If it is determined in step 801 that no neighbour cell received signal levels are above their respective threshold then the respective timer is reset as in step 803. If a received signal level is above its respective threshold and its respective timer has not been started then the timer is started as in step 804.

Other two independent determinations of whether a handover is required may be made by GSM nominal handover required method as determined in step 806 and trend analysis handover methods as in step 807. The trend analysis method includes signal strength trends and step change methods.

Although the methods of the present invention have been described as being implemented at the base station of the serving cell, the method could actually be implemented in a mobile station provided that the required intelligence is built into the mobile station. The methods could also be implemented at the base station of a neighbouring cell provided the proper information was passed to the base station of the neighbouring cell. As cellular systems expand, methods such as the one of the present invention may be implemented elsewhere in the infrastructure of the system.

In conclusion, the present invention uses programmable and absolute thresholds, elapsed timers and historic information to determine the handover candidates and the target handover cells. Thus, a method is provided for a multicellular communication system, that minimises the number of handovers required and makes efficient handovers decisions. The present invention significantly reduces the number of handovers required and the cellular environment is efficiently utilised. By efficiently utilising the cellular environment, capacity of the cellular communication system may be increased.

Claims

1. A method for determining a handover in a multicellular communication system including a serving cell and a plurality of neighbouring cells where the serving cell and the neighbouring cells comprise of at least one macrocell cell and a plurality of microcells, each cell having a respective base station, the method for determining a handover comprising the steps of:

measuring received signal parameters received from the serving cell and a plurality of neighbouring cells;

comparing received signal parameters with a variable threshold value for each of the plurality of neighbour cells;

measuring time received signal parameters are above threshold value for each of the plurality of neighbour cells; and

determining handover based on the measured time.

2. A method for determining a handover in a multicellular communication system including a serving cell and a plurality of neighbouring cells where the serving cell and the neighbouring cells comprise of at least one macrocell cell and a plurality of microcells, each cell having a respective base station, the method for determining a handover comprising the steps of:

measuring received signal parameters received from the serving cell and a plurality of neighbouring cells;

comparing received signal parameters with a variable threshold value for each of the plurality of neighbour cells;

measuring for a period of time a number of times the received signal parameters are above threshold value for each of the plurality of neighbour cells; and

determining handover based on the measured number of times.

3. The method of any preceding claim wherein the parameter is a received signal level.

4. The method of claims 1 or 2 wherein the parameter is a power level control signal.

5. The method of claims 1 or 2 wherein the parameter is a timing advance signal.

6. The method of any preceding claim wherein the step of determining handover includes determining whether the signal parameters received are continuously over the respective threshold value.

7. The method of any preceding claim wherein the step of determining handover further includes determining handover based on the respective measured received signal parameters.

8. The method of any preceding claim further comprising the step of calculating an average of the received signal parameters.

9. The method of any of the preceding claims for determining a requirement to handover, an ordering of a priority of handover candidates or both.

10. A method for determining a handover of a mobile unit in a cellular communication system substantially as herein described with reference to FIGS. 6-8 of the drawing.

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Y	GB 2204215 A	(MITSUBISHI) see abstract Claim 3	1, 2 at least
Y	WO 92/12602 A1	(BRITISH TELECOM) see whole document	1,2 at least

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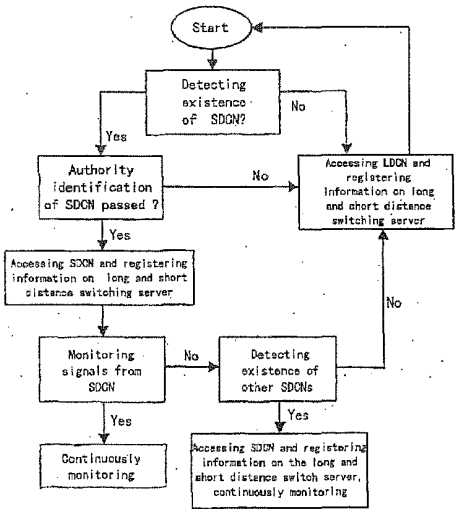
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(54) A COMBINED LONG AND SHORT DISTANCE WIRELESS COMMUNICATION SYSTEM AND ITS METHOD

(57) This invention provides a combined long and short distance wireless communication system and method thereof. A dual distance terminal provides subscribers with the long and short distance wireless communication service and guarantees that the service isn't interrupted when switching between different networks occurs. A remote distance base station provides the dual distance terminal with remote distance wireless access. A short distance AP provides the dual distance terminal with short distance wireless access. A dual distance network server connects the remote distance base station and the short distance AP to switch between networks and make the dual distance terminal access the network to which is switched. The present invention enables the dual distance terminal within the coverage of the long and short distance wireless system to communicate with the long distance networks and automatically switch to short distance wireless local area networks (WLAN) when the dual distance terminal enters the short distance WLAN so that seamless switch is achieved. The subscribers having different priority levels access different short distance WLANs with different levels after authority identification.

Fig. 2



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Description

BACKGROUND OF THE INVENTION

FIELD OF INVENTION

[0001] This invention relates to a wireless communication system and its method, more specially, to a wireless communication system which combines long and short distance wireless communication techniques and achieves seamless switch of links. This invention belongs to the field of communication techniques.

BACKGROUND OF PRIOR ART

[0002] In current mechanisms of communication systems, GSM/GPRS and the future 3G (third generation) are all long distance communication (LDC). The major characteristics for long distance communication include the coverage of large area, installation with low cost, and operation with high cost and low transmission rate, etc. The long distance communication can be referred as to a concept of "ocean". Recent 802.11 and BT, for example, belong to the short distance communication (SDC). The major characteristics of short distance communication include the use in office areas and certain business areas, the coverage of limited areas, installation with high cost, operation with low cost and high transmission rates, etc. The short distance communication can also be referred as to a concept of "island". The networks of the short distance communication are separated from each other, and have been significantly limited to a certain area respectively.

[0003] In GSM900/1800 networks, and the interacting networks of GSM/GPRS and the third generation mobile communication, all of them embody the concept of long distance, i.e. the concept of "ocean". The operation modes employed are multiple access modes such as TDMA, CDMA. However, in long and short distance communication networks, short distance communication generally employs operation modes such as CSMA/CA which are suitably used for short distance transmission. Meanwhile, in long distance communication networks (LDCN), although the transmission powers thereof are always very large, the transmission powers are limited due to the limitation of Local Area Networks (LAN) such as WLAN networks, so that the characteristics of "island" is present. Furthermore, with respect to long distance communication networks, short distance communication networks (SDCN) have the advantages of wide bands, fast transmission rates, low cost etc.

[0004] There exists a need to combine long distance communication networks and short distance communication networks to complement the advantages for each other. Thus, a terminal can receive the services from long and short distance communication networks according to different requests. For example, the terminal may obtain a voice service with long distance communication networks whereas obtain a data service with short distance communication networks. That is, in long and short distance communication networks, the characteristics of that short distance communication is present in long distance communication network coverage.

SUMMARY OF THE INVENTION

[0005] An object of the present invention is therefore to provide a wireless communication system and method which can combine long and short distance communication techniques.

[0006] Another object of the present invention is to provide a wireless communication dual distance terminal which can combine long and short distance communication techniques.

[0007] Yet another object of the present invention is to provide a wireless communication dual distance network server which can combine long and short distance communication techniques.

[0008] The present invention may achieve seamless switch such as automatic switching, capacity evaluation and security issues and the likes when a user enters an area covered by both long and short distance wireless communication while guarantee the long distance wireless communication so that the user may use short distance wireless communication and access whole networks through the short distance wireless access point (AP). Thus, the two types of network resources can be more effectively used.

[0009] To achieve above objects of the prevent invention, according to one aspect of the present invention, a combined long and short distance wireless communication system comprises: a dual distance terminal for providing subscribers with long and short distance communication services, at least one remote distance base station for providing remote distance wireless access for the dual distance terminal, at least one short distance access point (AP) for providing short distance wireless access for the dual distance terminal, and a dual distance network server for connecting the remote distance base station through the short distance AP to execute network switching for the dual distance terminal and enabling the dual distance terminal to access the network to which it is switched.

[0010] According to another aspect of the present invention, a wireless communication method using combined long and short distance wireless communication systems, comprising steps of scanning a dual distance terminal to determine whether it is located in a service area covered by a short distance access point upon powering on; entering a short distance communication network through the short distance access point if the dual distance terminal is located within the service area covered by the short distance access point, and informing a dual distance home server of the position of the dual distance terminal; searching for a base station for

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a long distance communication service if the dual distance terminal is not located in the area covered by any one of the short distance access points, entering a long distance communication network through a long distance access network, and informing the dual distance home server of the position of the dual distance terminal.

[0011] According to yet another aspect of the present invention, a dual distance network server used for a combined long and short distance wireless communication system, comprising:

a data service function entity for detecting whether a long and short distance data transmission occurs, if it occurs, then providing a connection service for said data transmission;

a memory function entity for storing data that may be missed at the time of memory switching, and sending the stored data to a terminal via said data service function entity after said terminal switching is completed, in order to implement seamless switch for the terminal between a long distance communication network and a short distance communication network;

a dual distance home server for registering the dual distance character parameters of the dominated dual distance terminals, obtaining terminal switch information via said data service function entity when dual distance switch occurs, updating the terminal data; and informing said data service function entity of terminal-related dual distance information when a query regarding the terminal exists;

an external network interface unit for connecting dual distance network and an interface of external networks.

[0012] For the dual distance terminal of the invention, it has to adapt configuration of both the long distance and short distance communication networks so that the dual distance terminal may move in both networks, the dual distance terminal comprises:

a short distance communication function entity having a short distance radio frequency function module for functioning as physical layer, part of MAC layer or link layer and operating in a short distance communication network to obtain data information;

a long distance communication function entity having a long distance radio frequency function module for functioning as physical layer and part of link layer;

a network switch condition judging function entity for performing network switching for the dual distance terminal based on the corresponding dual distance switch condition judging and instructing the short distance communication function entity or the long distance communication function entity to send a beacon signal to the dual distance network server;

a common function entity for implementing display and input and output functions of the terminal.

[0013] The combination of long and short distance wireless communication according to the invention brings a lot of convenience, and changes the status of separation of the architectures of long distance and short distance radically. The present invention has the advantages as follows:

at any time, a real-time transmission may be achieved by the long distance wireless communication;

when a mobile terminal is allowed to enter the short distance wireless LAN, it can automatically switching to the short distance communication mechanism with priority, and the transmitting traffic stream of the subscriber would not be interrupted so that seamless switch can be achieved;

when the mobile terminal move out the short distance wireless LAN, it can automatically switch to the long distance communication network, and the transmitting traffic stream for the subscriber would not be interrupted so that seamless switch can be achieved;

when the other subscriber terminal in the system according to the invention is calling and querying any one of the terminal allowed to be accessed, the system according to the invention may guarantee the subscriber could be accessed either in the short distance communication LAN or in the short distance communication network.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Above and/or other objects and advantages of the present invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompany drawings of which:

Figure 1 is a schematic diagram showing the structure of according to an embodiment of the present invention.

Figure 2 is a flow chart showing the operation according to the embodiment of the invention.

Figure 3 is a schematic diagram showing the structure of the dual distance communication network

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server function module of the invention.

Figure 4 is a flow chart when the dual distance communication network server performs switching.

Figure 5 is a schematic diagram showing the structure of the dual distance terminal according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0015] The present invention constructs a wireless communication system as a structure of "ocean + island". According to the wireless communication system of the present invention, remote distance base stations cover all the effective areas; short distance access points (AP) cover areas such as offices, residents, and business areas which subscriber density is relatively high. A long and short distance communication server connects the short distance APs with the remote distance base stations. A plurality of dual distance terminals may freely move within the all areas covered by the short distance APs and the remote distance base stations.

The operation principle of the present invention

[0016] When a dual distance terminal is powered on, first, it detects whether it is located in the service area covered by a certain short distance AP. If it is yes, then the dual distance terminal accesses the network through the short distance AP, and informs a dual distance home server of the position thereof. If the dual distance terminal is not within the area covered by any one of the short distance APs, then it searches for a base station for a long distance communication service, accesses network through the remote distance base station, and informs the dual distance home server of position thereof.

[0017] When a dual distance terminal located in the long distance communication network enters any one of the service areas covered by the short distance APs, the dual distance terminal will detect the short distance AP. If the short distance signal thereof is above a predetermined threshold, the dual distance terminal will automatically switch to short distance communication frequency band, and begin to access the network via the short distance AP. The data transmission carried out by the long distance communication network is then carried out by the short distance communication network to achieve seamless switch. Further, the terminal informs its home server of the area which it locates now. The server is in charge of the query and communication to the terminal from other terminals in the network.

[0018] When a dual distance terminal located in the short distance communication networks moves out of the service area covered by the short distance communication networks and enters the long distance network, the terminal detects the short distance AP signal. If the short distance signal thereof is below a predetermined threshold, the dual distance terminal automatically switches to the long distance network. The data transmission carried out by the short distance is then carried out by the long distance network to achieve seamless switch. Then, the terminal informs its home server that it has already located in the area covered by the long distance network. After that, the server is in charge of the query and communication to the terminal from other terminals in the network.

[0019] When a dual distance terminal located in the long distance networks requests to enter any one of the service areas of the short distance APs, if the AP in the area in which the terminal locate rejects the access of dual distance terminal due to security or other issues, the dual distance terminal then still keeps the long distance communication.

[0020] When a dual distance terminal moves from one short distance cell to another short distance cell, the dual distance terminal identify the area, into which the dual distance terminal will enter, covered by the short distance AP. Then the dual distance terminal transmits information of the corresponding cell to the dual distance communication network server so as to achieve the switching between the short distance cells. After that, the dual distance terminal informs the home server among the dual distance network communication servers that it has already been enter into the area covered by another short distance communication network. The home server is then in charge of the queries and communications to the dual distance terminal from the other terminals in the networks.

[0021] The invention will be described by using a combined dual distance wireless communication system which is formed by combining a long distance GSM/GPRS with a short distance WLAN by way of example. The network architecture of the wireless communication system according to the invention comprises GSM/GPRS base stations, a long distance access related network function entity, wireless LAN APs, a short distance access related network function entity, a dual distance communication network server for linking the long distance GSM/GPRS networks and the short distance wireless LANs, dual distance terminals compatible with long distance communication network and short distance communication network. Figure 1 shows the basic network structure of the invention. However, it should be noted that the present invention is not limited to the example shown as Figure 1, it may include a combined architecture formed by combining a long distance 3G communication with a short distance WLAN or a combined architecture of other long distance and short distance communication modes.

[0022] Now referring to Figures 1 and 2, the operation of a dual distance communication network formed by combining GSM/GPRS with WLAN according to an em-

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bodiment of the invention will be described in more detail.

1. In the dual distance network, after the dual terminal powered on.

[0023] For the system described in the invention, the dual terminal automatically searches for the network environment currently located after it is powered on by the subscriber. If the dual distance terminal detects that a wireless local area network WLAN network exists and does not require authority identification at present, the dual distance terminal then accesses the WLAN network directly. On the contrary, if the result of the detection indicates that current WLAN network requires authority identification, the dual distance terminal then performs access authority identification via WLAN. If the authority identification is successful, the dual distance terminal accesses current WLAN network. Otherwise, the dual distance terminal will continue the detection and enter into the long distance GPRS communication network.

[0024] After the dual distance terminal enters into the WLAN network, the dual distance terminal may perform data transmission by accessing the dual distance communication server via the short distance WLAN network.

2. Switching between networks

2.1 Switching from the short distance WLAN communication networks to the long distance GPRS communication networks

[0025] When the dual distance terminal moves out of the short distance WLAN network and enter into the GPRS network, the dual distance terminal may make judgment by using a predetermined switching condition. If a predetermined threshold for switching (which may refer to a non-usable threshold of a short distance communication network signal or may refer to a non-optimal threshold of a short distance communication network signal) is satisfied, the dual distance terminal terminates data transmitted through the WLAN radio frequency function entity (not shown) with the predetermined switching condition, and activates the long distance communication function entity and uses it to implement the possible sequent data transmission. If the service level of this dual distance terminal requires a seamless switching, then the dual distance terminal terminates the data being transmitted by the WLAN radio frequency function entity. At the same time, it sends beacon signal for switching between the short distance communication network and the long distance communication network to the short distance AP, from which the communication is switched, by the short distance communication function entity in the terminal. The beacon signal is transmitted to the dual distance communication network server by the short distance AP. After receiving the corresponding beacon signal, the dual distance network server informs the long distance communication function entity to be accessed by the dual distance terminal of the receipt, and determines the service queue position which the dual distance terminal is arranged in the long distance network function entity (provided in the dual distance network server, not shown) based on its service level.

[0026] Meanwhile, the dual distance communication network server stores the data packets which may be missed in the switching process to protect the data packets, the stored data packets are forwarded to the dual distance terminal after the switching is completed, thereby preventing data for the dual distance terminal from lost during the switching.

2.2 Switching from the long distance GPRS networks to the short distance WLAN networks

[0027] When the dual distance terminal moves out of the long distance GPRS network and enters into the short distance WLAN network, the dual distance terminal may make judgment by using switching condition. If the predetermined threshold for switching is satisfied, the dual distance terminal terminates the data transmitted through the long distance communication function entity with the predetermined switching condition, and activates the short distance communication function entity and uses it to implement the possible sequent data transmissions.

