

[0061] The invention of this integrated terminal includes the following parts:

[0062] First, the system and method of the present invention incorporates a communication terminal integrating the Wireless LAN technology, Wireless PAN technology, Voice over IP (VoIP) technology and Wireline Internet Access technology with the existing common air interfaces mobile communication standards (for example, cdma2000, WCDMA, GSM, GPRS, TD-SCDMA, OFDM, etc) through the Open Wireless Architecture (OWA) platform of the present invention. OWA defines the open interface standard for each subsystem and function unit so that the system is open for upgrade and reconfiguration. The method of present invention supports any short range wireless access technologies including Wireless LAN and Wireless PAN, but not limited thereto. Also, as utilized hereinafter the term "common air interface mobile standards" refers to any type of mobile cellular technology operable in the fashion of "TDMA or CDMA or OFDM" but not limited thereto.

[0063] Second, the integrated terminal of the present invention supports multiple standards of both wireless and wireline communications wherein Software Defined Module (SDM) is used to install or update the different communication standards module in case of need. This SDM can be stored in an External Card, for example, flash memory card, SIM card (as used in GSM system), or downloadable from the Internet. The External Card of the SDM may also contain independent processor, DSP (Digital Signal Processor) or other components in addition to memory unit to facilitate additional system processing.

[0064] Third, the integrated terminal of the present invention supports open interface between the main functional units of the terminal and the RF/IF Subsystem so that the terminal RF/IF part is portable and reconfigurable. This method of the present invention is necessary when the different wireless standards run in different frequency bands which are not within same RF/IF transceiver limit. This open and portable RF/IF architecture of the present invention is also very important to support new wireless transceiver technologies including smart antennas, MIMO (Multiple Input, Multiple Output), High efficiency power amplifiers, Improved RF modules allowing higher operating frequencies and improved receiver sensitivity, etc.

[0065] Fourth, the integrated terminal of the present invention incorporates automatic network access capabilities, wherein the terminal system searches the available network access in the order of wired network, Wireless LAN, mobile cellular network for example, but not limited thereto. The search order can be redefined or managed by the user. When the wired network is detected, this integrated terminal becomes the wireline terminal and the communication is established by IP connection including IP data and VoIP for voice. If wired network is not available, and Wireless LAN is detected (through various detection mechanisms), this integrated terminal becomes the Wireless LAN terminal and the communication is established by IP connection too. Wireless LAN access is regarded as the wireless extension of the wireline network access in the local short range domain. If both wired network and Wireless LAN are not available, the system of the present invention will search other short range wireless access networks including Wireless PAN, etc. In the event that all these networks are not

detected, the integrated terminal will switch back to the mobile cellular mode wherein common mobile air interface standards (for example, GSM, cdma2000, WCDMA, etc) will be employed based on the mobile preference list set by the user. The mobile cellular modules supported in the integrated terminal of the present invention can be stored in the terminal itself, or in the External Card or downloaded from the Internet in the form of the aforementioned SDM. The integrated terminal device associated with the system and method of the present invention is therefore capable of being operative in an open wireless and wireline communication environment supporting various standards and interfaces.

[0066] Fifth, the system and method of present invention incorporates a new Call Processing Management subsystem capability in the Mobile Switching Center (MSC) and/or Mobile Gateway, wherein the incoming mobile calls associated with the called mobile phone number are queued for further connecting to the destination terminal based on the Connection Table containing the current network access status of the destination terminal as set forth above. If this destination terminal connects to the wired Internet network (first priority for example) or Wireless LAN, the aforementioned incoming call is forwarded to the destination terminal directly through IP connection by IP-calling from MSC to the destination terminal as set forth above, wherein the Visitor IP address reported by the destination terminal is dialed, and VoIP protocol is activated and employed if this incoming call is a voice call. If the destination terminal, as set forth above, does not connect to both the wired network and the wireless LAN, but connects to the mobile cellular network (for example, TDMA and/or CDMA), the aforementioned incoming call is forwarded to the related Base Station wherein the communication with the destination terminal is over the wireless air link of available mobile cellular standards. In case the destination terminal, as set forth above, is not able to access any available networks, the MSC can forward the aforementioned incoming call to the user Home Server which is configured as a Virtual Mobile Server through IP connection, as will be described within the context of the present invention.

[0067] Sixth, the system and method of present invention comprises the utilization of the user home computer server with Internet access as the Virtual Mobile Server, as set forth above, supporting the aforementioned integrated terminal of the present invention with enhanced functions and services, for example, mobile secretary, mobile office, User Webpage, Voice Mailbox, Short Message Service (SMS), Multimedia Message Service (MMS) and Document Center, etc. This Virtual Mobile Server, as set forth above, also takes the function of Special Service Management for the aforementioned integrated terminal on mobile location, emergency call, information collection, security and safety control, and network O&M (Operation and Maintenance), etc. Additionally, one Virtual Mobile Server, as set forth above, can support one or multiple integrated terminals of the present invention, wherein many such terminals can share the same Virtual Mobile Server.

[0068] Seventh, the system and method of present invention introduces a new innovative solution to converge and integrate the various communication devices into one open platform, wherein the conventional home phone, office phone and cellular phone, etc are combined together into an