

## **SUMMARY OF THE INVENTION**

Embodiments of the invention allow a mobile device to communicate over a satellite network and to be located using the cellular mobile phone number associated with the cellular device.

According to a first aspect of the present invention, there is provided a method of roaming in a system comprising a mobile cellular enabled device that has an associated home base comprising a home registry, said mobile cellular device further comprising a short range non-cellular radio transceiver; a satellite communications emulator that comprises an antenna, a transceiver for two way communications over a satellite communications network, said emulator further comprising a short range non-cellular radio transceiver for communication with a mobile cellular device, said emulator associated with a home gateway comprising a gateway registry; a Back office comprising a processor and database, said Backoffice capable of communication with a satellite communications network and a public switched telephone network or a packet network; the method comprising the steps of: the Backoffice processor receiving a communication from said mobile cellular device requesting communication service through said satellite emulator; said Backoffice associating said satellite emulator with said mobile cellular device in said Backoffice database; said Backoffice sending notification to said cellular enabled mobile device home registry of the status of said mobile cellular device as a roaming device on said Backoffice.

According to a second aspect of the present invention, there is provided a method of forwarding calls to a cellular enabled device in a system comprising a cellular enabled device having a home base comprising a home registry, said cellular enabled device further comprising a short range non-cellular radio transceiver; a satellite communications emulator that comprises an antenna, a transceiver for two way communications over a satellite communications network, said emulator further comprising a short range non-cellular radio transceiver for communication with a mobile cellular device; a Backoffice comprising a processor and associated databases, said Backoffice in communications with a satellite communications network and a public switched telephone network or a packet network; the method comprising the steps of: the Backoffice processor receiving a communication from said cellular enabled device to communicate through said emulator; said Backoffice determining a routing number for communications with said emulator over said satellite communications network; said Backoffice sending a call forward request to said home network of said cellular enabled device, said call forwarding request including said routing number.

According to a third aspect of the present invention, there is provided a method of establishing a cellular device terminating call over a satellite network using the cellular device phone number or ISDN in a system comprising a cellular enabled device that has an associated home base comprising a home registry, said cellular enabled device further having an associated telephone number or ISDN, said cellular enabled device further comprising a short range non-cellular radio transceiver; a satellite communications emulator that comprises an antenna, a transceiver for two way communications to a satellite in a satellite communications network, said satellite communications emulator further comprising a short range non-cellular radio transceiver for communication with said cellular enabled device, said emulator associated with a home satellite gateway comprising a gateway registry; a Backoffice comprising a processor and database, said Backoffice in communication with a satellite communications network and a public switched telephone network or a packet network; the method comprising the steps of receiving a request for a cellular device terminating call to said cellular enabled device, said request including either the cellular enabled device's MSISDN, or the ISDN or an IP address of said cellular enabled device, but said request lacking satellite communications emulator address or identification information; identifying said emulator associated with said cellular enabled device or identifying an address of said emulator associated with a satellite gateway serving said satellite communications emulator; routing said cellular device terminating call through said servicing satellite gateway to said satellite to said satellite communications emulator; said satellite communications emulator routing said cellular device terminating call to said cellular device over said non-cellular short range transceiver in said satellite communications emulator.

According to a fourth aspect of the present invention, there is provided a system comprising mobile cellular enabled device that has an associated home base comprising a home registry, said mobile cellular device further comprising a short range non-cellular radio transceiver; a satellite communications emulator that comprises an antenna, a transceiver for two way communications over a satellite communications network, said emulator further comprising a short range non-cellular radio transceiver for communication with a mobile cellular device, said emulator associated with a home gateway comprising a gateway registry; a Backoffice comprising a processor and database, said Backoffice capable of communication with a satellite communications network and a public switched telephone network or a packet network; said Backoffice processor configured to: associate said satellite emulator with said mobile cellular device in said Backoffice database and to send notification to said cellular enabled mobile device home registry of the status of said mobile cellular device as a roaming device on said Backoffice

when said Backoffice processor receives a communication from said mobile cellular device requesting communication service through said satellite emulator.

In one embodiment, each emulator functions as a cell tower, providing an "access" point for cellular enabled devices, but the access point provided access to via a satellite communications network. While a normal "cell tower" is networked into the standard terrestrial telephone system or internet or public switch telephone network (PSTN), for one of the methods herein, the emulator communicates over a global satellite network (and its associated satellite gateways and/or network operations centers or earth stations), utilizing the Backoffice of the satellite system to route calls from the satellite system to the PSTN or Internet (a packet network). The emulator has satellite modem(s) and/or transceivers), each with an associated satellite identifier ( e.g., address such as. a satellite phone number (that may be stored on a SIM card like device j), and associated processor, antenna, and necessary equipment to place and receive satellite calls over a satellite communications network, as is well known in the prior art. The emulator has the satellite communication capabilities of a satellite phone, but data or voice received from the satellite network is passed through the emulator to the cellular device (call signaling may also pass through the emulator to the cellular device to set up/tear down and connect a communications channel). The emulator also has the equipment and ability to communicate wirelessly over short range radio communications with one or more cellular user devices> such as using standard WIFI communications, to allow the cellular device to pass data/voice over the satellite network via the emulator. The emulator will have a processor and associated equipment and may include the ability to reformat data received/transmitted via short range communications for uplink/downlink communications with the satellites in the satellite communications network (including handling protocol translators) (note the application residing on the cellular device may need similar reformatting and protocol translation ability also), The emulator can have media gateway functionality for interfacing different communications networks. One such emulator is the Sat-Fi satellite hotspot device marketed by Globalstar. In the Sat-Fi, an incoming call cannot be send over the satellite network to the user using the user's cell phone id (telephone number), but is placed using the Sat-Fi satellite identifier (satellite phone number). In embodiments of the present invention, the