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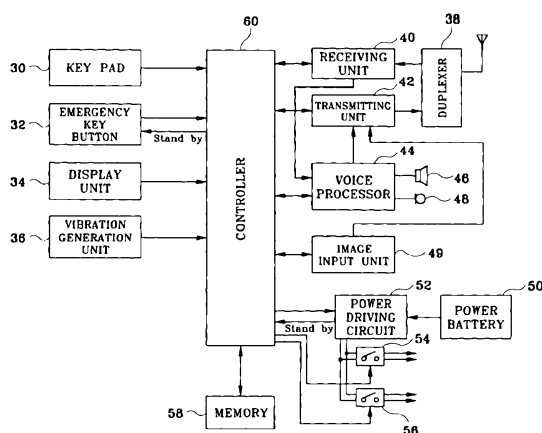
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(54) Title: APPARATUS FOR PROCESSING EMERGENCY CALL USING MOBILE COMMUNICATION NETWORK AND METHOD THEREOF



(57) Abstract: An apparatus for processing an emergency call using a mobile communication network and a method thereof configured to transmit emergency information to an emergency contact with a simple manipulation of a button on a mobile phone handset to thereby enable to advise an emergency situation and to maintain security by way of switch to mute/no-light modes, the apparatus comprising: an emergency function input unit for performing an input function for notifying an emergency situation that occurs to a subscriber of a relevant mobile phone handset; a memory unit stored with telephone number information of an emergency contact to be notified of the emergency situation according to the input function of the emergency function input unit, and emergency information equipped with notification contents of the emergency situation; and a controller for executing an emergency mode according to the input function of the emergency function input unit to make a call connection with the emergency contact, and transmitting the emergency information contained in the memory unit to the emergency contact, and executing a wiretapping mode according to the emergency transmission from the emergency contact to prohibit reception of voice signals from the receiving unit and to allow only the voice to be transmitted via the transmitting unit.

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APPARATUS FOR PROCESSING EMERGENCY CALL USING MOBILE COMMUNICATION
NETWORK AND METHOD THEREOF

FIELD OF THE INVENTION

5 The present invention relates to an apparatus for processing an emergency call using a mobile communication network and method thereof and, more particularly, to an apparatus for processing an emergency call using a mobile communication network and method thereof adapted to transmit emergency information via a mobile communication network using a mobile phone handset
10 when an emergency situation occurs to a mobile communication subscriber.

BACKGROUND OF THE INVENTION

 Generally, mobile communication systems enable users either in motion or standing still to communicate via radio with other parties even if the users are at positions where wire communication is not available. Mobile communication
15 systems make voice communication possible via radio between mobile phone base stations and mobile phone handsets.

 In mobile communication systems, radio communication is possible between mobile phone handsets, and between mobile phone handsets and wire telephones. Moreover, short message services (SMS) have been adopted to enable the exchange
20 of short text messages between mobile phone handsets.

 In other words, mobile phone subscribers can quickly communicate with other parties in emergency situations using their mobile phone handsets without moving to a location where wire telephones are installed.

 However, there is a drawback in the mobile communication systems

thus described in that voice communication may not be possible in emergency situations such as where the mobile phone user is being assailed by a burglar, the user is being chased by a third party, the user is distressed in a mountain, the user is confined in a trunk of a vehicle, and the like.

- 5 There is another drawback in that, even though the user is able to make a phone call to the police station, fire station or the like for coping with an emergency situation via his or her mobile phone, the user may not be able to elaborate on the particulars of his or her emergency situation or location.

SUMMARY OF THE INVENTION

- 10 The present invention provides an apparatus for processing an emergency call using a mobile communication network and method thereof configured to transmit emergency information to an emergency contact or dispatcher via a simple manipulation of a mobile phone handset to notify the dispatcher of the user's state of emergency and the location of the accident
15 and to maintain the user's security by having a mute mode on the mobile phone handset.

- The present invention further provides an apparatus for processing an emergency call using a mobile communication network and method thereof adapted to limit a call connection to be made only to a related emergency
20 contact or dispatcher while the emergency information is transmitted to the emergency contact or dispatcher, and to allow an automatic switch to a wire-tapping mode in which only information reception is permitted when the call connection is made with the emergency contact or dispatcher.

- In accordance with an embodiment of the present invention, the apparatus for
25 processing an emergency call using a mobile communication network includes

a key pad for performing an input of signals from a function key for transmitting voice communication and message information, a duplexer for performing a radio communication via a mobile communication, a receiving unit for receiving voice signals and text information from said duplexer, a voice
5 process unit for outputting the voice signals received from said receiving unit via a speaker and for voice-processing transmitted voice signals inputted from a microphone, a transmitting unit for transmittably filtering and amplifying the transmitted voice signals, a display unit for transmittably and receivably displaying the voice communication and the text information, and a power
10 driving circuit for supplying power from a power battery source to each operating circuit.

The apparatus comprises emergency function input means for performing an input function for notifying an emergency situation that occurs to a subscriber of a relevant mobile phone; memory means stored with telephone
15 number information of an emergency contact to be notified with the emergency situation and emergency information equipped with notification contents of the emergency situation according to the input function of said emergency function input means; and control means for executing an emergency mode according to the input function of said emergency function input means to make a call
20 connection to the emergency contact, and transmitting the emergency information contained in said memory means to the emergency contact, and executing a wire-tapping mode according to the emergency transmission from the emergency contact to prohibit reception of voice signals from said receiving unit and to allow only the voice to be transmitted via said transmitting unit.

25 In accordance with another embodiment of the present invention, there is provided a method for processing an emergency call using a mobile communication network, the method comprising the steps of: manipulating an

emergency function input means of a mobile phone handset by a subscriber of the mobile phone handset when an emergency situation occurs to the subscriber thereof; executing an emergency mode according to manipulation of said emergency function input means to make a call connection to a pre-set
5 emergency contact via a mobile communication network; transmitting emergency information via the mobile communication network in order to notify the emergency situation to the emergency contact when a call connection is made with the emergency contact; executing a wire-tapping mode when a call connection is requested by the emergency contact to prohibit reception of the
10 voice and to allow only the voice inputted from the surroundings of a relevant mobile phone handset to be transmitted and to be wire-tapped by the emergency contact; and disconnecting the call according to a call disconnection requested by the emergency contact.