[0028] When terminating the data being transmitted by the long distance communication function entity, the dual distance terminal further sends one beacon signal of long and short distance switching to the GPRS service function entity, from which switch is performed, by the base station and the corresponding GPRS network function entity in the dual distance terminal. The beacon signal is transmitted to the dual distance network server by the GPRS function entity. After receiving the corresponding beacon signal, the dual distance network server informs the short distance communication function entity of the receipt, and determines the priority of the dual distance terminal in the short distance communication network function entity based on its service level.

[0029] Meanwhile, the dual distance communication network server stores the data packets which may be missed in the switching process to protect the data packets, the stored data packets are forwarded to the dual distance terminal after the switching is completed, thereby preventing data for the dual distance terminal from lost during the switching.

2.3 Switching from one short distance communication network to another short distance communication network

[0030] When the dual distance terminal moves from one short distance cell to another short distance cell, the

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dual distance terminal identifies the short distance AP to which it will enter, and sends the cell information to the dual distance network server, thereby implementing the switching between the short distance cells. The dual distance terminal then informs the home server among the dual distance network servers that it has already entered in the area covered by another short distance communication network, and the home server is in charge of the query and communication to it from the other terminals in the network.

2.4 Automatic switching

[0031] The subscriber may define the priority level of the switching in advance if necessary so that the dual distance terminal may perform automatic switching. The priority level is set according to charging fee, transmission rates, quality stability and the likes, for example. The dual distance terminal automatically identifies the switching according to the priority level. Further, when the subscriber is located within the areas covered by short distance AP, it may not select the use of short distance AP, but may directly select the use of long distance communication.

3. Scanning and detecting

[0032] With respect to the long and short distance communication network architecture, the most important problems are as follows:

(1) the dual distance terminal keeps the long distance and the short distance radio frequency entity in operating state all the time, and detects the possible long distance or short distance communication network environment in real-time, continuously feeds the detected results back to the dual distance terminal switching management mechanism, the detected results are reported to the dual distance network server through the existing network periodically or as desired;

(2) the dual distance terminal keeps the radio frequency function entity in the network in which it locates in operating state all the time, and activates the corresponding radio frequency function entities for the other networks periodically or non-periodically to detect the candidate networks;

(3) The dual distance terminal may keeps the radio frequency function entity in the network in which it locates in operating state all the time, and does not scan and detect the other networks. In this case, the dual distance terminal detects the other networks only when the existing network is not available;

[0033] The detection for candidate networks with non-periodically activating the corresponding radio frequency function entity may be carried out by means of some specific algorithms, such as a viable-step detection method which the time interval of finally finding the occurrence of other networks is used as a function.

4. Switching conditions

[0034] The switching conditions can be selected according to different situations for the network user, hereafter is the two examples of the switching conditions. It should be noted that the present invention did not limit the two switching conditions as described below, other conditions can also be used in the present invention.

(1) The network switching is performed based on priority level. That is, as long as the dual distance terminal finds the occurrence of the network with higher priority level, then it switches to the network with higher priority level, no matter whether the network which is used currently is available or not. The subscribers can define the priority levels of various wireless networks as desired, for example, transmission rate, usage fee and the likes.

(2) The dual distance terminal switches to other networks only when the currently used wireless network signals may not be received. This switching condition means that the switch is performed only when the wireless network in which the dual distance terminal currently locates is not available. In contrary, the switch is not performed if the network in which the dual distance locates is available, even though there is a network with a higher priority level.

[0035] Figure 3 is a schematic diagram showing the dual distance network server. The dual distance network server comprises a data service function entity, a memory function entity, a dual distance home server, and an external network interface. The data service function entity detects whether a long or short distance data transmission occurs. The data transmission includes data transmission between the dual distance terminal located in a long distance communication network and the dual distance terminal located in a short distance communication network, and the data transmission between the dual distance terminal located in a long or a short distance communication network and external networks. The data transmission between the dual distance terminals located in a long (or short) distance communication network can be carried out by the long (or short) distance network function entity (provided in the dual distance network server, not shown). When a long and a short distance data transmission occurs, a connection service is provided to the data transmission.

[0036] A beacon signal of the dual distance terminal forwarded by the long (short) distance network function entity is detected to determine whether the dual distance

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terminal performs a switching between the long and short distance communication networks. If so, then a new terminal information (for example, a network name to which the terminal is switched) is informed to a dual distance home register.

[0037] The memory function entity stores the data which is possibly missed at the time of switching. Further, the memory function entity forwards the stored data to the terminal via the data service function entity after the switching is completed so that the terminal can achieve a seamless switching between the long distance communication network and the short distance communication network.

[0038] The dual distance home server records the dual distance characteristic parameters of the managed dual distance terminals, such as the situations of the located network, priority level parameters of the terminals and the likes. The terminal switching information can be obtained via the data service function entity when a switching occurs between the long distance communication network and the short distance communication network. The terminal data is updated. The terminal-related dual distance information is informed to the data service function entity when a query regarding the terminal occurs.

[0039] The external network interface connects the long distance communication network and short distance communication network to the external network. The external network interface comprises a wireless interface, an interface for wire network, and an interface for other wireless networks.

[0040] Figure 4 is a flow chart showing the operation process when the dual network server performs switching. When the dual distance terminal moves from one network to another network, the dual distance network server cooperates with the dual distance terminal for performing switch. The process of the switching is as follows:

first step: detecting the dual distance beacon signal of the dual distance terminal by the long (or short) distance network function entity, checking whether a switching occurs, if it is not, then the detection is repeated; if it is yes, the flow turns to next step;

second step: updating the subscriber information registered in the dual distance home register;

third step: determining whether or not data transmission occurs, if it is not, the flow returns to the first step;

fourth step: determining whether or not there exist a need for seamless switching, if it is not, the flow returns to the fist step;

fifth step: buffering the transmitted data, and forwarding the buffered data to the dual distance terminal after the switch is completed.

[0041] Figure 5 is a schematic diagram showing the functional structure of the dual distance terminals according to an embodiment of the invention. The dual distance terminal according to the present invention can operate within the long distance communication network and the short distance communication network during it moves in both networks. Therefore, it is necessary for the dual distance terminals of the invention to have a structure adaptive to the features of both networks. The dual distance terminal comprises at least a short distance communication function entity, a long distance communication function entity, a dual network switch condition judging function entity, and a common function entity.

[0042] The short distance communication function entity includes a short distance radio frequency function module and may achieve the functions of the physical layer and a part of a MAC layer or link layer. The short distance communication function entity operates in the short distance communication network and obtains data information.

[0043] The long distance communication function entity includes a long distance radio frequency function module and may achieve the functions the physical layer and a part of link layer.

[0044] The network switch condition judging function entity performs network switching for the dual distance terminal based on the corresponding dual distance switch condition judging and instructs the short distance communication function entity or the long distance communication function entity to send a beacon signal to the dual distance network server;

[0045] The common function entity includes basic functions such as display, input and output contained in conventional terminals;

[0046] The dual distance terminal controls the operating modes of the radio frequency function module in the long (short) communication function entity by using the dual network switch condition judging function entity. The operating modes of the radio frequency function modules comprise (1) the long radio frequency function module and short radio frequency function module operate simultaneously; (2) performs the viable-step operating mode according to circumstances; and (3) only when one network does not exist, the radio frequency function entity corresponding to the other network is activated so as to search for the other network.

[0047] In the present invention, alternatively, the dual distance terminal may also comprise a data management and buffering function entity which manages and buffers the corresponding data during the switching.

[0048] Unlike the conventional terminals, the dual distance terminal of the invention has both the long distance and the short distance communication function entity. Therefore, it can detect or automatically search the possible short distance communication networks

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such as WLAN and the long distance communication networks such as GSM/GPRS or 3G simultaneously. Further, it can also perform the short distance or long distance data transmission services (including voice which is a specific data service) by means of the short distance and the long distance function entities. Another difference from the conventional terminals is in that the dual distance terminal of the invention also comprises a network switch condition judging function entity. The network switch condition judging function entity performs network switching for the dual distance terminal based on the corresponding dual distance switch condition judging and instructs the short distance communication function entity or the long distance communication function entity to send a beacon signal to the dual distance network server. Further, it may optionally comprise a data management and buffering function entity which manages and buffers the corresponding data during the switching. Thus, the data transmission requested by the common function entity does not be interrupted due to the switching.

[0049] Although the present invention has been described by way of exemplary embodiments, it should be understood that many changes and substitutions may further be made by those skilled in the art without departing from the scope of the present invention which is defined by the appended claims.

Claims

1. A combined long and short distance wireless communication system comprising:

   a dual distance terminal for providing subscribers with long and short distance communication services;

   at least one remote distance base station for providing remote distance wireless access for said dual distance terminal;

   at least one short distance access point (AP) for providing short distance wireless access for said dual distance terminal; and

   a dual distance network server for connecting said at least one remote distance base station through said at least one short distance AP to execute network switching for said dual distance terminal and enabling said dual distance terminal to access the network to which it is switched.

2. The wireless communication system according to claim 1, wherein said at least one remote distance base station comprises a plurality of long distance communication network devices associated with said remote distance base stations.

3. The wireless communication system according to claim 1, wherein said short distance access point comprises a plurality of short distance communication network devices associated with said short distance access points.

4. A dual distance server used for a combined long and short distance wireless communication system as claimed in claim 1, comprising:

   a data service function entity for detecting whether or not the occurrence of a long and short distance data transmission is, if it is, then providing a connection service for said data transmission;

   a memory function entity for storing data that may be missed at the time of switching, and sending the stored data to a terminal via said data service function entity after said terminal switching is completed, in order to implement seamless switch for the terminal between a long distance communication network and a short distance communication network;

   a dual distance home server for registering the dual distance character parameters of the dominated dual distance terminals, obtaining terminal switch information via said data service function entity when dual distance switch occurs, updating the terminal data; and informing said data service function entity of terminal-related dual distance information when a query regarding the terminal exists;

   an external network interface unit for connecting dual distance network and an interface of an external network.

5. The dual distance server according to claim 4, wherein said external network interface comprises a wireless interface, an interface for wire network, and an interface for other wireless networks.

6. A dual distance terminal used for a combined long and short distance wireless communication system as claimed in claim 1, comprising:

   a short distance communication function entity having a short distance radio frequency function module for functioning as physical layer, part of MAC layer or link layer and operating in a short distance communication network to obtain data information;

   a long distance communication function entity

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having a long distance radio frequency function module for functioning as physical layer and part of link layer;

a network switch condition judging function entity for performing network switching for the dual distance terminal based on the corresponding dual distance switch condition and instructing the short distance communication function entity or the long distance communication function entity to send a beacon signal to the dual distance network server;

a common function entity for implementing display and input and output functions of the terminal.

7. The dual distance terminal according to claim 6, wherein said dual distance terminal further comprise a data management and buffering function entity for storing data which is missed during the switch and forwarding the stored data to the common function entity which is a higher level of the terminal after the switch is completed.

8. A wireless communication method using combined long and short distance wireless communication systems, comprising steps:

detecting a dual distance terminal to determine whether it is located in a service area covered by a short distance access point upon powering on;

entering a short distance communication network through the short distance access point if the dual distance terminal is located within the service area covered by the short distance access point, and informing a dual distance home server of the position of the dual distance terminal;

searching for a base station for a long distance communication service if the dual distance terminal is not located in the area covered by any one of the short distance access points, entering a long distance communication network through a long distance access network, and informing the dual distance home server of the position of the dual distance terminal.

9. The wireless communication method according to claim 8, further comprising the steps of if the dual distance terminal detects that a wireless local area network (WLAN) exists and does not require authority identification at present, the dual distance terminal then accesses the WLAN network directly; if the result of the detection indicates that current WLAN network requires authority identification, the dual distance terminal then performs access authority identification via WLAN network; and if the authority identification is successful, the dual distance terminal accesses current WLAN network; the dual distance terminal continues the detection and enters into the long distance GPRS communication network if the authority identification is unsuccessful.

10. The wireless communication method according to claim 9, further comprising the step of the dual distance terminal performs data transmission by accessing the dual distance server via the short distance WLAN network after the dual distance terminal enters into the WLAN network.

11. The wireless communication method according to claim 9 or 10, further comprising the steps of switching from the short distance communication network to the long distance communication network immediately before the dual distance terminal moves out of the short distance WLAN network and enters into the GPRS network; the dual distance terminal makes judgment by using switching conditions, if a predetermined threshold for the switching is satisfied, the dual distance terminal terminates data transmission through a short distance radio frequency function entity with the switching conditions, and activates a long distance communication function entity and uses it to implement the possible sequent data transmission.

12. The wireless communication method according to claim 11, wherein the threshold for the switching condition is a non-usable threshold of a short distance communication network signal or a non-optimal threshold of a short distance communication network signal.

13. The wireless communication method according to claim 11, wherein during the process of switching from the short distance communication network to the long distance communication network, if the dual distance terminal requests seamless switching based on its service level, the dual distance terminal terminates data transmission through the short distance radio frequency function entity and sends a beacon signal for switching between the short distance communication network and the long distance communication network to the short distance AP from which is switched through the short distance communication function entity in the terminal while it terminates the data being transmitted by the WLAN radio frequency function entity, the beacon signal is then transmitted to the dual distance network server by the short distance AP; after receiving the corresponding beacon signal, the dual distance

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network server informs the long distance communication function entity to be accessed by the dual distance terminal of the receipt, and determines the service queue position which the dual distance terminal is arranged in the long distance network function entity based on its service level.

14. The wireless communication method according to claim 13, wherein the dual distance communication network server stores the data packets which may be missed in the switching process to protect the data packets, the stored data packets are forwarded to the dual distance terminal after the switching is completed, preventing data for the dual distance terminal from lost during the switching.

15. The wireless communication method according to claim 8, further comprising the steps of switching from the long distance communication network to the short distance communication network immediately before the dual distance terminal moves out of the long distance communication network and enters into the short distance WLAN network; the dual distance terminal makes judgment by using switching conditions, if a predetermined threshold of the switching is satisfied, the dual distance terminal terminates data transmission through a long distance radio frequency function entity with the switching conditions, and activates a short distance communication function entity and uses it to implement the possible sequent data transmission.

16. The wireless communication method according to claim 15, wherein if the dual distance terminal requests seamless switching from the long distance communication network to the short distance communication network based on its service level, when terminating the data being transmitted by the long distance communication function entity, the dual distance terminal further sends one beacon signal of long and short distance switching to the long distance service function entity from which is switched through the base station and the long distance network function entity in the dual distance terminal, the beacon signal is transmitted to the dual distance network server by the long distance network function entity, and after receiving the corresponding beacon signal, the dual distance network server informs the short distance communication function entity of the receipt, and determines the priority of the dual distance terminal in the short distance communication network function entity based on its service level.

17. The wireless communication method according to claim 16, further comprises the dual distance communication network server stores the data packets which may be missed in the switching process to protect the data packets, the stored data packets are forwarded to the dual distance terminal after the switching is completed, thereby preventing data for the dual distance terminal from lost during the switching.

18. The wireless communication method according to claim 9 or 10, wherein when the dual distance terminal moves from one short distance cell to another short distance cell, the dual distance terminal identifies the short distance AP to which it enters, and sends the cell information to the dual distance network server, thereby implementing the switching between the short distance cells.

19. The wireless communication method according to claim 18, further comprises the step of when one dual distance terminal moves from one short distance cell to another short distance cell, the dual distance terminal informs the home server among the dual distance network servers that it has already entered in the area covered by said another short distance communication network, and the home server is in charge of the query and communication to it from the other terminals in the network.

20. The wireless communication method according to claim 8, wherein said dual distance terminal detects the long and short distance communication networks in the manner of scanning with one of the following three ways:

(1) the dual distance terminal keeps the long distance and the short distance radio frequency entity in operating state all the time, and detects the possible long distance or short distance communication network environment in real-time, continuously feeds the detected results back to the dual distance terminal switching management mechanism, the detected results are reported to the dual distance network server through the existing network periodically or as desired;

(2) the dual distance terminal keeps the radio frequency function entity corresponding to the network in which it locates in operating state all the time, and activates the radio frequency function entities for the other networks periodically or non-periodically to detect the candidate networks;

(3) the dual distance terminal keeps the radio frequency function entity in the network in which it locates in operating state all the time, and does not scan and detect the other networks until the existing network is not available.

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21. The wireless communication method according to claim 20, wherein the detection for candidate networks with non-periodically activating the corresponding radio frequency function entity is carried out by using a viable-step detection method which the time interval of finally finding the occurrence of other networks is used as a function.

22. The wireless communication method according to claim 11, wherein said switching conditions comprising two types of as follows:

(1) the dual distance terminal switches to the network with higher priority level as long as the network with higher priority level is detected;
(2) The dual distance terminal switches to other networks only when the currently used wireless network signals can not be received.

23. The wireless communication method according to claim 15, wherein said switching conditions comprising two types of as follows:

(1) the dual distance terminal switches to the network with higher priority level as long as the network with higher priority level is detected;

(2) The dual distance terminal switches to other networks only when the currently used wireless network signals can not be received.

24. The wireless communication method according to claim 18, wherein said switching conditions comprising two types of as follows:

(1) the dual distance terminal switches to the network with higher priority level as long as the network with higher priority level is detected;

(2) the dual distance terminal switches to other networks only when the currently used wireless network signals can not be received.

