50 in a conventional manner. The incoming call connection is then accordingly rerouted to the serving MSC/VLR 80.

As another embodiment of the present invention, the calling party subscriber may further be requested to pay for the air-interface 140 between the serving MSC/VLR 80 and the traveling mobile station 20. Accordingly, the calling party subscriber may be responsible for all three types of call connections and associated charges.

As yet another embodiment of the present invention, the serving HLR 70 is further associated with a register (R) 230 for storing a list of allowed directory numbers. Accordingly, when a query 90 is performed for an incoming call connection originated from a calling party subscriber associated with one of the allowed directory numbers, the HLR and the GMSC effectuates the call connection in a conventional manner. As a result, the received incoming call connection 40 is rerouted 160 without requesting the calling party subscriber to pay for the call. Alternatively, the register (R) 230 may further store an access code. The access code is retrieved from the register (R) 230 by the application module 220 when the called party mobile station is traveling outside of the home PLMN and provided to the requesting GMSC 50. The GMSC 50 then plays an announcement machine instructing the calling party subscriber to pay for the call connection. In response to such an indication from the GMSC 50 to pay for the rest of the call connection, the calling party subscriber may instead enter the valid access code and have the call connection terminated in a conventional manner.

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As yet another embodiment of the present invention, the register (R) 230 associated with the application module 220 instead stores a list of disallowed directory numbers. When a incoming call connection is received from one of the disallowed directory numbers, reversal billing as fully described above is effectuated. Otherwise, a conventional call routing is performed.

FIGURE 4 is a flowchart illustrating the steps performed by a mobile telecommunications network to provide reversal charging in accordance with the teachings of the present invention. A home mobile telecommunications network associated with a called party mobile station receives an incoming call connection at step 300. Such an incoming call connection is effectuated by receiving a connection-less ISUP based IAM signal. As the IAM signal is routed to the home PLMN, a corresponding circuit (speech) connection is established therewith. The received IAM signal includes the CgPn representing the calling party subscriber terminal and CdPn representing the called party mobile station. As fully described above, the incoming IAM signal is received by a gateway mobile telecommunications node, such as a gateway mobile switching center (GMSC), associated with the home PLMN. The GMSC then attempts to ascertain the current location of the traveling called party mobile station by transmitting a query signal, such as a Mobile Application Part (MAP) based Send Routing Information (SRI) signal, to an associated HLR at step 310. The transmitted SRI signal includes the CdPn and CgPn associated with the received incoming call setup signal. The HLR then determines whether the indicated called party mobile station is currently roaming outside of the home PLMN. Such a determination can be made by evaluating the network address associated with the serving MSC/VLR currently serving the traveling mobile station as fully described above. Alternatively, the HLR can transmit another MAP based signal requesting a roaming number to the serving

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MSC. The HLR then makes such a determination by evaluating the received roaming number.

In response to such a determination, the HLR returns an indication back to the requesting GMSC to effectuate reversal billing on the received incoming call connection at step 320. As an alternative, the HLR may further screen the received CgPn with a list of allowed/disallowed directory numbers to ascertain whether such a billing method should be performed. The GMSC then receives the indication from the HLR and plays an announcement message over the established incoming call connection to inform the calling party subscriber of the called party mobile subscriber's refusal to accept and to pay for the incoming call connection at step 330. The announcement message then asks whether the calling party subscriber is willing to be charged for the rest of the mobile call connections. The GMSC then instructs an associated recognizer, such as a DTMF recognizer, to receive and evaluate data (answer) inputted by the calling party subscriber at step 340. In response to an affirmative response from the calling party subscriber (yes decision link) at step 350, the GMSC reroutes the received incoming call connection to the serving MSC/VLR at step 370. Appropriate billing parameters and data are set to generate a billing statement charging the calling party subscriber for the effectuate call connection to the serving MSC/VLR.

On the other hand, if the calling party subscriber refuses to accept the charges, the incoming call connection is rejected and the call connection fails at step 360. The GMSC further plays an announcement message informing the calling party subscriber of such a failure.

Although a preferred embodiment of the method and apparatus of the present invention has been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiment disclosed, but is capable of numerous rearrangements, modifications

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and substitutions without departing from the spirit of the invention as set forth and defined by the following claims.

