(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
11 May 2006 (11.05.2006)

PCT

(10) International Publication Number
WO 2006/049691 A1

(51) International Patent Classification[7]: H04Q 7/38

(21) International Application Number:
PCT/US2005/031601

(22) International Filing Date:
6 September 2005 (06.09.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/975,566 28 October 2004 (28.10.2004) US

(71) Applicant *(for all designated States except US)*: **MOTOROLA INC.** [US/US]; 1303 East Algonquin Road, Schaumburg, Illinois 60196 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **RAGHURAM, Sharada** [US/US]; 2921 Bayberry Drive, Buffalo Grove, Illinois 60089 (US). **BURBIDGE, Richard C.** [GB/GB]; 11 Ravenscroft, Hook Hampshire RG27 9NP (GB). **POLISETTY, Rohini** [IN/US]; 1270 Chesterfield Lane, Grayslake, Illinois 60030 (US).

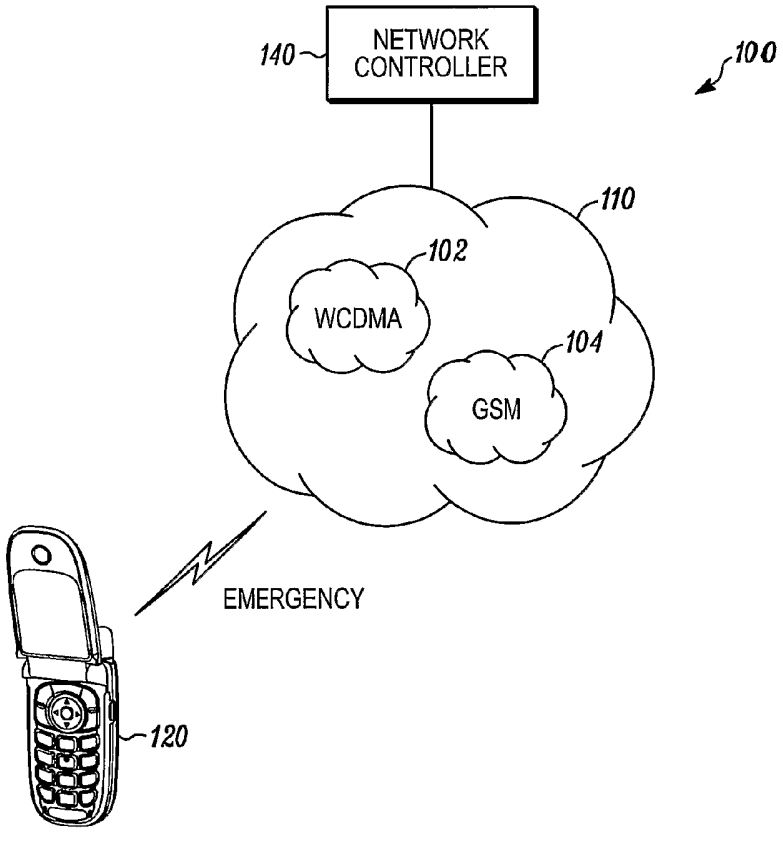
(74) Agents: **LOPPNOW, Matthew C.** et al.; 600 North US Highway 45, Libertyville, Illinois 60048 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR CONNECTING AN EMERGENCY CALL



(57) Abstract: An apparatus and method for connecting an emergency call with a wireless communication device. An initial direct transfer message with an emergency cause can be sent on an existing radio resource control connection. A cell change order can be received. Alternately, a connection release message with a call redirection cause can be received. The wireless communication device can synchronize to a designated global system for mobile communications cell. The emergency call can then be established on the global system for mobile communications cell.

WO 2006/049691 A1

Published:
— *with international search report*
— *with amended claims*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

APPARATUS AND METHOD FOR CONNECTING AN EMERGENCY CALL

BACKGROUND

1. Technical Field

The present disclosure is directed to a method and apparatus for connecting an emergency call. More particularly, the present disclosure is directed to redirecting an emergency call to a global system for mobile communications system.

2. Background Art

Presently, wireless communication device systems allow users to make emergency calls, such as 911 calls. Upcoming wireless communication device systems will also provide the ability to locate a user of a wireless communication device. This can allow a user to be located after placing an emergency call. Unfortunately, some Universal Mobile Telecommunications System (UMTS) networks might not support network based or user equipment based location solutions, such as Assisted Global Positioning System (AGPS). However, some Global System for Mobile communications (GSM) networks support other location methods, such as Uplink Time Difference of Arrival (UTDOA), and it may be possible to use an Inter RAT (Radio Access Technology) redirection procedure to move the wireless communication device to GSM during an emergency call establishment. Unfortunately, if the user initiates an emergency call when the wireless communication device is already in a connected mode, such as in the middle of a packet session, the wireless communication device's Radio Resource Control (RRC) entity will not send a "RRC CONNECTION REQUEST." Instead, it will use the existing connection and send a NAS (Non Access Stratum) message "CM SERVICE REQUEST" through an Initial Direct Transfer (IDT) message. In this scenario, the network cannot move the wireless communication device to GSM using the redirection procedure. Furthermore, current procedures for moving a wireless communication device between services are not suitable for locating the wireless communication device using UTDOA during an emergency call. For example, handover from a Universal Terrestrial Radio Access Network (UTRAN) procedure is not useful as the wireless communication device does not send GSM Random Access

Channel (RACH) bursts, which are required for UTDOA, after moving to GSM. Furthermore, current system specifications do not allow a Cell Change Order procedure to be used during a circuit switched call.

The present disclosure provides solutions for the above and other related problems.

SUMMARY

An apparatus and method for connecting an emergency call with a wireless communication device. An initial direct transfer message with an emergency cause can be sent on an existing radio resource control connection. A cell change order can be received. Alternately, a connection release message with a call redirection cause can be received. The wireless communication device can synchronize to a designated global system for mobile communications cell. The emergency call can then be established on the global system for mobile communications cell.

BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments of the present disclosure will be described with reference to the following figures, wherein like numerals designate like elements, and wherein:

Fig. 1 is an exemplary block diagram of a system according to one embodiment;

Fig. 2 is an exemplary block diagram of a wireless communication device according to one embodiment;

Fig. 3 is an exemplary flowchart illustrating the operation of a wireless communication device according to one embodiment;

Fig. 4 is an exemplary flowchart illustrating the operation of a wireless communication device according to another embodiment;

Fig. 5 is an exemplary signal diagram illustrating signals in the system according to one embodiment; and

Fig. 6 is an exemplary signal diagram illustrating signals in the system according to another embodiment.

DETAILED DESCRIPTION

Fig. 1 is an exemplary block diagram of a system 100 according to one embodiment. The system 100 can include a network controller 140, a network 110, and at least one wireless communication device 120. The wireless communication device 120 can be a telephone, a wireless telephone, a cellular telephone, a personal digital assistant, a pager, a personal computer, a mobile communication device, or any other device that is capable of sending and receiving communication signals on a network including wireless network.

In an exemplary embodiment, the network controller 140 is connected to the network 110. The controller 140 may be located at a base station, at a radio network controller, or anywhere else on the network 110. Also, there may be multiple controllers on the network 110. The controller 140 can control operations of the network 110. The network 110 may include any type of network that is capable of sending and receiving signals, such as wireless signals. For example, the network 110 may include a wireless telecommunications network, a cellular telephone network, a frequency division duplex network, a time division duplex network, a satellite communications network, and other like communications systems. According to one embodiment, the network 110 includes a wideband code division multiple access (WCDMA) network 102 and a global system for mobile communications (GSM) network 104. Furthermore, the network 110 may include more than one network and may include a plurality of different types of networks. Thus, the network 110 may include a plurality of data networks, a plurality of telecommunications networks, a combination of data and telecommunications networks and other like communication systems capable of sending and receiving communication signals.

Fig. 2 is an exemplary block diagram of a wireless communication device 200, such as the wireless communication device 120,according to one embodiment. The wireless communication device 200 can include a housing 210, a controller 220 coupled to the housing 210, audio input and output circuitry 230 coupled to the housing 210, a display 240 coupled to the housing 210, a transceiver 250 coupled to the housing 210, a user interface 260 coupled to the housing 210, a memory 270 coupled to the housing 210, and an antenna 280 coupled to the housing 210 and the transceiver 250. The wireless communication device 200 can also include a cell

change module 290. The cell change module 290 can be coupled to the controller 220, can reside within the controller 220, can reside within the memory 270, can be an autonomous module, can be software, can be hardware, or can be in any other format useful for a module on a wireless communication device 200.

The display 240 can be a liquid crystal display (LCD), a light emitting diode (LED) display, a plasma display, or any other means for displaying information. The transceiver 250 may include a transmitter and/or a receiver. The audio input and output circuitry 230 can include a microphone, a speaker, a transducer, or any other audio input and output circuitry. The user interface 260 can include a keypad, buttons, a touch pad, a joystick, other inputs, an additional display, or any other device useful for providing an interface between a user and a electronic device. The memory 270 may include a random access memory, a read only memory, an optical memory, a subscriber identity module memory, or any other memory that can be coupled to a wireless communication device.

In operation, the controller 220 can control the operations of the wireless communication device 200 and can operate the wireless communication device 200 on the wideband code division multiple access network 102. A user input, such as the user interface 260 or the audio input and output 230, can receive an emergency call request. The transceiver 250 can send an initial direct transfer message with an emergency cause on an existing radio resource control connection in response to the user input receiving the emergency call request. The cell change module 290 can receive a cell change order, synchronize to a designated global system for mobile communications cell, and establish an emergency call on the global system for mobile communications cell. The transceiver 250 can send the initial direct transfer message with an emergency cause on an existing radio resource control connection on the wideband code division multiple access network 102. The transceiver 250 can send a channel request with an emergency cause to a global system for mobile communications network 104 after synchronizing to the designated global system for mobile communications cell. The controller 220 can maintain the existing radio resource control connection while the cell change module 290 synchronizes to the designated global system for mobile communications cell. The cell change module 290 can synchronize to a designated global system for mobile communications cell by

collecting system information and reading system information on the designated global system for mobile communications cell.

According to another embodiment, the controller 220 can control the operations of the wireless communication device 200. The user input can receive an emergency call request. The transceiver 250 can send an initial direct transfer message with an emergency cause on an existing radio resource control connection in response to the user input receiving the emergency call request. The transceiver 250 can send the initial direct transfer message on the wideband code division multiple access network 102. The cell change module 290 can receive a connection release message with a call redirection cause, synchronize to a designated global system for mobile communications cell, and establish an emergency call on the global system for mobile communications cell. The cell change module 290 can send a channel request with an emergency cause to a global system for mobile communications network 104 after synchronizing to the designated global system for mobile communications cell. The cell change module can establish the emergency call on a global system for mobile communications network 104 after sending the channel request message with the emergency cause.

The connection release message can include inter-radio access technology redirection information. The controller 220 can avoid notifying a user of the wireless communication device 200 that that a call was released by the connection release message with the call redirection cause. The cell change module 290 can synchronize to a designated global system for mobile communications cell by performing global system for mobile communications cell selection and camping on a global system for mobile communications cell. The cell change module 290 can perform global system for mobile communications cell selection by collecting system information and reading system information on a selected global system for mobile communications cell.

