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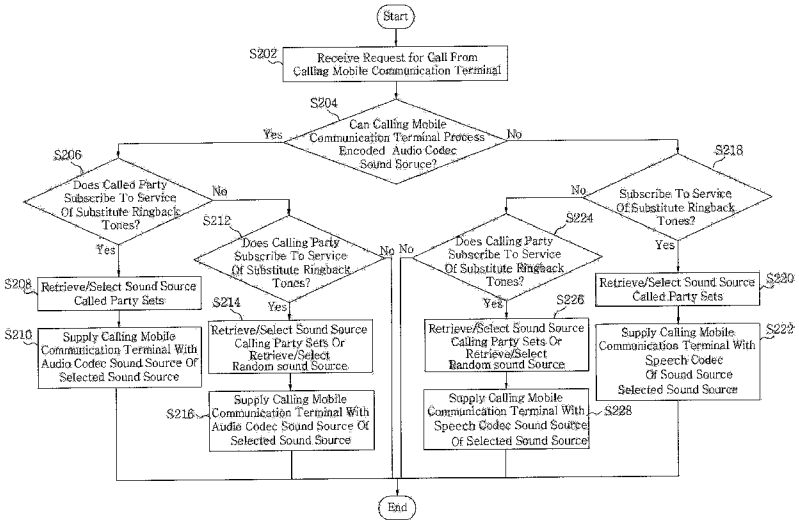
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(54) **Title:** METHOD, SYSTEM AND APPARATUS FOR PROVIDING MULTIMEDIA RING BACK TONE ALTERNATIVE SERVICE ACCORDING TO CAPABILITY OF MOBILE COMMUNICATION TERMINAL



(57) **Abstract:** Disclosed is a method, a system and an apparatus for providing a RBT-substitute service of various forms by taking into consideration not only whether or not a calling party or a called party is the subscriber to the RBT- substitute service, but also the capability of a mobile communication terminal of the calling party,*i.e.* whether or not the mobile communication terminal can decode a sound source of a substitute ringback tone by using an audio COder/DECoder (CODEC).

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METHOD, SYSTEM AND APPARATUS FOR PROVIDING MULTIMEDIA RING BACK TONE ALTERNATIVE SERVICE ACCORDING TO CAPABILITY OF MOBILE COMMUNICATION TERMINAL

Technical Field

The present invention relates to a method, a system and an apparatus for providing a multimedia ringback tone substitute service (hereinafter, "RBT-substitute service") according to the capability of a mobile communication terminal. More particularly, the present invention relates to a method, a system and an apparatus for providing a RBT-substitute service of various forms by taking into consideration not only whether or not a calling party or a called party is the subscriber to the RBT-substitute service, but also the capability of a mobile communication terminal of the calling party, i.e. whether or not the mobile communication terminal can decode a sound source of a substitute ringback tone by using an audio COder/DECoder (CODEC).

Background Art

As computers, electronics and communications

technologies progress by leaps and bounds, a variety of wireless communication services using a wireless communication network are widely provided. The most basic wireless communication service corresponds to a voice call service that enables a mobile communication subscriber to talk over the telephone with a counterpart subscriber who makes use of a mobile communication terminal without restrictions on time and place. Further, recently, data services over the air interface while the mobile communication subscribers are moving, emerged and are gathering strength.

Accordingly, a mobile communication subscriber can be provided with various information (e.g., news, weather conditions, sports, securities, exchange rates, traffic information, etc.), meeting the needs of living, in various forms such as characters, sounds, images, etc., by using the wireless data services.

In the meantime, a supplementary service has been developed which can replace a conventional ringback tone with songs, music, or other sounds (hereinafter, "RBT-substitute") that a called party or a calling party specifies, and is in the limelight for the mobile communication subscribers, wherein the ringback tone is the audible ringing that is heard on the phone line by the

calling party after dialing and prior to the call being answered at the distant end. When a calling party places a phone call to a called party, the calling party will hear the RBT-substitute instead of the conventional ringback tones through the calling party's mobile communication terminal. In the service of the substitute ringback tones, up-to-date pop songs, bird singings, sound of stream, even voice of the called party or the calling party that has been recorded, etc., can be used as the RBT-substitutes. As the RBT-substitute service is provided, the calling party hears not a monotonous and mechanical ringback tone but sounds of various sound sources, so that the RBT-substitute can satisfy the calling party's sense of hearing.

The service for the RBT-substitutes is conventionally provided for the mobile communication terminal from a mobile communication network implemented with a mobile communication system such as a Code Division Multiple Access (CDMA) 2000 system, a Wideband CDMA (WCDMA) system, etc.

In providing the RBT-substitute service, the mobile communication network conventionally uses a speech CODEC of variable transmission rates, such as an Enhanced Variable Rate Codec (EVRC), an Adaptive Multi Rate codec (AMR), for the efficiency of the voice call and optimization of wireless channels. The speech CODEC detects a silence

section and a second section, creates a proper code book, and is suitably designed for maximizing channel efficiency in order to provide a voice service at the least bit rate through mapping.

Yet, the speech CODEC of variable transmission rates such as the EVRC and the AMR also apply the same logic to a sound source such as music which has few silence section and encodes the sound source by using a voice code book. Meanwhile, if an encoding is performed by mapping the sound source like music onto the voice code book, a diversity of traits of music cannot be preserved since the encoding of the sound source is suited to a human voice pattern. Consequently, a coding error may be generated and the quality of the music becomes deteriorated. Hence, the speech CODEC of the variable transmission rates is not suitable for encoding a sound source of an audio form such as music.

In order to solve the problems of the speech CODEC of the variable transmission rates, a new way for correction of a sound source has been developed and is widely used. A Content Provider (CP) who supplies a sound source extracts the sound source from high-quality music such as a Compact Disk (CD), corrects the sound source to be fitted to the speech CODEC such as the EVRC and encodes a corrected sound source, to thereby minimize injury of the sound source that

may be generated due to the employment of the speech CODEC.

The scheme of correcting the sound source depends on a pre-processing considering characteristics of the EVRC CODEC or on manual work of an acoustic engineer. However, even though these corrections do work to a degree of a voice quality, they cannot guarantee the high quality for the RBT-substitute.

In this connection, encoding the sound source by using the audio CODEC is the most efficient in providing the RBT-substitute. To achieve this, however, there exist some preceding technical issues to be addressed.

Among the preceding technical issues, the first issue is that an audio CODEC for a voice channel of the mobile communication terminal should be provided. For example, a voice channel of 8 Kbps is used for CDMA 2000 system, and a voice channel of 12.3 Kbps is used for a Global System for Mobile communications (GSM) system. Tuning the audio CODEC to be suited to the transmission rates of the voice channel should be able to provide an improved-quality RBT-substitute service.

Second, a service section is classified into a RBT-service section and a voice section. While the audio CODEC is applied to transmission of the sound source to the mobile communication terminal in the RBT-substitute section, the

speech CODEC is applied to transmission of the sound source to the mobile communication terminal in the voice section. Further, the mobile communication terminal should enable a relevant CODEC to decode the sound source, and can produce a decoded sound source.

Third, sound sources suited to the audio CODEC applied to the mobile communication terminal and the mobile communication network should be provided.

In summary, so as to provide high-quality RBT-substitute service, the service section should be classified into the RBT-substitute section and the voice section, and it is essential to switch between the audio CODEC and the speech CODEC to apply an appropriate to the sound source. In other words, the CODECs should be adaptively applied to the mobile communication network and the mobile communication terminal, depending on the type of services including the service of RBT-substitute and the voice communication. However, a technology for providing RBT-substitute service in such a way has not yet been disclosed.

Meanwhile, since conventional RBT-substitute services provides music the RBT-substitute by using only the speech CODEC, it should only be determined whether to use a RBT-substitute set either by a calling party or by a called party. Namely, the calling party-based RBT-substitute

service and the called party-based RBT-substitute service have been provided, and the called party-based RBT-substitute service has been more popular.

In the case of the called party-based RBT-substitute service, a conventional RBT-substitute service is provided based on whether or not a called subscriber is subscribed to the RBT-substitute service. Still, in order to provide the above-mentioned high-quality RBT-substitute service, it should be checked not only whether or not the called subscriber is subscribed to the service, but also whether or not a mobile communication terminal of the calling party can accommodate the service.

As for the called party-based RBT-substitute service, even though the mobile communication terminal of the calling party is equipped with the audio CODEC capable of performing the RBT-substitute service, the conventional ringback tone is provided in a case where the called party is not subscribed to the RBT-substitute service. Further, when the called party is subscribed to the RBT-substitute service, but is not subscribed to the multimedia RBT-substitute service, only conventional ringback tone can be provided. Accordingly, the type of services should be determined by considering both the capability of the mobile communication terminal of the calling party, i.e. whether or not the

mobile communication terminal can perform the multimedia RBT-substitute service, and the subscription status, i.e., whether or not the calling party or the called party is subscribed to the RBT-substitute service.

