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(54) **METHODS FOR TRANSMITTING MOBILE ORIGINATED REQUESTS BY MOBILE STATION WITH SUBSCRIBER IDENTITY CARDS AND SYSTEMS UTILIZING THE SAME**

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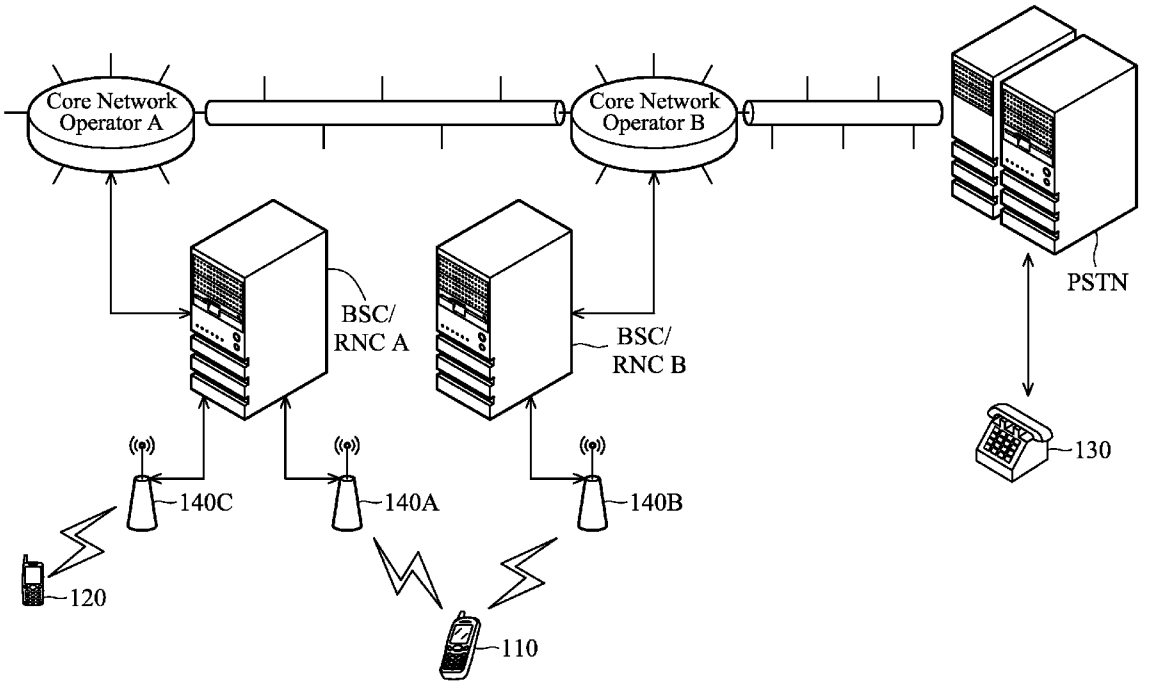
(57) **ABSTRACT**

A method for transmitting mobile originated request by a mobile station with a first subscriber identity card and a second subscriber identity card, executed by a processor, is provided. A subscriber identity card is determined from the first subscriber identity card and the second subscriber identity card. A first mobile originated request is sent to a called party via the determined subscriber identity card. A second mobile originated request is sent to the called party via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed.



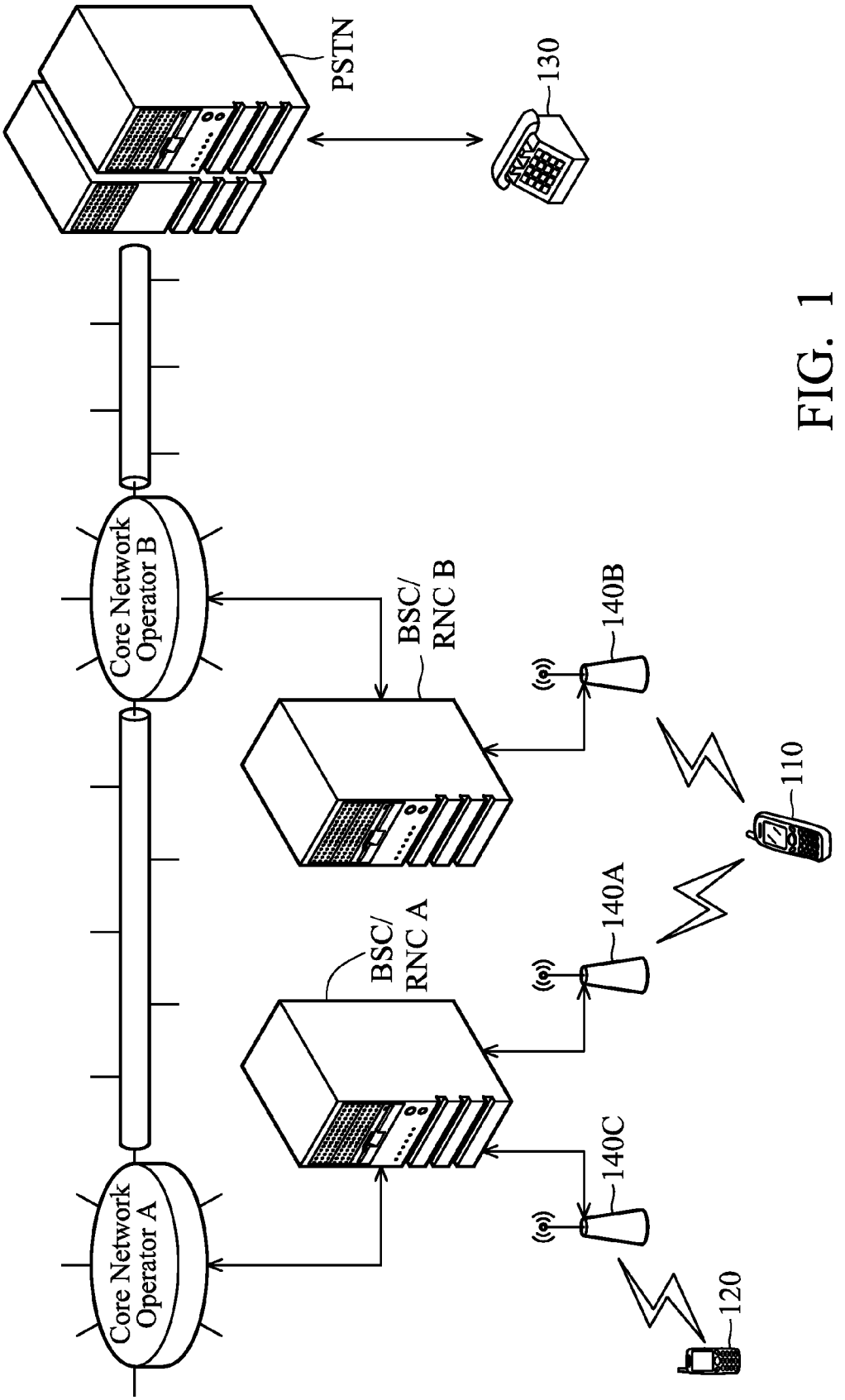

PSTN
130
Core Network Operator B
BSC/ RNC B
140B
110
BSC/ RNC A
140A
140C
Core Network Operator A
120