25. The wireless communication method according to any one of claims 22-24, wherein the switching condition which the dual distance terminal switches to other networks only when the currently used wireless network signals can not be received means that only when the wireless network in which the dual distance terminal is located is not available, the dual distance terminal performs switch, and if the network which the dual distance terminal currently located is available, the switch is not performed even though there are networks with a higher priority levels.

26. The wireless communication method according to claim 8, wherein when the dual distance terminal moves from one network to another network, the dual distance server cooperates with the dual distance terminal to perform the switch.

27. The wireless communication method according to claim 26, wherein the process of the dual distance server cooperating with the dual distance terminal to perform the switch comprises:

first step: detecting the dual distance beacon signal of the dual distance terminal by the long (or short) distance network function entity, checking whether a switching occurs, if it is not, then the detection is repeated; if it is yes, the flow turns to next step;

second step: updating the subscriber information registered in the dual distance home register;

third step: determining whether or not data transmission occurs, if it is not, the flow returns to the first step;

fourth step: determining whether or not there exists a need for seamless switching, if it is not, the flow returns to the fist step;

fifth step: buffering the transmitted data, and forwarding the buffered data to the dual distance terminal after the switch is completed.

28. The wireless communication method according to claim 15, wherein when the dual distance terminal located in the long distance network requests to enter any one of the service areas covered by the short distance APs, if the AP within the area rejects the access of the dual distance terminal due to security or other issues, then the dual distance terminal still operates the long distance communication.

29. The wireless communication method according to claim 8, wherein the subscriber may define the priority levels of the switching in advance as desired so that the dual distance terminal performs automatic switching.

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Fig. 1

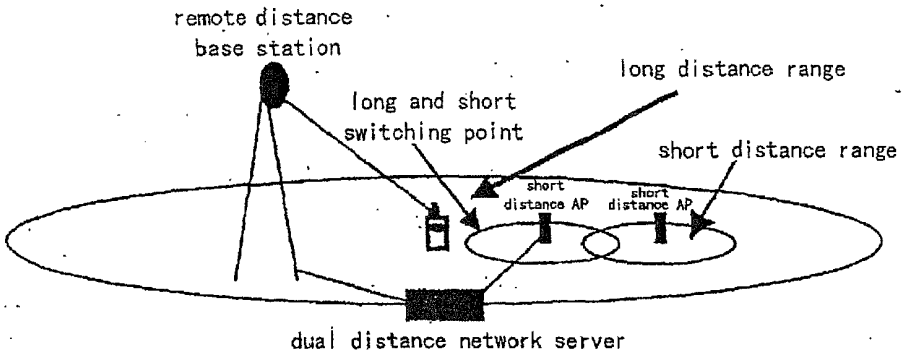
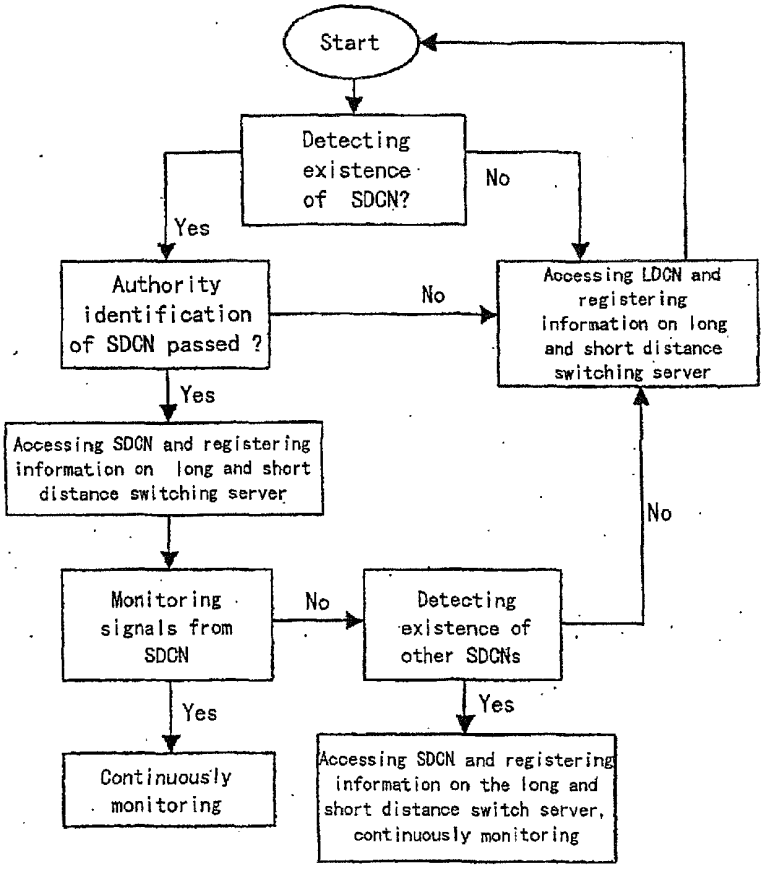


Fig. 2



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Fig. 3

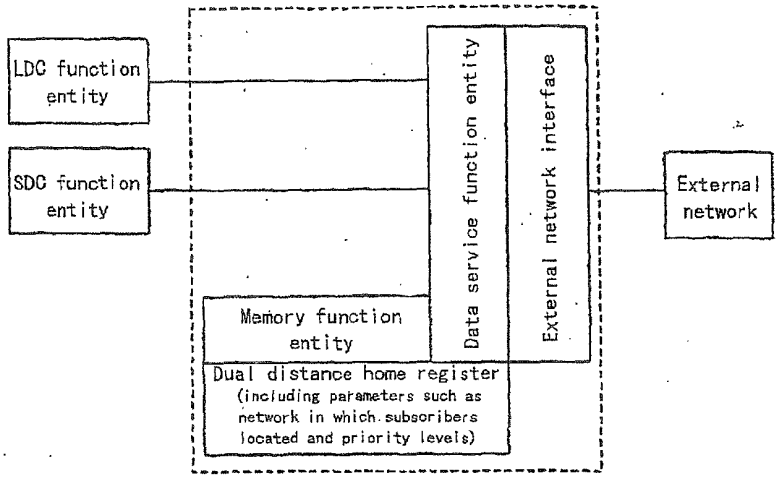
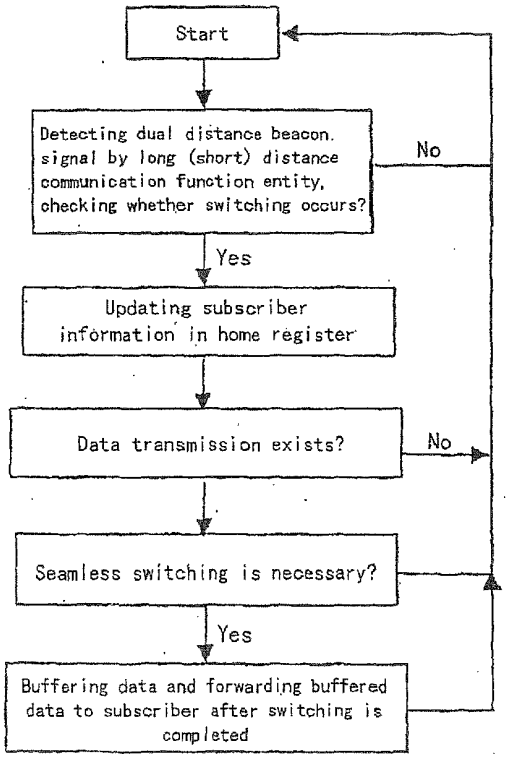
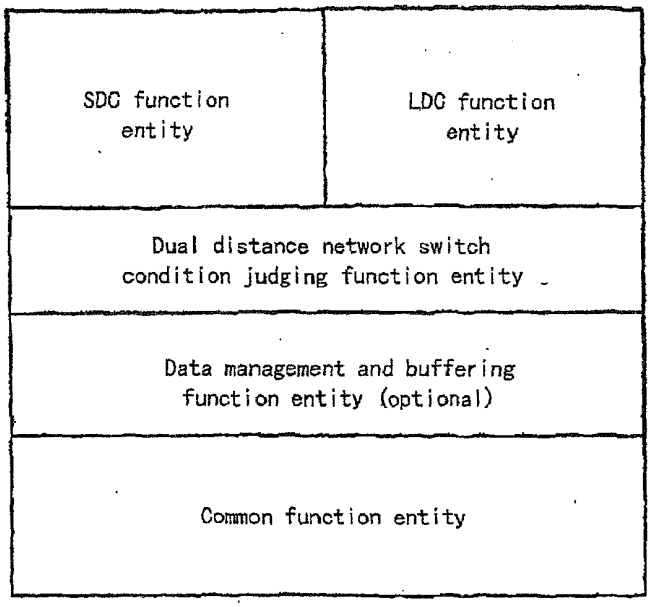


Fig. 4



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Fig. 5



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN02/00914

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: H04B 7/26 H04Q 7/32

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)

IPC[7]: H04B 7/26 H04Q 7/32

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

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

WPI、EPODOC、PAJ、CNPAT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,210,785 A (CANON KK, JP) 11 May 1993 (11.05.93) See Col. 1,line57 to Col. 11,line43 and Fig.1-10	1-3、6、8-13、15、16、18-20、22-26
A		4、5、14、17
Y	WO 94/00946 A1 (MOTOROLA INC.) 6 Jan. 1994 (06.01.94) See the whole document	1-3、6-13、15、16、20-26、28、29
A		4、5、14、17
Y	JP 58-151136 A (NIPPON ELECTRIC CO) 8 Sep. 1983 (08.09.83) See the whole document	1-3、6-13、15、16、18-26、28、29
A		4、5、14、17
Y	US 5,127,042 A (MOTOROLA INC.) 30 Jun. 1992 (30.06.92) See the whole document	1-3、6、8、15、16、20、22-26、28、29

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21. Feb 2003 (21. 02. 2003)	20 MAR 2003 (20.03.03)
Name and mailing address of the ISA/CN 6 Xitucheng Rd., Jimen Bridge, Haidian District, 100088 Beijing, China Facsimile No. 86-10-62019451	Authorized officer GUO QUN Telephone No. 86-10-62093785

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Information patent family members

Search request No.
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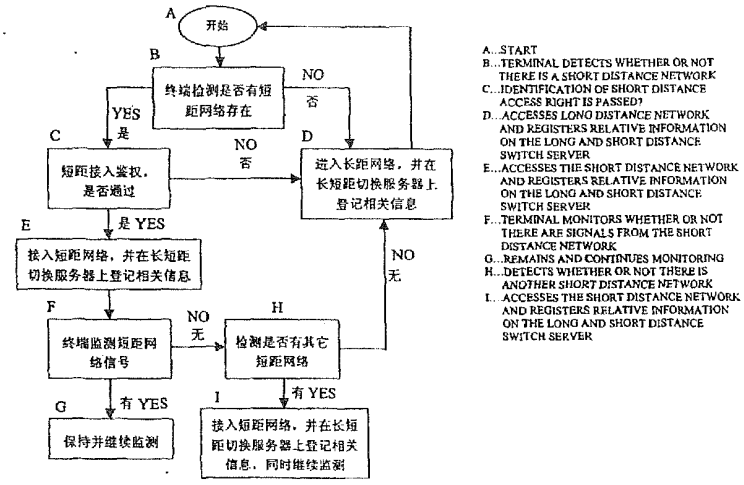
(84) 指定国(地区): 欧洲专利(AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR)

本国际公布:
— 包括国际检索报告。

所引用双字母代码和其它缩写符号，请参考刊登在每期PCT公报期刊起始的"代码及缩写符号简要说明"。

(54) Title: A COMBINED LONG AND SHORT DISTANCE WIRELESS COMMUNICATION SYSTEM AND ITS METHOD

(54) 发明名称: 长短距结合的无线通信系统及其方法



(57) Abstract: A combined long and short distance wireless communication system and its method, in which a dual distance terminal is used to provide subscribers with the long and short distance wireless service and guarantee that this service isn't interrupted when switching between different networks; a remote distance base station is used to provide for the dual distance terminal the function for performing remote distance wireless access; a short distance AP is used to provide for the dual distance terminal the function for performing short distance wireless access; a dual distance network server which connects the remote distance base station and the short distance AP is used for the dual distance terminal to implement switch between networks and access the switched network. The present invention can make the dual distance terminal in this wireless long and short distance system coverage be in communication with long distance networks and simultaneously automatically switch to short distance wireless local area networks when entering them so as to guarantee gapless switch of traffic stream and at the same time access different short distance local area networks for subscribers of different orders in different priority by right identification.

[见续页]

WO 03/056719 A1

(57) 摘要

一种长短距相结合的无线通信系统及其方法，其双距终端用于提供给用户长短距无线服务，且保证此服务在不同网络间切换时不被中断；远距基站用于为双距终端提供进行远距离无线接入功能；短距 AP 用于为双距终端提供进行短距无线接入功能；双距网络服务器连接远距基站和短距 AP，用于对双距终端实现网络的切换，并使终端接入切换后的网络中。本发明将使处于本无线长短距体系覆盖的双距终端可以保持与长距网络进行通信，同时可以使终端在进入短距无线局域网覆盖范围时自动转换到短距无线局域网中，保证业务流的无缝切换；同时保证对于不同级别的用户通过不同的优先级经过鉴权接入不同的短距局域网络。

长短距结合的无线通信系统及其方法

技术领域

本发明涉及一种无线通信系统及其实现，尤其是一种将长短距无线通信技术结合并实现无缝切换链接的无线通信系统，属于通信技术领域。

背景技术

目前的通讯网络机制， GSM/GPRS 和未来的 3G 都是长距通信。长距通信的主要特点是：覆盖面积大，铺设费用低，运行费用高，低传输速率等。其表现为“海洋”的概念。目前诸如 802.11 和 BT 等，则为短距通信方式。其特点是，在办公区域、特定的商业区域等，覆盖范围有限、铺设费用高，运行费用低，高传输速率等。其表现为“岛屿”的概念，一一孤立，明显具有区域限制的特性。

在 GSM900/1800 网络、GSM/GPRS 与第三代移动通信的交互网络中，其所体现的是均为长距的概念，即“海洋”的概念。其采用的工作方式均为 TDMA、CDMA 等多址方式，而在长短距网络中，短距则大多采用 CSMA/CA 等适用与短距传输的工作方式，同时，在长距网络中其发射功率均会很大，但由于局域网络的限制，如 WLAN 网络，其发射功率将受到限制，从而体现出“岛屿”的特性，另外，相对于长距网络，短距网络具有带宽较宽、传输速率快、费用低廉等优势。

如果能将长短距网络结合起来，实现优势互补，使得终端按照不同请求可以同时接收来自长距和短距两方面的服务，如利用长距获得语音服务，而通过短距获得数据业务的服务，即在长短距网络中明显存在位于长距网络覆盖范围内的短距通信特征。则是对现有技术的一个较大的贡献。目前尚未检索到能够实现上述功能的相关文献。

发明内容

本发明的目的在于提出一种长短距结合技术的无线通信系统及其方法；

本发明的另一个目的是提出一种长短距结合技术的无线通信双距终端；

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本发明的另一个目的是提出一种长短距结合技术的双距网络服务器；

本发明能够在保证无线长距通信的同时，使用户在进入相应的短距覆盖区域时，进行自动切换、容量评估和安全问题等为内容的无缝切换，为短距通信并通过短距无线接入点接入整个网络，从而实现两种网络资源更有效的综合利用。

本发明的目的是通过如下技术方案实现的：

一种长短距结合的无线通信系统，包括：双距终端、远距基站，短距AP及双距网络服务器；

双距终端用于提供给用户长短距无线服务；

远距基站用于为双距终端提供进行远距离无线接入功能；

短距AP用于为双距终端提供进行短距无线接入功能；

双距网络服务器连接远距基站、短距AP，用于对双距终端实现网络的切换，并使终端接入切换后的网络中。

一种长短距结合的无线通信方法，采用长短距结合的无线通信系统，双距终端开机以后，首先扫描检测，判断是否处于某一短距AP服务范围内，如果是，则通过短距AP接入网络进入短距网络，并通知双距归属服务器其所在位置；如果不在任何一个短距AP内，则搜索长距服务的基站，通过长距接入网络进入长距网络，并通知双距归属服务器其所在位置。

一种用于所述长短距结合无线通信系统的双距网络服务器，包括：

数据服务功能实体，用于检测是否有长短距数据传输发生，如有长短距数据传输发生，则为该数据传输提供接续服务；

存储器功能实体，用于存储切换时可能出现的丢失数据；并在终端切换完毕后将存储数据通过数据服务功能实体转发给终端，从而实现终端在双距网络中的无缝切换；

双距归属服务器，用于记载所管辖的双距终端的双距特性参数，在有双距切换发生时可通过数据服务功能实体获取终端切换信息，并进行终端数据的更

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新；在有对终端的查询时，告知数据服务功能实体终端相关双距信息；