Hence, it is required a RBT-substitute service that can take full advantage of the capability of the mobile communication terminal of the calling party. In other words, it is required to develop a scheme for providing various RBT-substitute services making use of the capability of the mobile communication terminal of the calling party or the subscription status of the calling party to the RBT-substitute services.

Disclosure of the Invention

Therefore, the present invention has been made in view of the above-mentioned problems, and it is an object of the present invention to provide a method, a system and an apparatus for providing a RBT-substitute service of various forms by taking into consideration not only whether or not a calling party or a called party is the subscriber to the RBT-substitute service, but also the capability of a mobile communication terminal of the calling party, i.e. whether or not the mobile communication terminal can decode a sound

source of a substitute ringback tone by using an audio COder/DECoder (CODEC).

In order to accomplish this object, there is provided a method for providing a RBT(RingBack Tone)-substitute service for a calling mobile communication terminal according to a capability of a mobile communication terminal, the method comprising the steps of: (a) establishing a communication path upon receiving a request for the call from the calling mobile communication terminal; (b) checking the capability of the calling mobile communication terminal and detecting whether the calling mobile communication terminal is capable of decoding and reproducing an audio CODEC sound source that corresponds to a sound source encoded by an audio CODEC; (c) checking whether a called mobile communication terminal is subscribed to the RBT-substitute service, if it is determined at step (b) that the calling mobile communication terminal is capable of decoding and reproducing the audio CODEC sound source; (d) encoding, by using the audio CODEC, a sound source that is set on the called mobile communication terminal, if it is determined at step (c) that the called mobile communication terminal is subscribed to the RBT-substitute service, and providing an encoded sound source to the calling mobile communication terminal; (e) checking whether a calling mobile

communication terminal is subscribed to the RBT-substitute service, if it is determined at step (c) that the called mobile communication terminal is not subscribed to the RBT-substitute service; and (f) encoding, by using the audio CODEC, a sound source that is set on the calling mobile communication terminal, if it is determined at step (e) that the calling mobile communication terminal is subscribed to the RBT-substitute service, and providing an encoded sound source to the calling mobile communication terminal.

According to another aspect of the present invention, there is provided a system for providing a RBT(RingBack Tone)-substitute service according to a capability of a mobile communication terminal, the system comprising: a calling mobile communication terminal for requesting a voice call; a called mobile communication terminal for receiving a request for the voice call; a sound source providing unit for providing a sound source of a RBT-substitute; and a mobile communication network for receiving the request for the voice call from the calling mobile communication terminal, for establishing a communication path with the calling mobile communication terminal, checking the capability of the calling mobile communication terminal and information on the RBT-substitute services of the calling mobile communication terminal and the called mobile

communication terminal, to gain knowledge of type of service to be provided for the calling mobile communication terminal, and accordingly providing the RBT-substitute service.

According to another aspect of the present invention, there is provided an apparatus for providing a RBT(RingBack Tone)-substitute service for a calling mobile communication terminal according to a capability of a mobile communication terminal, comprising: a unit for receiving information on the calling mobile communication terminal including a telephone number of the calling mobile communication terminal, information on the RBT-substitute service of a calling mobile communication terminal and information on the capability of the calling mobile communication terminal, and information on the called mobile communication terminal including a telephone number of the called mobile communication terminal, information on the RBT-substitute service of a called mobile communication terminal and information on the capability of the called mobile communication terminal, for gaining knowledge of type of service to be provided to the calling mobile communication terminal, and for providing the type of service.

Brief Description of the Drawings

The foregoing and other objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a block diagram illustrating a brief configuration of a system for providing a multimedia RBT-substitute service according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention;

FIG. 2 is a flowchart showing a method for providing a multimedia RBT-substitute service according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention; and

FIGs. 3A and 3B are flowcharts showing the first and second halves of a method for providing a multimedia RBT-substitute service according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention, respectively.

Best Mode for Carrying Out the Invention

Hereinafter, a preferred embodiment of the present invention will be described with reference to the accompanying drawings. In the following description and

drawings, the same reference numerals are used to designate the same or similar components, and so repetition of the description on the same or similar components will be omitted. In addition, a detailed description of known functions and configurations incorporated herein is omitted to avoid making the subject matter of the present invention unclear.

It will be assumed in the following description of a preferred embodiment of the present invention that a CDMA 2000 system is used as a mobile communication system for implementing a mobile communication network. However, this assumption is for convenience of description only, and the idea of the present invention is applicable to other types of synchronous or asynchronous mobile communication systems without being limited to that assumption.

As in providing a substitute of the conventional ringback tone (hereinafter, referred to as "RBT-substitute") insread of a conventional ringback tone to a wireless terminal in a wireless network, the wireless terminal controls a CODEC for a sound source of the RBT-substitutes to be switched to a speech CODEC or to an audio CODEC to reproduce the sound source. If a reproduced sound source is provided to various RBT-substitute services by taking into comprehensive consideration whether or not a calling party

and a called party subscribe to the RBT-substitute service, whether or not the calling party and the called party subscribe to a multimedia RBT-substitute service, and the capability of a mobile communication terminal of the calling party, it would be within the scope of the art of the present invention.

FIG. 1 is a block diagram illustrating a brief configuration of a system for providing a multimedia RBT-substitute service according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention.

The system for providing the multimedia RBT-substitute service reflecting the capability of a mobile communication terminal according to a preferred embodiment of the present invention includes a calling mobile communication terminal 110, a called mobile communication terminal 112, a mobile communication network 120, and a sound source providing unit 190.

The calling mobile communication terminal 110 and the called mobile communication terminal 112 are designated to provide voice communication therebetween via the mobile communication network 120 or with conventional wired telephones via a public switched telephone network (not shown). The mobile communication terminals may be Personal

Digital Assistants (PDAs), cellular phones, Personal Communication Service (PCS) phones, handheld PCs, Global System for Mobile (GSM) phones, Wideband CDMA (WCDMA) phones, CDMA-2000 phones, or Mobile Broadband System (MBS) phones, which are expected to be used in the 4th generation system currently under discussion.

According to a preferred embodiment of the present invention, the calling mobile communication terminal 110 transmits a voice communication request to the called mobile communication terminal 112 of the called party via the mobile communication network 120. When the called party is subscribed to the RBT-substitute service, the calling mobile communication terminal 110 receives a RBT-substitute from the mobile communication network 120, and plays it.

More particularly, as the calling mobile communication terminal 110 has transmitted a voice communication request to the called mobile communication terminal 112 via the mobile communication network 120 and received a RBT-substitute from the mobile communication network 120, if the sound source of the RBT-substitute has been encoded by an audio CODEC, the calling mobile communication terminal 110 sets the basic CODEC to the audio CODEC upon receiving signaling message, Data Burst Message (DBM), for requesting such setting. Then, the calling mobile communication

terminal 110 performs decoding of the sound source received from the mobile communication network 120 using the audio CODEC and plays it.

When the inventive calling mobile communication terminal 110 receives the DBM requesting that the basic CODEC be set as a voice CODEC from the mobile communication network 120, the calling mobile communication terminal 110 conducts the setting, so that the voice communication is provided by using the voice CODEC.

The called mobile communication terminal 112 according to a preferred embodiment of the present invention is adapted to receive a communication request from the calling mobile communication terminal 10 via the mobile communication network 120 and respond to a paging request of the mobile communication network 120.

The mobile communication network 120 according to a preferred embodiment of the present invention includes a caller-side wireless base station 130; a receiver-side wireless base station 132; a caller-side mobile communication exchange 140; a receiver-side mobile communication exchange 142; a Common Channel Signaling Network (CCSN) 150; a Home Location Register (HLR) 160; a gateway 170; and a sound source providing device 180, so as to provide the calling and called mobile communication

terminals 110 and 112 with a voice call service and a RBT-substitute service.

Each of the caller-side and receiver-side wireless base stations 130 and 132 of the mobile communication network 120 includes a base station transmission system and a base station controller.

According to a preferred embodiment of the present invention, upon receiving a call request from the calling mobile communication terminal 110, the caller-side wireless base station 130 establishes a speech path between the calling mobile communication terminal 110 and the caller-side mobile communication exchange 140. Upon receiving a bypass setup message corresponding to a transcoder control request message necessary to switch over to a bypass mode from the caller-side mobile communication exchange 140, the caller-side wireless base station 130 switches over to the bypass mode and relays an audio CODEC sound source received from the caller-side mobile communication exchange 140 to the calling mobile communication terminal 110 without passing through a vocoder.