FIG. 1

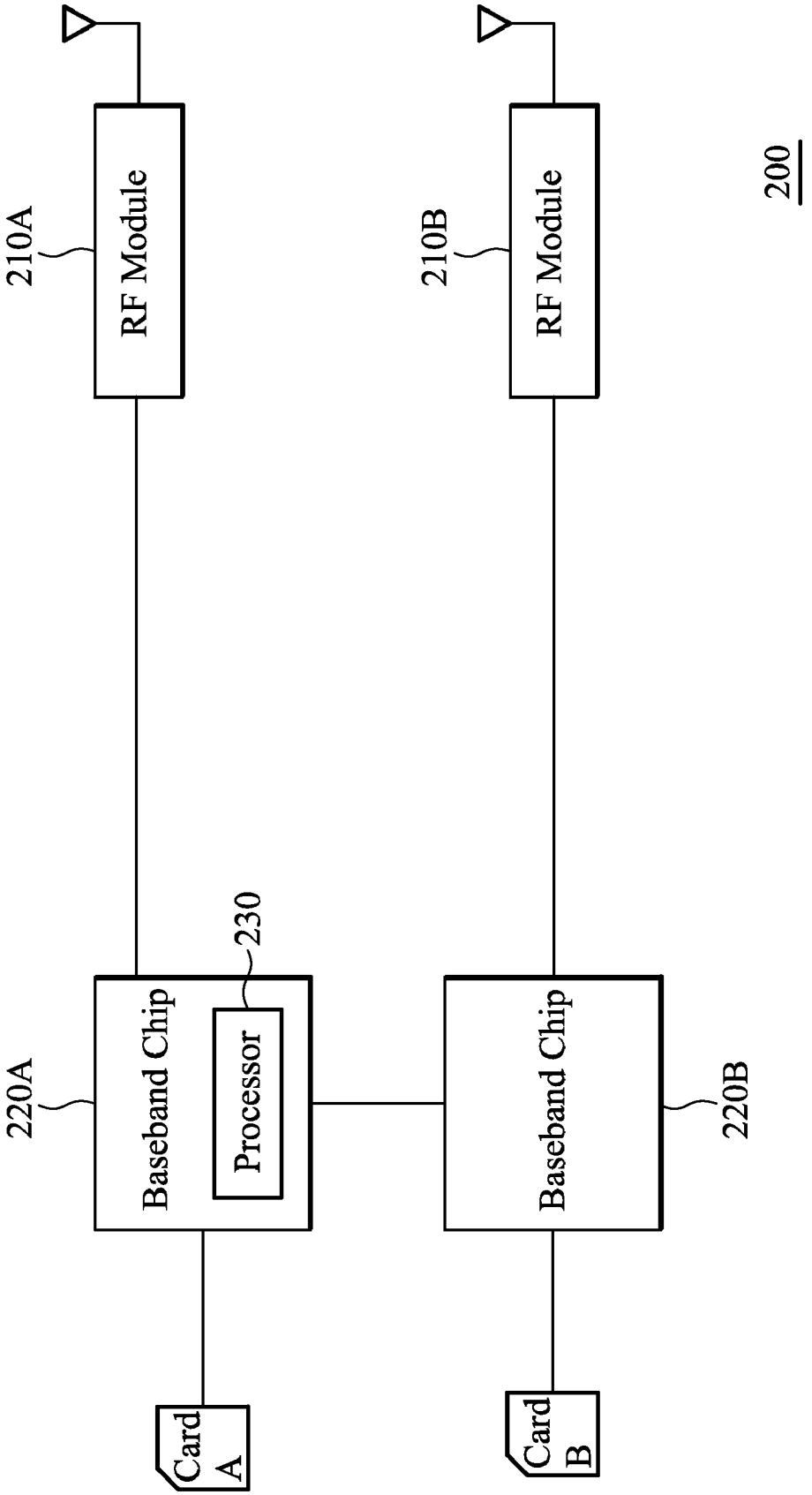

200
210A
RF Module
210B
RF Module
220A
Baseband Chip
230
Processor
220B
Baseband Chip
Card A
Card B

FIG. 2A

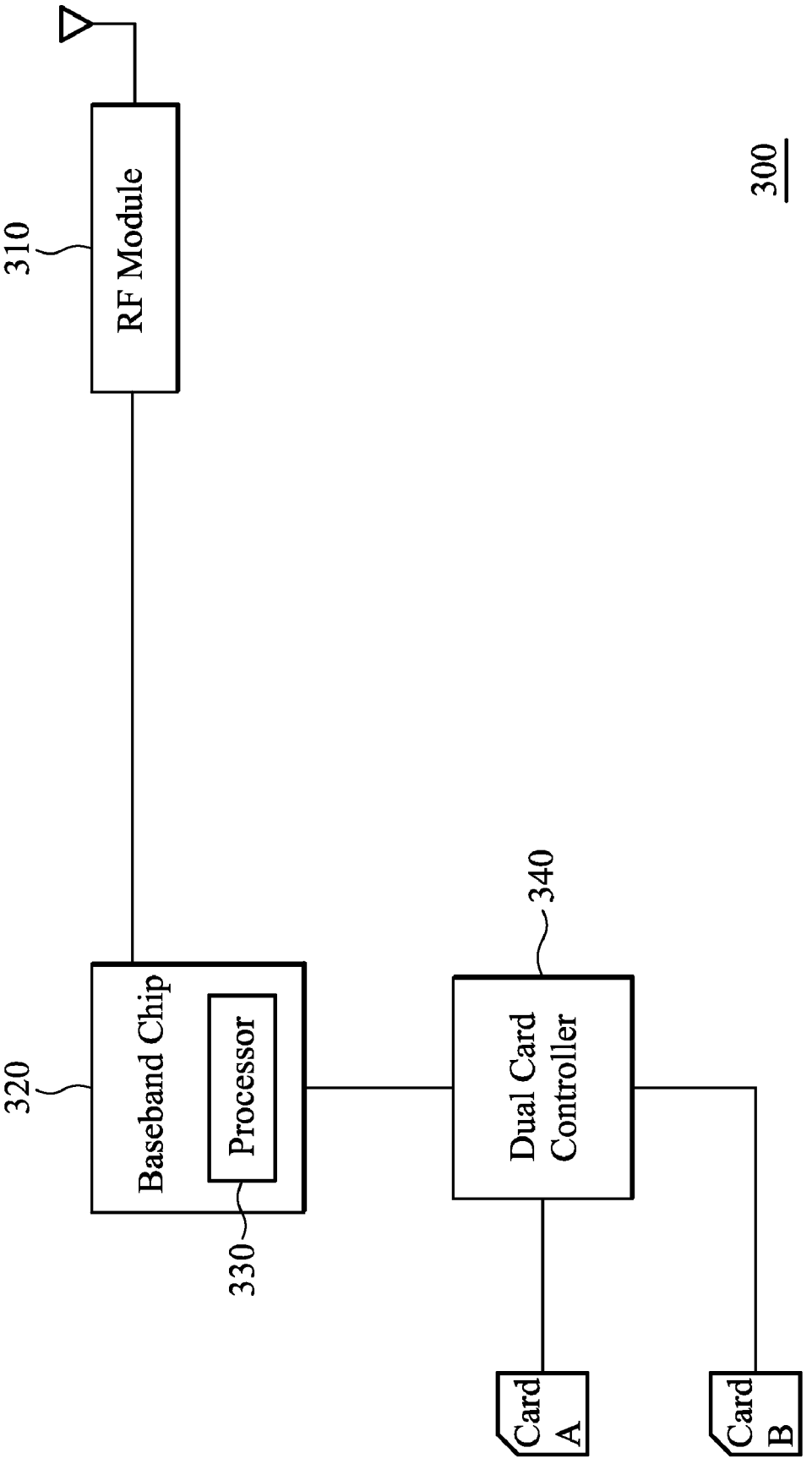

300
310
RF Module
320
Baseband Chip
Processor
330
340
Dual Card Controller
Card A
Card B