BRIEF DESCRIPTION OF THE DRAWINGS

15 For fuller understanding of the nature and objects of the invention, reference should be made to the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic block diagram for illustrating a state where an emergency call processing apparatus is applied to a mobile communication
20 network according to an embodiment of the present invention;

FIG. 2 is another schematic block diagram for illustrating a construction of an emergency call processing apparatus according to an embodiment of the present invention;

FIGs. 3a and 3b are schematic drawings of the exterior of a mobile
25 phone handset where an emergency call processing apparatus is applied according to an embodiment of the present invention; and

FIGs. 4a and 4b are flow charts for explaining the operations of an

emergency call processing method using a mobile communication network according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

5

Hereinafter, the preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings.

As shown in FIG. 1, an emergency call processing apparatus according to the preferred embodiment of the present invention includes a mobile phone
10 handset 2, a plurality of mobile phone base station transceivers 4, a mobile communication relay 6, a mobile communication controller 8, a mobile communication switch board 10, an emergency information control server 12, a short message processing server 14, an information database 16, an information display unit 18, an emergency transmitting phone 20 and a position
15 tracking control server 22.

When a user of a mobile phone handset 2 is being assailed by a robber, is confined in a bounded area against his or her will, is being chased, is being attacked in a house by a burglar, or is distressed in a mountainous area, the user may simply manipulate an emergency key button disposed on the handset
20 which transmits emergency information intrinsically stored therein to an emergency contact such as a police station, fire station or dispatcher via a mobile communication network.

Furthermore, the mobile phone handset 2 restrictively allows only the call connection from a relevant emergency contact to be made while the
25 emergency information is transmitted to the emergency contact, and call incoming from other wire telephones or mobile phone handsets are blocked. When the restricted call connection is made to the emergency contact, an

automatic mode switch to a wire-tapping mode is executed to stop the voices transmitted from the emergency contact and to allow voices and images at an accident site around the mobile phone handset to be transmitted in voices and images, whereby key input contents are transmitted via a key pad 30 at the
5 mobile phone handset 2.

A plurality of base station transceivers (4, BST) are installed at the vicinity of the moving positions of the mobile phone handset 2, and when a relevant mobile phone handset 2 is moved, the voice and the radio data are enabled to be transmitted and registered so that a mobile phone handset or a
10 wire phone at the other party can be matched via radio.

The mobile communication relay 6 relays data between each BST 4 and the mobile communication controller 8, whereas the mobile communication controller 8 performs the matching function of the BST 4 via the mobile communication relay 6 and performs hand-off processes and call controls
15 among each BST 4.

As shown in FIG. 1, the mobile communication switch board 10 performs call connection between the mobile phone handset 2 and the emergency information control server 12 to thereby enable to exchange voices, images, key input data and text information.

20 The emergency information control server 12 performs a call connection with the mobile phone handset 2 via the mobile communication switch board 10 to receive and record the short messages of emergency information transmitted from the mobile phone handset 2. When a call connection is realized with the mobile phone handset 2 in relation to emergency transmittal
25 via the emergency transmitting phone 20, the server 12 records voice contents at the accident site received via the wire-tapping mode of the mobile phone

handset 2, and images and key input contents.

The emergency information control server 12 further requests to the position tracking control server 22 a position tracking of the mobile phone handset 2 that has transmitted the emergency information and receives a
5 detected position information in relation to the result of the position tracking from the position tracking control server 22 to display same on the information display unit 18.

The short message processing server 14 processes short messages containing the contents of the emergency information transmitted from the
10 mobile phone handset 2 to display same on the information display unit 18 and to store same in the information database 16.

The information database 16 stores the emergency information as text data transmitted from the mobile phone handset 2, voice data received from the accident site via wire-tapping, and images and key input contents. The
15 information display unit 18 displays short message data of emergency information with reference to the emergency state transmitted from the mobile phone handset 2 via the mobile communication network.

The emergency transmitting phone 20 is manipulated by a controller at a related emergency contact office to refer to an emergency information and to
20 make a call connection of emergency transmission for confirmation of the emergency state when the emergency information with reference to the occurrence of the emergency state is received from the mobile phone handset 2 via the emergency information control server 12 to be displayed on the information display unit 18.

25 The position tracking control server 22 searches a BST adjacent to the

position of the mobile phone handset 2 that has transmitted emergency information out of a plurality of BSTs according to the request of the position tracking by the emergency information control server 12, and searches an area where the mobile phone handset 2 is positioned according to a position
5 information transmitted from the BST.

FIG. 2 is a block diagram for illustrating the construction of an emergency call processing apparatus according to an embodiment of the present invention.

As shown in FIG. 2, the emergency call processing apparatus includes a
10 key pad 30, an emergency key button 32, a display unit 34, a vibration generating unit 36, a duplexer 38, a receiver 40, a transmitter 42, a voice processor 44, a speaker 46, a microphone 48, an image input unit 49, a power battery 50, a power driving circuit 52, first and second power switches 54 and 56, a memory 58 and a controller 60.

15 The key pad 30 is mounted with a plurality of function key buttons inclusive of number key buttons for a power on/off manipulation of a related mobile phone handset 2 and for text input for exchanging short messages and input of telephone numbers for voice communication with third parties. The keypad 30 serves to perform manipulation of input of a secret number and
20 mode release for releasing an emergency mode by which emergency information transmission is made possible.

Furthermore, the emergency key button 32 executes an emergency mode for notifying an emergency state by way of button manipulation by a mobile phone subscriber while a stand-by power is received regardless of the
25 power on/off state of a related mobile phone 2 handset. It is preferable to execute the emergency mode by continuous manipulation of the related

emergency key button 32 for over a few seconds, e.g., over 3 seconds.

In other words, as illustrated in Figure 3a, the key pad 30 includes a communication key button 30a for forming a communication route in order to make it possible to communicate via voice with a controller at an emergency contact office by releasing a wire-tapping mode under an emergency mode, a menu key button 30b for performing a set-up manipulation for releasing an emergency mode, and a number key button 30c for inputting a predetermined secret number in order to release an emergency mode, where the emergency key button 32 is mounted at an external lateral surface of a related mobile phone handset 2 for a mobile phone subscriber to easily manipulate same under emergency situations.

The plurality of function key buttons and an emergency key button 32 disposed at the key pad 30 are prohibited from being supplied with power for lighting each key button according to the power control from the controller 60 when an emergency mode is executed.

The display unit 34, a thin liquid crystal diode for visually displaying the states of voice communication and text communication with third parties stops its display operation for displaying the communication function under the power control from the controller 60 when an emergency mode is executed.