On receiving a bypass release message corresponding to the transcoder control request message necessary to release the bypass mode from the caller-side mobile communication exchange 140 to deselect the bypass mode, the caller-side

wireless base station 130 does so. Then, the caller-side wireless base station 130 vocodes a voice call for voice call by using the vocoder, and relays it to the calling mobile communication terminal 110.

The caller-side and receiver-side mobile communication exchanges 140 and 142 of the mobile communication network 120 are adapted to process basic and additional services, subscribers' originating and incoming calls, and location registration and handoff procedures, as well as interwork with another network. Particularly, each of the caller-side and receiver-side mobile communication exchanges 140 and 142 uses the HLR 160 so as to obtain information on the calling and called parties, who are mobile communication subscribers of the calling and called mobile communication terminals 110 and 112, respectively, as well as information on the location and condition of respective mobile communication terminals.

When the caller-side mobile communication exchange 140 according to a preferred embodiment of the present invention is connected to the calling mobile communication terminal 110 through a speech path, on receiving a call requesting a voice call from the calling mobile communication terminal 110, the caller-side mobile communication exchange 140, with a receiver-side mobile communication exchange 142, performs

setup of an Integrated Services digital network (ISdn) User Part (ISUP) call. On receiving information on the RBT-substitute from a sound source providing device 180, information on the bypass mode, and information on control, the caller-side mobile communication exchange 140 controls the caller-side wireless base station 130 to switch to the bypass mode.

Besides, after the caller-side mobile communication exchange 140 controls the calling wireless bas station 130 to switch to the bypass mode, the caller-side mobile communication exchange 140 transmits a signaling message though the caller-side wireless base station 130, and controls the calling mobile communication terminal 110 to switch a basic CODEC to the audio CODEC. On receiving the audio CODEC sound source from the sound source providing device 180, the caller-side mobile communication exchange 140 transfers the received audio CODEC sound source to the calling mobile communication terminal 110.

Furthermore, if the receiver-side mobile communication exchange 142 informs the caller-side mobile communication exchange 140 that the called mobile communication terminal 112 responds to the receiver-side mobile communication exchange 142, the caller-side mobile communication exchange 140 controls the caller-side wireless base station 130 to

release the bypass mode, and controls the calling mobile communication terminal 110 to switch the basic CODEC to the speech CODEC. The caller-side mobile communication exchange 140 informs the calling mobile communication terminal 110 of the fact of the response of the called mobile communication terminal 112 as alert information, and enables the voice call to be performed between the calling mobile communication terminal 110 and the called mobile communication terminal 112.

In addition, when the caller-side mobile communication exchange 140, with the receiver-side mobile communication exchange 142, sets the ISUP call, the caller-side mobile communication exchange 140 transmits, to the receiver-side mobile communication exchange 142, information on the calling mobile communication terminal 110, including a telephone number of the calling mobile communication terminal 110, information on the RBT-substitute service of the calling party, and information on the capability of the calling mobile communication terminal 110.

If the caller-side mobile communication exchange 140 informs the receiver-side mobile communication exchange 142 according to a preferred embodiment of the present invention that the caller-side mobile communication exchange 140 is requested to receive a request for a voice call to the

called mobile communication terminal 112, the receiver-side mobile communication exchange 142, with the caller-side mobile communication exchange 140, performs setup of an ISUP call, carries out paging of the called mobile communication terminal 112, performs setup of an ISUP call with the sound source providing device 180, and transfers, to the caller-side mobile communication exchange 140, the audio CODEC sound source received from the sound source providing device 180.

Moreover, in a case where there exists a response from the called mobile communication terminal 112, the receiver-side mobile communication exchange 142 according to a preferred embodiment of the present invention informs the caller-side mobile communication exchange 140 of the fact of the response from the called mobile communication terminal 112, relays the audio CODEC sound source transmitted from the sound source providing device 180 to the caller-side mobile communication exchange 140, and relays the voice call between the calling mobile communication terminal 110 and the called mobile communication terminal 112.

Furthermore, when the receiver-side mobile communication exchange 142, with the sound source providing device 180, sets an ISUP call, the receiver-side mobile communication exchange 142 transmits, to the sound source

providing device 180, information on the called mobile communication terminal 112, including a telephone number of the called mobile communication terminal 112, and information on the RBT-substitute service of the called party, as well as information on the calling mobile communication terminal 110 received from the caller-side mobile communication exchange 140.

Herein, information on the RBT-substitute service of the calling mobile communication terminal 110 and that of the called mobile communication terminal 112, indicate whether or not the calling party and the called party subscribe to the RBT-substitute service, and the information on the capability of the calling mobile communication terminal 110 indicates whether or not the calling mobile communication terminal 110 equipped with the audio CODEC can perform the RBT-substitute service by enabling the audio CODEC to decode the audio CODEC sound source encoded by the audio CODEC to reproduce the audio CODEC sound source.

The CCSN 150 consists of signaling points and signaling links so as to provide a common channel signaling scheme standardized by ITU-T No. 7 scheme. As used herein, the common channel signaling scheme refers to a signaling scheme for separating the signaling information and network management information into voice and data so that they are

transmitted via a separate channel, which is commonly used for signal transmission.

The HLR 160 is a database storing service profiles related to subscription information of mobile communication subscribers. Particularly, the HLR 160 identifies the registration of respective mobile communication terminals, deletes the registration, and identifies their location. In addition, the HLR 160 stores the telephone numbers of mobile communication subscribers using respective mobile communication terminals, Mobile Identification Numbers (MINs), Electronic Serial Numbers (ESNs), information on the service type (i.e. whether or not the RBT-substitute service has been subscribed to), information necessary for routing to the sound source providing device 180, etc.

The gateway 170 corresponds to a device that enables communication networks to exchange information therebetween by connecting multiple communication networks of different types or multiple communication networks of the same type, to one another. The gateway 170 makes it possible to connect a plurality of communication networks or devices with one another, which are different in protocols from one another and are not compatible, to convert their protocols, and to exchange information between the communication networks or the devices with the relay of the gateway 170.

The sound source providing device 180 is an intelligent network IP for storing a sound source of the RBT-substitutes. At a request for the sound source of the RBT-substitutes, the sound source providing device 180 transmits a sound source authentication request to a sound source providing control server 194, and when the authentication has been successful, transmits the sound source of the RBT-substitutes to the receiver-side mobile communication exchange 142. When the sound source of the RBT-substitutes is received from a web server 198, the sound source providing device 180 stores and manages it.

After the sound source providing device 180 according to a preferred embodiment of the present invention performs setup of an ISUP call with the receiver-side mobile communication exchange 142, the sound source providing device 180 checks if the RBT-substitute service should be provided, i.e. the type of services, by using information on the RBT-substitute service, including information of the calling mobile communication terminal 110 and that of the called mobile communication terminal 112, received from the receiver-side mobile communication exchange 142. This will be described in detail with reference to FIG. 2.

At this time, in the case of providing the multimedia RBT-substitute service that provides the calling mobile

communication terminal 110 the audio CODEC sound source encoded by the audio CODEC, after generating information on the RBT-substitutes of a relevant sound source, information on the bypass mode, and information on control, the above information is transmitted to the caller-side mobile communication exchange 140, and the audio CODEC sound source is transferred to the receiver-side mobile communication exchange 142.

The sound source providing unit 190 includes Internet 192, a sound source providing control server 194, a subscriber DB 196, and a web server 198. The sound source providing unit 190 creates or receives the sound source of the RBT-substitutes, encodes it by an audio CODEC or a voice CODEC, and provides the sound source providing device 180 with it.

The Internet 192 refers to a global open-type computer network structure providing TCP/IP protocol and various services existing on its upper layers, particularly Hypertext Transfer Protocol (HTTP), Telnet, File Transfer Protocol (FTP), Domain Name Server (DNS), Simple Mail Transfer Protocol (SMTP), Simple Network Management Protocol (SNTP), Network File Service (NFS), and Network Information Service (NIS).

The sound source providing control server 194 is

adapted to control the provision of the RBT-substitutes. Particularly, the sound source providing control server 194 controls the sound source providing device 180 and the user DB so as to authenticate sound sources based on information on the calling and called parties of the calling and called mobile communication terminals 110 and 112, call request time, etc.

The subscriber DB 196 is adapted to store and manage information on subscribers of RBT-substitute service. The subscriber DB 196 provides subscriber information necessary for the sound source providing control server 194 to authenticate sound sources.

The web server 198 is connected to the sound source providing device 180 and the sound source providing control server 194 via Internet 192 so as to add the RBT-substitutes to the sound source providing device 180. In addition, the web server 198 provides user terminals or mobile communication terminals with a user interface so that the sound source providing control server 194 can determine and modify information necessary to specify a sound source, i.e. information on the calling party, calling party group, calling time, etc., as well as a sound source code corresponding to that information. To this end, the web server 198 provides the user terminals or mobile

communication terminals with web pages or WAP pages.