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## WHAT IS CLAIMED IS:

1. A method for charging for a call connection within a mobile telecommunications network, said method comprising the steps of:

5 receiving a first call connection at a gateway telecommunications node within a first mobile telecommunications network associated with a called party mobile station, said first call connection originated by a calling party subscriber terminal;

10 determining that said called party mobile station is roaming within a second mobile telecommunications network;

transmitting a message to said calling party subscriber terminal inquiring whether said calling party subscriber terminal is willing to pay for a second call connection between said gateway telecommunications node and said called party mobile station; and

in response to an affirmative determination:

15 establishing said second call connection between said gateway telecommunications node and said called party mobile station; and

20 charging said calling party subscriber terminal for said second call connection;

otherwise,

25 rejecting said first call connection originated by said calling party subscriber terminal.

2. The method of claim 1 wherein said gateway telecommunications node comprises a gateway mobile switching center (GMSC) within a first Public Land Mobile Network (PLMN) associated with said called party mobile station.

3. The method of claim 2 wherein said step of determining that said called party mobile station is roaming within said second mobile telecommunications network further comprises the steps of:

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querying a centralized database within said first PLMN maintaining data associated with said called party mobile station; and

5 receiving an indication from said centralized database that said called party mobile station is roaming outside of said first PLMN.

4. The method of claim 3 wherein said centralized database further comprises a register for storing a list  
10 of calling party directory numbers, and said step of determining whether said called party mobile station is roaming outside of said first PLMN further comprises the steps of:

15 comparing a directory number representing said calling party subscriber terminal with said list of calling party directory numbers stored at said register; and

20 transmitting said indication to said GMSC if said directory number has a match within said list of calling party directory numbers.

5. The method of claim 3 wherein said centralized database further comprises a register for storing a list  
25 of calling party directory numbers, and said step of determining whether said called party mobile station is roaming outside of said first PLMN further comprises the steps of:

30 comparing a directory number representing said calling party subscriber terminal with said list of calling party directory numbers stored at said register; and

transmitting said indication to said GMSC if said directory number does not have a match within said list  
35 of calling party directory numbers.

6. The method of claim 3 wherein said centralized database comprises a home location register (HLR).



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7. The method of claim 1 wherein said step of transmitting said message to said calling party subscriber terminal further comprises the step of playing an announcement by said gateway telecommunication node  
5 informing said calling party subscriber terminal of said pay option.

8. The method of claim 1 wherein said second call connection comprises a call connection between said  
10 gateway telecommunications node and a visited mobile switching center (MSC) currently serving said called party mobile station.

9. The method of claim 1 wherein said second call connection further comprises a radio connection between  
15 a base station serving said called party mobile station and said called party mobile station.

10. A method for charging an incoming call connection within a mobile telecommunications network, said method comprising the steps of:

receiving a query at a home location register (HLR) associated with a home mobile telecommunications network associated with a particular called party mobile station,  
25 said query transmitted by a gateway telecommunications node and requesting routing instructions for an incoming call connection originated by a calling party subscriber terminal;

determining whether said called party mobile station  
30 is traveling outside of said home mobile telecommunications network; and

if yes,

charging a call connection between said gateway telecommunications node and a mobile switching center (MSC) serving said called party mobile  
35 station to said calling party subscriber terminal; otherwise,

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charging said call connection to said called party mobile station.

5 11. The method of claim 10 wherein said step of determining whether said called party mobile station is traveling outside of said home mobile telecommunications network further comprises the steps of:

receiving a network address associated with a mobile switching center (MSC) currently serving said called party mobile station; and

10 evaluating said network address to determine whether said serving MSC is located within said home mobile telecommunications network.

15 12. The method of claim 10 wherein said step of charging said call connection to said calling party subscriber terminal further comprises the steps of:

transmitting an indication to said calling party subscriber terminal inquiring whether said calling party subscriber is willing to pay for said call connection between said gateway mobile telecommunications node and said MSC serving said called party mobile station;

20 receiving an answer from said calling party subscriber terminal; and

25 in response to an affirmative answer, charging said call connection to said calling party subscriber terminal; otherwise,

rejecting said incoming call connection.

30 13. The method of claim 12 wherein said step of transmitting said indication further comprises the step of playing an announcement by said gateway telecommunications node over said incoming call connection.