Fig. 3 is an exemplary flowchart 300 illustrating the operation of the wireless communication device 200 according to one embodiment. In step 310, the flowchart begins. For example, the wireless communication device 200 can be operating on the wideband code division multiple access network 102 and can receive a user input of an emergency call request on an input of the wireless communication device 200. In

step 320, the wireless communication device 200 can send an initial direct transfer message with an emergency cause on an existing radio resource control connection. For example, the wireless communication device 200 can send an initial direct transfer message with an emergency cause on an existing radio resource control connection on the wideband code division multiple access network 102. In step 330, the wireless communication device 200 can receive a cell change order, such as a cell change message, which can include a call redirection cause. The call redirection cause can inform the wireless communication device 200 that it can attempt establishment of the call on the GSM network 104 rather than just aborting the call attempt or going into idle mode on the GSM network 104. Alternately, the cell change message does not need to include an explicit call redirection indicator. For example, the fact that the message is received while the wireless communication device 200 has a circuit switched domain connection active can be seen as an implicit call redirection indicator. In step 340, the wireless communication device 200 can synchronize to a designated global system for mobile communications cell. The wireless communication device 200 can synchronize to a designated global system for mobile communications cell by collecting system information and reading system information on the designated global system for mobile communications cell. The wireless communication device 200 can maintain the existing radio resource control connection while synchronizing to the designated global system for mobile communications cell. In step 350, the wireless communication device 200 can establish an emergency call on the global system for mobile communications cell. The wireless communication device 200 can establish an emergency call by sending a channel request with an emergency cause to the global system for mobile communications network 104. In step 350, the flowchart 300 ends.

Fig. 4 is an exemplary flowchart 400 illustrating the operation of the wireless communication device 200 according to another embodiment. In step 410, the flowchart begins. For example, the wireless communication device 200 can be operating on the wideband code division multiple access network 102 and can receive a user input of an emergency call request on an input of the wireless communication device 200. In step 420, the wireless communication device 200 can send an initial direct transfer message with an emergency cause on an existing radio resource control

connection. The wireless communication device 200 can send the initial direct transfer message with an emergency cause on an existing radio resource control connection on the wideband code division multiple access network 102. In step 430, the wireless communication device 200 can receive a connection release message with a call redirection cause. The connection release message can include inter-radio access technology redirection information. The wireless communication device 200 can avoid notifying a user of the wireless communication device 200 that that a call was released by the connection release message with the call redirection cause. In step 440, the wireless communication device 200 can synchronize to a designated global system for mobile communications cell. Synchronizing to a designated global system for mobile communications cell can include performing global system for mobile communications cell selection and camping on a global system for mobile communications cell. Performing global system for mobile communications cell selection can include collecting system information and reading system information on a selected global system for mobile communications cell. In step 450, the wireless communication device 200 can establish an emergency call on the global system for mobile communications cell. For example, the wireless communication device 200 can establish the emergency call by sending a channel request with an emergency cause to the global system for mobile communications network 104 after synchronizing to the designated global system for mobile communications cell. The wireless communication device 200 can then establish the emergency call on the global system for mobile communications network 104 after sending the channel request message with the emergency cause. In step 450, the flowchart 400 ends.

Fig. 5 is an exemplary signal diagram 500 illustrating signals in the system 100 according to one embodiment. The wireless communication device 200 can include global system for mobile communication (GSM) and wideband code division multiple access (WCDMA) circuitry or software in the controller 220. In step 505, the wireless communication device 200 can operate in radio resource control (RRC) connected mode on the WCDMA network 102. In step 510, a user of the wireless communication device 200 can initiate an emergency call. In step 515, the wireless communication device 200 can send an initial direct transfer (IDT) message with an emergency cause to the WCDMA network 102. In step 520, the WCDMA network

102 can send a cell change order to the wireless communication device 200 and the cell change order message can include a call redirection cause. In step 525, the wireless communication device 200 does not indicate the connection release or a call failure to the user and can initiate the cell change order procedure. In step 530, the wireless communication device 200 can synchronize to a GSM cell on the GSM network 104. In step 535, the wireless communication device 200 can collect system information. In step 540, the wireless communication device 200 can read system information on a selected GSM cell. In step 545, the wireless communication device 200 can select the GSM cell. In step 550, the wireless communication device 200 can send a channel request with an emergency cause to the GSM network 104. In step 555, the wireless communication device 200 can establish the emergency call on the GSM network 104.

Thus, the wireless communication device 200 can handle a cell change order when a circuit switch domain is active. As an example, when a user initiates an emergency call while the wireless communication device 200's RRC is in connected state, the wireless communication device 200 can use the existing signaling connection and send a "CM Service Request" through IDT message. A Universal Mobile Telecommunications System Terrestrial Radio Access Network (UTRAN) can know that the wireless communication device 200 is trying to establish an emergency call. The UTRAN can then send a Cell Change Order message which can include a call redirection cause to wireless communication device 200. At this point, the wireless communication device 200 can synchronize to the specified GSM carrier and establish the emergency call by sending a "Channel Request," such as on RACH bursts, on the selected cell.

Fig. 6 is an exemplary signal diagram 600 illustrating signals in the system 100 according to another embodiment. In step 605, the wireless communication device 200 can operate in RRC connected mode on the WCDMA network 102. In step 610, a user of the wireless communication device 200 can initiate an emergency call. In step 615, the wireless communication device 200 can send an initial direct transfer (IDT) message with an emergency cause to the WCDMA network 102. In step 620, the WCDMA network 102 can send a connection release message including Inter-Radio Access Technology (Inter-RAT) information and with a cause of redirecting a

call to GSM to the wireless communication device 200. In step 625, the wireless communication device 200 does not indicate the connection release or a call failure to the user and initiates a GSM redirection procedure. In step 630, the wireless communication device 200 can synchronize to a GSM cell on the GSM network 104. In step 635, the wireless communication device 200 can collect system information. In step 640, the wireless communication device 200 can read system information on a selected GSM cell. In step 645, the wireless communication device 200 can select the GSM cell. In step 650, the wireless communication device 200 can send a channel request with an emergency cause to the GSM network 104. In step 655, the wireless communication device 200 can establish the emergency call on the GSM network 104.

Thus, redirection information can be added to a RRC Connection Release message to direct a wireless communication device 200 to a certain RAT. This can be used to redirect the wireless communication device 200 to GSM after the network 110 receives an Initial Direct Transfer that includes a CM Service Request for an emergency call. The wireless communication device 200 can receive a Connection Release Message including a cause such as "redirecting a call to GSM." The wireless communication device 200 does not inform the user that the call is released or failed. Therefore, if the wireless communication device 200 receives a Connection Release with this new cause, it can select a suitable GSM carrier and establish the emergency call automatically without notifying the user.