FIG. 2B

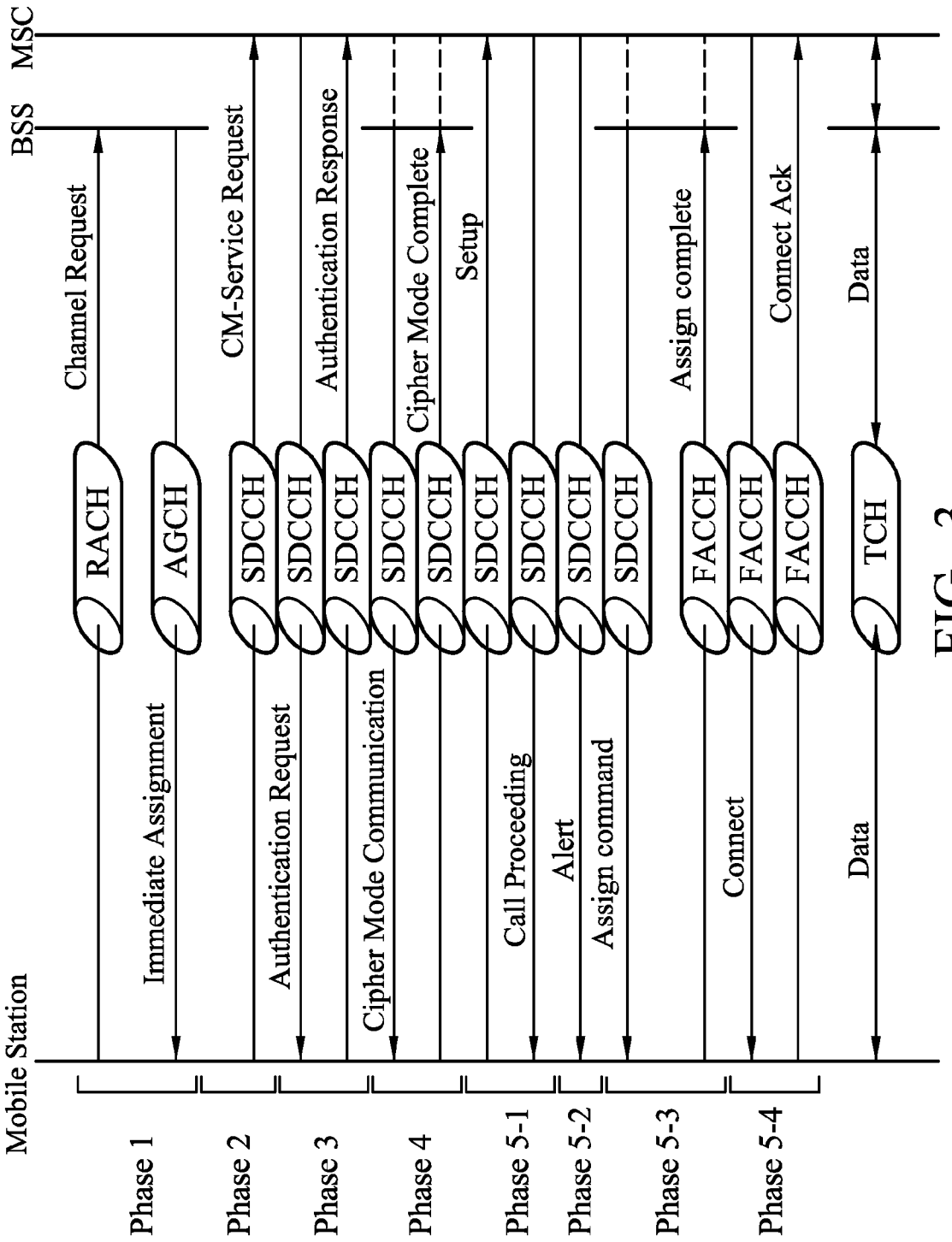

Mobile Station
BSS
MSC
Channel Request
RACH
Immediate Assignment
AGCH
CM-Service Request
SDCCH
Authentication Request
SDCCH
Authentication Response
SDCCH
Cipher Mode Communication
SDCCH
Cipher Mode Complete
SDCCH
Setup
SDCCH
Call Proceeding
SDCCH
Alert
SDCCH
Assign command
SDCCH
Assign complete
FACCH
Connect
FACCH
Connect Ack
FACCH
Data
TCH
Data
Phase 1
Phase 2
Phase 3
Phase 4
Phase 5-1
Phase 5-2
Phase 5-3
Phase 5-4