FIG. 2 is a flowchart showing a method for providing a multimedia RBT-substitute service according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention.

If the calling mobile communication terminal 110 requests the mobile communication network 120 to receive a voice call that the called mobile communication terminal 112 is to answer, the mobile communication network 120 sets a speech path with the calling mobile communication terminal 110, performs paging of the called mobile communication terminal 112, and checks if a certain RBT-substitute service is to be provided to the calling mobile communication terminal 110, i.e. the type of services.

Namely, if the mobile communication network 120 is requested to receive a call by the calling mobile communication terminal 110 (S202), the mobile communication network 120 checks if the calling mobile communication terminal 110 enables the audio CODEC to decode an encoded audio CODEC sound source to reproduce an audio CODEC sound source (S204). This is why a conventional RBT-substitute service or a simple ringback tone is provided if the calling mobile communication terminal 110 cannot process the audio CODEC sound source.

If it is checked in step S204 that the calling mobile communication terminal 110 can process the audio CODEC sound source, the mobile communication network 120 checks if a called party subscribes to the RBT-substitute service (S206).

If it is checked in step S206 that the called party subscribes to the RBT-substitute service, after the mobile communication network 120 searches for a sound source that the called party sets and selects the set sound source, the mobile communication network 120 supplies the calling mobile communication terminal 110 with the audio CODEC sound source of the selected sound source (S210).

On the contrary, if it is checked in step S206 that the called party does not subscribe to the RBT-substitute service, the mobile communication network 120 checks if a calling party subscribes to the RBT-substitute service (S212). If it is checked in step S212 that the calling party does not subscribe to the RBT-substitute service, the mobile communication network 120 completes the procedure and provides a standard ringback tone to the calling mobile communication terminal 110. If it is checked in step S212 that the calling party subscribes to the RBT-substitute service, after the mobile communication network 120 searches for a sound source that the calling party sets to select the set sound source or retrieves a sound source at random to

select the retrieved sound source (S214), the mobile communication network 120 supplies the calling mobile communication terminal 110 with the audio CODEC sound source of the selected sound source (S216).

Herein, the reason the mobile communication network 120 retrieves the sound source at random to select the retrieved sound source is as in the following. In a case when the mobile communication network 120 retrieves a sound source set for the calling mobile communication terminal 110 to select the retrieved sound source, a single sound source or a small number of sound sources is/are provided to the calling mobile communication terminal 110 as a sound source of a multimedia RBT-substitute, and accordingly, a variety of sound sources cannot be provided to the calling mobile communication terminal 110. On this account, in a case where the multimedia RBT-substitute service is provided, on whether or not the calling mobile communication terminal 110 subscribes to the RBT-substitute service, it is desirable that a diversity of RBT-substitutes can be provided by retrieving the sound source at random to select the retrieved sound source.

Meanwhile, if it is checked in step S204 that the calling mobile communication terminal 110 cannot process the audio CODEC sound source, the mobile communication network

120 checks if the called party subscribes to the RBT-substitute service (S218).

If it is checked in step S218 that the called party subscribes to the RBT-substitute service, the mobile communication network 120 retrieves the sound source set by the called party to select the retrieved sound source (S220), and transmits to the calling mobile communication terminal 110, a speech CODEC sound source of the selected sound source, i.e. a sound source of conventional RBT-substitutes encoded by a speech CODEC (S222).

If it is checked in step S218 that the called party does not subscribe to the RBT-substitute service, the mobile communication network 120 checks if the calling party subscribes to the RBT-substitute service (S224). If the calling party does not subscribe to the RBT-substitute service, the mobile communication network 120 completes the procedure, and supplies the calling mobile communication terminal 110 with the standard ringback tone. If the calling party subscribes to the RBT-substitute service, the mobile communication network 120 retrieves a sound source set by the calling party to select the retrieved sound source (S226), and provides a speech CODEC sound source of the selected sound source to the calling mobile communication terminal 110 (S228).

With reference to FIG. 2, the description of the method for providing a multimedia RBT-substitute service according to the capability of the mobile communication terminal was made based on the mobile communication network 120. Hereinafter, referring to FIGs. 3A and 3B, a procedure for processing the aforesaid method in the mobile communication network 120 will be described in detail.

FIGs. 3A and 3B are flowcharts showing the first and second halves of a method for providing a multimedia RBT-substitute service according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention, respectively.

Referring to FIGs. 3A and 3B, in specifically describing a method for providing a multimedia RBT-substitute service tones according to the capability of a mobile communication terminal according to a preferred embodiment of the present invention, as an aforementioned assumption, it should be clearly perceived that a description of the method will be made for convenience of description on the assumption that the mobile communication system constructing the mobile communication network 120 is CDMA 2000. Thus, terminologies and functions related to the following description may be different in other mobile communication systems.

While transmitting to the caller-side wireless base station 130 information, i.e., a telephone number, etc., on the called mobile communication terminal 112 according to the calling party's key input, the calling mobile communication terminal 110 requests the caller-side wireless base station 130 to receive a call (S302). The caller-side wireless base station 130 receiving a request for the call requests the caller-side mobile communication exchange 140 to set a speech path (S304), and the caller-side mobile communication exchange 140 requests the caller-side wireless base station 130 to assign the speech path to the calling mobile communication terminal 110 (S306).

The caller-side wireless base station 130 connects the speech path with the calling mobile communication terminal 110 (S308). The calling mobile communication terminal 110 informs the caller-side wireless base station 130 that the speech path is connected, and ascertains that the speech path is connected (S310). The caller-side wireless base station 130 informs the caller-side mobile communication exchange 140 that the assignment of the speech path is completed (S312).

If the caller-side mobile communication exchange 140 ascertains through the caller-side wireless base station 130 that the speech path is connected to the calling mobile

communication terminal 110, the caller-side mobile communication exchange 140 detects, by using HLR 160, the receiver-side mobile communication exchange 142 corresponding to a mobile communication exchange of an area where the calling mobile communication terminal 110 is located, and sets an ISUP call with the receiver-side mobile communication exchange 142. At this time, the caller-side mobile communication exchange 140 transmits, to the receiver-side mobile communication exchange 142, information on the calling mobile communication terminal 110, including a telephone number of the calling mobile communication terminal 110, information on the RBT-substitute service of the calling party, and the capability of the calling mobile communication terminal 110.

The receiver-side mobile communication exchange 142 that sets the ISUP call with the caller-side mobile communication exchange 140 performs paging of the called mobile communication terminal 112 by using a receiver-side wireless base stations 132 (S316), and sets an ISUP call with the sound source providing device 180 (s318). Then, the receiver-side mobile communication exchange 142 transfers, to the sound source providing device 180, information on the called mobile communication terminal 112, including a telephone number of the called mobile communication terminal

112 and information on the RBT-substitute service of the called party, as well as the information on the calling mobile communication terminal 110 received from the caller-side mobile communication exchange 140, in step 314.

In order to determine the type of services provided to the calling mobile communication terminal 110, the sound source providing device 180 that sets an ISUP call with the receiver-side mobile communication exchange 142 analyzes both the information on the calling mobile communication terminal 110 received from the receiver-side mobile communication exchange 142 and the information on the called mobile communication terminal 112, and determines the kind of services (S320).

Herein, because how the sound source providing device 180 determines the type of services has been described with reference to FIG. 2, a detailed description will be omitted. Hereinafter, for convenience of description, a description will be made of only a case where the calling mobile communication terminal 110 can process the audio CODEC sound source. Namely, hereinafter, at least one of a calling party and a called party is subscribing to the RBT-substitute service, and the description will be made on the assumption that the calling mobile communication terminal 110 corresponds to a terminal which can process the audio CODEC

sound source.

In order to provide the audio CODEC sound source to the calling mobile communication terminal 110, the sound source providing device 180 determining the type of services in step 320 transmits, to the caller-side mobile communication exchange 140, an Integrated Services digital network User Part_Call ProGress message (ISUP_CPG) message including information on a bypass mode and control information (S322).

The caller-side mobile communication exchange 140 receiving the ISUP_CPG message transfers, to the caller-side wireless base station 130, a bypass setup message corresponding to a transcoder control request message necessary to switch to the bypass mode. Upon receiving the transcoder control request message, after the caller-side wireless base station 130 switches to the bypass mode in which a vocoder does not operate, the caller-side wireless base station 130 transmits, to the caller-side mobile communication exchange 140, a bypass setup acknowledge message corresponding to a transcoder control acknowledge message giving notice of the completion of switching to the bypass mode (S324).

Then, so as to switch a basic CODEC of the calling mobile communication terminal 110 to the audio CODEC, the

caller-side mobile communication exchange 140 that controls the caller-side wireless base station 130 as in step 324, transfers to the calling mobile communication terminal 110, a DBM whose Teleservice Identifier (TI) is a specific value (e.g., 61888), as a signaling message (S326).