The method of this disclosure is preferably implemented on a programmed processor. However, the controllers, flowcharts, and modules may also be implemented on a general purpose or special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit elements, an ASIC or other integrated circuit, a hardware electronic or logic circuit such as a discrete element circuit, a programmable logic device such as a PLD, PLA, FPGA or PAL, or the like. In general, any device on which resides a finite state machine capable of implementing the flowcharts shown in the Figures may be used to implement the processor functions of this disclosure.

While this disclosure has been described with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. For example, various components of the embodiments may be

interchanged, added, or substituted in the other embodiments. Also, all of the elements of each figure are not necessary for operation of the disclosed embodiments. For example, one of ordinary skill in the art of the disclosed embodiments would be enabled to make and use the teachings of the disclosure by simply employing the elements of the independent claims. Accordingly, the preferred embodiments of the disclosure as set forth herein are intended to be illustrative, not limiting. Various changes may be made without departing from the spirit and scope of the disclosure.

CLAIMS

1. A method in a wireless communication device comprising:

sending an initial direct transfer message with an emergency cause on an existing radio resource control connection;

receiving a cell change order;

synchronizing to a designated global system for mobile communications cell; and

establishing an emergency call on the global system for mobile communications cell.

2. The method according to claim 1, wherein sending an initial direct transfer message further comprises sending an initial direct transfer message with an emergency cause on an existing radio resource control connection on a wideband code division multiple access network.

3. The method according to claim 1, further comprising sending a channel request with an emergency cause to a global system for mobile communications network after synchronizing to the designated global system for mobile communications cell.

4. The method according to claim 1, further comprising maintaining the existing radio resource control connection while synchronizing to the designated global system for mobile communications cell.

5. The method according to claim 1, wherein synchronizing to a designated global system for mobile communications cell includes:

collecting system information; and

reading system information on the designated global system for mobile communications cell.

6. The method according to claim 1, further comprising operating on a wideband code division multiple access network.

7. The method according to claim 1, further comprising receiving a user input of an emergency call request on an input of the wireless communication device.

8. The method according to claim 1, wherein the cell change order includes a call redirection cause.

9. A wireless communication device comprising:

a user input configured to receive an emergency call request;

a transceiver configured to send an initial direct transfer message with an emergency cause on an existing radio resource control connection in response to the user input receiving the emergency call request; and

a controller coupled to the transceiver and the user input, the controller configured to control the operations of the wireless communication device, the controller including a cell change module configured to receive a cell change order, synchronize to a designated global system for mobile communications cell, and establish an emergency call on the global system for mobile communications cell.

10. The wireless communication device according to claim 9, wherein the transceiver is further configured to send the initial direct transfer message with an emergency cause on an existing radio resource control connection on a wideband code division multiple access network.

11. The wireless communication device according to claim 9, wherein the transceiver is further configured to send a channel request with an emergency cause to a global system for mobile communications network after synchronizing to the designated global system for mobile communications cell.

12. The wireless communication device according to claim 9, wherein the controller is further configured to maintain the existing radio resource control connection while the cell change module synchronizes to the designated global system for mobile communications cell.

13. The wireless communication device according to claim 9, wherein the cell change module is configured to synchronize to a designated global system for mobile communications cell by collecting system information and reading system information on the designated global system for mobile communications cell.

14. The wireless communication device according to claim 9, wherein the controller is configured to operate the wireless communication device on a wideband code division multiple access network.

15. A method in a wireless communication device comprising:

operating on a wideband code division multiple access network;

sending an initial direct transfer message with an emergency cause on an existing radio resource control connection on the wideband code division multiple access network;

receiving a cell change order;

synchronizing to a designated global system for mobile communications cell; and

establishing an emergency call on the global system for mobile communications cell.

16. The method according to claim 15, further comprising sending a channel request with an emergency cause to a global system for mobile communications network after synchronizing to the designated global system for mobile communications cell.

17. The method according to claim 15, further comprising maintaining the existing radio resource control connection while synchronizing to the designated global system for mobile communications cell.

18. The method according to claim 15, wherein synchronizing to a designated global system for mobile communications cell includes:

collecting system information; and

reading system information on the designated global system for mobile communications cell.

19. The method according to claim 15, further comprising receiving a user input of an emergency call request on an input of the wireless communication device.

20. The method according to claim 15, wherein the cell change order includes a call redirection cause.

AMENDED CLAIMS

Received by the International Bureau on 21 February 2006 (21.02.2006)

1. A method in a wireless communication device comprising:

sending an initial direct transfer message with an emergency cause on an existing radio resource control connection;

receiving a cell change order;

synchronizing to a designated global system for mobile communications cell; and

establishing an emergency call on the global system for mobile communications cell.

2. The method according to claim 1, wherein sending an initial direct transfer message further comprises sending an initial direct transfer message with an emergency cause on an existing radio resource control connection on a wideband code division multiple access network.

3. The method according to claim 1, further comprising sending a channel request with an emergency cause to a global system for mobile communications network after synchronizing to the designated global system for mobile communications cell.

4. The method according to claim 1, further comprising maintaining the existing radio resource control connection while synchronizing to the designated global system for mobile communications cell.

5. The method according to claim 1, wherein synchronizing to a designated global system for mobile communications cell includes:

collecting system information; and

reading system information on the designated global system for mobile communications cell.

6. A wireless communication device comprising:

a user input configured to receive an emergency call request;

a transceiver configured to send an initial direct transfer message with an emergency cause on an existing radio resource control connection in response to the user input receiving the emergency call request; and

a controller coupled to the transceiver and the user input, the controller configured to control the operations of the wireless communication device, the controller including a cell change module configured to receive a cell change order, synchronize to a designated global system for mobile communications cell, and establish an emergency call on the global system for mobile communications cell.