FIG. 3

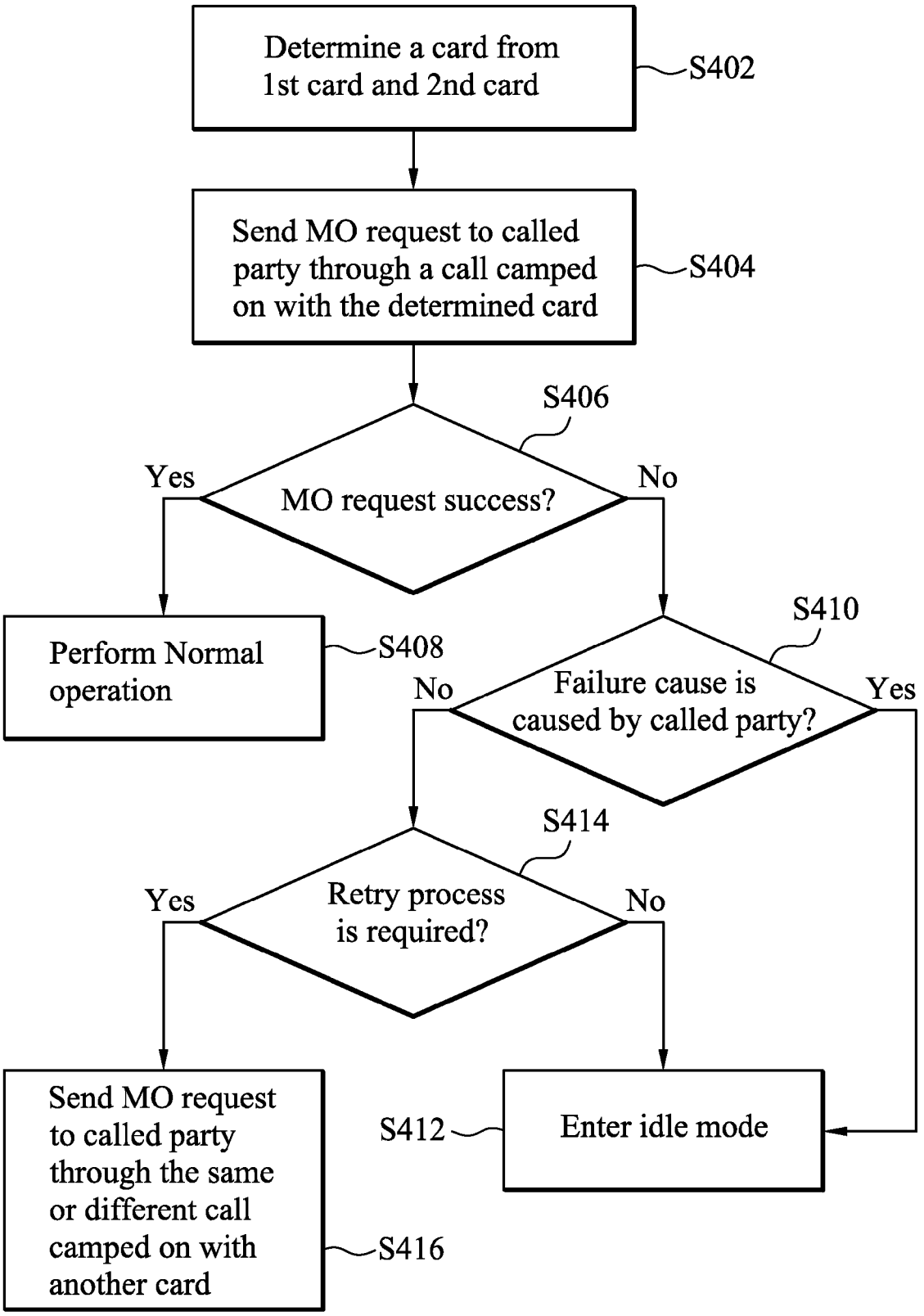

Determine a card from 1st card and 2nd card
S402
Send MO request to called party through a call camped on with the determined card
S404
S406
MO request success?
Yes
No
Perform Normal operation
S408
S410
Failure cause is caused by called party?
No
Yes
S414
Retry process is required?
Yes
No
Send MO request to called party through the same or different call camped on with another card
S416
S412
Enter idle mode

FIG. 4

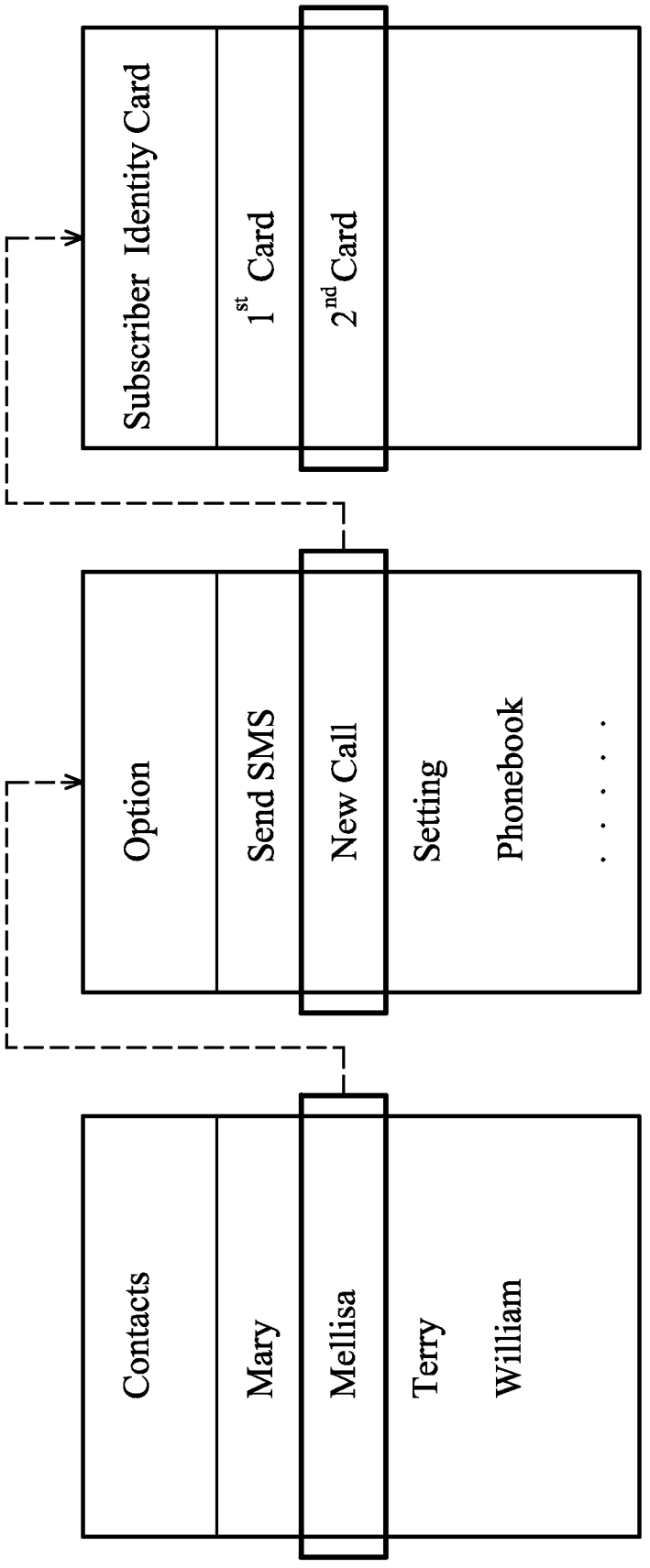

Subscriber Identity Card
1st Card
2nd Card
Option
Send SMS
New Call
Setting
Phonebook
. . . . .
Contacts
Mary
Mellisa
Terry
William

FIG. 5

METHODS FOR TRANSMITTING MOBILE ORIGINATED REQUESTS BY MOBILE STATION WITH SUBSCRIBER IDENTITY CARDS AND SYSTEMS UTILIZING THE SAME

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/038,426, filed on Mar. 21, 2008, the entirety of which is incorporated by reference herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to a method for transmitting the mobile originated requests by a mobile station, and more particularly to a method for transmitting the mobile originated requests by a mobile station with multiple subscriber identity cards.

[0004] 2. Description of the Related Art

[0005] Currently, the Global System for Mobile communication (GSM) standard is the popular standard for mobile phones in the world. The GSM standard, standardized by the European Telecommunication Standards Institute (ETSI) is a cellular network structure and a Time Division Multiple Access (TDMA) system. For a carrier frequency, the TDMA system will divide a frame into eight time slots, wherein each time slot is used to transmit a channel data for a subscriber. In addition, the General Packet Radio Service (GPRS) technology is one of the available technologies of a GSM system. The GPRS technology utilizes the unused channels in the GSM system to provide moderate speed data transmission. The Wideband Code Division Multiple Access (W-CDMA) is a wideband spread-spectrum mobile air interface that utilizes the direct-sequence spread spectrum method of asynchronous code division multiple access to achieve higher speeds and support more users compared to the implementation of time division multiplexing (TDMA) used by 2G GSM systems. Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) is another type of 3G mobile telecommunications standard.

[0006] A dual SIM mobile phone is a phone with two Subscriber Identity Modules (SIMs), which correspond to different telephone numbers. The dual SIM mobile phone allows a user to use two communication services without carrying two phones at the same time. For example, the same mobile phone may be used for business and private use with separate numbers and bills, thus providing convenience to mobile phone users.

BRIEF SUMMARY OF THE INVENTION

[0007] Methods for transmitting mobile originated (MO) requests by a mobile station with a first subscriber identity card and a second subscriber identity card and the systems utilizing the same are provided. An exemplary embodiment of a method for transmitting MO request by a mobile station with a first subscriber identity card and a second subscriber identity card, executed by a processor, is provided. A subscriber identity card is determined from the first subscriber identity card and the second subscriber identity card. A first mobile originated request is sent to a called party via the determined subscriber identity card. A second mobile originated request is sent to the called party via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed.

[0008] Furthermore, another exemplary embodiment of a method for transmitting mobile originated request by a mobile station with a first subscriber identity card and a second subscriber identity card, executed by a processor, is provided. A subscriber identity card is determined from the first subscriber identity card and the second subscriber identity card. A first mobile originated request is sent to a called party through a cell camped on with the determined subscriber identity card. A failure cause is obtained when the first mobile originated request has failed. It is determined whether a retry process is required when the failure cause indicates that the failure is not caused by the called party. A second mobile originated request is sent to the called party through the same cell or a different cell camped on with the subscriber identity card other than the determined subscriber identity card during the retry process.