The vibration generating unit 36 generates vibrations by driving a vibration motor coupled to an eccentricity cam for notifying the mobile phone subscriber of a call from another party. In other words, the vibration generating unit 36 generates vibrations for notifying that an emergency information is being transmitted to the emergency information control server 12 of the emergency contact office while the emergency mode is normally executed by the manipulation of the emergency key button 32. It is preferred that

vibrations are continuously generated a plurality of times at a predetermined time interval, e.g., three times.

The duplexer 38 is for separating transmitted signals from received signals by performing radio communications with the BSTs 4 at the mobile communication network via an antenna, where the receiver 40 receives voice signals or text information from the mobile phone handset of the other party or a wire telephone via the antenna or the duplexer 38, while the transmitter 42 transmittably filters and amplifies the voice signals inputted from the microphone 48 disposed at a related mobile phone handset 2 and image signals inputted from the image input unit 49 and key input information outputted from the controller 60.

When the wire-tapping mode in the receiver is executed, receiving process is stopped relative to the voice signals from the emergency contact office received via the antenna and the duplexer 38 according to the control of the controller 60, such that transmission of received voices via the speaker 46 is prohibited.

The voice processor 44 processes the voice signals received from the other party via the receiver 40 to allow same to be outputted through the speaker 46 and processes the voice signals of a user inputted from the microphone 48 to allow same to be outputted to the transmitter 42. If the wire-tapping mode is executed, the received voice cannot be processed because reception of voice signals from the receiver 40 is prohibited.

As illustrated in FIG. 3a, an area where the microphone 48 is installed at the longitudinal end of the mobile phone handset 2 is formed with a groove 70 for enabling the ambient voice signals to be inputted through the microphone 48 even if a lid of the mobile phone handset 2 is closed while the wire-tapping

mode is executed.

As shown in FIG. 3b, the image input unit 49 is installed at an external front side of the mobile phone handset 2, such that, when the wire-tapping mode is executed, the unit 49 receives an external front image of the mobile phone handset 2 in response to the control of the controller 60 to generate an
5 image signal and sends same to the transmitter 42.

The power driving circuit 52 receives power from the power battery 50 to supply power to a stand-by power source and to each operating circuitry. The first and second power switches 54 and 56 perform switching operations
10 for intermittently supplying operating power of the power driving circuit 52 according to the switching control of the controller 60.

Although the first and second power switches 54 and 56 perform the switching operations for supplying the operating power to the whole operating circuitries according to the switching control of the controller 60 in a normal
15 mode under which voice communication and text information transmission are possible, the second power switch 56 is switched off to cut off a power supply route under the switching control of the controller 60 when the emergency mode is implemented, such that power can be supplied to the operating circuitries such as illuminating circuits including the key pad 30 and the
20 emergency key button 32 and a back light circuit at the display unit 34 which may be exposed to the outside.

The memory 58 stores the emergency information inclusive of emergency contact telephone numbers under the emergency mode designated in accordance with the button manipulation of the emergency key button 32,
25 names, addresses, identification numbers of related mobile phone subscribers and particular emergency messages, and also stores data of reception refusal

guide messages for advising call connection refusals with reference to generation of an emergency condition when telephone numbers are called other than the emergency telephone numbers of the emergency contacts.

At this time, it is preferable that the emergency contact telephone
5 numbers and reception refusal guide messages stored in the memory 58 are arbitrarily inputted and stored by manipulation of the key pad 30 by a user.

The controller 60 executes an emergency mode of requesting a call connection with an emergency contact on the mobile communication network through the transmitter 42 and the duplexer 38 according to a button signal
10 inputted by a continuous manipulation of the emergency button for a few seconds while stand-by power is supplied to the emergency key button 32 regardless of the on/off power states. The controller 60 executes mute/no-light modes under the above-mentioned call connection request state to switch off the second power switch 56, thereby stopping an illumination operation of
15 the key pad 30 and the emergency key button 32, back light function of the display unit 34 and generation of call sound.

Furthermore, the controller 60 controllably drives the vibration generating unit 36 to regularly create a plurality of vibrations at set time periods, such that a predetermined emergency contact and a call connection
20 can be informed of their normal operation with reference to implementation of the emergency mode.

When a call connection with the emergency information control server 12 of an emergency contact is implemented according to the execution of the emergency mode, the controller 60 processes the emergency information stored
25 at the memory 58 by way of short messages to send same to the emergency information control server 12 via the transmitter 42 and the duplexer 38.

At this time, although the controller 60 is allowed to execute the emergency mode according to the manipulation of the emergency key button 32 for a few seconds continuously, e.g., three seconds, it should be apparent that the emergency mode may be allowed to be executed if the related emergency
5 key button 32 is manipulated a plurality of times, e.g., three times, within a set period of time.

Furthermore, although the controller 60 is so configured to make a call only to a pre-set single emergency contact, e.g., police station, by a continuous manipulation of the emergency key button 32, it should be preferable that,
10 while the memory 58 is stored with telephone numbers of a plurality of emergency contacts, e.g., crime report center, fire station, home telephone number, etc., only the emergency mode is mode-switched by a continuous one-time manipulation of the emergency key button 32 for a few seconds, where a desired emergency contact is sequentially selected out of the plurality of
15 emergency contacts to enable to send emergency information according to a button manipulation of the emergency key button 32 for a short period time under the emergency mode.

Furthermore, when a call connection is requested from the emergency information control server 12 while the emergency mode is implemented to
20 allow the emergency information to be sent to the emergency information control server 12, the controller 60 determines whether the telephone number is the one requested by the call connection and then determines again whether that telephone number is the same as the information of the emergency call telephone number stored in the memory 58, thereby performing the automatic
25 call connection. When there is a call connection attempt by other telephone numbers except the telephone number of the relevant emergency contact, the guide message stored in the memory 58 is sent to notify that the attempted call

connection is being rejected by the occurrence of the emergency condition, thereafter prohibiting the call connection.

Hereinafter, the operation of the present invention thus constructed will be described in detail with reference to flow charts in FIGs. 4a and 4b.

5 First, let's assume that a subscriber of a mobile phone handset 2 is being threatened by a robber. When the emergency key button 32 mounted at an external lateral surface of the mobile phone handset 2 is continuously manipulated for more than a few seconds, e.g., 3 seconds (step S10), the controller 60 receives a button input signal according to the continuous button
10 manipulation of the emergency key button 32 to execute the emergency mode, and determines whether the relevant mobile phone handset 2 is turned off (step S11).