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14. The method of claim 10 wherein said step of charging said call connection to said calling party subscriber terminal further comprises the steps of:

5 receiving a directory number associated with said calling party subscriber terminal at said HLR;  
comparing said directory number with a list of directory numbers stored at a register associated with said HLR; and  
charging said call connection if there is a match.

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15. The method of claim 10 wherein said step of charging said call connection to said calling party subscriber terminal further comprises the steps of:

15 receiving a directory number associated with said calling party subscriber terminal at said HLR;  
comparing said directory number with a list of directory numbers stored at a register associated with said HLR; and  
charging said call connection if there is no match.

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16. A telecommunications node associated with a home mobile telecommunications network for charging an incoming call connection originated by a calling party subscriber terminal towards a called party mobile station, said called party mobile station currently being served by a mobile switching center (MSC) and said incoming call connection received by a gateway mobile switching center (GMSC) associated with said home mobile telecommunications network, comprising:

30 a first register for storing a network address representing said MSC; and

a first application module for determining whether said called party mobile station is currently traveling outside of said home telecommunications network by  
35 evaluating said network address stored at said first register, and in response to an affirmative determination, said application module charging said calling party

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subscriber terminal for rerouting said incoming call connection from said GMSC to said serving MSC.

5 17. The HLR of claim 16 further comprising a second register for storing a list of disallowed directory numbers and said application module charges said calling party subscriber terminal if a directory number representing said calling party subscriber terminal is included within said stored disallowed directory number.

10 18. The HLR of claim 16 further comprising a second register for storing a list of disallowed directory numbers and said application module charges said calling party subscriber terminal if a directory number representing said calling party subscriber terminal is included within said stored disallowed directory number.

15 19. A gateway mobile switching center (GMSC) for rerouting a received incoming call connection towards a called party mobile station, said called party mobile station associated with a home location register (HLR) located within a home mobile telecommunications network and currently being served by a particular mobile switching center (MSC), comprising:

20 25 means for querying said HLR for routing instructions regarding said received incoming call connection;

30 means for receiving an indication from said HLR informing said GMSC that said called party mobile station is currently outside of said home mobile telecommunications network;

35 means for inquiring said calling party subscriber terminal as to whether said calling party subscriber terminal is willing to pay for a call connection from said GMSC to said MSC currently serving said called party mobile station; and

means responsive to an affirmative determination for rerouting said received incoming call connection from said

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GMSC to said MSC and otherwise, rejecting said received incoming call connection.

5 .20. The GMSC of claim 19 wherein said means for inquiring said calling party subscriber terminal further comprises an announcement machine for playing an announcement message over said received incoming call connection.