[0009] Moreover, an exemplary embodiment of a system comprises a first subscriber identity card, a second subscriber identity card and a processor. The processor determines a subscriber identity card from the first subscriber identity card and the second subscriber identity card, and sends a first mobile originated request to a called party via the determined subscriber identity card. The processor sends a second mobile originated request via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed.

[0010] A detailed description is given in the following embodiments with reference to the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0011] The invention can be more fully understood by reading the subsequent detailed description and examples with references made to the accompanying drawings, wherein:

[0012] FIG. **1** shows a schematic diagram of a mobile communication network system;

[0013] FIG. **2**A shows a mobile station according to an embodiment of the invention;

[0014] FIG. **2**B shows a mobile station according to another embodiment of the invention;

[0015] FIG. **3** shows logical channel assignments and signaling procedures of a mobile originated request in the GSM;

[0016] FIG. **4** shows a flow chart illustrating a method for transmitting mobile originated request by a mobile station with a first subscriber identity card and a second subscriber identity card according to an embodiment of the invention; and

[0017] FIG. **5** shows a table illustrating a menu comprising the contact, option and card items that are to be selected.

DETAILED DESCRIPTION OF THE INVENTION

[0018] The following description is of the best-contemplated mode of carrying out the invention. This description is made for the purpose of illustrating the general principles of the invention and should not be taken in a limiting sense. The scope of the invention is best determined by reference to the appended claims.

[0019] A subscriber identity module (SIM) card typically contains user account information, an international mobile subscriber identity (IMSI) and a set of SIM application toolkit (SAT) commands and provides storage space for phone book contacts. A micro-processing unit (MCU) of the Baseband

chip (simply referred to as a Baseband MCU hereinafter) may interact with MCUs of the SIM cards (each simply referred to as a SIM MCU hereinafter) to fetch data or SAT commands from the plugged in SIM cards. A mobile station (MS) is immediately programmed after plugging in the SIM card. SIM cards may also be programmed to display custom menus for personalized services.

[0020] A universal SIM (USIM) card is inserted into a mobile station for universal mobile telecommunications system (UMTS) and Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) (also called 3G) telephony communication. The USIM card stores user account information, an IMSI, authentication information and a set of USIM Application Toolkit (USAT) commands and provides storage space for text messages and phone book contacts. A Baseband MCU may interact with an MCU of the USIM card (each simply referred to as a USIM MCU hereinafter) to fetch data or SAT commands from the plugged in USIM cards. The phone book on the USIM card is greatly enhanced when compared to the SIM card. For authentication purposes, the USIM card may store a long-term preshared secret key K, which is shared with the Authentication Center (AuC) in the network. The USIM MCU may verify a sequence number that must be within a range using a window mechanism to avoid replay attacks, and is in charge of generating the session keys CK and IK to be used in the confidentiality and integrity algorithms of the KASUMI (also termed A5/3) block cipher in the UMTS. A mobile station is immediately programmed after plugging in the USIM card.

[0021] A removable User Identity Module (R-UIM) or a Code Division Multiple Access (CDMA) Subscriber Identity Module (CSIM) card has already been developed for a CDMA mobile station and is equivalent to the GSM SIM and 3G USIM except that it is capable of working in CDMA networks. The R-UIM or the CSIM card is physically compatible with the GSM SIM card, and provides similar security mechanisms for the CDMA system.

[0022] The International Mobile Subscriber Identity (IMSI) is a unique number associated with a global system for mobile communication (GSM) or a universal mobile telecommunications system (UMTS) network user. The IMSI may be sent by a mobile station to a GSM or UMTS network to acquire other details of the mobile user in the Home Location Register (HLR) or as locally copied in the Visitor Location Register (VLR). An IMSI is typically 15 digits long, but may be shorter (for example MTN South Africa's IMSIs are 14 digits). The first 3 digits are the Mobile Country Code (MCC), and they are followed by the Mobile Network Code (MNC), which is either 2 digits (European standard) or 3 digits (North American standard). The remaining digits are the mobile subscriber identification number (MSIN) for a GSM or UMTS network user.

[0023] FIG. **1** shows a schematic diagram of a mobile communication network system. In FIG. **1**, a mobile station (may be called user equipment interchangeably) **110** with dual subscriber identity cards A and B may simultaneously access two core networks such as a Global System for Mobile Communications (GSM), Wideband Code Division Multiple Access (WCDMA), and Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) network and the like after camping on two cells **140**A and **140**B (i.e. each may be a base station, a node-B or others). The subscriber identity card A or B may be a SIM, USIM, R-UIM or CSIM card. The mobile station **110** may make a voice or data call to a called party **120** or **130** through the GSM system with the Base Station Controller (BSC), WCDMA/TD-SCDMA network with Radio Network Controller (RNC), Public Switched Telephone Network (PSTN) or any combinations thereof using either of the subscriber identity cards A or B. For example, the mobile station **110** may make a voice call with the subscriber identity card A to the called party **120** through the cell **140**A, an BSC/RNC A and a cell **140**C in sequence, or make a voice call with the subscriber identity card B to the called party **120** through the cell **140**B, an BSC/RNC B, a core network operator B, a core network operator A, the BSC/RNC A and the cell **140**C in sequence. Moreover, the mobile station **110** may receive a phone call request with either of the subscriber identity cards A or B from the calling party **120** or **130**. For example, the mobile station **110** may receive a phone call request to the subscriber identity card B from the calling party **130** via a Public Switched Telephone Network (PSTN), the core network operator B, the BSC/RNC B and the cell **140**B.

[0024] FIG. **2**A shows the hardware architecture of a mobile station **200** according to an embodiment of the invention. The mobile station **200** comprises two radio frequency (RF) modules **210**A and **210**B and two Baseband chips **220**A and **220**B, wherein the RF module **210**A is coupled to the Baseband chip **220**A and the RF module **210**B is coupled to the Baseband chip **220**B. Two subscriber identity cards A and B may be plugged into two sockets of the mobile station **200** connecting to the Baseband chips **220**A and **220**B, respectively. Each of the subscriber identity cards A and B may be a SIM, USIM, R-UIM or CSIM card, which is provided by a particular network operator. The mobile station **200** can therefore simultaneously camp on two cells (base stations) provided by either the same network operator or different network operators for the plugged in cards A and B and operate in stand-by/idle modes, or even dedicated modes, using different RF modules and Baseband chips. Each of the Baseband chips **220**A and **220**B may read data from a particular subscriber identity card A or B and write data to the subscriber identity card A or B. Furthermore, the Baseband chip **220**A may be a master device for the mobile station **200**, and the Baseband chip **220**A comprises a processor **230** for controlling the communications between the subscriber identity cards A and B and the RF modules **210**A and **210**B. A further processor (not shown) may be provided in the Baseband chip **220**B to coordinately operate with the processor **230** of the Baseband **220**A to improve performance.