As a result, if it is determined that the power of the relevant mobile phone handset 2 is off, instead of the power driving circuit 52 and the first
15 power switch 56 being controllably switched on by the power-on manipulation to allow the power to be supplied to each operating circuit terminal from the power battery 50 (step S12), the controller 60 performs no sound/no light modes to maintain the switching-off state of the second power switch 56, thereby preventing illumination of the key pad 30 and the emergency key button
20 32, preventing visibility to third parties. Further, the back light of the display unit 34 is also prevented from being illuminated and a call sound from being generated (step S13).

Under the above-mentioned condition, the controller 60 dials the emergency telephone number of the emergency contact, e.g., police station,
25 stored in the memory 58 according to a manipulation of the emergency key button 32 to request a call connection to the emergency information control

server 12 corresponding to the emergency contact via the mobile phone base station transceivers 4, the mobile phone relay 6, the mobile communication controller 8 and the mobile phone communication switch board 10 and drives the vibration generator 36 in the midst of a call connection request to allow the
5 relevant mobile phone handset 2 to vibrate a plurality of times regularly at set periods of time (step S14).

As a result, when there is a response from the emergency information control server 12 with regard to call connection (step S15), the mobile communication switch board 10 prompts call connection between the mobile
10 phone handset 2 and the emergency information control server 12 (step S16).

Under the call connection, the controller 60 processes the emergency information data stored in the memory 58 as a short message to generate an emergency guide message (step S17) and transmits a short emergency guide message to the emergency information control server 12 via the mobile
15 communication network (step S18).

Under step S18, the emergency information control server 12 receives the short emergency message data transmitted from the mobile phone handset 2 to display the contents thereof so that a controller at the related emergency contact can visually confirm the contents (step S19).

20 Successively, the emergency information control server 12 entrusts the position tracking server 22 with a position tracking of the mobile phone handset 2 (step S20) and the emergency transmitting phone 20 is manipulated by the controller at the related emergency contact office (step S21) to request a call connection with the mobile phone handset 2 through the mobile
25 communication switch board 10 (step S22).

Meanwhile, the position tracking control server 22 searches the position of the relevant mobile phone handset 2 according to the strength of the electric field relative to the radio waves from the mobile phone handset 2 received from the plurality of base station transceivers 4 to thereby detect an accurate
5 position (step S23) and draws up a detected position information of the mobile phone handset 2 according to the detected position of the mobile phone handset 2 to send same to the emergency information control server 12 (step S24).

As a result, the emergency information control server 12 visually
10 displays the position information of the mobile phone 2 handset on the information display unit 18 based on the detected position information received from the position tracking control server 22 (step S25).

Under the afore-mentioned state, the controller 60 of the mobile phone handset 2 determines whether the telephone number requesting the call
15 connection through the mobile communication switch board is the telephone number of the emergency contact stored in the memory 58 (step S26) and as a result of the determination thereof, if the telephone number requesting the call connection through the mobile communication switch board 10 is not the telephone number of the emergency contact, the controller 60, under the call
20 connection state, processes the data of the receipt ban guide message stored in the memory 58 by way of a short message to send same to the other party (step S27) and stops the call-back with the other party (step S28).

However, if it is determined as a result of step S26 that the telephone number requesting the call connection is the telephone number of the
25 emergency contact, the controller 60, instead of switching the mode to a wire-tapping mode to prevent the receiving sound signal transmitted from the emergency transmitting phone 20 of the emergency contact office from being

processed at the receiver 40, allows the sound signal inputted from the microphone 48 and processed through the voice processor 44 and the image signal outputted from the image input unit 49 and the key input information via the key pad 30 to be transmitted via the transmitter 42 and the duplexer 38
5 (step S29).

At this time, the controller 60 activates the microphone 48, the voice processor 44 and the image input unit 49 regardless of whether the lid of the mobile phone 2 is closed or opened to allow the voice and the image to be sent and the key input information to be transmitted via the key pad 30. By way of
10 reference, even if the lid of the mobile phone 2 is closed, surrounding voices can be inputted to the microphone 48 through the groove 70 formed at the body of the mobile phone handset 2.

As a result, the mobile communication switch board 10 transmits the voice signal, image signal and the key input information received from the
15 mobile phone handset 2 to the emergency information control server 12 (step S30), while the emergency information control server 12 records and stores the wire-tapped voice signal, the image signal and the key input information of the mobile phone handset 2 received via the mobile communication switch board 10 into the information database 16 (step S31).

20 By way of reference, the key input information recorded and stored in the information database 16 is so recorded as to be confirmed of its contents and take necessary measures when a mobile phone subscriber under a coerced condition or an unrelated person uses the mobile phone handset 2 to perform on-line transactions such as sending cash, transferring money via bank
25 accounts or settling accounts via credit cards.

Meanwhile, the controller 60 at the mobile phone handset 2

determines whether a relevant mobile phone subscriber manipulates the communication key button 30a at the keypad 30 in order to communicate with the emergency contact office (step S32).

As a result of the determination at step S32, if it is determined that the communication key button 30a at the key pad 30 is being manipulated, the controller 60 changes the mode from a communication mode to a wire-tapping mode to allow the voice signal from the receiver 40 to be signal-processed (step S33), such that it is possible to voice-communicate between the relevant mobile phone handset 2 and the emergency transmitting phone 20 via the mobile communication network (step S34).

Successively, the controller 60 determines whether the mobile phone subscriber has manipulated the function key button at the keypad 30 to end the communication (step S35). As a result of the determination at step S35, if it is determined that the mobile phone subscriber has manipulated the key pad 30 to end the call connection, the controller 60 requests release of the call connection to the mobile phone switch board 10 on the mobile communication network (step S36), whereby the mobile communication switch board 10 disconnects the call connection with the emergency transmitting phone 20 and the mobile phone handset 2 (step S37).

Meanwhile, the controller 60 determines whether the menu key button 30b at the keypad 30 has been manipulated for release of the emergency mode (step S38).

As a result of the determination at step S38, if it is determined that the menu key button 30b of the key pad 30 has been manipulated for release of the emergency mode, a comparison is made between the secret number input through the button manipulation of the number key button 30c and the pre-set

secret number (step S39), and when the secret number pre-set by the number key button 30c is accurately inputted, the emergency mode is released to be switched to normal mode (step S40).