对外网络接口，用于连接双距网络及外部网络的接口。

本发明所述双距终端要实现在长短两种网络中的移动，必须有适应两种网络特点的结构。它至少包括：

短距通信功能实体，包括短距射频功能模块，以及实现物理层和部分MAC层或链路层的功能，用于在短距网络中工作，获取数据信息；

长距通信功能实体，包括长距射频功能模块，以及实现物理层和部分链路层的功能；

双网切换判决策略功能实体，用于在相应的双距切换判决条件下对所处网络进行切换动作，并命令短距通信功能实体或长距通信功能实体向双距网络服务器发出信标信号。

通用功能实体，用于实现基本终端所具有的显示及输入输出功能。

本发明长短距无线通信的结合给人们带来了很多便利，并在根本上改变了目前长距、短距体制分立的局面。本发明具有如下明显优点：

在任何时候都可以通过无线长距实现实时传输；

在终端进入被允许的无线短距局域网时，可以自动优先转换到短距通信体制中，并保证用户正在传输的业务流不被间断，实现无缝切换；

在用户离开短距无线局域网时，可以保证终端自动切换到长距网络中，并保证用户正在传输的业务流不被间断，实现无缝切换；

在本系统中的其他用户终端对任一被允许访问的终端进行呼叫和查询时，该系统可以保证用户不论在任何短距局域网还是长距网络中都可被访问。

附图说明

图1为本发明系统构成示意图。

图2为本发明工作流程示意图。

图3为双距网络服务器功能模块结构示意图。

图4为双距网络服务器进行切换时的流程图。

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图5为双距终端功能结构示意图。

具体实施方式

本发明将无线通信系统构架为“海洋+岛屿”的结构，其中长距基站用以覆盖所有有效地区；短距AP用以覆盖用户相对密集的地区，如办公区，住宅区、商用区等；一个长短距服务器，将短距AP与长距基站相连，双距终端，在整个有短距AP和长距基站所覆盖的区域之间自由活动。

本发明的基本工作原理如下：

当双距终端开机以后，终端首先检测是否处于某一短距AP服务范围内，如果是则通过短距AP接入网络，并通知双距归属服务器其所在位置；如果不在任何一个短距AP内，则将搜索长距服务的基站，通过长距接入网络，并通知双距归属服务器其所在位置。

当一个处于长距网络的双距终端进入任何一个短距AP服务区域时，用户将检测短距AP，如果其短距信号处于一定阈值以上，双距终端将自动切换到短距频段，并开始由短距AP接入网络，其正在由长距承担的数据传输将由短距网络负责，实现无缝切换，且终端将通知其归属服务器其所在区域，服务器将负责网络中的其它终端对其的查询与通信。

当一个处于短距网络中的双距终端离开该短距区域进入长距网络时，终端将检测短距AP信号，如其短距信号低于一顶阈值时，双距终端将自动切换到长距网络，其正在由短距承担的数据传输将由长距网络负责，实现无缝切换，且终端将通知其归属服务器其已处于长距网络范围内，服务器将负责网络中的其它终端对其的查询与通信。

当一个处于长距网络的双距终端请求进入任何一个短距AP服务区域时，如果其所在区域的AP因安全或其它问题拒绝无线终端接入，则无线终端将依然保持长距通信。

当一个双距终端从一个短距小区移动到另一个短距小区时，双距终端将判别即将进入的短距AP，并把相应小区信息传送至双距网络服务器，从而实现短

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距小区之间的切换。双距终端将通知双距网络服务器中的归属服务器其已处于另一短距网络范围内，归属服务器将负责网络中的其它终端对其的查询与通信。

现以长距GSM/GPRS与短距WLAN的双距结合的无线通信系统为例，对本发明加以说明。所述无线通信系统的网络框架由GSM/GPRS基站及与长距接入相关的网络功能实体、无线局域网AP及与短距接入相关的网络功能实体、链接长距GSM/GPRS网络和短距无线局域网络的双距网络服务器、兼容双距的双距终端构成。其基本网络结构如图1所示。但本发明不局限于图1的实例，还包括长距3G与短距WLAN结合框架或其他长距、短距通信方式的结合框架。

参见图1和图2，下面以GSM/GPRS与WLAN相结合的双距网络为实施例，具体说明如下：

1、在双距网络中，双距终端开机后

对本发明所述系统而言，当用户在开机以后，双距终端将自动搜索当前所处网络环境，如果双距终端检测目前有无线局域网WLAN网络存在并不需要鉴权，则双距终端将直接接入WLAN网络；如果检测结果发现当前WLAN网络需要鉴权，则双距终端通过WLAN进行接入鉴权，如果鉴权成功双距终端将接入当前WLAN网络，如果不成功，双距终端将继续检测并进入到长距GPRS网络。

当双距终端接入WLAN网络后，双距终端可以通过WLAN短距网络接入双距服务器进行数据传输。

2、网络间的切换

2.1 从短距WLAN网络到长距GPRS网络的切换

当双距终端即将离开短距WLAN网络进入GPRS网络时，用户可通过相应的切换策略进行判断，如果已达到切换策略门限（该切换策略门限可指短距网络信号不可用门限，也可为短距网络信号非最优的门限），则双距终端将利用切换策略终止通过WLAN射频功能实体进行传输的数据，开始启动长距通信功能实体并利用该功能实体实现后续可能发生的数据传输；如该双距终端的服务等级要

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求其切换为无缝切换，则用户在终止WLAN射频功能实体正在传输的数据时，还将通过终端中的短距通信功能实体发射一个长短距切换的信标信号给即将切离的短距AP，并由该短距AP将该信标信号传至双距网络服务器，该双距网络服务器接收到相应的信标信号后将通知双距终端即将接入的长距通信功能实体，并根据双距终端的服务等级确定其在长距网络功能实体中的服务队列位置。

同时，双距网络服务器还可通过存储方式将该切换过程中可能丢失的数据包进行保护，待切换完成后再转发给该双距终端，从而可保证双距终端在切换过程中的数据不会丢失。

2.2 从长距GPRS网络到短距WLAN网络的切换

当双距终端即将从长距GPRS网络进入到短距WLAN网络时，双距终端可通过相应的切换策略进行判断，如果已达到切换策略门限，则双距终端将利用切换策略终止通过长距通信功能实体进行传输的数据，开始启动短距通信功能实体并利用该功能实体实现后续可能发生的数据传输。

双距终端在终止长距通信功能实体正在传输的数据时，还将通过双距终端中的基站及相应的GPRS网络功能实体发射一个长短距切换的信标信号给即将切离的GPRS服务功能实体，并由GPRS功能实体将该信标信号传至双距网络服务器，所述双距网络服务器接收到相应的信标信号后将通知短距网络功能实体，并根据双距终端的服务等级确定其在短距网络功能实体中的优先权。

同时，双距网络服务器还可通过存储方式将该切换过程中可能丢失的数据包进行保护，待切换完成后再转发给该双距终端，从而保证双距终端在切换过程中的数据不会丢失。

2.3 从一个短距网络到另一个短距网络的切换

当一个双距终端从一个短距小区移动到另一个短距小区时，双距终端将判别即将进入的短距AP，并把相应小区信息传送至双距网络服务器，从而实现短距小区之间的切换。双距终端将通知双距网络服务器中的归属服务器其已处于另一短距网络范围内，归属服务器将负责网络中的其它终端对其的查询与通

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信。

2.4自动切换

用户可以根据需要，预先自定义切换的优先级别，使得双距终端进行自动切换，例如：按照费用，传输速率，质量稳定性能等设置优先级别等，由双距终端根据优先条件自动识别切换。再有，当用户处于短距覆盖范围内时，也可选择不使用短距AP，而直接选择长距进行通信。

3、扫描与检测

对于长短距网络框架而言，一个很重要的问题就是(1) 双距终端始终保持长距和短距射频实体处于工作状态，实时地检测可能存在的长距或短距网络环境，并不断反馈给双距终端切换管理机制，并定时或必要时通过现有网络上报给双距网络服务器；

(2) 双距终端始终保持支持现有所处网络的射频功能实体处于工作状态，而对其他网络定期或不定期的启动相应射频功能实体对候选网络进行检测；

(3) 双距终端可始终保持支持现有所处网络的射频功能实体处于工作状态，而对其他网络不做扫描检测，而只有当现有网络不可用时，才对其他网络进行检测；

所述不定期的启动相应射频功能实体对候选网络进行检测，可以通过一些特定算法对候选网络进行检测，例如，以最后发现有其他网络存在的时间间隔为函数的变步长检测方法。

4、切换策略

切换策略可根据网络实现者的不同情况进行选择，以下是两种切换策略的举例，但本发明所包含的切换策略并不仅局限于以下两种：

(1)优先级网络切换策略；即只要发现有优先级高的网络存在，就切换到该网络中，不论现有网络是否可用；用户可以根据需要自行定义各类无线网络的优先级别，如传输速率、使用费用等；

(2)仅在当前使用的无线网络信号不存在时，切换到其他无线网络；该切

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换策略是指：当且仅当双距终端现处无线网络不可用时才进行切换，如现处网络可用，则即使存在高优先级网络也不进行切换。

图3 为双距网络服务器功能模块结构示意图。双距网络服务器可分为如下几个部分：

数据服务功能实体

用于检测是否有长短距数据传输发生，所述该数据传输是指：

长距和短距网络之间的双距终端之间的数据传输；

长距或短距网络中的双距终端对外部网络的数据传输。

长（短）距网络内的双距终端间的数据传输可由长（短）距网络功能实体完成；如有长短距数据传输发生，则为该数据传输提供接续服务。

检测长（短）距网路功能实体转发的双距终端的信标信号，判断双距终端是否在长短距网络间是否有切换发生，如有切换发生，则将新的终端信息（如该终端切换后的网络名）通知给双距归属寄存器。

存储器功能实体

用于存储切换时可能出现的丢失数据；并在终端切换完毕后将存储数据通过数据服务功能实体转发给终端，从而实现终端在双距网络中的无缝切换。

双距归属服务器

用于记载所管辖的双距终端的双距特性参数，如所处网络状况，终端优先级参数等；在有双距切换发生时可通过数据服务功能实体获取终端切换信息，并进行终端数据的更新；在有对终端的查询时，可告知数据服务功能实体终端相关双距信息。

对外网络接口

用于连接双距网络及外部网络的接口，所述对外网络接口包括：无线接口，与有线网络的接口、与其它无线网络的接口。

图4为双距网络服务器进行切换时的流程图。当双距终端从一个网络向另一个网络移动时，双距网络服务器配合双距终端进行切换。其切换过程如下：

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第一步，通过长（或短）距网络功能实体，检测用户双距信标信号，查看是否有切换发生，如果没有，则继续检测；如果有，则

第二步，更新双距归属寄存器中用户信息；

第三步，判断当前是否有数据传输，如果没有，回到第一步；

第四步，判断是否需要无缝切换，如果不需要，回到第一步；

第五步，进行数据缓存，并在切换动作完毕后将所缓存数据发送给用户。

图5为双距终端功能结构示意图。本发明所述双距终端要实现在长短两种网络中的移动，必须有适应两种网络特点的结构。它至少包括:

短距通信功能实体，包括短距射频功能模块,以及实现物理层和部分MAC层或链路层的功能，用于在短距网络中工作，获取数据信息；

长距通信功能实体，包括长距射频功能模块,以及实现物理层和部分链路层的功能；

双网切换判决策略功能实体，用于在相应的双距切换判决条件下对所处网络进行切换动作，并命令短距通信功能实体或长距通信功能实体向双距网络服务器发出信标信号。

通用功能实体，包括基本终端所具有的显示及输入输出功能；

所述双距终端通过双网切换判决策略功能实体控制长（短）通信功能实体中的射频功能模块的工作状态，即(1)长短距射频模块同时工作；(2)根据情况，变步长工作；(3)仅在一种网络不存在后，才启动另一射频实体进行工作进行搜寻网络。

本发明所述双距终端中，作为可选部分，还可包括：数据管理及数据缓存功能实体，用于在切换过程中对相应的数据进行管理及缓存。

双距终端与与以往终端不同，它同时具有长距和短距功能实体；因此，它可同时检测或自动搜索可能存在的短距如WLAN及长距GSM/GPRS或3G网络，它还可通过短距和长距功能实体进行短距或长距数据业务（包括属于一种特殊数据业务的语音）传输。与以往终端另一个不同之处在于，它还具有一个双网切换

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判决策略功能实体，用于在相应的双距切换判决条件下对所处网络进行切换动作，并命令短距通信功能实体或长距通信功能实体向双距网络服务器发出信标信号。同时，它还可选的具有一个数据管理及数据缓存功能实体，其目的是在切换过程中对相应的数据进行管理及缓存，从而保证终端的通用功能实体所需的数据传输不因切换而造成中断。

最后所应说明的是：以上实施例仅用以说明而非限制本发明的技术方案，尽管参照上述实施例对本发明进行了详细说明，本领域的普通技术人员应当理解：依然可以对本发明进行修改或者等同替换，而不脱离本发明的精神和范围的任何修改或局部替换，其均应涵盖在本发明的权利要求范围当中。

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权 利 要 求 书

1. 一种长短距结合的无线通信系统，其特征在于：包括双距终端、远距基站，短距AP及双距网络服务器；

双距终端用于提供给用户长短距无线服务；

远距基站用于为双距终端提供进行远距离无线接入功能；

短距AP用于为双距终端提供进行短距无线接入功能；

双距网络服务器连接远距基站、短距AP，用于对双距终端实现网络的切换，并使终端接入切换后的网络中。

2. 根据权利要求1所述的长短距结合的无线通信系统，其特征在于：所述远距基站包括与远距基站有关的长距网络设备。

3. 根据权利要求1所述的长短距结合的无线通信系统，其特征在于：所述短距接入点包括与短距接入点有关的短距网络设备。

4. 一种用于权利要求1所述的长短距结合无线通信系统的双距网络服务器，其特征在于，包括:

数据服务功能实体，用于检测是否有长短距数据传输发生，如有长短距数据传输发生，则为该数据传输提供接续服务；

存储器功能实体，用于存储切换时可能出现的丢失数据；并在终端切换完毕后将存储数据通过数据服务功能实体转发给终端，从而实现终端在双距网络中的无缝切换；

双距归属服务器，用于记载所管辖的双距终端的双距特性参数，在有双距切换发生时可通过数据服务功能实体获取终端切换信息，并进行终端数据的更新；在有对终端的查询时，告知数据服务功能实体终端相关双距信息；

对外网络接口，用于连接双距网络及外部网络的接口。

5. 根据权利要求4所述的双距网络服务器，其特征在于，所述对外网络接口包括: 与有线网络的接口、与其它无线网络的接口。

6. 一种用于权利要求1所述长短距结合无线通信系统的双距终端，其特征

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在于，所述双距终端包括:

短距通信功能实体，包括射频功能模块,以及实现物理层和部分MAC层或链路层的功能，用于在短距网络中工作，获取数据信息;

长距通信功能实体，包括射频功能模块,以及实现物理层和部分链路层的功能;

双网切换判决策略功能实体，用于在相应的双距切换判决条件下对所处网络进行切换动作，并命令短距通信功能实体或长距通信功能实体向双距网络服务器发出信标信号。

通用功能实体，包括基本终端所具有的显示及输入输出功能。

7. 根据权利要求 6 所述的双距终端，其特征在于，所述双距终端中，还可包括: 数据管理及数据缓存功能实体，用于存储在切换中出现的丢失数据，并在切换完毕后向终端上层通用功能实体进行转发。

8. 一种长短距结合的无线通信方法，采用长短距结合的无线通信系统，其特征在于: 双距终端开机以后，首先扫描检测，判断是否处于某一短距 AP 服务范围内，如果是，则通过短距 AP 接入网络进入短距网络，并通知双距归属服务器其所在位置; 如果不在任何一个短距 AP 内，则搜索长距服务的基站，通过长距接入网络进入长距网络，并通知双距归属服务器其所在位置。

9. 根据权利要求 8 所述的长短距结合的无线通信方法，其特征在于，如果双距终端检测处于某一短距 AP 服务范围内有无线局域网 WLAN 网络存在并不需要鉴权，则双距终端将直接接入 WLAN 网络;如果检测结果发现当前 WLAN 网络需要鉴权，则双距终端通过 WLAN 进行接入鉴权，如果鉴权成功终端将接入当前 WLAN 网络，如果不成功，双距终端将继续检测并进入到长距 GPRS 网络。

10. 根据权利要求9所述的长短距结合的无线通信方法，其特征在于，当双距终端接入WLAN网络后，双距终端可以通过WLAN短距网络接入双距服务器进行数据传输。

11. 根据权利要求9或10所述的长短距结合的无线通信方法，其特征在于，

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当双距终端即将离开短距WLAN网络进入GPRS网络时，则进行从短距网络到长距网络的切换，双距终端通过相应的切换策略进行判断，如果已达到切换策略门限，则双距终端将利用切换策略终止通过短距射频功能实体进行传输的数据，开始启动长距通信功能实体并利用该功能实体实现后续可能发生的数据传输。

12. 根据权利要求11所述的长短距结合的无线通信方法，其特征在于，所述切换策略门限可为短距网络信号不可用门限，也可为短距网络信号非最优的门限。

13. 根据权利要求11所述的长短距结合的无线通信方法，其特征在于，进行从短距网络到长距网络的切换时，如该双距终端的服务等级要求其切换为无缝切换，则用户在终止WLAN射频功能实体正在传输的数据时，还将通过终端中的短距通信功能实体发射一个长短距切换的信标信号给即将切离的短距AP，并由该短距AP将该信标信号传至双距网络服务器，该双距网络服务器接收到相应的信标信号后将通知双距终端即将接入的长距网络功能实体，并根据双距终端的服务等级确定其在长距网络功能实体中的服务队列位置。

14. 根据权利要求13所述的长短距结合的无线通信方法，其特征在于，还包括所述双距网络服务器通过存储方式将该切换过程中可能丢失的数据包进行保护，待切换完成后再转发给该双距终端，从而可保证双距终端在切换过程中的数据不会丢失。