[0025] FIG. **2**B shows the hardware architecture of a mobile station **300** according to another embodiment of the invention. The mobile station **300** comprises an RF module **310**, a Baseband chip **320** and a dual card controller **340**, wherein the two subscriber identity cards A and B may be plugged into two sockets of the mobile station **300** connecting to the dual card controller **340**. Those skilled in the art may practice the dual card controller **340** in the Baseband chip **320**. Each of the subscriber identity cards A and B may be a SIM, USIM, R-UIM or CSIM card, which is provided by a particular network operator. The mobile station **300** may therefore camp on two cells provided by either the same network operator or different network operators for the plugged in cards A and B and operate in stand-by/idle modes, or even dedicated modes, using the same RF module and Baseband chip. The dual card controller **340** is coupled/connected between the Baseband chip **320** and the subscriber identity cards A and B. Furthermore, the Baseband chip **320**

comprises a processor **330** for controlling the communications between the subscriber identity cards A and B and the RF module **310**. Moreover, the processor **330** of the Baseband chip **320** may read data from the subscriber identity card A or B via the dual card controller **340**, and may also write data to the subscriber identity card A or B via the dual card controller **340**.

[0026] An RF module (e.g. **210**A or **210**B of FIG. **2**A, or **310** of FIG. **2**B) receives wireless radio frequency signals, converts the received signals to baseband signals to be processed by a corresponding Baseband chip (e.g. **220**A or **220**B of FIG. **2**A, or **320** of FIG. **2**B), or receives baseband signals from the Baseband chip and converts the received signals to wireless radio frequency signals to be transmitted to a peer device. The RF module may comprise a plurality of hardware devices to perform radio frequency conversion. For example, the RF module may comprise a mixer to multiply the baseband signals with a carrier oscillated in the radio frequency of the wireless communication system, wherein the radio frequency may be, for example, 900 MHz or 1800 MHz for a global system for mobile communication (GSM), or 1900 MHz or 2100 MHz for a Universal Mobile Telecommunications System (UMTS). The Baseband chip further converts the baseband signals to a plurality of digital signals, and processes the digital signals, and vice versa. The Baseband chip may also comprise a plurality of hardware devices to perform baseband signal processing. The baseband signal processing may comprise analog to digital conversion (ADC), digital to analog conversion (DAC), gain adjustments, modulation/demodulation, encoding/decoding, and so on.

[0027] As the mobile station equipped with two or more subscriber identity cards as shown in FIG. **2**A or FIG. **2**B, the mobile station can be operated in an idle mode and dedicated mode for each inserted subscriber identity card. Referring to FIG. **1**, in an idle mode, the mobile station **110** is either powered off, searches for or measures the Broadcast Control Channel (BCCH) with better signal quality from a base station (e.g. the cell **140**A or **140**B) provided by a specific network operator, or is synchronized to the BCCH of a specific base station to be ready to perform a random access procedure on the Random Access Channel (RACH) to request a dedicated channel. In a dedicated mode, the mobile station **110** occupies a physical channel and tries to synchronize therewith, and establishes logical channels and switches throughout them.

[0028] Specifically, for each inserted subscriber identity card in the idle mode, the mobile station **110** continuously listens to the BCCH from a base station and reads the BCCH information and conducts periodic measurements of the signaling strength of the BCCH carriers in order to select a suitable cell to be camped on. In the idle mode, no exchange of signaling messages is presented with the network. The data required for Radio Resource Management (RR) and other signaling procedures is collected and stored, such as the list of neighboring BCCH carriers, thresholds for RR algorithms, Common Control Channel (CCCH) configurations, information regarding the use of RACH and Paging channel (PCH), or others. Such kind of information (e.g. system information (SI)) is broadcasted by a base station system on the BCCH and provides information about the network configuration. Moreover, the SI is available for all mobile stations currently in the cell. The SI comprises a Public Land Mobile Network (PLMN) code uniquely owned by a network operator. The PLMN code comprising a Mobile Country Code (MCC) and a Mobile Network Code (MNC), indicating which network operator is providing the communication services. In addition, a cell identity (ID) indicating which cell is broadcasting the BCCH is also contained in the SI. Furthermore, the SI may comprise network identification, neighboring cells, channel availability and power control requirements etc. The PLMN code may be acquired and stored in a corresponding subscriber identity card of the electronic device upon receiving the SI from the BCCH. The Base Station System (BSS) further continuously sends out, on all PCHs of a cell valid Layer 3, messages (PAGING REQUEST) which the mobile station **110** can decode and recognize if its address (e.g. its IMSI of a specific SIM card) is paged. The mobile station **110** periodical monitors the PCHs to avoid loss of paging calls.

[0029] Each exchange of signaling messages with the network, e.g. BSS, Mobile Switching Center (MSC) and the similar, requires an Radio Resource Management (RR) connection and the establishment of an LAPDm connection between a mobile station and BSS. Setting up the RR connection can be initiated by the mobile station or network. In either situation, the mobile station sends a channel request (CHAN-QUEST) on the RACH in order to get a channel assigned on the Access Grant Channel (AGCH), also referred to as an immediate assignment procedure. The channel request may be rejected by an immediate assignment reject procedure. If the network does not immediately answer to the channel request, the request is repeated for a certain number of times. In the situation of a network-initiated connection, a procedure is preceded by a paging call (PAGING REQUEST) to be answered by the mobile station (PAGING RESPONSE). After an RR connection has been successfully completed, higher protocol layers, Connection Management (CM) and Mobility Management (MM) can receive and transmit signaling messages.

[0030] In contrast to the setup of connections, the release is typically initiated by the network (CHANNEL RELEASE). The release may occur when the signaling transaction ends, there are too many errors, or the channel is removed due to a higher priority call, e.g. an emergency call, or end of a call.

[0031] Once an RR connection has been set up, the mobile station has either a Stand-alone Dedicated Control Channel (SDCCH) or a Traffic Channel (TCH) with associated Slow/Fast Associated Control Channel (SACCH/FACCH) available for exclusive bidirectional use.

[0032] Setting up an MM connection from the mobile station presumes the existence of an RR connection, but a single RR connection can be used by multiple MM connections. If the MM connection can be established, the MS sends the message CM-SERVICE REQUEST to the network. The message CM-SERVICE REQUEST contains information regarding a mobile subscriber (IMSI or Temporary Mobile Subscriber Identity (TMSI)), where a TMSI has only local significance within a Location Area and must be used together with the Location Area Identity (LAI) for the unique identification of a subscriber, as well as information regarding the requested service (outgoing voice call, short message service SMS transfer, activation or registration of a supplementary service, or others). If the mobile station receives the message CM-SERVICE ACCEPT or local message from the RR sub-layer that enciphering has been activated, it is treated as an acceptance of the service request, and the requesting CM entity is informed about the successful setup of an MM connection. Otherwise, if the service request has been

rejected by the network, the mobile station receives a message CM-SERVICE REJECT, and the MM connection cannot be established.

[0033] The mobile station equipped with two or more inserted subscriber identity card cards as shown in FIG. **2**A or FIG. **2**B, can be operated in an idle mode and connected mode for each inserted subscriber identity card, wherein the inserted subscriber identity cards are USIM cards. Referring to FIG. **1**, in an idle mode, the mobile station selects (either automatically or manually) a PLMN to contact. The MS continuously listens to the BCCH to acquire an SI comprising a PLMN code uniquely owned by a network operator. The PLMN code comprising an MCC and an MNC, indicates which network operator is providing communication services. In addition, an ID indicating which cell is broadcasting the BCCH is also contained in the SI. The PLMN code may be acquired and stored in a corresponding USIM card of the electronic device upon receiving the SI from the BCCH. The mobile station searches for a suitable cell of the chosen PLMN, chooses that cell to provide available services, and tunes to its control channel, also referred to as "camping on a cell". After camping on a cell in an idle mode, the MS can receive system information and cell broadcast messages from a node-B (e.g. the cell **140**A or **140**B). The mobile station stays in an idle mode until the MS transmits a request to establish a Radio Resource Control (RRC) connection. In the idle mode, the mobile station is identified by non-access stratum identities such as IMSI, TMSI and Packet-TMSI (P-TMSI).