7. The wireless communication device according to claim 6, wherein the transceiver is further configured to send the initial direct transfer message with an emergency cause on an existing radio resource control connection on a wideband code division multiple access network.

8. The wireless communication device according to claim 6, wherein the transceiver is further configured to send a channel request with an emergency cause to a global system for mobile communications network after synchronizing to the designated global system for mobile communications cell.

9. The wireless communication device according to claim 6, wherein the controller is further configured to maintain the existing radio resource control connection while the cell change module synchronizes to the designated global system for mobile communications cell.

10. The wireless communication device according to claim 6, wherein the cell change module is configured to synchronize to a designated global system for mobile communications cell by collecting system information and reading system information on the designated global system for mobile communications cell.

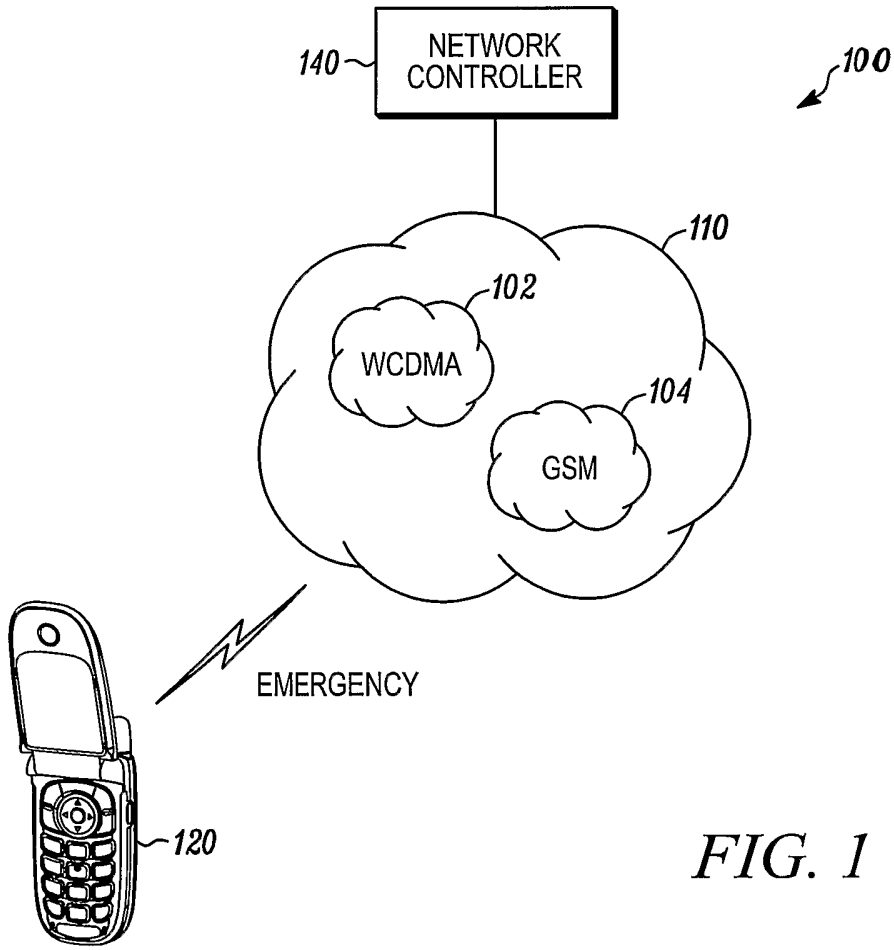

140
NETWORK CONTROLLER
100
110
102
WCDMA
104
GSM
EMERGENCY
120

FIG. 1

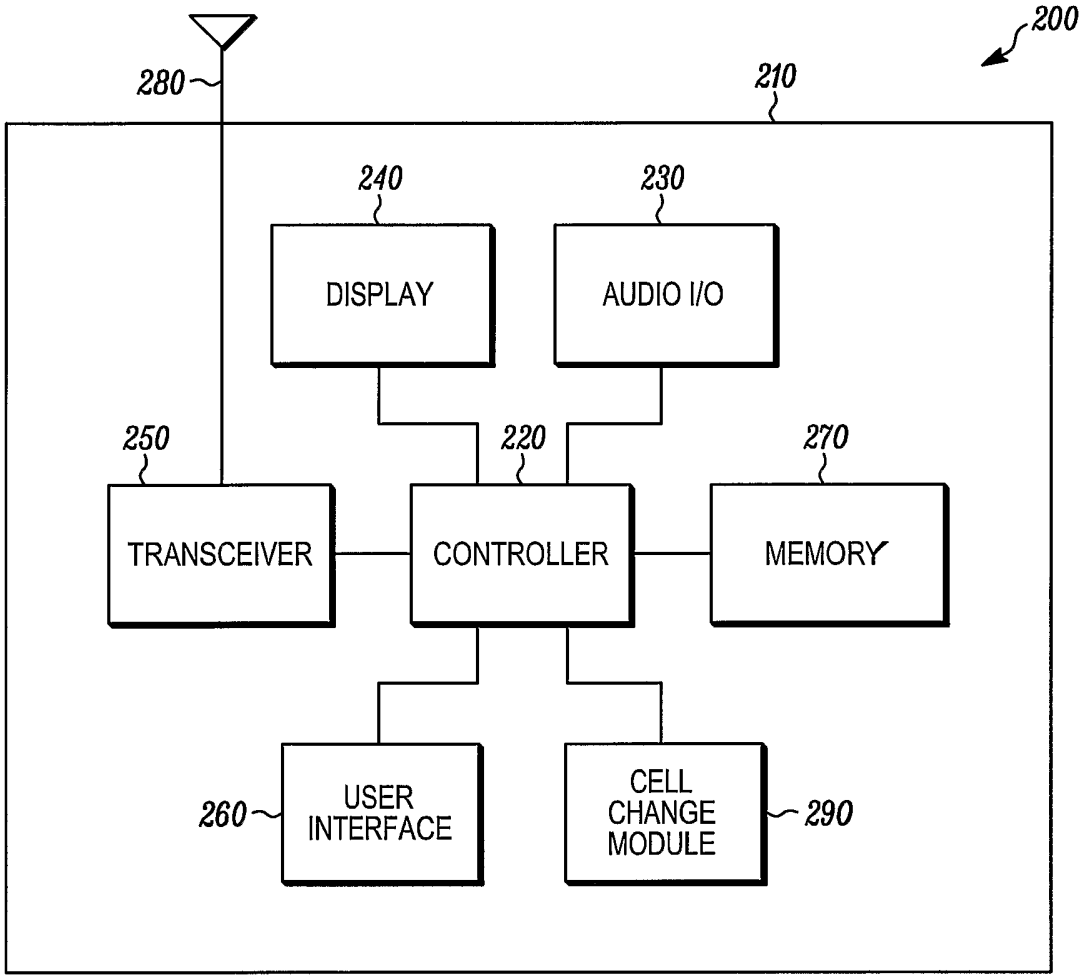

200
280
210
240
230
DISPLAY
AUDIO I/O
250
220
270
TRANSCEIVER
CONTROLLER
MEMORY
260
USER INTERFACE
CELL CHANGE MODULE
290

FIG. 2

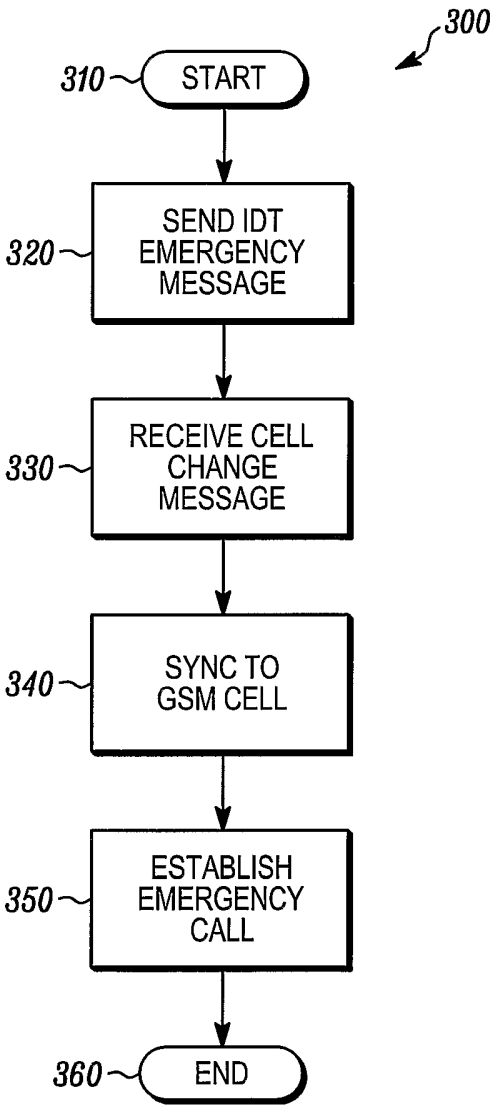

300
310
START
320
SEND IDT EMERGENCY MESSAGE
330
RECEIVE CELL CHANGE MESSAGE
340
SYNC TO GSM CELL
350
ESTABLISH EMERGENCY CALL
360
END

FIG. 3

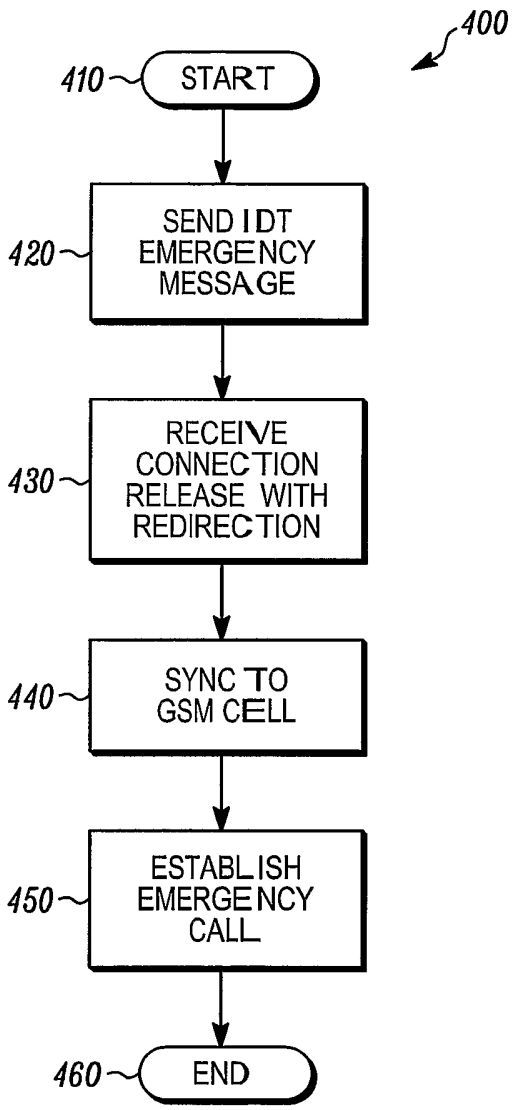

400
410
START
420
SEND IDT EMERGENCY MESSAGE
430
RECEIVE CONNECTION RELEASE WITH REDIRECTION
440
SYNC TO GSM CELL
450
ESTABLISH EMERGENCY CALL
460
END