The calling mobile communication terminal 110 receiving the DBM checks the specific value (i.e., 61888) of the TI of the DBM, ascertains receiving a request for switching to the audio CODEC, and transmits a Data Burst Acknowledge Message (DBAM), as a signaling message, and in response to the DBM, whose TI is a specified value (e.g., 61889) to the caller-side mobile communication exchange 140 through the caller-side wireless base station 130 (S328). The DBAM corresponds to a message whose reprocessing cannot be accomplished, and the caller-side mobile communication exchange 140 receiving the DBAM does not perform other operations.

The calling mobile communication terminal 110 transmitting the DBAM switches its basic CODEC to the audio CODEC (S330).

After the basic CODEC of the calling mobile communication terminal 110 is switched to the audio CODEC, the audio CODEC sound source is transmitted to the calling mobile communication terminal 110. Namely, the sound source

providing device 180 transfers, to the receiver-side mobile communication exchange 142, the audio CODEC sound source of the RBT-substitutes that are set for the calling mobile communication terminal 110 or for the called mobile communication terminal 112. The receiver-side mobile communication exchange 142 relays transmission of the audio CODEC sound source to the caller-side mobile communication exchange 140. Then, the caller-side mobile communication exchange 140 transfers the audio CODEC sound source to the calling mobile communication terminal 110 through the caller-side wireless base station 130 (S332).

The calling mobile communication terminal 110 receiving the audio CODEC sound source enables the audio CODEC set for the basic CODEC to decode the audio CODEC sound source, and reproduces a RBT-substitute (S334). At this time, it is desirable that the calling mobile communication terminal 110 selects or switches an applied CODEC by retrieving a bit stream of the received audio CODEC sound source. Namely, it is desirable that the calling mobile communication terminal 110 retrieves the received audio CODEC sound source and switches the basic CODEC to a suitable CODEC by itself, in preparation for a case where a normal CODEC switching is not accomplished, including a case where there exists an error of the DBM that the calling

mobile communication terminal 110 receives from the caller-side mobile communication exchange 140, or a case when a specified CODEC is different from an equipped CODEC for the other reasons, etc.

Hereby, since the mobile communication network 120 can supply the calling mobile communication terminal 110 with the audio CODEC sound source encoded by the audio CODEC, and since the calling mobile communication terminal 110 can reproduce the audio CODEC sound source by using the audio CODEC, the quality of the RBT-substitute service can be improved, and various RBT-substitute services can be provided by taking, into comprehensive consideration, the capability of the calling mobile communication terminal 110, whether or not the calling mobile communication terminal 110 or the called mobile communication terminal 112 subscribes to the RBT-substitute service, in the mobile communication network 120.

Meanwhile, while the calling mobile communication terminal 110 is reproducing the RBT-substitutes, the called mobile communication terminal 112 can answer a request for a call of the calling mobile communication terminal 110, i.e. paging of the receiver-side mobile communication exchange 142. In this case, the mobile communication network 120 enables the calling mobile communication terminal 110 and

the called mobile communication terminal 112 to communicate with each other through a voice call. Hereinafter, a description will be made of a method in which the calling mobile communication terminal 110 can enable the speech CODEC to perform a voice call with the called mobile communication terminal 112 by controlling the calling mobile communication terminal 110 whose basic CODEC switches to the audio CODEC to switch to the speech CODEC.

If the called mobile communication terminal 112 is requested to receive paging by the receiver-side mobile communication exchange 142 in step S314, the called mobile communication terminal 112 informs a called party that the called party is requested to answer a call with the sound of the bell, vibrations, etc. Then the called party grasps this, manipulates the called mobile communication terminal 112 with a specific action, such as pressing a specific key, opening a cover of a mobile phone, etc., and expresses his/her intention to receive the call. At this time, the called mobile communication terminal 112 responds to paging of the receiver-side mobile communication exchange 142 (S336).

The receiver-side mobile communication exchange 142 receiving the response of the called mobile communication terminal 112 to paging, transfers to the caller-side mobile

communication exchange 140, an Integrated Services digital network User Part__ANswer Message (ISUP_ANM) message giving notice of the response of the called mobile communication terminal 112 (S338). As there is no need to supply the calling mobile communication terminal 110 with a RBT-substitute, i.e., an audio CODEC sound source, the receiver-side mobile communication exchange 142 releases an ISUP call with the sound source providing device 180 (S340).

In order to release the bypass mode requested in step S324, the caller-side mobile communication exchange 140 receiving the ISUP_ANM message in step S338 transmits to the caller-side wireless base station 130, a bypass release message corresponding to a transcoder control message requesting a release of the bypass mode (S342). The caller-side wireless base station 130 releases the bypass mode, carries out vocoding of a voice delivered thereafter through the speech CODEC, and delivers a vocoded voice to the calling mobile communication terminal 110.

The caller-side mobile communication exchange 140 requesting the caller-side wireless base station 130 to release the bypass mode so as to switch the basic CODEC of the calling mobile communication terminal 110, transmits a DBM whose TI is a specific value (e.g., 61890), as a signaling message, to the calling mobile communication

terminal 110 through the caller-side wireless base station 130 (S344).

The calling mobile communication terminal 110 receiving the DBM checks the specific value of the TI, ascertains a request for switching the basic CODEC to the speech CODEC, and transfers a DBAM whose TI is a specified value (e.g., 61891), as a signaling message and in response to the ascertained request, to the caller-side mobile communication exchange 140 through the caller-side wireless base station 130 (S346).

The caller-side mobile communication exchange 140 enables the caller-side wireless base station 130 to transmit to the calling mobile communication terminal 110 alert information giving notice of the response of the called mobile communication terminal 112 (S348).

The calling mobile communication terminal 110 receiving the alert information switches the basic CODEC to the speech CODEC (S350), and enables the speech CODEC to perform a voice call with the called mobile communication terminal 112 (S352). At this time, the caller-side wireless base station 130 enables the speech CODEC, set for the basic CODEC in step S350, to carry out vocoding of a voice, delivers the vocoded voice, and then the calling mobile communication terminal 110 enables the speech CODEC to

reproduce the voice. Accordingly, the audio CODEC decodes the RBT-substitute (i.e., the audio CODEC sound source) encoded by the audio CODEC, to reproduce the audio CODEC sound source, whereas the speech CODEC decodes the voice to be able to reproduce the voice. Consequently, the voice and the sound are respectively separated by the speech CODEC and the audio CODEC, the separated voice and the sound are delivered, and the delivered voice and the sound are reproduced, so that high-quality RBT-substitute services can be provided.

While this invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment and the drawings, but, on the contrary, it is intended to cover various modifications and variations within the spirit and scope of the appended claims.

Industrial Applicability

As can be seen from the foregoing, the present invention is advantageous in that in providing a RBT-substitute service, an audio CODEC and a speech CODEC are separately applied, and accordingly, high-quality RBT-

substitute services, can be provided.

Furthermore, a multimedia RBT-substitute service, a conventional RBT-substitute service, etc., can be provided by taking into comprehensive consideration, the capability of a mobile communication terminal of a calling party, whether or not the calling party or a called party subscribes to the multimedia RBT-substitute service, etc.

Claims

1. A method for providing a RBT(RingBack Tone)-substitute service for a calling mobile communication terminal according to a capability of a mobile communication terminal, the method comprising the steps of:

(a) establishing a communication path upon receiving a request for the call from the calling mobile communication terminal;

(b) checking the capability of the calling mobile communication terminal and detecting whether the calling mobile communication terminal is capable of decoding and reproducing an audio CODEC sound source that corresponds to a sound source encoded by an audio CODEC;

(c) checking whether a called mobile communication terminal is subscribed to the RBT-substitute service, if it is determined at step (b) that the calling mobile communication terminal is capable of decoding and reproducing the audio CODEC sound source;

(d) encoding, by using the audio CODEC, a sound source that is set on the called mobile communication terminal, if it is determined at step (c) that the called mobile communication terminal is subscribed to the RBT-substitute service, and providing an encoded sound source to the

calling mobile communication terminal;

(e) checking whether a calling mobile communication terminal is subscribed to the RBT-substitute service, if it is determined at step (c) that the called mobile communication terminal is not subscribed to the RBT-substitute service; and

(f) encoding, by using the audio CODEC, a sound source that is set on the calling mobile communication terminal, if it is determined at step (e) that the calling mobile communication terminal is subscribed to the RBT-substitute service, and providing an encoded sound source to the calling mobile communication terminal.

2. The method as claimed in claim 1, further comprising the steps of:

(g) checking whether the calling mobile communication terminal is subscribed to the RBT-substitute service, if it is determined at step (c) that the called mobile communication terminal is not subscribed to the RBT-substitute service; and

(h) retrieving randomly a sound source, encoding a retrieved sound source by using the audio CODEC, and providing an encoded sound source to the calling mobile communication terminal, if it is determined at step (g) that

the calling mobile communication terminal is subscribed to the RBT-substitute service.