[0034] In the Cell_DCH state of a connected mode, a dedicated physical channel is allocated to the mobile station, and the mobile station is known by its serving radio network controller (RNC) on a cell or active set level. The mobile station performs measurements and sends measurement reports according to measurement control information received from RNC. The mobile station with certain capabilities monitors the Forward Access Channel (FACH) for system information messages. In the Cell_FACH state of a connected mode, no dedicated physical channel is allocated for the mobile station, but a Random Access Channel (RACH) and FACH are used instead, for transmitting both signaling messages and small amounts of user plane data. In this state, the mobile station also listens to the Broadcast Channel (BCH) to acquire system information. The mobile station performs cell reselections, and after a reselection the mobile station typically sends a Cell Update message to the RNC, so that the RNC knows the MS location on a cell level. In the Cell_PCH state of a connected mode, the mobile station is known on a cell level in a Serving Radio Network Controller (SRNC), but the mobile station can be reached only via the Paging Channel (PCH). The URA_PCH state of a connected mode is very similar to the Cell_PCH state, except that the mobile station does not execute Cell Update after each cell reselection procedure, but instead reads the UMTS Terrestrial Radio Access Network (UTRAN) Registration Area (URA) identities from the BCH, and only if the URA changes (after cell reselection) does the mobile station inform its location to the SRNC. The mobile station leaves the connected mode and returns to the idle mode when the RRC connection is released or following RRC connection failure.

[0035] The establishment of an RRC connection and Signaling Radio Bearers (SRB) between a mobile station and UTRAN (RNC) is initiated by a request from higher layers (non-access stratum) on the mobile station side. In a network-originated case, the establishment is preceded by an RRC Paging message. The UTRAN (RNC) may respond with an RRC Connection Set-up message including a dedicated physical channel assignment for the mobile station (move to the Cell-FACH state), or a command to instruct the mobile station to use common channels (move to the Cell_FACH state).

[0036] FIG. **3** shows exemplary logical channel assignments and signaling procedures of an apparatus originated communication request in the GSM system. In the GSM system, a Call Control (CC), comprises procedures to establish, control, and terminate a communication service, and is an element of Connection Management (CM). When a mobile station plans to originate a communication service, such as a voice call service, the CC entity first requests a Mobility Management (MM) connection from the local MM entity (Phase **1**) via a Random Access Channel (RACH). For a standard call, the mobile station may need to register with the wireless network, whereas for an emergency call, registration is only optionally required. That is, an emergency call may be established on an un-enciphered Radio Resource (RR) connection from a mobile station that has not registered with the wireless network. The BSS in the wireless network may assign a Stand-alone Dedicated Control Channel (SDCCH) or a Traffic Channel (TCH) via an Immediate Assignment carried in the Access Grant Channel (AGCH). After the processes of sending out a CM-service request (Phase **2**), authentication (Phase **3**) and ciphering (Phase **4**) with the MSC via the SDDCH is completed, an MM connection is established. After successful establishment of the MM connection and activation of the user data encryption, the service-requesting CC entity is informed. Thus, the signals on the connection desiring to connect to the CC entity in the Mobile Switching Center MSC (SETUP). The MSC may respond to the connection request in several ways. The MSC may indicate with a message Call Proceeding (Phase **5-1**) that the call request has been accepted and that all the necessary information for the setup of the call is available. Otherwise, the call request may be declined with a message Release Complete. Next, the mobile station receives the Alert message (Phase **5-2**) when the MSC is trying to connect to the called party. As soon as the called party receives the Alert message and accepts the call, the mobile station receives an Assign Command and a dedicated channel will be assigned after the mobile station responds to an Assignment Complete message via a Fast Associated Control Channel (FACCH) (Phase **5-3**). The mobile station next responds with a Connect Acknowledge message after receiving the Connect message from the MSC (Phase **5-4**), and the traffic channel, successfully established on the TCH and the mobile station, may now begin to communicate with the called party. It is to be noted that the CC procedure of the WCDMA or TD-SCDMA system is similar to that of GSM system and is not further described for brevity.

[0037] In addition, the CC in the GSM system has a number of special conditions, especially to account for the limited resources and properties of the radio channel. In particular, the call request of the mobile station can be entered into a queue (call queuing), if there is no immediately free TCH for the establishment of the call. The maximum waiting time, a call may have to wait for assignment of a TCH can be adjusted according to operator requirements. Furthermore, the point at which the TCH is actually assigned can be chosen. For example, the traffic channel can be assigned immediately

after acknowledging the call request (CALL PROCEEDING), also referred to as early assignment. On the other hand, the call can be first processed completely and the assignment occurs only after the targeted subscriber is being called, also referred to as late assignment or Off-Air Call Setup (OACSU). The OACSU may avoid unnecessary allocation of a TCH if the called party is not available. On the other hand, there is the probability that after a successful call request signaling procedure, no TCH can be allocated for the calling party before the called party accepts the call, and thus the call cannot be completely switched through and is broken off.

[0038] Mobile-originated (MO) SMS messages are transported from a mobile station to a Short Message Service Centre (SMSC), and may be destined to mobile users, subscribers on a fixed network, or Value-Added Service Providers (VASPs), also known as application-terminated. Mobile-terminated (MT) SMS messages are transported from the SMSC to the destination mobile station.

[0039] In the GSM system, a completely established MM connection is required for the transport of SMS messages, which again presumes an existing RR connection with LAPDm protection on an SDCCH or SACCH. An SMS transport Protocol Data Unit (PDU) is transmitted with an RP-DATA message between an MSC and MS using the Short Message Relay Protocol (SM-RP). Correct reception is acknowledged with an RP-ACK message from the SMS service center (mobile-originated SMS transfer). In a WCDMA or TD-SCDMA system, before transport of SMS messages, an RRC connection has to be successfully established.

[0040] FIG. **4** shows a flow chart illustrating a method for transmitting mobile originated (MO) requests by a mobile station with a first subscriber identity card and a second subscriber identity card (e.g cards A and B of FIG. **2**A or **2**B), which is performed when executing software/firmware code by a processor of the mobile station (e.g. **230** of FIG. **2**A or **330** of FIG. **2**B), according to an embodiment of the invention. For a mobile station equipped with dual RF modules and Baseband chips respectively connected to dual subscriber identity cards as shown in FIG. **2**A, or a single RF module and a single Baseband chip connected to dual subscriber identity cards as shown in FIG. **2**B, two cells are camped on by the mobile stations with IMSIs stored in the inserted subscriber identity cards. When a user desires to make an MO voice or data call, or transmit an SMS message to a called party, one of the inserted subscriber identity cards is selected/determined. The selection may be preset by a configuration setting, or selected via interaction with a man-machine interface (MMI) by a user. The MMI may comprise screen menus and icons, command language and online help displayed on a display of the mobile station with at least one input device of a touch panel, physical keys on a key pad, buttons, dragging jogs and the similar. By using input devices of the MMI, users may manually touch, press, click, rotate or move the input devices to operate the mobile station. Referring to FIG. **5**, for example, a contact item captioned "Mellisa" is selected from a Contact menu, corresponding to a mobile phone or telephone number. And then, an option item of "New Call" is selected from an Option menu to indicate a desire to make an MO voice call. Subsequently, another option item of "**2**nd CARD" is selected from a subscriber identity card menu to indicate a determined subscriber identity card.