5 The present invention is by no means limited to the afore-said embodiment, and various modifications may be possible within the scope of the present invention. By way of example, although in the present invention, a call connection is made with a relevant mobile phone handset via the emergency transmitting phone connected with the information control server connected in order to wire-tap an emergency situation at a place where the mobile phone
10 handset is located according to the wire-tapping mode, it should be apparent that call connections are possible for wire-tapping through a radio communication apparatus of other emergency contacts such as mobile patrol cars, adjacent police boxes connectable via radio or wire service with the emergency information control server and other mobile phone handsets.

15 As apparent from the foregoing, there is an advantage in the apparatus for processing an emergency call using a mobile communication network and method thereof thus described according to the present invention in that, when an emergency occurs to a mobile phone subscriber, an emergency key button separately disposed at a mobile phone handset can be easily manipulated to
20 enable to transmit an emergency information to a pre-designated emergency contact while a call connection to the emergency contact is not exposed for the viewing of third parties.

There is another advantage in that, according to an emergency call to a relevant emergency contact, a wire-tapping mode is set up to enable to wire-tap
25 an ambient situation at an accident site in voice and image signals without being visibly exposed, such that it is possible to swiftly and accurately notify the urgent emergency situation to an intended emergency contact, allowing effective

access to the accident site and enabling to cope with the emergency situation at an early stage.

There is still another advantage in that the surroundings of a mobile phone can be filmed when in wire-tapping mode and the filmed images can be
5 transmitted to an emergency contact to allow an immediate notification of a mug shot of a culprit for swift action to the emergency situation, preventing escape or hiding of the culprit at the very beginning.

There is still a further advantage in that contents inputted to a key pad of a mobile phone handset can be transmitted to an emergency contact when in
10 wire-tapping mode to ascertain the contents and to take appropriate action thereto when a mobile phone subscriber under a coercive situation or an unrelated third person uses the mobile phone handset to transmit money on-line via a phone banking or an Internet banking method, or credit card transaction.

15

WHAT IS CLAIMED IS:

1. An apparatus for processing an emergency call using a mobile communication network, the apparatus including a key pad for performing an input of signals from a function key for transmitting voice communication and message information, a duplexer for performing a radio communication via a mobile communication, a receiving unit for receiving voice signals and text information from said duplexer, a voice process unit for outputting the voice signals received from said receiving unit via a speaker and for voice-processing transmitted voice signals inputted from a microphone, a transmitting unit for transmittably filtering and amplifying the transmitted voice signals, a display unit for transmittably and receivably displaying the voice communication and the text information, and a power driving circuit for supplying power from a power battery source to each operating circuit end, the apparatus comprising:

emergency function input means for performing an input function for notifying an emergency situation that occurs to a subscriber of a relevant mobile phone;

memory means stored with telephone number information of an emergency contact to be notified with the emergency situation and emergency information equipped with notification contents of the emergency situation according to the input function of said emergency function input means; and

control means for executing an emergency mode according to the input function of said emergency function input means to make a call connection to the emergency contact, and transmitting the emergency information contained in said memory means to the emergency contact, and executing a wire-tapping mode according to the emergency transmission from the emergency contact to prohibit reception of voice signals from said receiving unit and to allow only the

voice to be transmitted via said transmitting unit.

2. The apparatus as defined in claim 1, wherein said control means performs an emergency mode according to the input function continued for a few seconds from said emergency function input means.

5 3. The apparatus as defined in claim 1, wherein said emergency function input means is a single emergency key button disposed at an external surface of a relevant mobile phone handset.

4. The apparatus as defined in claim 1 further comprising a power switch for selectively controlling the power supply to each operational circuit in relation to
10 operational power from said power driving circuit, wherein said control means applies mute/no-light modes when the emergency mode is executed to switchingly control said power switch, such that illumination of the key pad, lighting of back light at the display unit and generation of call sound can be avoided.

15 5. The apparatus as defined in claim 1, wherein said control means supplies stand-by power to said emergency function input means and drives said power driving circuit by way of input function of said emergency function input means to controllably turn on the power.

6. The apparatus as defined in claim 1 further comprising a vibration
20 generating unit for generating vibrations when a call connection is made to an emergency contact under the emergency mode, wherein said control means controls said vibration generating unit so that said vibration generating unit can regularly and periodically generate plural vibrations when a call connection is made to an emergency contact under the emergency mode.

25 7. The apparatus as defined in claim 1, wherein the emergency information

stored in said memory means is a short text message including personal information of a relevant subscriber of a mobile phone handset and emergency message information for guiding the emergency situation.

8. The apparatus as defined in claim 1, wherein said control means changes a mode to communication mode when the function key at said key pad is manipulated under the wire-tapping mode to enable to perform a voice communication with an emergency contact through said receiver and said transmitter.

9. The apparatus as defined in claim 1 further comprising an image input unit for inputting images, wherein said control means transmits an image signal inputted via said image input unit under a wire-tapping mode to the emergency contact along with the transmitted voice.

10. The apparatus as defined in claim 1, wherein said control means further performs a control operation where the key input information inputted by manipulating said key pad under the wire-tapping mode is transmitted to the emergency contact along with the transmitted voice so that on-line settlement contents using phone banking, Internet banking or credit cards can be wire-tapped.

11. An emergency call processing method using the mobile communication network, the method comprising the steps of:

manipulating an emergency function input means of a mobile phone handset by a subscriber of the mobile phone handset when an emergency situation occurs to the subscriber thereof;

executing an emergency mode according to manipulation of said emergency function input means to make a call connection to a pre-set

emergency contact via a mobile communication network;

transmitting emergency information via the mobile communication network in order to notify the emergency situation to the emergency contact when a call connection is made with the emergency contact;

5 executing a wire-tapping mode when a call connection is requested by the emergency contact to prohibit reception of the voice and to allow only the voice inputted from the surroundings of a relevant mobile phone handset to be transmitted and to be wire-tapped by the emergency contact; and

 disconnecting the call according to a call disconnection requested by
10 the emergency contact.

12. The method as defined in claim 11, wherein the step of executing the emergency mode according to manipulation of said emergency function input means to perform a call connection with a pre-set emergency contact further comprises a step of generating vibrations regularly and periodically for a set
15 period of time under a normal call connection condition with the emergency contact.