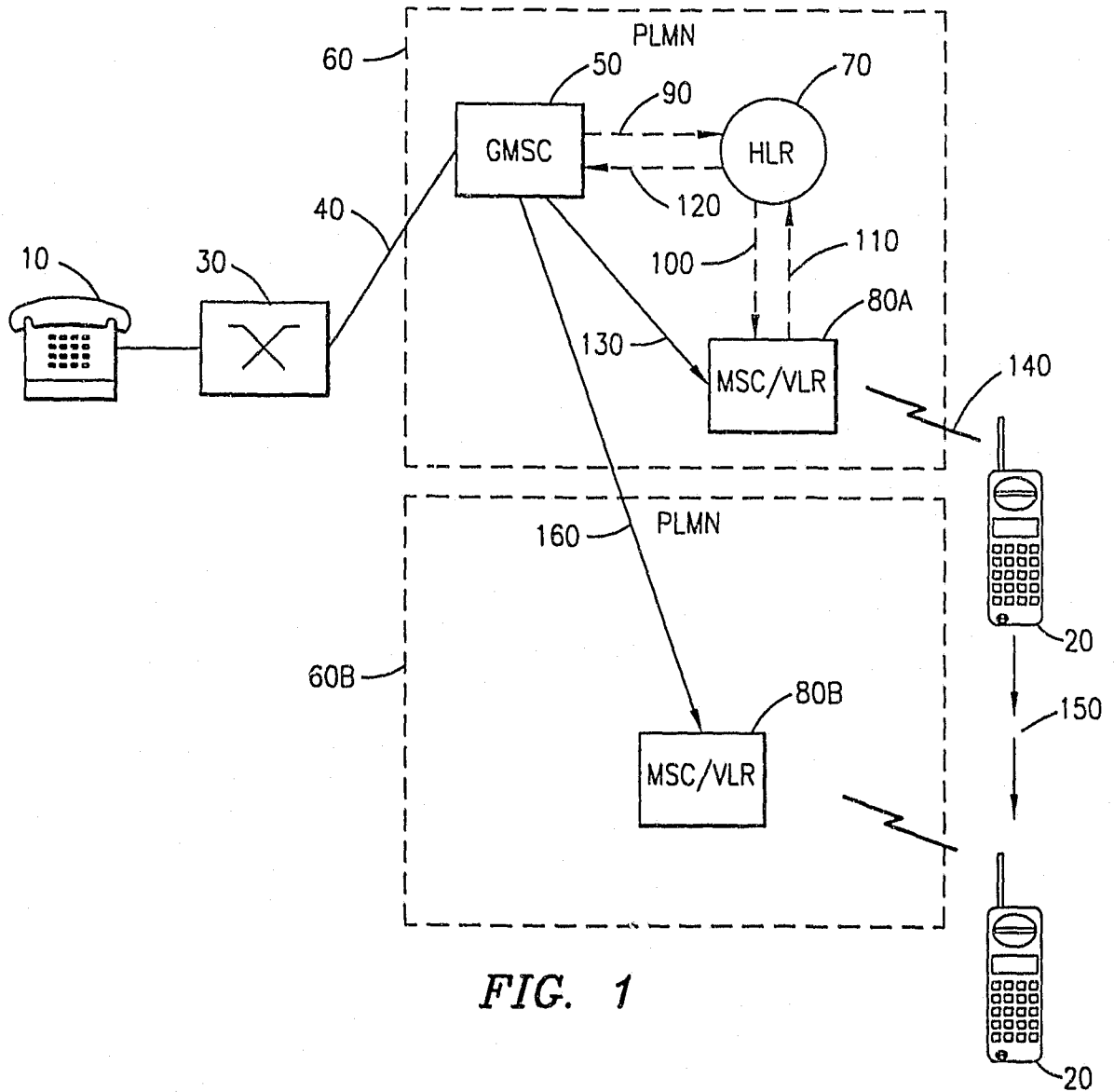


FIG. 1

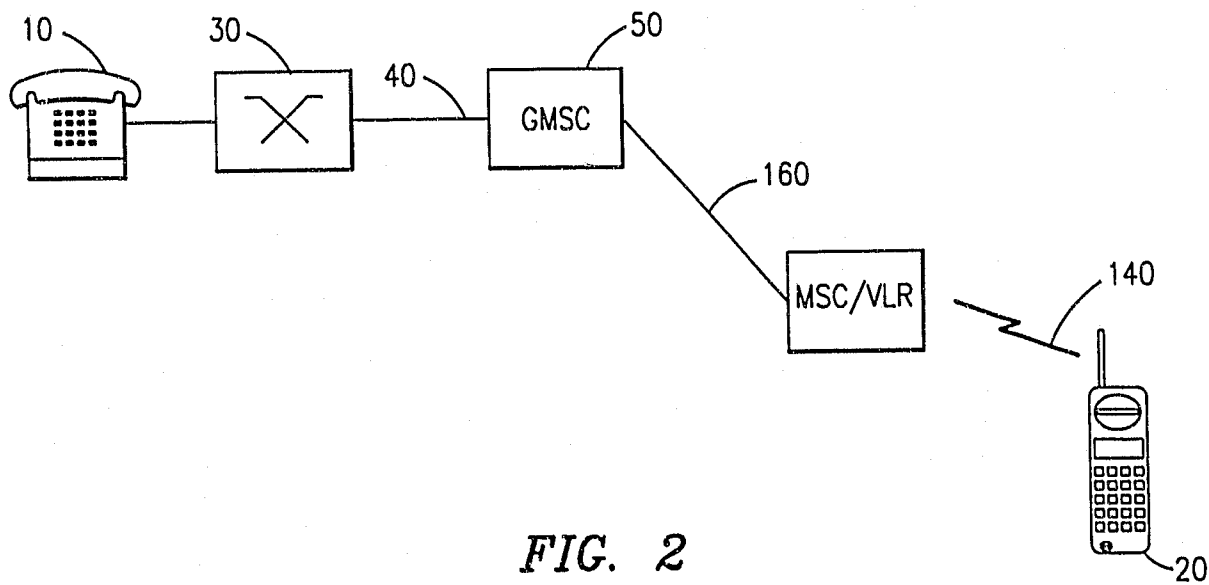


FIG. 2

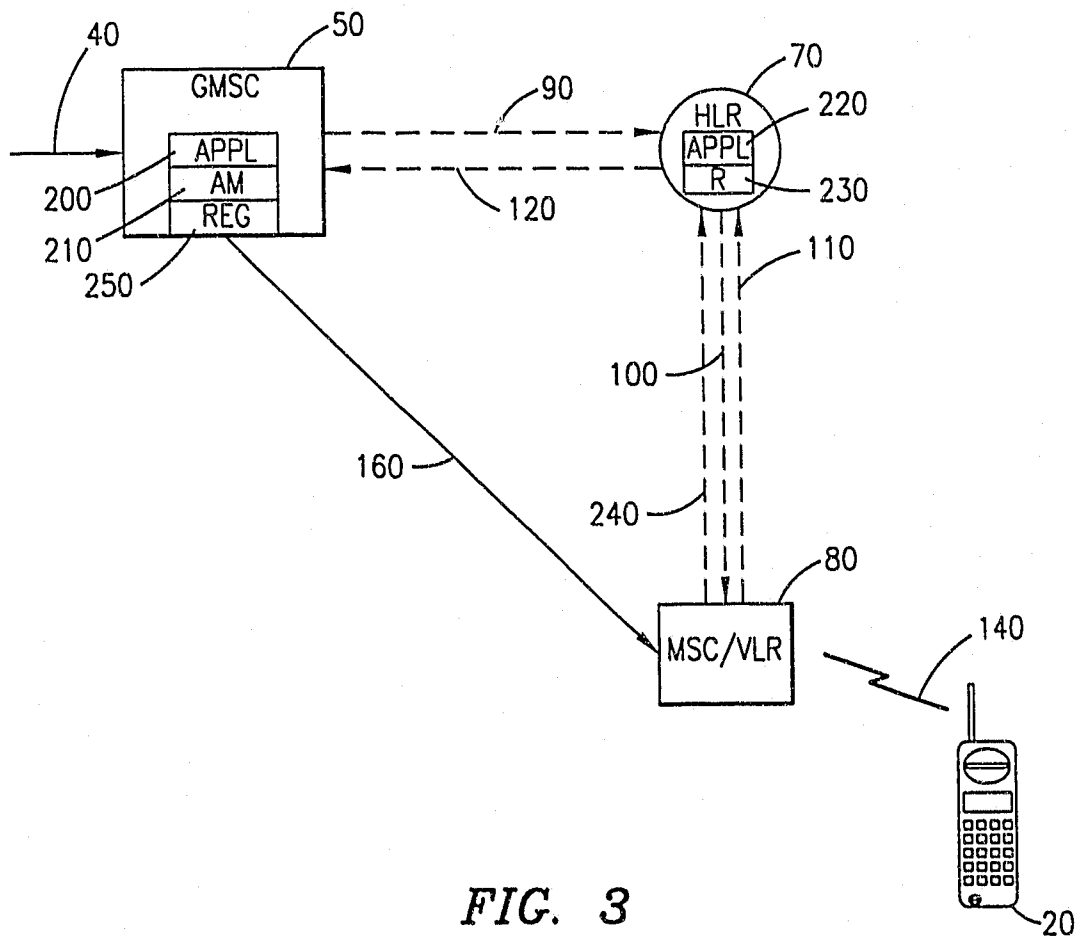


FIG. 3



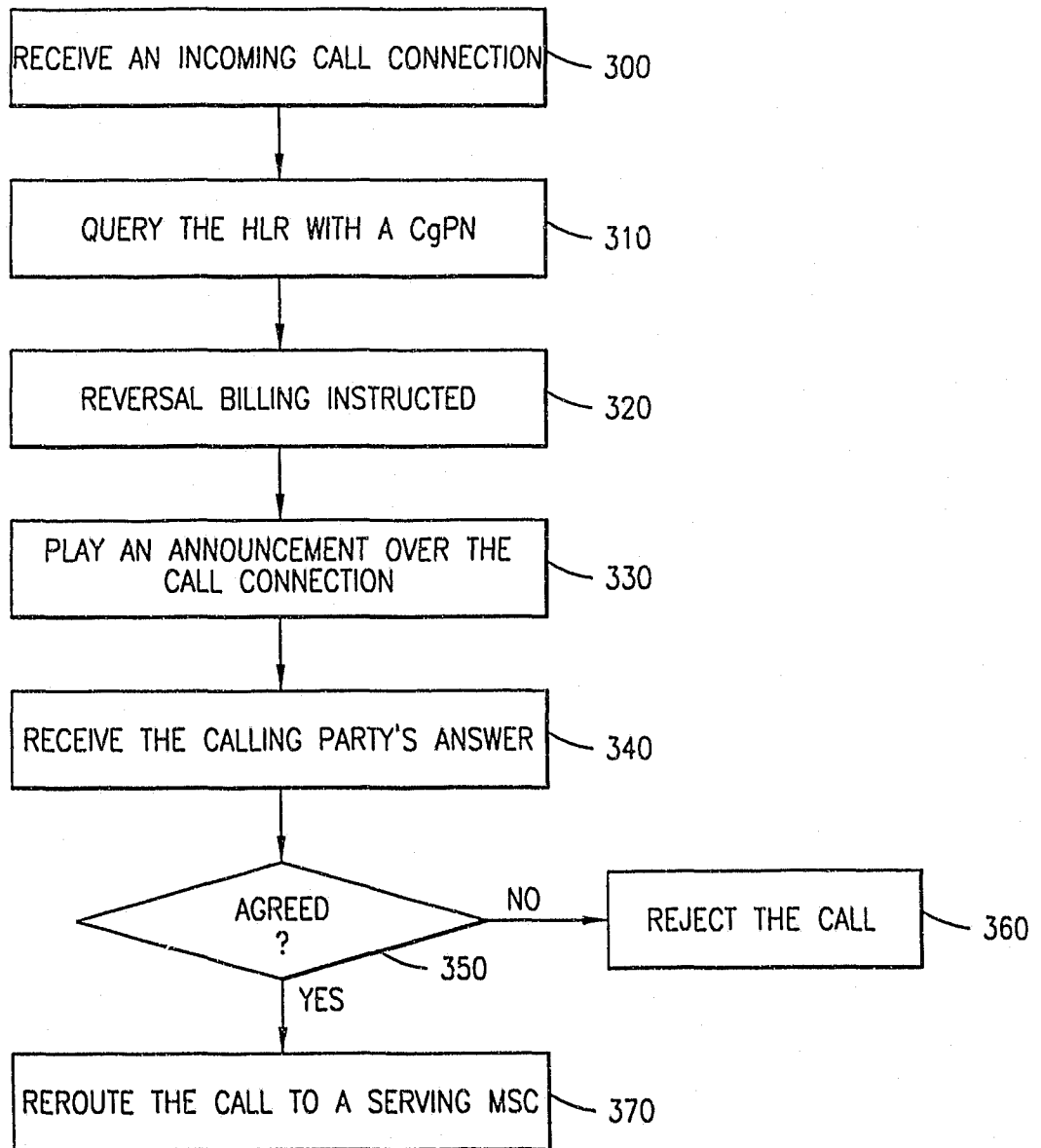


FIG. 4

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 98/11034

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 H04Q7/22 H04M15/28

*According to International Patent Classification (IPC) or to both national classification and IPC*

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 H04M H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 579 379 A (SCHWARTZ LAURIE D ET AL) 26 November 1996 see column 8, line 31 - column 9, line 6 see column 24, line 46 - column 26, line 45 see column 28, line 1 - line 60	1-20
X	DE 195 15 418 A (SIEMENS AG) 31 October 1996	1-3, 6, 8-12, 16, 19
A	see column 3, line 4 - line 54 see column 5, line 18 - line 67	7, 13, 20
X	WO 94 28670 A (NOKIA TELECOMMUNICATIONS OY ;SALMELA SEIJA (FI); LAATU JUHO (FI);) 8 December 1994 see page 12, line 1 - page 13, line 29	1-3, 6, 8-12, 16, 19
	-/--	

Further documents are listed in the continuation of box C

Patent family members are listed in annex.

\* Special categories of cited documents :

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Date of the actual completion of the international search:  <b>14 October 1998</b>	Date of mailing of the international search report  <b>26/10/1998</b>
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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 98/11034

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