FIG. 4

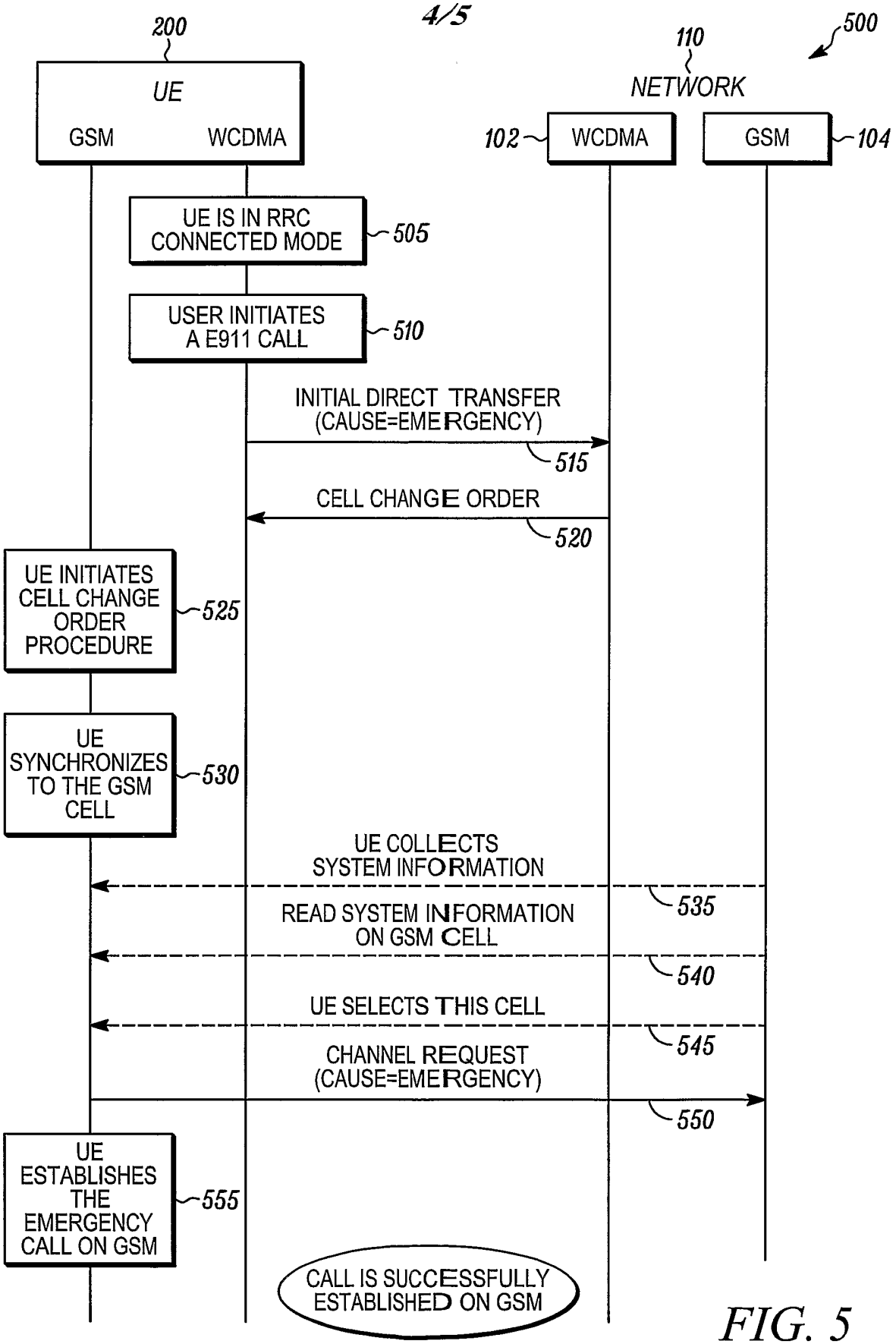

200
UE
GSM
WCDMA
110
NETWORK
500
102
WCDMA
GSM
104
UE IS IN RRC CONNECTED MODE
505
USER INITIATES A E911 CALL
510
INITIAL DIRECT TRANSFER (CAUSE=EMERGENCY)
515
CELL CHANGE ORDER
520
UE INITIATES CELL CHANGE ORDER PROCEDURE
525
UE SYNCHRONIZES TO THE GSM CELL
530
UE COLLECTS SYSTEM INFORMATION
READ SYSTEM INFORMATION ON GSM CELL
535
UE SELECTS THIS CELL
540
CHANNEL REQUEST (CAUSE=EMERGENCY)
545
UE ESTABLISHES THE EMERGENCY CALL ON GSM
550
555
CALL IS SUCCESSFULLY ESTABLISHED ON GSM