15. 根据权利要求8所述的长短距结合的无线通信方法，其特征在于，当双距终端即将从长距网络进入到短距WLAN网络时，则进行从长距网络到短距网络的切换，双距终端可通过相应的切换策略进行判断，如果已达到切换策略门限，则双距终端将利用切换策略终止通过长距网络功能实体进行传输的数据，开始启动短距通信功能实体并利用该功能实体实现后续可能发生的数据传输。

16. 根据权利要求15所述的长短距结合的无线通信方法，其特征在于，如双距终端的服务等级要求所述从长距网络到短距网络的切换为无缝切换的时候，双距终端在终止长距通信功能实体正在传输的数据时，还将通过双距终端

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中的基站及相应的长距网络功能实体发射一个长短距切换的信标信号给即将切离的长距网络功能实体，并由长距网络实体将该信标信号传至双距网络服务器，所述双距网络服务器接收到相应的信标信号后将通知短距通信功能实体，并根据双距终端的服务等级确定其在短距网络功能实体中的优先权。

17. 根据权利要求16所述的长短距结合的无线通信方法，其特征在于，双距网络服务器还可通过存储方式将该切换过程中可能丢失的数据包进行保护，待切换完成后再转发给该双距终端，从而保证双距终端在切换过程中的数据不会丢失。

18. 根据权利要求 9 或 10 所述的长短距结合的无线通信方法，其特征在于，当一个双距终端从一个短距小区移动到另一个短距小区时，双距终端将判别即将进入的短距 AP，并把相应小区信息传送至双距网络服务器，从而实现短距小区之间的切换。

19. 根据权利要求 18 所述的长短距结合的无线通信方法，其特征在于，当一个双距终端从一个短距小区移动到另一个短距小区时，还包括：双距终端将通知双距网络服务器中的归属服务器其已处于另一短距网络范围内，归属服务器将负责网络中的其它终端对其的查询与通信。

20. 根据权利要求8所述的长短距结合的无线通信方法，其特征在于，所述双距终端对长短距网络进行扫描检测，可以采取以下三种方式之一：

(1) 双距终端始终保持长距和短距射频实体处于工作状态，实时地检测可能存在的长距或短距网络环境，并不断反馈给双距终端切换管理机制，并定时或必要时通过现有网络上报给双距网络服务器；

(2) 双距终端始终保持支持现有所处网络的射频功能实体处于工作状态，而对其他网络定期或不定期的启动相应射频功能实体对候选网络进行检测；

(3) 双距终端可始终保持支持现有所处网络的射频功能实体处于工作状态，而对其他网络不做扫描检测，而只有当现有网络不可用时，才对其他网络进行检测。

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21. 根据权利要求20所述的长短距结合的无线通信方法，其特征在于，所述不定期的启动相应射频功能实体对候选网络进行检测，可以通过例如以最后发现有其他网络存在的时间间隔为函数的变步长检测方法的特定算法，对候选网络进行检测。

22. 根据权利要求11所述的长短距结合的无线通信方法，其特征在于，所述切换策略包括以下两种切换策略：

(1)优先级网络切换策略；即只要发现有优先级高的网络存在，就切换到该网络中，不论现有网络是否可用；

(2)仅在当前使用的无线网络信号不存在时，切换到其他无线网络。

23. 根据权利要求15所述的长短距结合的无线通信方法，其特征在于，所述切换策略包括以下两种切换策略：

(1)优先级网络切换策略；即只要发现有优先级高的网络存在，就切换到该网络中，不论现有网络是否可用；

(2)仅在当前使用的无线网络信号不存在时，切换到其他无线网络。

24. 根据权利要求18所述的长短距结合的无线通信方法，其特征在于，所述切换策略包括以下两种切换策略：

(1)优先级网络切换策略；即只要发现有优先级高的网络存在，就切换到该网络中，不论现有网络是否可用；

(2)仅在当前使用的无线网络信号不存在时，切换到其他无线网络。

25. 根据权利要求 22、23 或 24 所述的长短距结合的无线通信方法，其特征在于，所述第二种切换策略是指：当且仅当双距终端现处无线网络不可用时才进行切换，如现处网络可用，则即使存在高优先级网络也不进行切换。

26. 根据权利要求 8 所述的长短距结合的无线通信方法，其特征在于，还包括：当双距终端从一个网络向另一个网络移动时，由双距网络服务器配合双距终端进行切换。

27. 根据权利要求 26 所述的长短距结合的无线通信方法，其特征在于，

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所述双距网络服务器配合双距终端进行切换过程如下：

第一步，通过长（或短）距网络功能实体，检测用户双距信标信号，查看是否有切换发生，如果没有，则继续检测；如果有，则

第二步，更新双距归属寄存器中用户信息；

第三步，判断当前是否有数据传输，如果没有，回到第一步；

第四步，判断是否需要无缝切换，如果不需要，回到第一步；

第五步，进行数据缓存，并在切换动作完毕后将所缓存数据发送给用户。

28. 根据权利要求 15 所述的长短距结合的无线通信方法，其特征在于，当一个处于长距网络的双距终端请求进入任何一个短距 AP 服务区域时，如果其所在区域的 AP 因安全或其它问题拒绝无线终端接入，则无线终端将依然保持长距通信。

29. 根据权利要求 8 所述的长短距结合的无线通信方法，其特征在于，用户可以根据需要，预先自定义切换的优先级别，使得双距终端进行自动切换。

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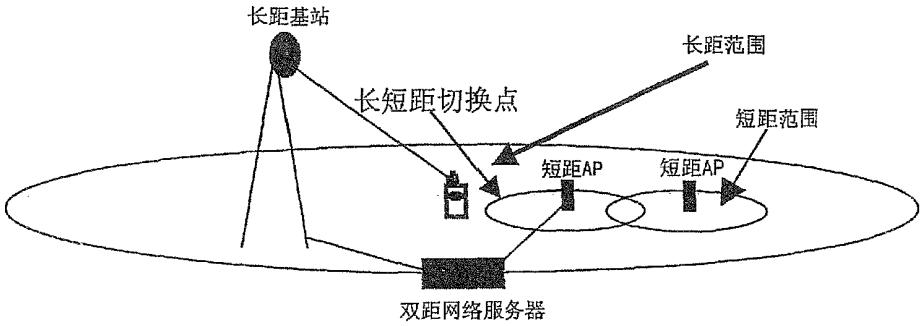

长距基站
长距范围
长短距切换点
短距范围
短距AP
短距AP
双距网络服务器

图 1

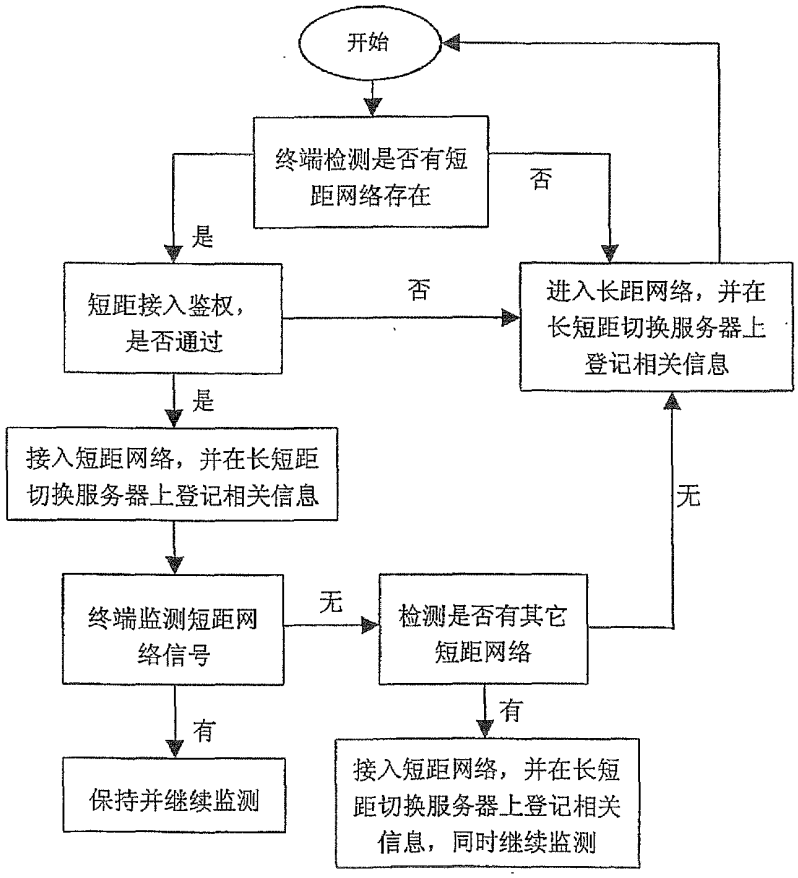

开始
终端检测是否有短距网络存在
否
是
短距接入鉴权，是否通过
否
进入长距网络，并在长短距切换服务器上登记相关信息
是
接入短距网络，并在长短距切换服务器上登记相关信息
无
终端监测短距网络信号
无
检测是否有其它短距网络
有
有
保持并继续监测
接入短距网络，并在长短距切换服务器上登记相关信息，同时继续监测

图 2

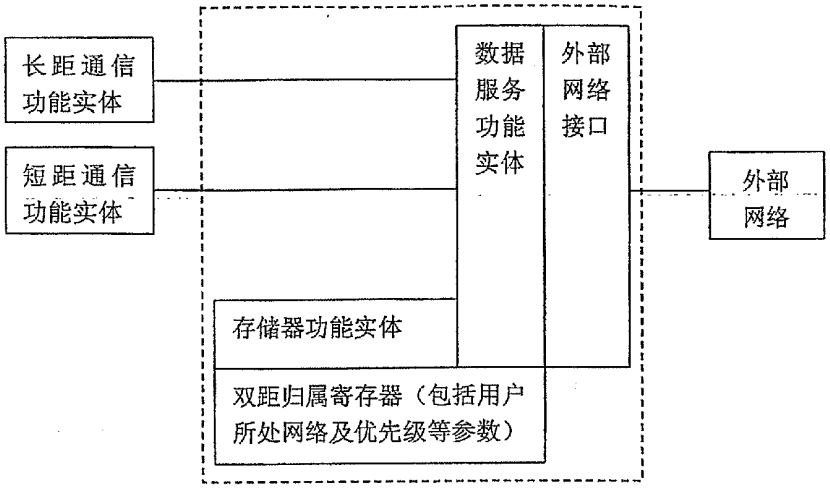

长距通信功能实体
短距通信功能实体
数据服务功能实体
外部网络接口
外部网络
存储器功能实体
双距归属寄存器（包括用户所处网络及优先级等参数）

图 3

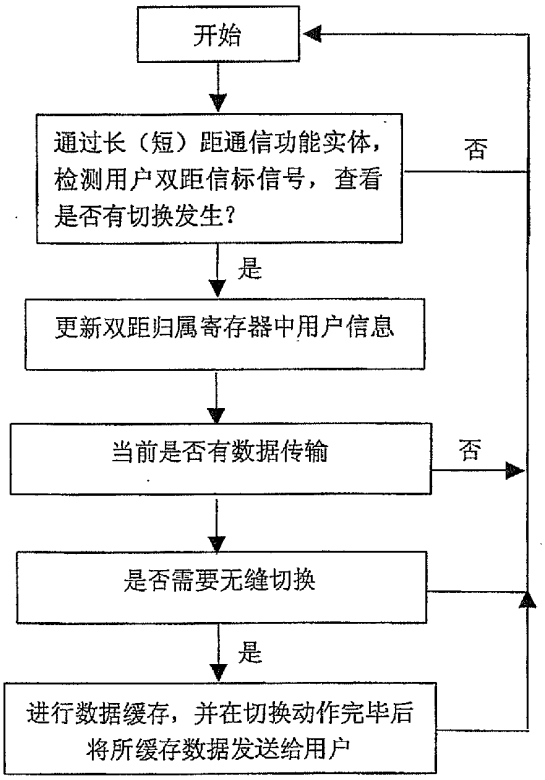

开始
通过长（短）距通信功能实体，检测用户双距信标信号，查看是否有切换发生？
否
是
更新双距归属寄存器中用户信息
当前是否有数据传输
否
是否需要无缝切换
是
进行数据缓存，并在切换动作完毕后将所缓存数据发送给用户

图 4

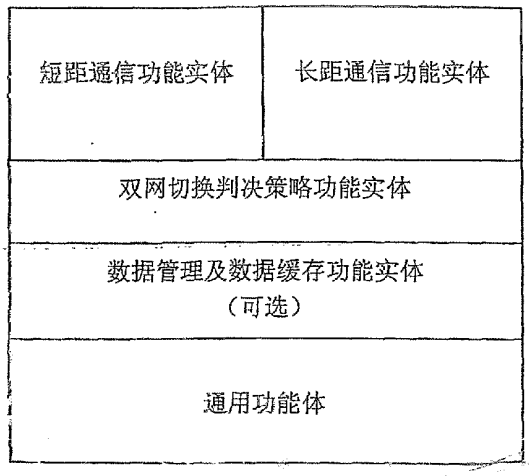


图 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN02/00914

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: H04B 7/26 H04Q 7/32

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)

IPC[7]: H04B 7/26 H04Q 7/32

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

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

WPI、EPODOC、PAJ、CNPAT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,210,785 A (CANON KK, JP) 11 May 1993 (11.05.93) See Col. 1,line57 to Col. 11,line43 and Fig.1-10	1-3、6、8-13、15、16、18-20、22-26
A		4、5、14、17
Y	WO 94/00946 A1 (MOTOROLA INC.) 6 Jan. 1994 (06.01.94) See the whole document	1-3、6-13、15、16、20-26、28、29
A		4、5、14、17
Y	JP 58-151136 A (NIPPON ELECTRIC CO) 8 Sep. 1983 (08.09.83) See the whole document	1-3、6-13、15、16、18-26、28、29
A		4、5、14、17
Y	US 5,127,042 A (MOTOROLA INC.) 30 Jun. 1992 (30.06.92) See the whole document	1-3、6、8、15、16、20、22-26、28、29

☐ 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 another 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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21. Feb 2003 (21. 02. 2003)	20 MAR 2003 (20.03.03)
Name and mailing address of the ISA/CN 6 Xitucheng Rd., Jimen Bridge, Haidian District, 100088 Beijing, China Facsimile No. 86-10-62019451	Authorized officer GUO GUN Telephone No. 86-10-62093785

TERNATIONAL SEARCH REPORT

Information patent family members

Search request No.
PCT/CN02/00914

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		JP 1 288 026 A	20.11.1989
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WO 9 400 946 A1	06.01.1994	MX 9 303 781 A	01.12.1993
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US 5 127 042 A	30.06.1992	GB 2 225 512 AB	30.05.1990
		JP 3 001 621 A	08.01.1991
		US 4 989 230 A	29.01.1991
		CA 1 292 041 A	12.11.1991
		US 5 367 558 A	22.11.1994
		US 5 463 674 A	31.10.1995
		HK 42 596 A	22.03.1996
		JP 8 237 747 A	13.09.1996
		JP 2 000 209 664 A	28.07.2000
		US 6 141 560 A	31.10.2000

国际检索报告

国际申请号
PCT/CN02/00914

A. 主题的分类

IPC[7]: H04B 7/26 H04Q 7/32

按照国际专利分类表(IPC)或者同时按照国家分类和IPC两种分类

B. 检索领域

检索的最低限度文献(标明分类体系和分类号)

IPC[7]: H04B 7/26 H04Q 7/32

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称和，如果实际可行的，使用的检索词)

WPI、EPODOC、PAJ、CNPAT

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求编号
Y	US 5,210,785 A（日本 CANON KK）1993 年 5 月 11 日（11.05.93） 说明书第 1 栏第 57 行至第 11 栏第 43 行，图 1-10	1-3、6、8-13、15、16、18-20、22-26
A		4、5、14、17
Y	WO 94/00946 A1（摩托罗拉公司）1994 年 1 月 6 日（06.01.94） 说明书摘要及附图	1-3、6-13、15、16、20-26、28、29
A		4、5、14、17
Y	JP 58-151136 A（日本电气株式会社）1983 年 9 月 8 日（08.09.83） 说明书摘要及附图	1-3、6-13、15、16、18-26、28、29
A		4、5、14、17
Y	US 5,127,042 A（摩托罗拉公司）1992 年 6 月 30 日（30.06.92） 说明书摘要及附图	1-3、6、8、15、16、20、22-26、28、29

☐ 其余文件在C栏的续页中列出。　　☒ 见同族专利附件。

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"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

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"&" 同族专利成员的文件

国际检索实际完成的日期	国际检索报告邮寄日期
21.2月 2003（21.02.03）	20. 3月 2003 (20.03.03)
国际检索单位名称和邮寄地址 ISA/CN 中国北京市海淀区西土城路 6 号(100088) 传真号： 86-10-62019451	受权官员 郭 群 电话号码：86-10-62093785

PCT/ISA/210 表(第 2 页)(1998 年 7 月)