13. The method as defined in claim 11, wherein the step of executing the call connection to the emergency contact according to the emergency mode and the step of transmitting the emergency information to the emergency contact
20 according to the call connection comprises a step of executing mute/no-light modes to prohibit visibility of illumination from the mobile phone handset and generation of call sound.

14. The method as defined in claim 11, wherein the step of generating a call connection request from the emergency contact further comprises a step of
25 transmitting a message for notifying refusal of call incoming in response to the

emergency situation and prohibiting call incoming when there are call requests by other parties except the emergency contact.

15. The method as defined in claim 11, wherein the step of wire-tapping the transmitted voice of a mobile phone handset from the emergency liaison
5 according to the wire-tapping mode further comprises a step of switching to a normal communication mode when a communication key button at the key pad is manipulated by a subscriber of a mobile phone handset.

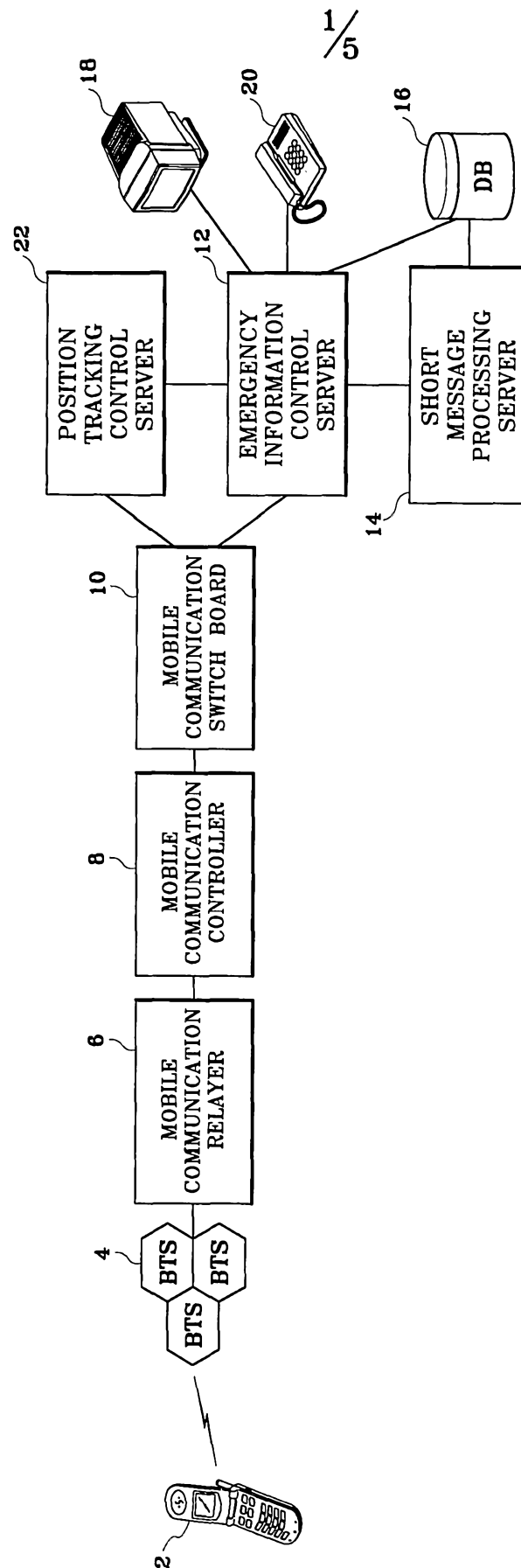
16. The method as defined in claim 11, wherein the step of disconnecting the call connection with the emergency contact further comprises the steps of:
10 executing the release of the emergency mode by a menu manipulation on the key pad at the mobile phone handset; and

 inputting a secret number pre-set by manipulation of the key pad to release the emergency mode.

17. The method as defined in claim 11 further comprising a step of
15 transmitting an image inputted via said image input unit disposed at the mobile phone handset along with the transmitted voice to allow the emergency contact to wire-tap the image when the wire-tapping mode is being executed.

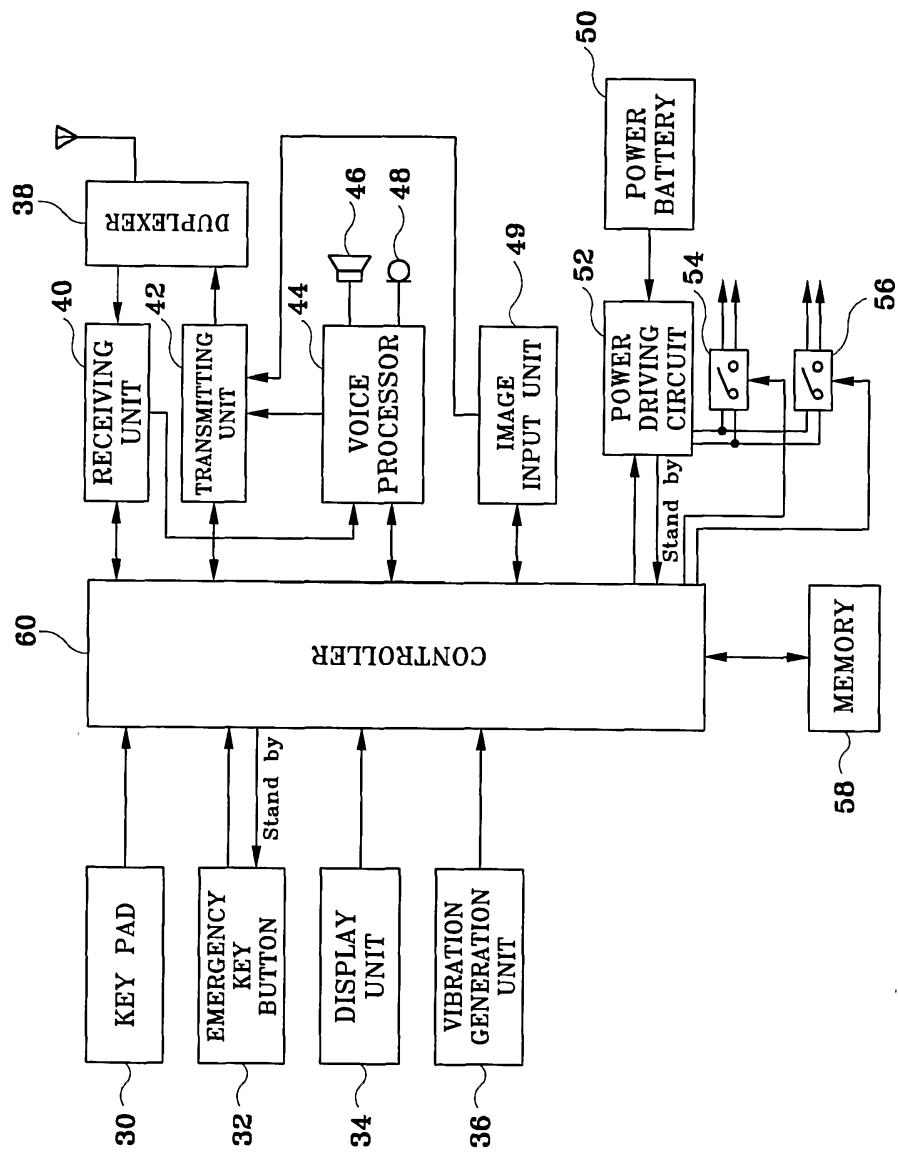
18. The method as defined in claim 11 further comprising a step of
20 transmitting key input contents inputted through the key pad at the mobile phone handset along with the transmitted voice to allow the emergency contact to wire-tape the key input contents when the wire-tapping mode is being executed such that on-line settlement contents using phone banking, Internet banking or credit card can be wire-tapped.