3. The method as claimed in claim 1, further comprising step (i) providing the calling mobile communication terminal with a ringback tone, it is determined at step (e) that the calling mobile communication terminal is not subscribed to the RBT-substitute service.

4. The method as claimed in claim 1, further comprising, after step (c), the steps of:

(c1) checking whether the called mobile communication terminal is subscribed to the RBT-substitute service, if it is determined at step (b) that the calling mobile communication terminal is not capable of decoding the audio CODEC sound source to reproduce a decoded audio CODEC sound source; and

(c2) encoding, by using a speech CODEC, a sound source that is set on the called mobile communication terminal, and providing an encoded sound source to the calling mobile communication terminal, if it is determined at step (c1) that the called mobile communication terminal is subscribed to the RBT-substitute service.

5. The method as claimed in claim 4, further comprising, after step (c2), the steps of:

(c3) checking whether the calling mobile communication terminal is subscribed to the RBT-substitute service, if it is determined at step (c1) that the called mobile communication terminal is not subscribed to the RBT-substitute service; and

(c4) encoding, by a speech CODEC, a sound source that is set on the calling mobile communication terminal, and providing an encoded sound source to the calling mobile communication terminal, if it is determined at step (c3) that the calling mobile communication terminal is subscribed to the RBT-substitute service.

6. The method as claimed in claim 5, which further comprises, after step (c4), step (c5) providing a ringback tone to the calling mobile communication terminal, if it is determined at step (c3) that the calling mobile communication terminal is not subscribed to the RBT-substitute service.

7. A system for providing a RBT(RingBack Tone)-substitute service according to a capability of a mobile communication terminal, the system comprising:

a calling mobile communication terminal for requesting a voice call;

a called mobile communication terminal for receiving a request for the voice call;

a sound source providing unit for providing a sound source of a RBT-substitute; and

a mobile communication network for receiving the request for the voice call from the calling mobile communication terminal, for establishing a communication path with the calling mobile communication terminal, checking the capability of the calling mobile communication terminal and information on the RBT-substitute services of the calling mobile communication terminal and the called mobile communication terminal, to gain knowledge of type of service to be provided for the calling mobile communication terminal, and accordingly providing the RBT-substitute service.

8. The system as claimed in claim 7, wherein the type of service includes at least one among:

a multimedia RBT-substitute service for providing an audio CODEC sound source that is a sound source encoded by an audio CODEC as a sound source;

a RBT-substitute service for providing a speech CODEC

sound source that is a sound source encoded by a speech CODEC as the sound source; and

the RBT service for providing conventional ringback tones.

9. The system as claimed in claim 8, wherein the mobile communication network provides the calling mobile communication terminal with the multimedia RBT-substitute service, in a case when the calling mobile communication terminal corresponds to a terminal whose audio CODEC decodes the audio CODEC sound source to reproduce the audio CODEC sound source.

10. The system as claimed in claim 8, wherein the mobile communication network provides the calling mobile communication terminal with the RBT-substitute service, in a case when the calling mobile communication terminal does not correspond to a terminal whose audio CODEC decodes the audio CODEC sound source to reproduce the audio CODEC sound source.

11. The system as claimed in claim 8, wherein the mobile communication network provides the calling mobile communication terminal with the RBT service, in a case when the calling mobile communication terminal and the called

mobile communication terminal are not subscribed to the RBT-substitute service.

12. The system as claimed in claim 8, wherein the mobile communication network randomly retrieves a sound source, selects a retrieved sound source, encodes a selected sound source by using the audio CODEC, and provides an encoded sound source to the calling mobile communication terminal, in a case when the calling mobile communication terminal corresponds to a terminal whose audio CODEC decodes the audio CODEC sound source to reproduce the audio CODEC sound source, when the called mobile communication terminal is not subscribed to the RBT-substitute service, and when the calling mobile communication terminal is subscribed to the RBT-substitute service.

13. The system as claimed in claim 7, wherein the mobile communication network includes:

a caller-side wireless base station for receiving and delivering a call request from the calling mobile communication terminal;

a caller-side mobile communication exchange for storing information on the calling mobile communication terminal, including information on the capability of the

calling mobile communication terminal, a telephone number of the calling mobile communication terminal, and the RBT-substitute service of the calling mobile communication terminal, and for delivering the information on the calling mobile communication terminal if a call is requested from the caller-side wireless base station;

a receiver-side mobile communication exchange for receiving the information on the calling mobile communication terminal from the caller-side mobile communication exchange, for setting an Integrated Services digital network User Part (ISUP) call, for storing the information on the called mobile communication terminal, including a telephone number of the called mobile communication terminal and the information on the RBT-substitute service of the called mobile communication terminal, for storing information on the RBT-substitute service, including the information on the calling mobile communication terminal and the information on the called mobile communication terminal, and for delivering the information on the RBT-substitute service; and

a sound source providing device for receiving the information on the RBT-substitute service from the receiver-side mobile communication exchange, for analyzing the received information on the RBT-substitute service, for

detecting the type of services, and for providing a detected type of service.

14. An apparatus for providing a RBT(RingBack Tone)-substitute service for a calling mobile communication terminal according to a capability of a mobile communication terminal, comprising:

a unit for receiving information on the calling mobile communication terminal including a telephone number of the calling mobile communication terminal, information on the RBT-substitute service of a calling mobile communication terminal and information on the capability of the calling mobile communication terminal, and information on the called mobile communication terminal including a telephone number of the called mobile communication terminal, information on the RBT-substitute service of a called mobile communication terminal and information on the capability of the called mobile communication terminal, for gaining knowledge of type of service to be provided to the calling mobile communication terminal, and for providing the type of service.

15. The apparatus as claimed in claim 14, wherein the type of services includes at least one among:

a multimedia RBT-substitute service for providing an audio CODEC sound source that is a sound source encoded by an audio CODEC as the sound source;

a RBT-substitute service for providing a speech CODEC sound source that is a sound source encoded by a speech CODEC as the sound source; and

a RBT service for providing conventional ringback tones.