国际检索报告
关于同族专利成员的情报

国际申请号
PCT/CN02/00914

检索报告中引用的专利文件	公布日期	同族专利成员	公布日期
US 5 210 785 A	11.05.1993	JP 1 220 922 A	04.09.1989
		JP 1 288 026 A	20.11.1989
		US 5 517 553 A	14.05.1996
		US 5 724 647 A	03.03.1998
WO 9 400 946 A1	06.01.1994	MX 9 303 781 A	01.12.1993
		FR 2 693 067 AB	31.12.1993
		CA 2 115 657 AC	06.01.1994
		CN 1 085 707 A	20.04.1994
		US 5 442 680 A	15.08.1995
		IT 1 262 367 B	19.06.1996
JP 58 151 136 A	08.09.1983	无	
US 5 127 042 A	30.06.1992	GB 2 225 512 AB	30.05.1990
		JP 3 001 621 A	08.01.1991
		US 4 989 230 A	29.01.1991
		CA 1 292 041 A	12.11.1991
		US 5 367 558 A	22.11.1994
		US 5 463 674 A	31.10.1995
		HK 42 596 A	22.03.1996
		JP 8 237 747 A	13.09.1996
		JP 2 000 209 664 A	28.07.2000
		US 6 141 560 A	31.10.2000

Electronic Acknowledgement Receipt

EFS ID:	21830922
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	20-MAR-2015
Filing Date:	09-OCT-2014
Time Stamp:	11:57:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_3_20_2015.pdf	612308 972af9acd66ad35fac4023201969792cda84d198	no	4

Warnings:	
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A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

2	Foreign Reference	GB2287858.pdf	1782443 042e6c1ae011c5bb5f28ec57b519fdc291e96590	no	20
Warnings:					
Information:					
3	Foreign Reference	EP1471665.pdf	1649535 a25e1b03bc954b9803913186d08394a80cb507cf	no	16
Warnings:					
Information:					
4	Foreign Reference	WO03056719.pdf	2136260 72d2c97b4e6cdd3509484c0342b11868ab31bd7b	no	26
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New Applications Under 35 U.S.C. 111
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National Stage of an International Application under 35 U.S.C. 371
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402

CONFIRMATION NO. 2888

28960
HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086

PUBLICATION NOTICE

OC000000074380620

Title:MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

Publication No.US-2015-0092747-A1
Publication Date:04/02/2015

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The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

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PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050090259	A1	2005-04-28	Jain et al.	
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

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Examiner Signature		Date Considered	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

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Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2015-04-08
Name/Print	Jonathan O. Owens	Registration Number	37902

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Electronic Acknowledgement Receipt

EFS ID:	22009791
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	08-APR-2015
Filing Date:	09-OCT-2014
Time Stamp:	20:31:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_4_8_2015.pdf	612158 89ee657eb3137ef753d1809e225e1432e5d88385	no	4

Warnings:	
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National Stage of an International Application under 35 U.S.C. 371
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New International Application Filed with the USPTO as a Receiving Office
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

U.S.PATENTS						Remove
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	1	8520605	B2	2013-08-27	Ganesan	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

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☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens	Date (YYYY-MM-DD)	2015-06-17
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	22664049
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	17-JUN-2015
Filing Date:	09-OCT-2014
Time Stamp:	18:16:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_Form_6_17_2015.pdf	612170 4e0c9ccfe9354833e427001f95a906dc32c28861	no	4

Warnings:	
Information:	

Total Files Size (in bytes):	612170

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
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New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not yet assigned
Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020183038	A1	2002-12-15	Comstock et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2015-06-19
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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Electronic Acknowledgement Receipt

EFS ID:	22690252
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	19-JUN-2015
Filing Date:	09-OCT-2014
Time Stamp:	18:21:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_6_19_2015.pdf	612102 712ec40c7f23c29eafd599ea0cac6a532d6768ec	no	4

Warnings:	
Information:	

Total Files Size (in bytes):	612102

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/82 (07-12)
Approved for use through 11/30/2014, OMB 0651-0035
U.S. Patent and Trademark Office: U.S DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 28960

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☐ The address associated with Customer Number:

OR

☒ Firm or Individual Name: Haverstock & Owens LLP

Address	162 North Wolfe Road		
City	Sunnyvale	State CA	Zip 94086
Country	US		
Telephone	408-530-9700	Email jowens@hollp.com	

Assignee Name and Address: VASU NETWORKS CORPORATION
19500 PRUNERIDGE AVENUE, #6208
CUPERTINO, CA 95014

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	[signature]	Date	July 29, 15
Name	VASUDEVAN GANESAN	Telephone	408-482-1695
Title	CEO		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Late Filing Fee for Oath or Declaration	2051	1	70	70
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**70**

Electronic Acknowledgement Receipt	
EFS ID:	23122951
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	05-AUG-2015
Filing Date:	09-OCT-2014
Time Stamp:	14:45:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$70
RAM confirmation Number	1018
Deposit Account	081275
Authorized User	OWENS, JONATHAN O.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	POA_Transmittal_8_5_2015.pdf	113706 c3614d2708be7a16010cc64d11095fcbe67ed797	no	1
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration_Ganesan_8_5_2015.pdf	633531 3373a52d76b21adf056a9584298be0a269d5cbb9	no	2
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	Statement_373c_8_5_2015.pdf	265789 58b2472331ad837c6d9b888e566e27b447aed946	no	3
Warnings:					
Information:					
4	Power of Attorney	Power_Of_Attorney_8_5_2015.pdf	814968 122a6c0a86da901f825efff0736fa294bc092ae9	no	1
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	30554 54f5f7f5540c666d640db11d1c6d455226200f0d8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1858548		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Art Unit: 2414
Vasudevan Ganesan	Examiner:
Serial No.: 14/510,766	**TRANSMITTAL LETTER**
Filed: October 9, 2014	
For: **MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER**	162 N. Wolfe Road Sunnyvale, CA 94086 (408) 530-9700
	Customer No. 28,960

MS: Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed please find the executed Declaration, Statement Under 37 CFR 3.73(c) and Power of Attorney, for filing in the U.S. Patent and Trademark Office.

The Commissioner is hereby authorized to charge any additional fee or credit overpayment to our Deposit Account No. 08-1275.

Respectfully submitted,

HAVERSTOCK & OWENS LLP

Dated: August 5, 2015

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg No.: 37,902

Attorneys for Applicant

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Vasudevan Ganesan et al.	)	
	)	
Serial No.: 14/510,766	)	**DECLARATION**
	)	
Filed: October 9, 2014	)	162 North Wolfe Road
	)	Sunnyvale, CA 94086
For: **MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER**	)	(408) 530-9700
	)	
	)	Customer No. 28960
	)	
	)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450.

As a below named inventor, I hereby declare that:

IDENTIFICATION OF APPLICATION

This declaration is directed to:

[ ] the application filed herewith, including any Preliminary Amendment filed herewith.
[X] the application identified above.
[ ] the application identified above, as amended by Preliminary Amendment filed herewith.
[ ] the application identified above, and which was amended on _____.
[ ] PCT International Application No.: _____ filed on_____, and amended under PCT Article 19 on _____ (if applicable).

APPLICATION AUTHORIZATION

The above-identified application was made or authorized to be made by me.

INVENTORSHIP STATEMENT

I believe I am the original inventor or an original joint inventor of a claimed invention in the application.

ACKNOWLEDGMENT OF PENALTIES

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above. I acknowledge the duty to disclose information known to me which is material to patentability as defined in 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

PATENT
Attorney Docket No.: HAVA-00402

POWER OF ATTORNEY

I hereby appoint the following as my attorneys with full power of substitution to prosecute this application and transact all business in the Patent and Trademark Office in connection therewith:

Thomas B. Haverstock	32,571	Jonathan O. Owens	37,902
David A. Hill	44,153	Tina T. Wang	64,265
Jack R. Harris (Agent)	51,145	Lucas J. Myslinski	56,418

Please direct all correspondence regarding this application to the following:

Jonathan O. Owens
HAVERSTOCK & OWENS LLP
162 North Wolfe Road
Sunnyvale, California 94086
Customer No.: 28960

WARNING

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. Petitioner/applicant is advised that documents which form the record of a patent application (such as the PTO/SB/01) are placed into the Privacy Act system of records DEPARTMENT OF COMMERCE, COMMERCE-PAT-7, System name: Patent Application Files. Documents not retained in an application file (such as PTO-2038) are placed in the Privacy Act System of COMMERCE/PAT-TM-10, System name: Deposit Accounts and Electronic Funds Transfer Profiles.

SIGNATURE(S)

Legal Name of Inventor: Vasudevan Ganesan
Inventor's Signature: [signature]
Date: July 29, 15
Residence: Cupertino, CA
Post Office Address: 19580 Pruneridge Ave., #6208, Cupertino CA 95014

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Vasu Networks Corporation

Application No./Patent No.: 14/510,766 Filed/Issue Date: October 9, 2014

Titled: MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING

Vasu Networks, a CORPORATION

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 033924, Frame 0607, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

   1. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

   2. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

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6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

[signature]	July 29, 15
Signature	Date
VASUDEVAN GANESAN	CEO
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402

CONFIRMATION NO. 2888

28960
HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086

POA ACCEPTANCE LETTER

OC000000076824370

Date Mailed: 08/12/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/05/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tnguyen/

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8514867	B2	2013-08-20	Ganesan	
	2	8958434	B2	2015-02-17	Ganesan	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2015-11-17
Name/Print	Jonathan O.Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	24103299
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	17-NOV-2015
Filing Date:	09-OCT-2014
Time Stamp:	11:20:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_11_17_2015.pdf	612190 2e3cb191cce1620087fea457d76e7a755614ff4d	no	4

Warnings:	
Information:	

Total Files Size (in bytes):	612190

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	Group Art Unit:
	)	
Vasudevan Ganesan	)	Examiner:
	)	
Application No.: 14/510,766	)	
	)	
Filed: October 9, 2014	)	**SUPPLEMENTAL AMENDMENT**
	)	
For: **MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER**	)	162 North Wolfe Road Sunnyvale, California 94086 (408) 530-9700
	)	
	)	Customer No. 28960

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENTS

Prior to an examination on the merits please amend the subject application as follows:

Amendments to the Title begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 15 of this paper.

Amendments to the Title:

Please change the title to:

MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (previously presented) A method of providing communications for a mobile communication device that roams between multiple wireless networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a first wireless communication link between the mobile communication device and a first wireless network;

monitoring a signal strength of the first wireless communication link;

when the signal strength drops below a threshold, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link;

notifying the mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second wireless communication link between the mobile communication device and a second wireless network.

2. (previously presented) The method of claim 1 wherein the first wireless communication link comprises a WiFi communication link, and the first wireless network comprises a WiFi network access point.

3. (previously presented) The method of claim 2 wherein the second wireless network comprises a wireless cellular network.

4. (original) The method of claim 1 wherein establishing the first communication link includes routing through a VOIP network.

5. (original) The method of claim 1 wherein establishing the first communication link includes routing through a cellular network.

6. (original) The method of claim 1 wherein establishing the second communication link includes routing through a VOIP network.

7. (original) The method of claim 1 wherein establishing the second communication link includes routing through a cellular network.

8. (previously presented) The method of claim 1 further comprising providing a connectivity status by the mobile communication device to the interface server while the mobile communication device is within a first coverage area of the first wireless network.

9. (previously presented) The method of claim 8 further comprising providing a routing association to a mobile switching center within the second wireless network, wherein the routing association associates the mobile communication device to the interface server.

10. (previously presented) The method of claim 9 further comprising routing a termination communication intended for the mobile communication device from the mobile switching center to the interface server according to the routing association when the connectivity status is active, and routing the termination communication from the interface server to the mobile communication device over the first wireless network.

11. (original) The method of claim 10 further comprising when the connectivity status is not provided to the interface server, the router association is removed from the mobile switching center.

12. (previously presented) The method of claim 1 further comprising registering the mobile communication device with a mobile switching center within the second wireless network when the signal strength drops below the threshold.

13. (original) The method of claim 12 further comprising setting up the second communication link with the end destination device and forwarding the second communication link to the interface server.

14. (previously presented) A method of providing communications for a mobile communication device that roams between multiple IEEE 802.11 standard based coverage areas, the method comprising:

associating the mobile communication device with a nomadic server, wherein the nomadic server is coupled to one or more IEEE 802.11 standard based access points;

establishing a first IEEE 802.11 standard based communication link between the mobile communication device and a first IEEE 802.11 standard based access point;

configuring a communication path to the mobile communication device via the nomadic server and the first IEEE 802.11 standard based communication link;

detecting movement of the mobile communication device into a coverage area of a second IEEE 802.11 standard based access point;

establishing a second IEEE 802.11 standard based communication link between the mobile communication device and the second IEEE 802.11 standard based access point; and

re-configuring the communication path via the nomadic server and the second IEEE 802.11 standard based communication link;

wherein the mobile communication device attempts to notify the nomadic server if the first communication link falls below a threshold.

15. (original) The method of claim 14 further comprising associating the mobile communication device to the nomadic server at the mobile switching center.

16. (original) The method of claim 14 further comprising providing a routing association to a mobile switching center within a cellular network, wherein the routing association associates the mobile communication device to the interface server.

17. (original) The method of claim 16 further comprising routing a termination communication intended for the mobile communication device from the mobile switching center to the interface server according to the routing association, and routing the termination communication from the interface server to the mobile communication device over the communication path.

18. (previously presented) The method of claim 14 wherein registering the mobile communication device with the nomadic server provides a connectivity status of the mobile communication device while the mobile communication device is within a specific coverage area of a specific IEEE 802.11 standard based access point.

Claims 19-37 (canceled)

38. (previously presented) A method of providing communications between mobile communication devices, the method comprising:

routing a communication over a first communication link between a first mobile communication device and a first cellular base station, wherein the communication is directed from the first mobile communication device to a second communication device;

routing the communication over a second communication link between the first cellular base station and a first controller device;

routing the communication over a third communication link between the first controller device and a second controller device, wherein the third communication link comprises an Internet Protocol network;

routing the communication over a fourth communication link between the second controller device and a second cellular base station; and

routing the communication over a fifth communication link between the second cellular base station and the second communication device;

wherein the first mobile communication device notifies an interface server if the first communication link falls below a threshold.

39. (new) The method of claim 1, wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer

workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

40. (new) The method of claim 1 wherein the communications comprise a secured telephone call.

41. (new) The method of claim 1 wherein the communications comprise an unsecured telephone call.

42. (new) The method of claim 1 wherein the communications comprise a secured transmission of broadband content.

43. (new) The method of claim 42 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

44. (new) The method of claim 1 wherein the communications comprise an unsecured transmission of broadband content.

45. (new) The method of claim 44 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

46. (new) The method of claim 1 wherein the communications comprise a secured data transmission.

47. (new) The method of claim 1 wherein the communications comprise an unsecured data transmission.

48. (new) The method of claim 1 wherein the interface server is coupled to a gateway device.

49. (new) The method of claim 48 wherein the gateway device is bi-directionally coupled to a packet network.

50. (new) The method of claim 49 wherein the packet network comprises packet switched telephone network.

51. (new) The method of claim 48 wherein the gateway device comprises a softswitch.

52. (new) The method of claim 14 wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

53. (new) The method of claim 14 wherein the communications comprise a secured telephone call.

54. (new) The method of claim 14 wherein the communications comprise an unsecured telephone call.

55. (new) The method of claim 14 wherein the communications comprise a secured transmission of broadband content.

56. (new) The method of claim 55 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

57. (new) The method of claim 14 wherein the communications comprise an unsecured transmission of broadband content.

58. (new) The method of claim 57 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

59. (new) The method of claim 14 wherein the communications comprise a secured data transmission.

60. (new) The method of claim 14 wherein the communications comprise an unsecured data transmission.

61. (new) The method of claim 14 wherein the interface server is coupled to a gateway device.

62. (new) The method of claim 61 wherein the gateway device is bi-directionally coupled to a packet network.

63. (new) The method of claim 62 wherein the packet network comprises packet switched telephone network.

64. (new) The method of claim 61 wherein the gateway device comprises a softswitch.

65. (new) The method of claim 38 wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

66. (new) The method of claim 38 wherein the communications comprise a secured telephone call.

67. (new) The method of claim 38 wherein the communications comprise an unsecured telephone call.

68. (new) The method of claim 38 wherein the communications comprise a secured transmission of broadband content.

69. (new) The method of claim 68 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

70. (new) The method of claim 38 wherein the communications comprise an unsecured transmission of broadband content.

71. (new) The method of claim 70 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

72. (new) The method of claim 38 wherein the communications comprise a secured data transmission.

73. (new) The method of claim 38 wherein the communications comprise an unsecured data transmission.

74. (new) The method of claim 38 wherein the interface service is coupled to a gateway device.

75. (new) The method of claim 74 wherein the gateway device is bi-directionally coupled to a packet network.

76. (new) The method of claim 75 wherein the packet network comprises packet switched telephone network.

77. (new) The method of claim 74 wherein the gateway device comprises a softswitch.

78. (new) The method of claim 38 wherein the first controller device manages processing of data based on parameters comprising IP flow and IP mobility.

79. (new) A method of providing communications for a mobile communication device that roams between multiple wireless networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a

first wireless communication link between the mobile communication device and a first wireless network;
monitoring a first context of a signal of the first wireless communication link;
when a second wireless network is detected as available and a second context of a second communication link corresponding to the second wireless network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link;
notifying the mobile communication device to terminate transmission over the first communication link; and
re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second wireless communication link between the mobile communication device and the second wireless network.

80. (new) The method of claim 79 wherein the first context comprises signal strength characteristics.

81. (new) The method of claim 79 wherein the first context comprises first characteristics of the first wireless communication link and the second context comprises second characteristics of the second wireless communication link.

82. (new) The method of claim 79 wherein the interface server is coupled to a gateway device.

83. (new) The method of claim 82 wherein the gateway device is bi-directionally coupled to a packet network.