FIG. 1



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FIG. 2



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FIG.3a

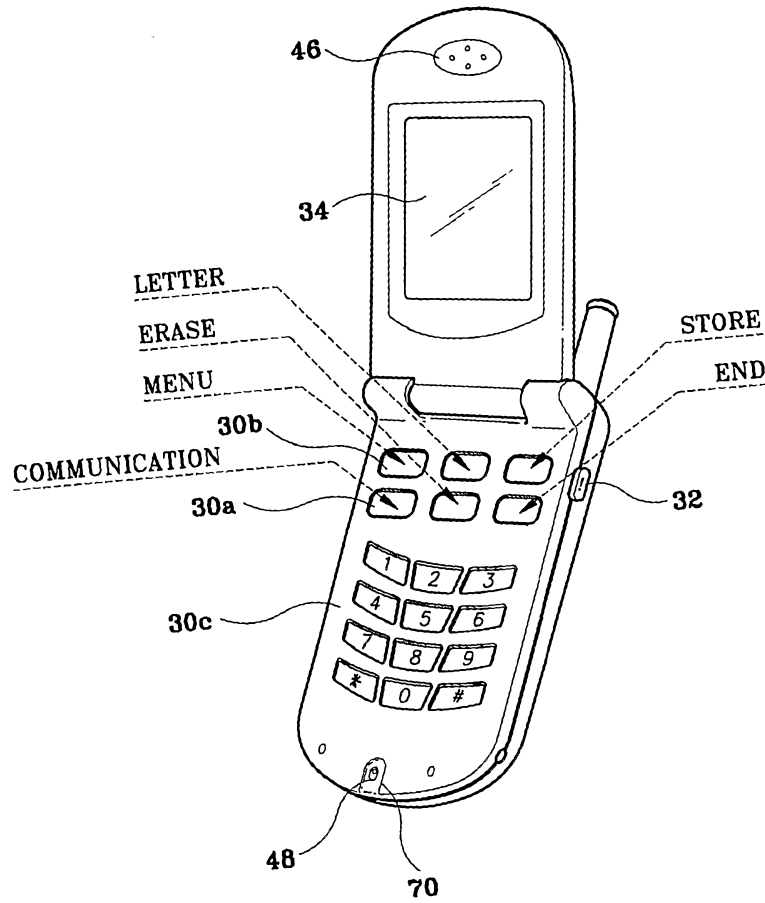
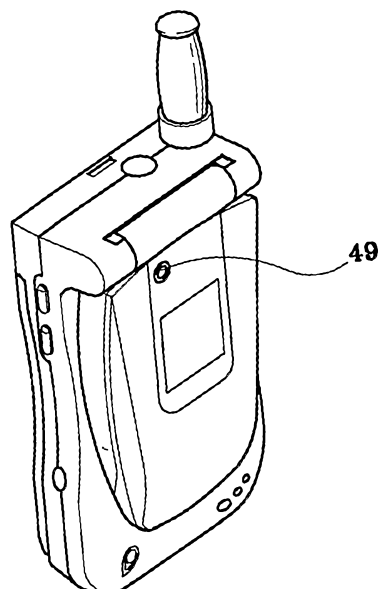
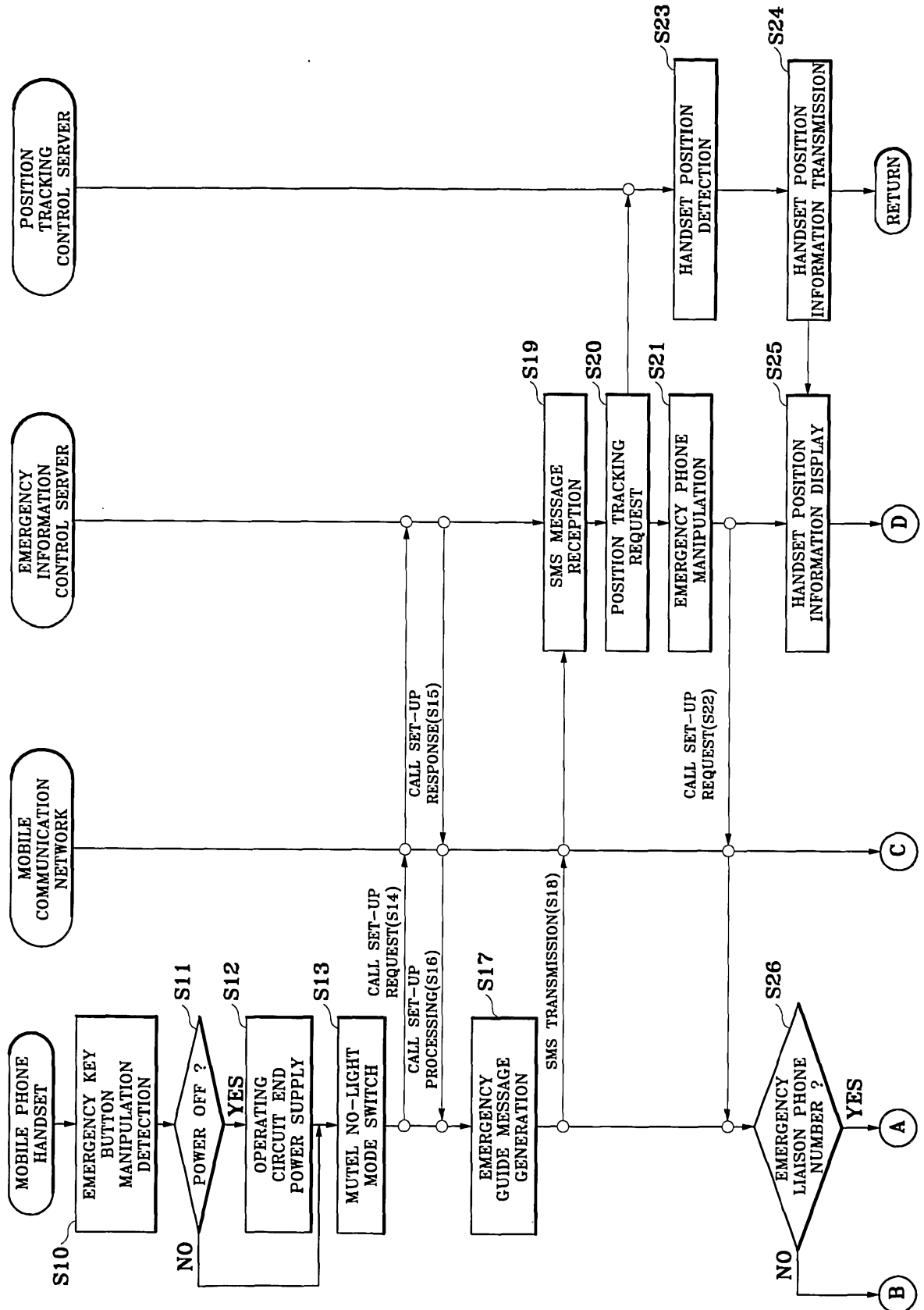