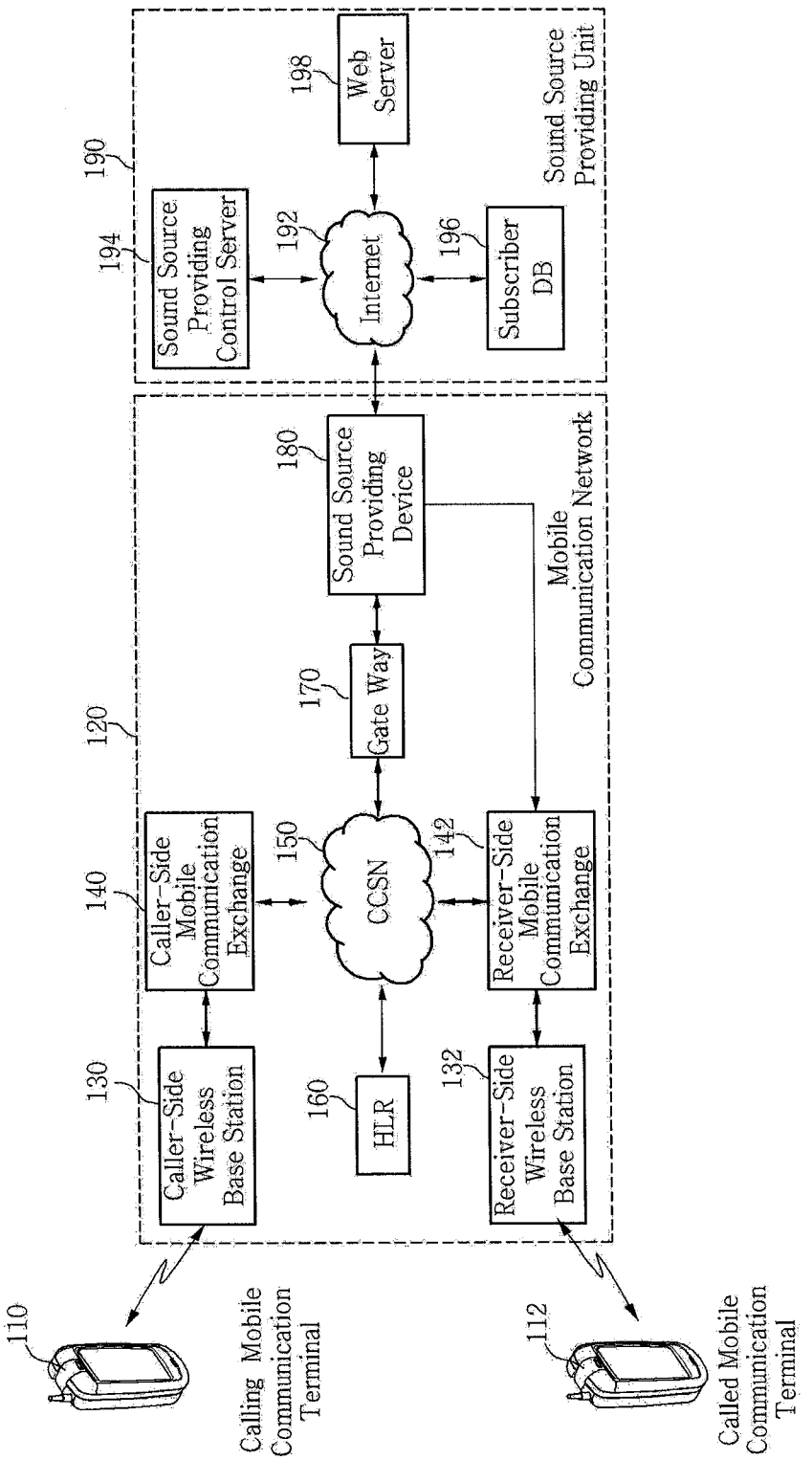

Sound Source Providing Unit
190
Web Server
198
Sound Source Providing Control Server
194
Internet
192
Subscriber DB
196
Mobile Communication Network
Sound Source Providing Device
180
Gate Way
170
120
Caller-Side Mobile Communication Exchange
140
CCSN
150
Receiver-Side Mobile Communication Exchange
142
Caller-Side Wireless Base Station
130
HLR
160
Receiver-Side Wireless Base Station
132
110
Calling Mobile Communication Terminal
112
Called Mobile Communication Terminal

FIG. 1

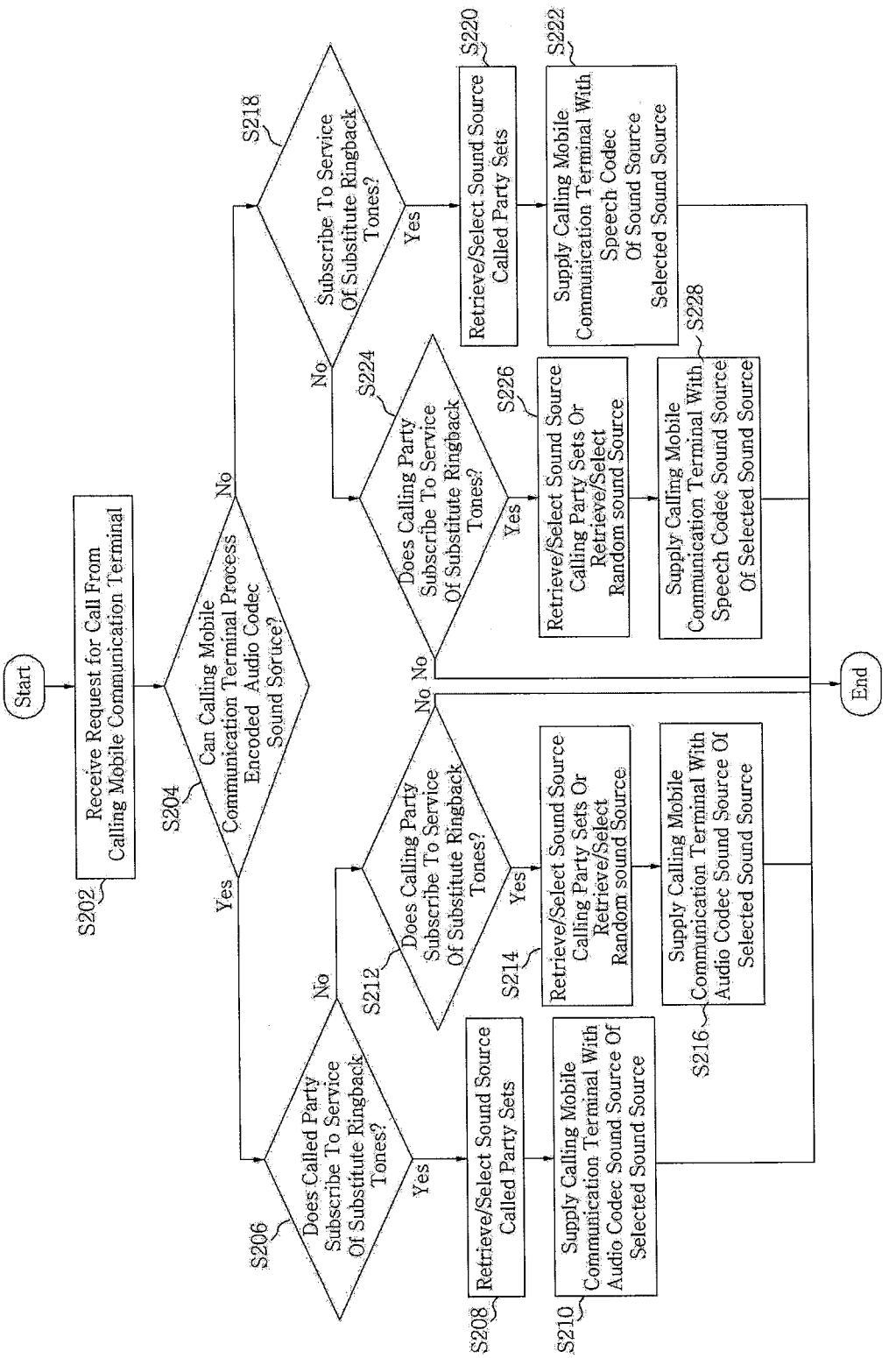

Start
Receive Request for Call From Calling Mobile Communication Terminal
S202
Can Calling Mobile Communication Terminal Process Encoded Audio Codec Sound Source?
S204
Yes
No
Does Called Party Subscribe To Service Of Substitute Ringback Tones?
S206
Yes
No
Retrieve/Select Sound Source Called Party Sets
S208
Supply Calling Mobile Communication Terminal With Audio Codec Sound Source Of Selected Sound Source
S210
Does Calling Party Subscribe To Service Of Substitute Ringback Tones?
S212
Yes
No
Retrieve/Select Sound Source Calling Party Sets Or Retrieve/Select Random sound Source
S214
Supply Calling Mobile Communication Terminal With Audio Codec Sound Source Of Selected Sound Source
S216
Subscribe To Service Of Substitute Ringback Tones?
S218
Yes
No
Retrieve/Select Sound Source Called Party Sets
S220
Supply Calling Mobile Communication Terminal With Speech Codec Of Sound Source Selected Sound Source
S222
Does Calling Party Subscribe To Service Of Substitute Ringback Tones?
S224
Yes
No
Retrieve/Select Sound Source Calling Party Sets Or Retrieve/Select Random sound Source
S226
Supply Calling Mobile Communication Terminal With Speech Codec Sound Source Of Selected Sound Source
S228
End