84. (new) The method of claim 83 wherein the packet network comprises packet switched telephone network.

85. (new) The method of claim 82 wherein the gateway device comprises a softswitch.

86. (new) A method of providing communications for a mobile communication device that roams between multiple wireless networks, the method comprising:

establishing a first communication link between a first mobile communication device and an end destination device, wherein the first communication link comprises a first wireless communication link between the first mobile communication device and a first wireless network;

monitoring a first context of a signal of the first wireless communication link;

when a second wireless network is detected as available and a second context of a second communication link corresponding to the second wireless network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link;

notifying the first mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to a second mobile communication device, thereby establishing a second wireless communication link between the first mobile communication device and the second wireless network.

87. (new) The method of claim 86 wherein the first context comprises signal strength characteristics.

88. (new) The method of claim 86 wherein the first context comprises first characteristics of the first wireless communication link and the second context comprises second characteristics of the second wireless communication link.

89. (new) The method of claim 86, wherein the first wireless communication link comprises a first WiFi communication link, and the first wireless network comprises a first WiFi network access point.

90. (new) The method of claim 89, wherein the second wireless communication link comprises a second WiFi communication link, and the second wireless network comprises a second WiFi network access point.

91. (new) A method of providing communications for a mobile communication device that roams between multiple non-cellular based coverage areas, the method comprising:

associating the mobile communication device with a nomadic server, wherein the nomadic server is coupled to one or more non-cellular based access points;

establishing a first non-cellular based communication link between the mobile communication device and a first non-cellular based access point;

configuring a communication path to the mobile communication device via the nomadic server and the first non-cellular based communication link;

detecting movement of the mobile communication device into a coverage area of a second non-cellular based access point;

establishing a second non-cellular based communication link between the mobile communication device and the second non-cellular based access point; and

re-configuring the communication path via the nomadic server and the second non-cellular based communication link when a second context of the second non-cellular based communication link is preferable to a first context of the first non-cellular based communication link.

92. (new) The method of claim 91 wherein the first context comprises signal strength characteristics.

93. (new) The method of claim 91 wherein the first context comprises first characteristics of the first wireless communication link and the second context comprises second characteristics of the second wireless communication link.

94. (new) A method of providing communications between mobile communication devices, the method comprising:

routing a communication over a first communication link between a first mobile communication device and a first cellular base station, wherein the communication is directed from the first mobile communication device to a second communication device;

routing the communication over a second communication link between the first cellular base station and a first controller device;

routing the communication over a third communication link between the first controller device and a second controller device, wherein the third communication link comprises an Internet Protocol network;

routing the communication over a fourth communication link between the second controller device and a second cellular base station; and

routing the communication over a fifth communication link between the second cellular base station and the second communication device;

wherein the first mobile communication device notifies an interface server when a sixth context of a sixth communication link is preferable to a first context of the first communication link.

REMARKS

Applicants respectfully request further examination and reconsideration in view of the arguments set forth fully below. Claims 1-18 and 38 were pending in this application. By the above amendments, new Claims 39-94 have been added. Accordingly, Claims 1-18 and 38-94 are currently pending.

Applicants respectfully submit that the claims, as amended, are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: December 14, 2015

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg. No.: 37,902
Attorneys for Applicant

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	55	40	2200
Independent Claims in Excess of 3	2201	4	210	840
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**3040**

Electronic Acknowledgement Receipt

EFS ID:	24357566
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	14-DEC-2015
Filing Date:	09-OCT-2014
Time Stamp:	18:28:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$3040
RAM confirmation Number	6194
Deposit Account	081275
Authorized User	OWENS, JONATHAN O.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Supplemental_Amendment_12_14_2015.pdf	135523 db83dea2c0aa4655674bd02ce4370c54f81a1a93	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	14
	Applicant Arguments/Remarks Made in an Amendment	15	15

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32191 83290151f31d679637d216090acb5aab458bd3d1	no	2

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/510,766

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	19 minus 20=	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

10-09-14

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	* 19	Minus	** 20	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

12-14-15

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	* 75	Minus	** 75	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	* 7	Minus	*** 7	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1	20040205158	A1	2004-10-14	Hsu	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2016-03-23
Name/Print	Jonathan O.Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EFS ID:	25289645
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	23-MAR-2016
Filing Date:	09-OCT-2014
Time Stamp:	21:48:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_03_23_2016.pdf	612184 80ce5e6f62f88fce86c0c9362c8a4410c7e04e2c	no	4

Warnings:	
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National Stage of an International Application under 35 U.S.C. 371
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New International Application Filed with the USPTO as a Receiving Office
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not Yet Assigned
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030053632	A1	2003-03-20	Bousis	
	2	20040141484	A1	2004-07-22	Rogalski et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	First Named Inventor	Vasudevan Ganesan
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CERTIFICATION STATEMENT

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OR

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2016-04-26
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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Electronic Acknowledgement Receipt

EFS ID:	25602380
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	26-APR-2016
Filing Date:	09-OCT-2014
Time Stamp:	16:27:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_4_26_2016.pdf	612212 91357205db7517410837d49aa867c3f57a1543ab	no	4

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National Stage of an International Application under 35 U.S.C. 371
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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not yet assigned
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040181811	A1	2004-09-16	Rakib	
	2	20060098643	A1	2006-05-11	Pfeffer	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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	Application Number	14510766
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	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

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See attached certification statement.

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A certification statement is not submitted herewith.

SIGNATURE

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Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2016-07-29
Name/Print	Jonathan O. Owens	Registration Number	37902

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EFS ID:	26498624
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	29-JUL-2016
Filing Date:	09-OCT-2014
Time Stamp:	16:31:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_7_29_2016.pdf	612219 0a0f36d5e833af737b6633529f40c1e064189116	no	4

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not yet assigned
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040176128	A1	2004-09-09	Grabelsky et al.	
	2	20040192294	A1	2004-09-30	Pan et al.	
	3	20040246990	A1	2004-12-09	Krishnamurthi et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2003061177	WO	A2	2004-07-24	Winphoria Networks Inc.		

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	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

	2	2003061177	WO	A3	2004-07-24	Winphoria Networks Inc.		

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Examiner Signature		Date Considered	

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	First Named Inventor	Vasudevan Ganesan
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See attached certification statement.

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A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2016-07-29
Name/Print	Jonathan O. Owens	Registration Number	37902

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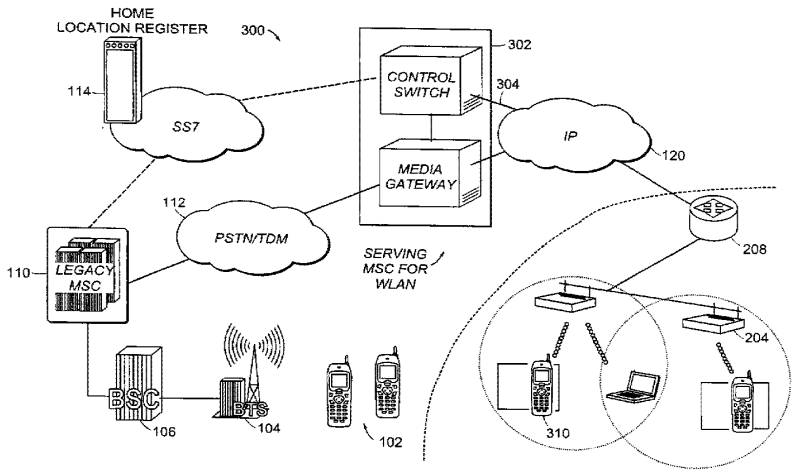
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(54) Title: METHOD, SYSTEM AND APPARATUS FOR PROVIDING WWAN SERVICES TO A MOBILE STATION SERVICED BY A WLAN



(57) Abstract: A method, system and apparatus for internetworking a WWAN and a WLAN are disclosed. More specifically, a method, system and appparatus for providing WWAN services to a mobile station serviced by a WLAN are disclosed. An MSC is provisioned to provide a WLAN service. The MSC forms SIP messages using the received WWAN mesages and delivers the SIP messages to the WLAN via an IP link. The WLAN delivers the SIP messages to the mobile station via a WLAN air interface protocol. Under one embodiment, the WWAN service is a Short Message Service (SMS). Under another embodiment, the WWAN service is a Message Wait Notification (MWN). Under another embodiment, an MSC that services the WLAN and an MSC servicing the WWAN cooperate to provide TFO call services between a mobile station operating in the WLAN and a mobile station operating in the WWAN.

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Method, System and Apparatus for Providing WWAN Services to a Mobile Station Serviced by a WLAN

Cross Reference to Related Applications

This application claims priority to provisional application no. 60/345,800, entitled "Method for Voice Internetworking Between Local Area and Wide Area Mobile Wireless Networks," filed on January 2, 2002.

Background of the Invention

1. Field of the Invention

This invention relates to internetworking between wireless local area networks (WLANs) and wide area mobile wireless networks.

2. Discussion of Related Art

Subscribers are adopting wireless telephony in increasingly large numbers. This trend is being fueled further by attractive rate plans that are bringing the cost of telephony to acceptable levels for people in most walks of society. It is more common for people to rely almost exclusively on a mobile telephone for their telephony needs. In an office or enterprise environment, however, mobile telephony has not surpassed wireline enterprise telephony for a number of reasons, salient amongst which are the following:

- The weakness of R/F signals from the wide area network infrastructure within an office building, leading to problems in mobility management and voice quality.
- The availability of special PBX features in office telephony systems, such as abbreviated dialing, offer a strong incentive for the continued use of enterprise telephony solutions.

The situation at the present is that people employ two distinct telephony systems, one in the wireless wide area network, and another in the enterprise premises that is a wireline telephony system, leading to a plurality of handsets, voice mailboxes and addressing mechanisms.

Parallel to these developments, wireless local area networks are becoming increasingly popular for wireless data applications. In such networks, reasonable bandwidth is available to enterprise-wide wireless clients, e.g., in 802.11b WLAN

networks up to 11Mbps are available to a wireless client. This bandwidth is more than sufficient to carry voice as well. Moreover, widespread use of WLAN technology is driving down the price of the technology.

Figure 1 shows an exemplary wireless wide area network (WWAN) 100 (also known as a wide area mobile wireless network). WWAN 100 includes a plurality of remote units (handsets) 102 in radio contact with one or more antennae based systems called Base Transceiver System (BTS) 104 that transceive the radio signals to/from the handsets. A plurality of BTS communicate with a controller called the Base Station Controller (BSC) 106 via fixed links 108 using a variety of protocols and techniques, such as TDM, IP etc. A plurality of BSC communicate with a switch called the mobile switching center (MSC) 110 that provides connectivity to a wide area switched telephone network (WSTN) 111. The WSTN includes signaling links 113, such as SS7 links, and the public switched telephone network (PSTN) 112. As illustrated by MSC 115, an MSC may include a control plane 117 for handling messages on the signaling links, which may be communicated according to a variety of protocols, such as IOS, GSM A interface, IS 41, GSM MAP, etc. The MSC 115 may also include a media gateway 119 that cooperates with the control plane for handling the bearer circuits of the PSTN 112. Some modern MSCs, such as MSC 115, may also communicate on IP networks, such as IP network 120.

An MSC with its associated BSC and BTS collectively define a coverage area in which handsets are allowed to receive or transmit telephone calls. Incoming calls to a mobile handset arrive from the PSTN to a gateway MSC, e.g., 115, that then routes the call to the MSC 110, called a serving MSC, within whose coverage area the receiving handset is currently roaming. Outgoing calls from a handset are routed to the serving MSC 109 of the originating handset from where the call is either routed to the serving MSC of the receiving mobile handset via the gateway MSC or to the WSTN via the gateway MSC from where the WSTN routes the call to a (wireline) handset.

In some arrangements, the gateway and serving MSC functions may be implemented by the same physical entities. Subscribers are allowed to roam in the coverage area and while roaming the various entities of the WWAN cooperate to ensure that the wireless connectivity of the handset is preserved under roaming. A handset may roam from the coverage area of one set of BTS/BSC/MSC to the coverage area of another

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set of BTS/BSC/MSC. The former set of BTS/BSC/MSC is called the source and the latter set is called the target entities. A set of procedures has been defined that mediate the handoff of the handset from the source to the target entities of the WWAN. As a consequence of the handoff procedures, an update of the location of the handset may occur. This is accomplished by the handset sending a location update message to an MSC that routes the message to a registry called the Home Location Register (HLR) 114 using standard industry protocols such as IS-41, GSM-MAP, etc.

Various air interface technologies are used for the communication between handsets 102 and BTS 104. These technologies include code division multiple access (CDMA), global system for mobile communications (GSM), Personal Digital cellular (PDC), etc., and various extensions and enhancements of these technologies such as CDMA2000, universal mobile terrestrial system (UMTS), international mobile telephone IMT-2000, etc. All such networks employ the above referenced entities in well known, albeit using different nomenclature, configurations to transceive telephone calls. All this is well known to practitioners with ordinary skill in the art.

Figure 2 illustrates an exemplary wireless local area network (WLAN) 200. WLAN includes one or more geographical areas (cells) called basic service set (BSS) 202. A cell is controlled by a system called an access point (AP) 204. Typically, a WLAN includes several BSS, each with its associated AP. The AP are interconnected usually with a wireline network 206 typically using Ethernet in 802.x WLAN technologies. The AP communicate with an enterprise router 208 that typically routes traffic within and out of an enterprise network. Wireless data clients 210 are allowed to roam within a defined BSS and across the defined BSS, with handoff of the client from one AP to the adjoining AP in accordance to known procedures. In typical WLAN implementations, the physical layer uses variety of technologies, e.g., in 802.11 WLAN implementations the physical layer may use infrared, frequency hopping spread spectrum in the 2.4GHz Band, or direct sequence spread spectrum in the 2.4GHz Band. The medium access layer (MAC) in addition to carrying out typical functions performs additional functions such as packet fragmentation, re-transmission and acknowledgements.

The MAC layer supports two basic access mechanisms: the distributed coordination function (DCF) and the point coordination function (PCF). In DCF the basic

access mechanism is a carrier sense multiple access with collision avoidance (CSMA/CA) mechanism. A typical example is Ethernet that is a CSMA with collision detection (CD) mechanism. In CSMA protocols a client wishing to transmit senses the medium, and if the medium is found to be busy, i.e., is being used by some other client, defers the transmission; otherwise it is allowed to transmit. There is always a possibility that two clients will sense the medium to be free and start transmissions thus resulting in collisions; therefore, collision avoidance and detection is very important in such protocols. For example, the 802.11 WLAN uses collision avoidance and detection mechanisms. An 802.11 client wishing to transmit senses the medium and if found busy defers the transmission; otherwise, it transmits. The receiver checks the receipt of a proper transmission (via the cyclical redundancy check –CRC) and if found satisfactory, sends back an acknowledgement. Receipt of the acknowledgement will indicate to the transmitter that the transmission was received properly. If no acknowledgement is received, the transmitter will re-transmit until an acknowledgement is received or the transmitter decides to abort the transmission. In order to further reduce the possibility of collisions certain implementations also use the virtual carrier sense mechanism. In this scheme, a client wishing to transmit, first signals its intent by sending a request to send (RTS) to the intended receiver. The receiver responds with a clear to send (CTS) that effectively "reserves" the medium for the transmitter and receiver. The transmitter may now transmit the intended information.

In those cases when a client wishing to transmit finds the medium busy, the client defers the transmission. The client is thus obliged to re-try to find the status of the medium. In standard approaches to this problem, an "exponential back off procedure" is used to determine the frequency of re-trials. The method involves the choice of a random number and awaiting that many time slots before a re-trial. If a re-try finds the medium busy again, the re-trial number is reduced exponentially. This back off procedure is also used after a successful transmission and after each re-transmission.

When a client wishes to access a BSS (either after a power up or when first entering the BSS) it needs to get synchronization information from the AP controlling the BSS. Two methods have been defined for clients to get this information. In the passive scanning method the client waits to receive a "beacon frame" from the AP that is transmitted by the AP at regular intervals. The beacon frame contains the synchronization

information. In the second method, called active scanning, the client sends a probe to the AP and awaits a response to the probe. Once the station finds an AP, it needs to be authenticated. This requires exchange of information between the AP and the client to establish the authenticity of the client. Once the authentication process is completed, the client starts the association process that involves exchange of information between the client and the APs about the location of the client and the capabilities of the BSS. At the completion of the association process, the client is ready for receiving or transmitting data.

In the PCF access mechanism, the AP gains control of the medium upon sensing it to be free for a given length of time called the point inter frame space (PIFS). The AP then assumes the role of the coordinator and starts to poll all stations enumerated on a "poll list" maintained by the AP. When polled, a station is allowed to transmit. The period in which the AP supports PCF mode is contention-free so may provide better opportunities for voice traffic. The AP must alternate the DCF and PCF periods. All this is well known to practitioners with ordinary skill in the art.

Therefore, what is needed is a method for internetworking of WLAN and Wireless Wide Area Networks (WWAN) for voice communications with full mobility management across the two networks and the preservation of PBX features in the WWAN environment.

Summary

The invention provides a method, system, and apparatus for a Mobile Station to Sense and Select a Wireless Local Area Network (WLAN) or a Wide Area Mobile Wireless Network (WWAN). Among other things, this facilitates the internetworking of WLANs and WWANs and facilitates the use of multimode mobile stations that can selectively communicate with either a WLAN or a WWAN.