[0041] Referring back to FIG. **4**, first, a specific subscriber identity card is determined from the first and second subscriber identity cards (step S**402**). Next, an MO request is sent to a called party through a camped on cell with the determined subscriber identity card, where details of MO call request signaling may refer to the above description (step S**404**). After that, it is determined whether the MO request has succeeded (step S**406**). A normal operation is performed when the MO request has succeeded (step S**408**). The normal operation is performed to handle voice or data communications between the mobile station and the called party, ex. to transmit a SMS message to the called party via a SMS service center or establish a call to the called party. Otherwise, a fallback mechanism is performed when the MO request has been rejected (i.e. the MO request has failed).

[0042] In the fallback mechanism, a failure cause of the rejected MO request is first analyzed according to its return code and it is determined whether the failure is caused by the called party (step S**410**). For example, if the failure cause of the MO request is caused by the called party, it may be due to unavailability of the called party, rejection or not answering of the MO request, or others. In addition, the failure of the MO request may be caused by other reasons as listed as follows. For an example, with a single RF module and a single Baseband chip, the single RF and Baseband resources may be occupied by another subscriber identity card, other than the determined subscriber identity card as described above. For another example, in the GSM system, the LAPDm or RR connection between the mobile station and a BSS for the determined subscriber identity card may not be successfully established, or the MM connection may not be successfully set up because the MO request may not be supported or granted by an MSC. For still another example, in the WCDMA system, the RRC connection between the mobile station and a BSS for the determined subscriber identity card may not be successfully established, or the MM connection may not be successfully set up because the MO request may not supported or granted by a UTRAN (RNC). For still another example, the determined subscriber identity card may be rejected to issue the MO request because of the Fix Dial Number (FDN) bar, the advice of charging (AoC) exceeding a predetermined limit or the remaining quota is lower than a predetermined limit. If so (i.e. the failure cause is caused by the called party), an idle mode is entered (step S**412**); otherwise, it is further determined whether a retry process is required (step S**414**). In an embodiment of step S**412**, a message such as "No user response" or others, may be further displayed on a display device of the mobile station when the failure cause is caused by the called party. In an embodiment of step S**414**, a dialog may be displayed on a display device to ask a user whether to make another MO request with another subscriber identity card. It is determined that the retry process is required when the user decides to make another MO request with another subscriber identity card. If so, another MO request is sent to the called party through the same or a different camped-on cell with another subscriber identity card when the retry process is required, where details of MO call request signaling may refer to the above description (step S**416**), for example, the processor may use another subscriber identity card to make an MO call with the same number corresponding to the called party again. Otherwise, an idle mode is entered (step S**412**).

[0043] In another embodiment, the retry process may be automatically performed according a pre-configured setting, wherein the pre-configured setting may be set via interaction with an MMI by a user in advance. For example, if the pre-configured setting is set and the failure of the MO request is

determined to have not been caused by the called party, the processor may automatically and directly send another MO request through the same or a different camped-on cell with another subscriber identity card, so that step S**414** may be omitted.

[0044] While the invention has been described by way of example and in terms of preferred embodiment, it is to be understood that the invention is not limited thereto. Those who are skilled in this technology can still make various alterations and modifications without departing from the scope and spirit of this invention. Therefore, the scope of the present invention shall be defined and protected by the following claims and their equivalents.

What is claimed is:

1. A method for transmitting mobile originated request by a mobile station with a first subscriber identity card and a second subscriber identity card, performed by a processor of the mobile station, comprising:

determining a subscriber identity card from the first subscriber identity card and the second subscriber identity card;

sending a first mobile originated request to a called party via the determined subscriber identity card; and

sending a second mobile originated request to the called party via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed.

2. The method as claimed in claim **1**, wherein the step of sending the second mobile originated request further comprises:

obtaining a failure cause when the first mobile originated request has failed;

determining whether a retry process is required according to the failure cause; and

sending the second mobile originated request via the other subscriber identity card when the retry process is required.

3. The method as claimed in claim **2**, wherein the step of sending the second mobile originated request further comprises:

entering an idle mode when no retry process is required.

4. The method as claimed in claim **2**, wherein no retry process is required when the failure cause is caused by the called party.

5. The method as claimed in claim **1**, further comprising:

handling a voice or data communication between the mobile station and the called party when the first mobile originated request has succeeded.

6. The method as claimed in claim **1**, wherein the second mobile originated request is automatically sent to the called party via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed.

7. The method as claimed in claim **1**, further comprising obtaining a signal indicating whether a retry process is required from a man-machine interface (MMI), wherein the second mobile originated request is sent to the called party via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed and the obtained signal indicating the retry process is required.

8. A method for transmitting mobile originated request by a mobile station with a first subscriber identity card and a second subscriber identity card, performed by a processor of the mobile station, comprising:

determining a subscriber identity card from the first subscriber identity card and the second subscriber identity card;

sending a first mobile originated request to a called party through a cell camped on with the determined subscriber identity card;

obtaining a failure cause when the first mobile originated request has failed;

determining whether a retry process is required when the failure cause indicates that the failure is not caused by the called party; and

sending a second mobile originated request to the called party through the same cell or a different cell camped on with the subscriber identity card other than the determined subscriber identity card during the retry process.

9. The method as claimed in claim **8**, wherein the failure cause indicates that a single radio frequency module and a single Baseband of the mobile station are occupied by another subscriber identity card other than the determined subscriber identity card.

10. The method as claimed in claim **8**, wherein the failure cause indicates that LAPDm or Radio Resource (RR) connection between the mobile station and a Base Station System (BSS) for the determined subscriber identity card is unestablished.

11. The method as claimed in claim **8**, wherein the failure cause indicates that Mobility Management (MM) connection is not be successfully set up because the first mobile originated request is not be supported or granted by an Mobile Switching Center (MSC).

12. The method as claimed in claim **8**, wherein the failure cause indicates that Radio Resource Control (RRC) connection between the mobile station and a node-B for the determined subscriber identity card is unestablished.

13. The method as claimed in claim **8**, wherein the failure cause indicates that Mobility Management (MM) connection is not be successfully set up because the first mobile originated request is not supported or granted by a UMTS Terrestrial Radio Access Network (UTRAN) or a radio network controller (RNC).

14. The method as claimed in claim **8**, wherein the failure cause indicates that the determined subscriber identity card is rejected to issue the first mobile originated request.

15. A system for transmitting mobile originated request, comprising:

a first subscriber identity card camping on a cell;

a second subscriber identity card camping on the same cell or a different cell;

a processor determining a subscriber identity card from the first subscriber identity card and the second subscriber identity card, sending a first mobile originated request to a called party via the determined subscriber identity card, and sending a second mobile originated request via the subscriber identity card other than the determined subscriber identity card when the first mobile originated request has failed.

16. The system as claimed in claim **15**, wherein the second mobile originated request is sent via the subscriber identity card other than the determined subscriber identity card automatically or manually when the first mobile originated request has failed.

17. The system as claimed in claim **15**, wherein whether the second mobile originated request is sent via the subscriber identity card other than the determined subscriber identity card automatically or manually is pre-configured.

18. The system as claimed in claim **15**, wherein the processor obtains a failure cause when the first mobile originated request has failed.

19. The system as claimed in claim **18**, wherein the processor determines whether a retry process is required according to the failure cause, and sends the second mobile originated request through the other subscriber identity card during the retry process.

20. The system as claimed in claim **19**, wherein the retry process proceeds to enter an idle mode when the failure cause is caused by the called party.

21. The system as claimed in claim **15**, wherein the processor handles a voice or data communication with the called party when the first mobile originated request has succeeded.

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