FIG. 2

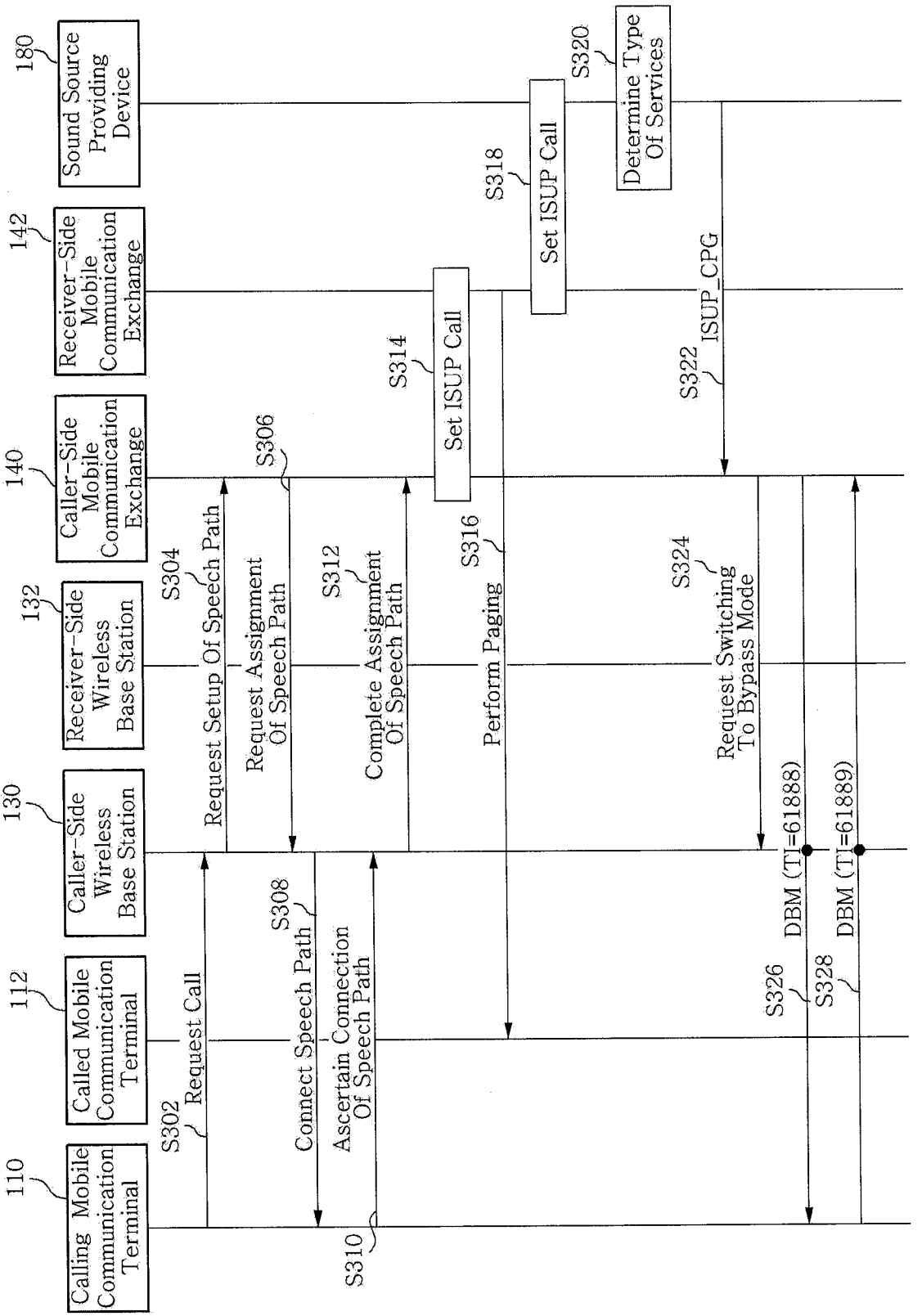

110
Calling Mobile Communication Terminal
112
Called Mobile Communication Terminal
130
Caller-Side Wireless Base Station
132
Receiver-Side Wireless Base Station
140
Caller-Side Mobile Communication Exchange
142
Receiver-Side Mobile Communication Exchange
180
Sound Source Providing Device
S302
Request Call
S304
Request Setup Of Speech Path
S306
Request Assignment Of Speech Path
S308
Connect Speech Path
S310
Ascertain Connection Of Speech Path
S312
Complete Assignment Of Speech Path
S314
Set ISUP Call
S316
Perform Paging
S318
Set ISUP Call
S320
Determine Type Of Services
S322
ISUP_CPG
S324
Request Switching To Bypass Mode
S326
DBM (TI=61888)
S328
DBM (TI=61889)

FIG. 3a

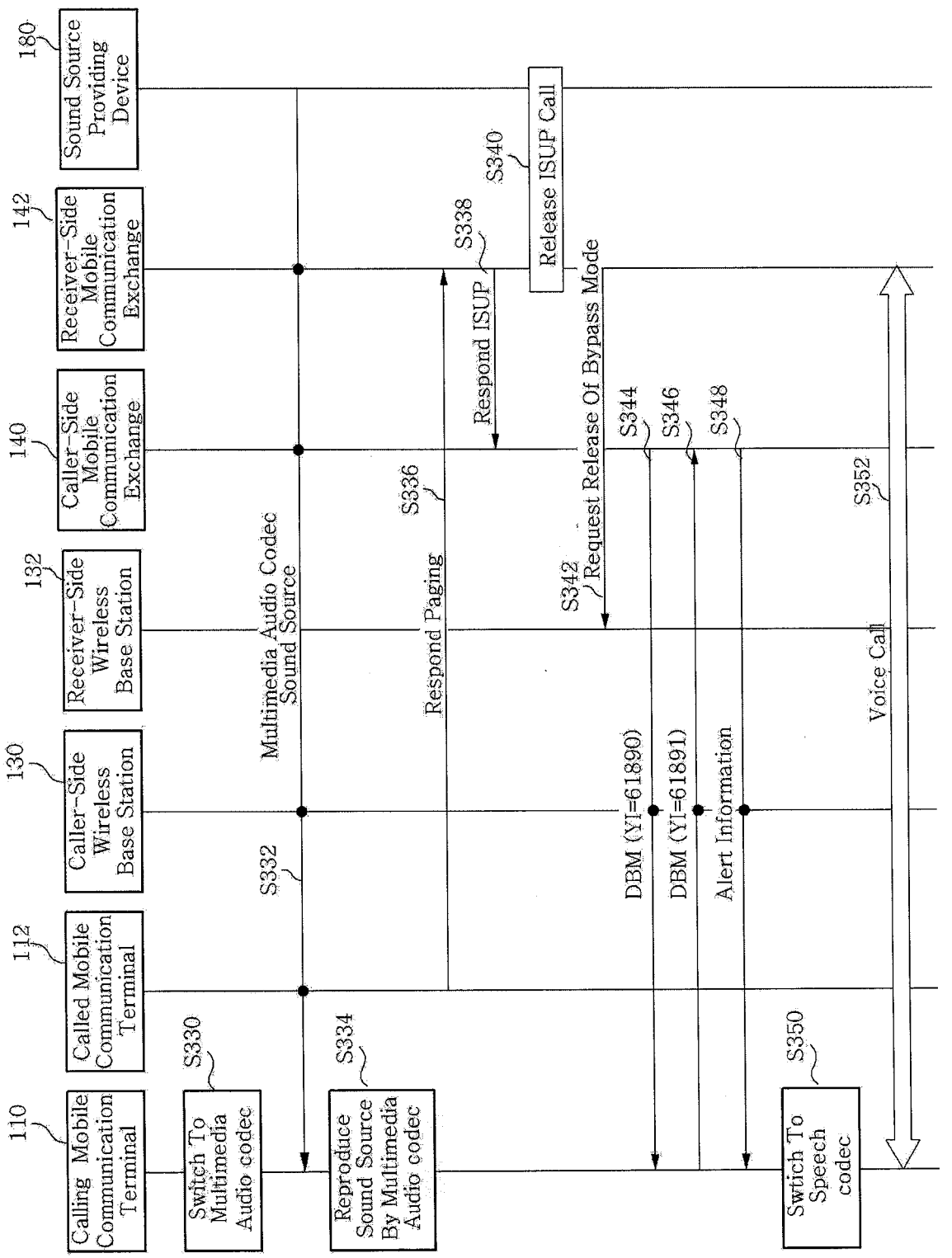

110
Calling Mobile Communication Terminal
112
Called Mobile Communication Terminal
130
Caller-Side Wireless Base Station
132
Receiver-Side Wireless Base Station
140
Caller-Side Mobile Communication Exchange
142
Receiver-Side Mobile Communication Exchange
180
Sound Source Providing Device
S330
Switch To Multimedia Audio codec
S332
Multimedia Audio Codec Sound Source
S334
Reproduce Sound Source By Multimedia Audio codec
S336
Respond Paging
S338
Respond ISUP
S340
Release ISUP Call
S342
Request Release Of Bypass Mode
S344
DBM (YI=61890)
S346
DBM (YI=61891)
S348
Alert Information
S350
Swtich To Speech codec
S352
Voice Call

FIG. 3b

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/003475

A. CLASSIFICATION OF SUBJECT MATTER

H04Q 7/38(2006.01)i

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)

IPC8: H04Q

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

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

eKIPASS(KIPO internal) "multimedia ring back tone, alternative sound, substitute sound"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO2005043926A2 (WIDERTHAN.COM CO., LTD.) 12 May 2005 See Abstract and Figure 4(including its corresponding detailed description)	1-15
Y	WO2006001682A2 (SK TELECOM CO., LTD) 05 Jan. 2006 See Abstract and Figure 3(including its corresponding detailed description)	1-15
Y	WO2006001681A1 (SK TELECOM CO., LTD) 05 Jan. 2006 See Abstract and Figure 3(including its corresponding detailed description)	1-15
Y	KR2006003548A (SK TELECOM CO., LTD) 11 Jan. 2006 See Abstract and Figure 3(including its corresponding detailed description)	1-15
Y	KR2006003746A (SK TELECOM CO., LTD) 11 Jan. 2006 See Abstract and Figure 3(including its corresponding detailed description)	1-15
Y	WO2006006801A1 (SK TELECOM CO., LTD) 19 Jan. 2006 See Abstract and Figure 3(including its corresponding detailed description)	1-15
Y	WO2006009362A1 (SK TELECOM CO., LTD) 26 Jan. 2006 See Abstract and Figure 4(including its corresponding detailed description)	1-15

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

☒ See patent family annex.

* Special categories of cited documents:

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

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

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

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

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

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

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Date of the actual completion of the international search	Date of mailing of the international search report
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