FIG. 5

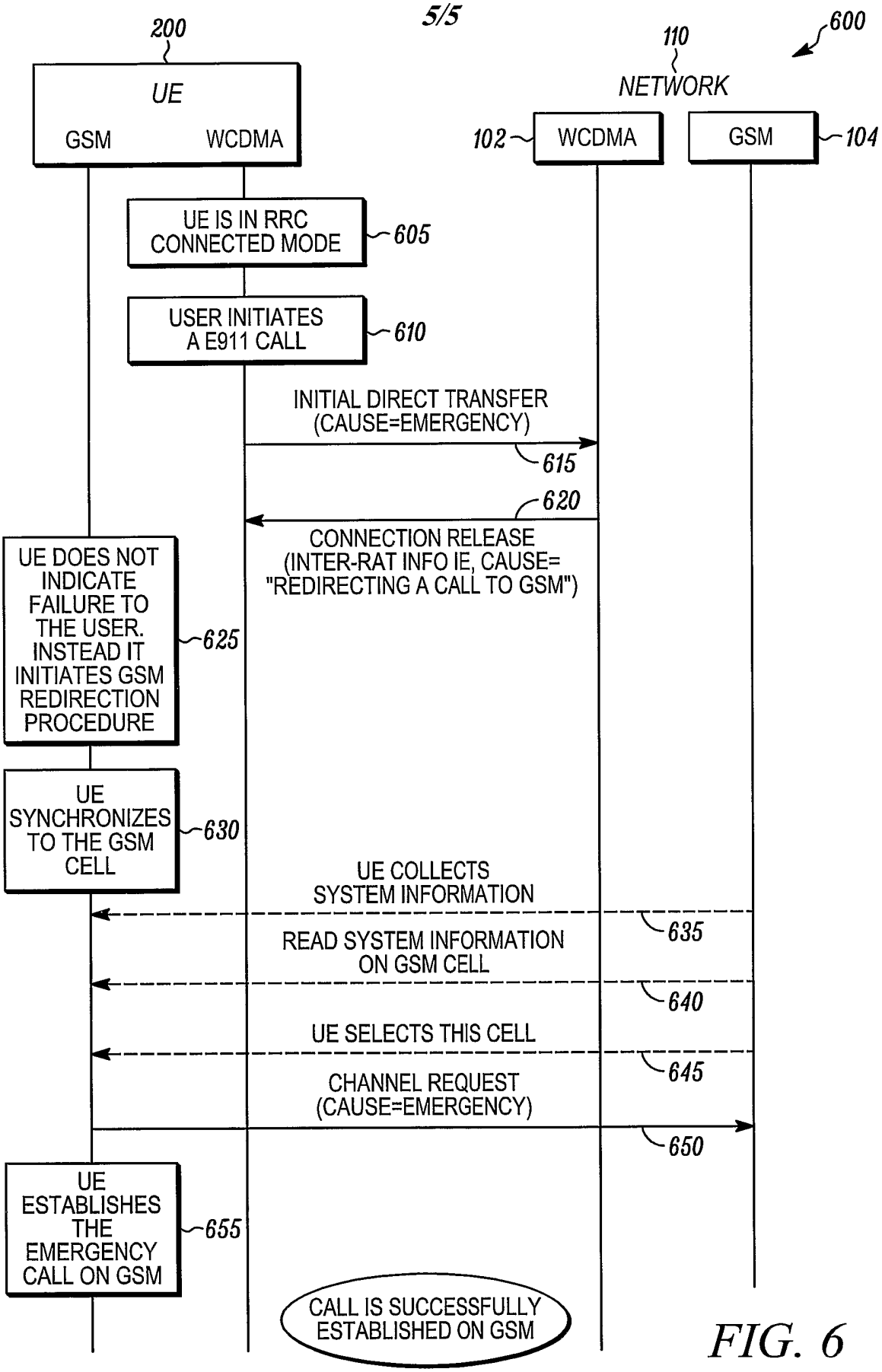

200
UE
GSM
WCDMA
110
NETWORK
600
102
WCDMA
GSM
104
UE IS IN RRC CONNECTED MODE
605
USER INITIATES A E911 CALL
610
INITIAL DIRECT TRANSFER (CAUSE=EMERGENCY)
615
620
CONNECTION RELEASE (INTER-RAT INFO IE, CAUSE= "REDIRECTING A CALL TO GSM")
UE DOES NOT INDICATE FAILURE TO THE USER. INSTEAD IT INITIATES GSM REDIRECTION PROCEDURE
625
UE SYNCHRONIZES TO THE GSM CELL
630
UE COLLECTS SYSTEM INFORMATION
635
READ SYSTEM INFORMATION ON GSM CELL
640
UE SELECTS THIS CELL
645
CHANNEL REQUEST (CAUSE=EMERGENCY)
650
UE ESTABLISHES THE EMERGENCY CALL ON GSM
655
CALL IS SUCCESSFULLY ESTABLISHED ON GSM

FIG. 6

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/031601

A. CLASSIFICATION OF SUBJECT MATTER
H04Q7/38

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)
H04Q G08B

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/081939 A (NOKIA CORPORATION; HULKKONEN, TONY; BACK, JUHA; MUHONEN, JANNE) 2 October 2003 (2003-10-02) page 1, line 3 - page 6, line 18 page 7, line 28 - page 10, line 31 claims 1-9 figure 1	1-20
X	US 6 801 762 B1 (HUILGOL SHARAD) 5 October 2004 (2004-10-05) column 1, lines 10-26 column 4, line 7 - column 5, line 42 column 6, line 48 - column 7, line 22 claim 1 figures 1-3	1-20

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 December 2005	05/01/2006

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Pérez, M

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/031601

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 516 188 B1 (NEW WEN J ET AL) 4 February 2003 (2003-02-04) column 1, lines 10-63 column 3, lines 18-33 column 4, line 50 - column 6, line 53 column 7, lines 5-20 claim 1 figures 4,5	1-20
A	US 2003/157923 A1 (TANI YASUHIRO) 21 August 2003 (2003-08-21) paragraph '0002! paragraphs '0019! - '0032! claim 1	1-20
A	EP 1 257 141 A (NORTEL NETWORKS LIMITED) 13 November 2002 (2002-11-13) paragraph '0001! paragraphs '0013! - '0017! paragraphs '0032! - '0037! claim 1	1-20
A	US 2004/114615 A1 (VIRTANEN JARMO J ET AL) 17 June 2004 (2004-06-17) paragraph '0001!; claims 1-44 paragraphs '0013! - '0031! paragraphs '0039! - '0044!	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2005/031601

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 03081939	A	02-10-2003	AU	2003209592 A1	08-10-2003
			BR	0308357 A	25-01-2005
			CA	2480348 A1	02-10-2003
			CN	1643962 A	20-07-2005
			EP	1488659 A1	22-12-2004
			JP	2005521350 T	14-07-2005
			US	2005107094 A1	19-05-2005
			ZA	200408090 A	07-04-2005
US 6801762	B1	05-10-2004	AU	7438800 A	30-04-2001
			CN	1402948 A	12-03-2003
			EP	1216591 A1	26-06-2002
			WO	0124563 A1	05-04-2001
			JP	2003519454 T	17-06-2003
US 6516188	B1	04-02-2003	AU	1627001 A	04-06-2001
			WO	0139532 A1	31-05-2001
US 2003157923	A1	21-08-2003	GB	2388496 A	12-11-2003
			JP	2003244284 A	29-08-2003
EP 1257141	A	13-11-2002	WO	02091783 A1	14-11-2002
			US	2004147262 A1	29-07-2004
US 2004114615	A1	17-06-2004	AU	2003302947 A1	09-07-2004
			EP	1579726 A1	28-09-2005
			WO	2004056150 A1	01-07-2004