FIG.3b



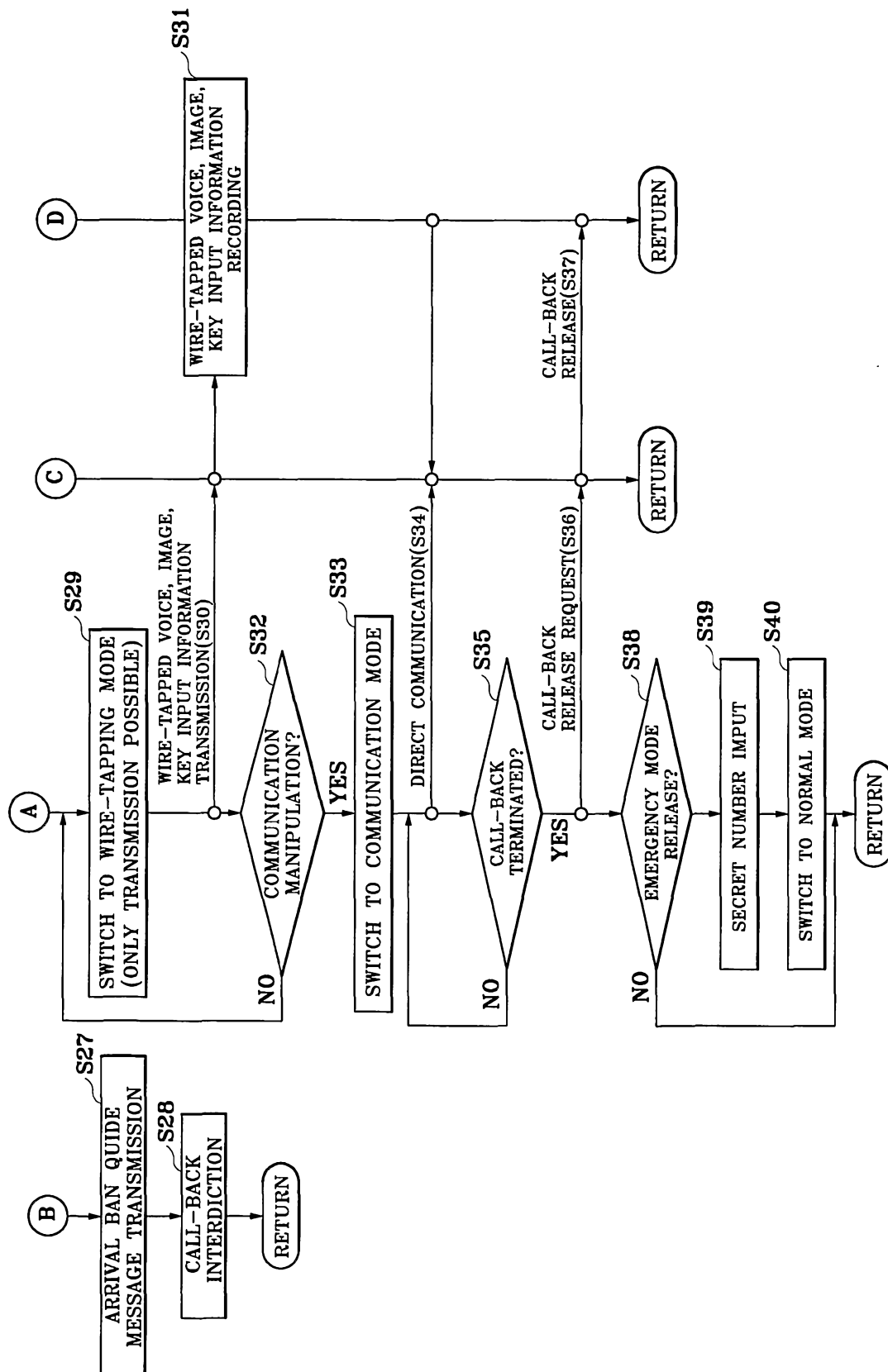
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FIG. 4a



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FIG. 4b



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR02/02351

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04B 1/40

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)

H04B 1/38, 40

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

Korean Patents and applications for inventions since 1975, Korean Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, 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.
A	KR 2001-8938 A (SAMSUNG ELECTRONICS CORP.) 5 FEB. 2001, page 3 1-25lines	1-18
A	KR 20-184208 Y1 (SA ELECTRONICS CORP) 21 MAR 2000, page 7-30lines	1-18
A	KR 20-191013 Y1 (LEE KWANG-WOOK) 22 MAY 2000, see abstract	1,11

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search

28 JANUARY 2003 (28.01.2003)

Date of mailing of the international search report

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