According to one aspect of the invention, a mobile station may communicate according to an 802.xx wireless local area network air interface protocol via WLAN logic or according to a wireless wide area network air interface protocol via WWAN logic. The mobile station detects RF energy in the 802.xx spectrum and, in response to the energy detection, determines whether there is an 802.xx WLAN capable of servicing the mobile station by performing a scanning operation. If there is an 802.xx WLAN capable

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of servicing the mobile station, the mobile station selects the WLAN logic so that it may communicate via an air interface.

According to another aspect of the invention, the WWAN has information identifying the areas in which capable WLANs operate and the WWAN provisions the mobile station with at least a subset of such information. The mobile station uses such area-identifying information to determine whether to perform the RF energy detection operation.

According to another aspect of the invention, the area-identifying information is cell ids and the mobile station compares the cell id information in which it is operating with the provisioned cell ids.

According to another aspect of the invention, the area-identifying information is geographical positioning satellite (GPS) information and the mobile station determines its GPS coordinates and compares it against the provisioned GPS information.

According to another aspect of the invention, the mobile station compares the RF energy value with a threshold value and the mobile station detects the RF energy of the WWAN and compares said RF energy of the WWAN with a predetermined value. The comparisons of the RF energy values with corresponding thresholds are used by the mobile station to select whether to communicate with the 802.xx WLAN and the WWAN.

According to another aspect of the invention, the area-identifying information includes information identifying WLANs other than that used by a service plan of the mobile station.

According to another aspect of the invention, the information identifying WLANs includes information identifying WLANs of enterprises accepting service of the mobile station.

According to another aspect of the invention, the mobile station is provisioned with the area information via SMS messages from the WWAN.

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The invention provides a method, system and apparatus for providing mobility management of a mobile station in WLAN and WWAN environments.

According to one aspect of the invention, a mobile switching center (MSC) is provisioned to act as a serving MSC for a WLAN. A mobile station detects the RF energy of the WLAN and validates its ability to be a member of the WLAN. In response, the mobile station issues a registration request to the serving MSC for the WLAN, and in response, the serving MSC for the WLAN causes a WWAN to recognize that the mobile station is registered with the serving MSC for the WLAN and that the mobile station is no longer served by a prior MSC. The mobile station communicates to entities outside of the WLAN by communicating with the WLAN via a WLAN protocol and the WLAN communicates with the WWAN via the serving MSC for the WLAN.

Under another aspect of the invention, the mobile station issues a registration request by sending a SIP Register message on the WLAN via a WLAN air interface protocol to request registration therein, and the WLAN communicates the registration request to the MSC serving the WLAN.

Under another aspect of the invention, a mobile station detects the RF energy of the WLAN and validates its ability to be a member of the WLAN while the mobile station is participating in a call using a WWAN air interface protocol. In response thereto a message is sent to a source MSC that is servicing the call, indicating that a handoff is desired. The source MSC analyzes the message, establishes itself as an anchor MSC, and establishes communication channels with a target MSC servicing the detected WLAN. The mobile station begins communication with the WLAN via a WLAN air interface. The WLAN forwards messages to the target MSC serving the WLAN via IP communication, and the target MSC relays those communication to the anchor MSC.

Under another aspect of the invention, a mobile station determines that it should communicate via a WWAN air interface protocol and not via a WLAN air interface protocol. The mobile station issues a registration request to the WWAN via a base station controller (BSC) and MSC corresponding to a location in which the mobile station resides. The corresponding MSC causes the WWAN to recognize that the mobile station is registered with the corresponding MSC and that the mobile station is no longer served

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by a prior MSC which served the mobile station when it was communicating according to a WLAN air interface protocol.

Under another aspect of the invention, a mobile station determines that it should communicate according to a WWAN air interface protocol while the mobile station is participating in a call under a WLAN air interface protocol. In response thereto, a message is sent to a source MSC that is servicing the call indicating that a handoff is desired. The source MSC analyzes the message, establishes itself as an anchor MSC, and establishes communication channels with a target MSC servicing a geographic WWAN area in which the mobile station resides. The mobile station begins communication with the WWAN and the target MSC relays those communication to the anchor MSC.

Under another aspect of the invention, the mobile station informs the MSC serving the WLAN of the cell ids of the WWAN geographic area, and the source MSC uses the cell ids information to establish communication channels with the target MSC.

Under another aspect of the invention, a mobile station determines that it should communicate according to a WWAN air interface protocol while the mobile station is participating in a call under a WLAN air interface protocol. In response thereto a message is sent to a source MSC to request a temporary local directory number (TLDN) . The source MSC provides a TLDN to the mobile station. The source MSC causes a called party of the call to be placed on hold and the mobile station requests a call to be made using the TLDN as a called party. The WWAN causes call connections to be made connecting the mobile station with the TLDN to resume the call.

The invention provides a method, system and apparatus for providing WWAN services to a mobile station serviced by a WLAN.

According to one aspect of the invention, an MSC is provisioned to serve a WLAN. The MSC that serves the WLAN receives WWAN messages that provide a WWAN service. The MSC forms SIP messages using the received WWAN messages and delivers the SIP messages to the WLAN via an IP link. The WLAN delivers the SIP messages to the mobile station via a WLAN air interface protocol.

According to another aspect of the invention, the WWAN service is a Short Message Service (SMS) and the WWAN includes a SMS Center for delivering SMS

messages on the WWAN. The MSC forms SIP Invite messages with SMS payload and delivers said SIP Invite messages to the WLAN.

According to another aspect of the invention, the WWAN service is a Message Wait Notification (MWN) and the WWAN provides MWN messages to the WWAN. The MSC forms SIP Invite messages with MWN information and delivers said SIP Invite messages to the WLAN.

According to another aspect of the invention, the MSC that services the WLAN and an MSC servicing the WWAN cooperate to provide TFO call services between an mobile station operating in the WLAN and a mobile station operating in the WWAN.

Summary

The invention provides a method, system and apparatus for internetworking a mobile station to operate in a WWAN environment and in a WLAN environment with PBX services.

According to one aspect of the invention, a switch is provisioned to communicate with a WLAN via IP communication and to communicate with a PBX via a PBX interface. The switch receives mobile station communications via the WLAN. The switch converts the mobile station communications to a format compatible with the PBX interface and forwards the converted communications to the PBX. The PBX receives and handles the converted communications.

According to another aspect of the invention, the switch is further provisioned to communicate with a WWAN and the switch analyzes the mobile station communications and determines that the communications address an entity external to a domain of the PBX. In response, the switch requests a TLDN from a MSC serving the WWAN. In response to receiving a TLDN from the MSC, the switch sends a message to the PBX to connect the mobile station call to the specified TLDN. The PBX connects the mobile station call to the specified TLDN.

According to another aspect of the invention, a mobile station may roam during the call and switch to an WWAN air interface protocol. The mobile station reconnects to the call by specifying the TLDN of the call.

According to another aspect of the invention, the reconnection happens automatically without user intervention.

Brief Description of the Drawing

In the Drawing,

Figure 1 shows a prior art wireless wide area network (WWAN);

Figure 2 shows a prior art wireless local area network (WLAN);

Figure 3 shows an internetworked wireless network according to certain embodiments of the invention;

Figure 4 shows a multimode mobile station detecting the presence of a WLAN according to certain embodiments of the invention;

Figure 5 shows a multimode mobile station receiving cell id information from the macro network identifying relevant areas in which the mobile station may sense for a WLAN according to certain embodiments of the invention;

Figure 6 shows a multimode mobile station receiving cell id information from the macro network identifying public and other enterprise WLANs according to certain embodiments of the invention;

Figure 7 shows a multimode mobile station according to certain embodiments of the invention;

Figure 8 shows an internetworked wireless network according to certain embodiments of the invention in which a mobile station may roam from a WLAN environment and/or in which a handoff of servicing a mobile station from a WLAN to a WWAN occurs;

Figure 9 shows mobility management logic according to certain embodiments of the invention;

Figures 10-11 show specific mobility management logic according to certain embodiments of the invention;

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Figure 12 shows mobility management logic according to certain embodiments of the invention;

Figures 13-14 show specific mobility management logic according to certain embodiments of the invention;

Figure 15 shows an internetworked wireless network according to certain embodiments of the invention in which a mobile station may roam from a WWAN environment and/or in which a handoff of servicing a mobile station from a WWAN to a WLAN occurs;

Figure 16 shows mobility management logic according to certain embodiments of the invention;

Figures 17-18 show specific mobility management logic according to certain embodiments of the invention;

Figure 19 shows mobility management logic according to certain embodiments of the invention;

Figures 20-21 show specific mobility management logic according to certain embodiments of the invention;

Figure 22 shows logic for providing SMS to a mobile station operating in a WLAN environment according to certain embodiments of the invention;

Figure 23 shows logic for providing MWN service to a mobile station operating in a WLAN environment according to certain embodiments of the invention;

Figures 24-25 show logic for handling intra enterprise calls according to certain embodiments of the invention;

Figures 26-27 show logic for handling an enterprise to PSTN call according to certain embodiments of the invention;

Figure 28 shows logic for handling an enterprise to macro network call according to certain embodiments of the invention;

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Figure 29 shows an internetworked wireless network according to certain embodiments of the invention;

Figure 30 shows mobility management logic according to certain embodiments of the invention; and

Figure 31 shows an internetworked wireless network according to certain embodiments of the invention in which PBX services are integrated.

Detailed Description

Preferred embodiments of the invention provide voice internetworking between WLANs and WWANs and effectively unify these two disparate technologies. Consequently, users no longer need to suffer the problems associated with multiple handsets, addresses, and voice mailboxes. As will be explained below, under certain embodiments a gateway MSC (GMSC) switch of the WWAN with some associated modifications to the WLAN client provides the logic necessary for unification. In essence the GMSC simultaneously acts as a serving MSC for WLAN voice traffic.

Figure 3 illustrates an exemplary embodiment of the present invention. The WWAN components are like those described above in conjunction with figure 1 except that MSC 302 includes some new internetworking logic discussed below to handle the unification of the WLAN and WWAN to make it act as one macro network 300. Among other things, the MSC 302 acts as a serving MSC for the WLAN. The WLAN and WWAN are now effectively connected by the IP links 304. Voice traffic along with the associated signaling and control messages to and from the WLAN are carried on the set of IP links 304 from the enterprise to the IP interfaces of the MSC 302. The WLAN components are also like those described above, except that the handsets or wireless data clients 310 now include multimode devices capable of operating in the WLAN or WWAN environments, as will be explained below.

The MSC 302 allows telephone calls to be completed between clients of the WWAN 100 and WLAN 200. The WLAN clients are free to roam in the WLAN environment and may also roam in the WWAN environment without any manual interventions required of the subscriber. The voice traffic from the WLAN to the MSC 302 may utilize any of the known voice coding technologies. For CDMA networks the

Enhanced Variable Rate Codec (EVRC) may be used and for GSM networks Adaptive Multi-rate (AMR) coding could be used. The coded voice is then carried as RTP/UDP/IP packets on the IP links 304. The control and signaling information is also carried on the IP links 304 from the WLAN 200 to the MSC 302. In certain embodiments the control and signaling information is carried in the format of Session Initiation Protocol (SIP) messages with additional information elements (IEs) described as a part of the present invention for control of hand offs of the handsets.

Voice internetworking in certain embodiments is facilitated by the use of a multimode handset 310 that may operate in a WLAN or WWAN environment. The WLAN and WWAN (multimode) phone 310 at any time should be able to automatically determine if it is capable of using WLAN access instead of a macro network carrier (GSM, CDMA, UMTS, TDMA, PDC, etc.).

The presence of a WLAN can be inferred by detecting RF energy in the permitted 802.11b/a spectrum (2.4GHz band for 802.11b/802.11g and 5 GHz band for 802.11a). As shown in Figure 4, the mobile station 310 may initiate a detection 402 of RF energy in the relevant spectrum. After successful energy detection, the mobile station can detect if a valid WLAN 200 is present by one of the two methods:

- Passive Scanning: the station 310 searches for a beacon frame broadcast by the 802.11x AP 204
- Active Scanning: the station 310 transmits probe request frames and waits for probe response frames from the AP 204.

As part of the beacon frame or the probe response, the AP sends a SSID (1-32 octets length string) that identifies the AP 204. The mobile station 310 compares this SSID with a list of SSIDs (which may include ranges) and if there is a match, infers that the WLAN 200 is a valid network for it to gain access. The mobile station 310 goes through an authentication process after a successful SSID match. If the authentication succeeds, the mobile station proceeds with the association process whereby the mobile station joins the WLAN network as a valid and legal client (node).

The mobile station 310 is *a priori* provisioned with the valid list of SSIDs and SSID ranges. The SSID comparison avoids the mobile station from entering into

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authentication or association processes in functioning WLAN networks on which it could never be authenticated. For example, let the mobile station MS1 belong to Enterprise E1 that uses SSID En1SSID1. When the mobile station enters the Enterprise E1, the beacon search succeeds and further an SSID match occurs and hence the mobile station proceeds with the authentication process. On successful authentication, it proceeds with the association process and gains access to the WLAN service. When the same mobile station MS1 enters another enterprise that also happens to have a valid 802.11 WLAN but with a different SSID (say, En2SSID2) the SSID does not match the SSID in the mobile and hence the mobile station does not even attempt to initiate authentication (and hence presumes that the WLAN service is not available).

The provisioning of SSIDs in the mobile station can be initiated from the macro network 300 using over the air provisioning procedures (OTASP/OTAPA) in the case of CDMA networks and equivalent in GSM/UMTS networks (using Short Message Service). In order to prevent eavesdropping of the SSIDs in the macro network, the message itself could be encrypted using the same key used in the mobile station for macro network authentication/encryption (A-key or SSD).

The periodic detection and subsequent discovery of the presence of the WLAN impacts the battery life of the mobile station. It is desirable to minimize the battery consumption and one way to achieve this in the multimode phone is to minimize the number of detection or discovery attempts and at the same time preserving the ability to jump on to the enterprise WLAN if it is available. Two observations on the use of the multimode mobile stations 310 enable the reduction in the number of detection/discovery attempts:

- The number of areas where the enterprise Wireless LAN service is available for the subscriber is limited; for example, enterprise subscribers may be limited to get access to their WLAN services in their enterprise locations only.

- The multimode mobile station is always attempting to stay connected to the macro network (CDMA, GSM, UMTS, etc.). For example, a CDMA phone on detection of a valid IS-95/IS-2000 signal will attempt registration with the IS-41 core network; a GSM/UMTS phone on detection of a valid GSM/UMTS signal will attempt registration with the GSM-MAP core network. As a consequence of

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registration, the cell id that is known to both the macro network and the mobile station, indicates the current location of the mobile station.

By relating the above two facts, the macro network 300 can determine when the mobile station 310 should be attempting to detect or discover the enterprise WLAN. As shown in figure 5 in a preferred embodiment of the present invention, the macro network 300 can send 502 information regarding the detection or discovery process to the mobile station 310 on a successful network registration. The information includes the macro network cell-ids where the mobile station 310 should attempt to detect or discover 402' an enterprise WLAN. The cell-id is a gross measure and hence can cover a very large area (in the order of few square miles in rural/suburban areas) or a very small area (in the order of few hundred square meters in dense urban areas).

As an exemplary manifestation of the method of the present invention, consider a CDMA (IS-95) subscriber who is also an enterprise subscriber to 802.11 services in Building W located in Tewksbury, Mass. When the subscriber enters the CDMA switching area in Tewksbury, his IS-95 phone initiates a network registration. As part of this registration, the macro network 300 determines that the subscriber may possibly enter the coverage area of the WLAN service in Building W; that is, the macro network correlates the information that the subscriber and Building W are in the Tewksbury switching area. The macro network now provides 502 the cell-id information where the W building is located to the subscriber's mobile station 310 and a trigger that WLAN sensing should now begin. On receipt of this information, the mobile station starts to scan for the 802.11 beacon, specifically looking for a match with the SSID list of the APs in Building W. This detection will not succeed until the subscriber enters the BSS 202. Upon successful detection of the beacon from the AP 204, the mobile station 310 of the subscriber de-registers from the macro network 300 and registers with the serving MSC 302 for the WLAN 200. When the mobile station 310 roams in the WLAN 200, it continues to sense the RF energy strength of the WWAN 100 and WLAN 200. If it detects that the WLAN RF strength decreases below some threshold value and the WWAN strength is above a threshold value, it initiates a registration process with the macro (WWAN) network 100.

As mentioned before, the cell ids of the macro network 300 may designate very large geographical areas. If the cell id relates to a small geographical area then the

chances of minimizing power consumption in the mobile station are better since the detection or discovery process is limited to the smaller geographical area. Under some embodiments the availability of GPS (Geographical Positioning Satellite) information integrated into the mobile stations may be used. Since GPS information is more accurate as compared to cell id information, the use of GPS information will further reduce the geographical area in which the detection or discovery process needs to be initiated, thus leading to more savings in the power consumption of the mobile station.

The list of cell-ids provided by the macro network to the mobile station can consist not only of enterprise locations that the subscriber can roam into but potentially other "enterprises" or "public areas" as well. For example, the macro network service provider may have a roaming arrangement with a public enterprise LAN such as a restaurant or a hotel. Referring to figure 6, when a subscriber 310 registers with the macro network, it would be beneficial to also receive 602 the cell-ids where the subscriber's enterprise is located but also the cell-ids where the public LANs are located in the same switching area.

The delivery of the location information or more direct instruction to start (or stop) searching for WLAN beacon in the mobile station 310 can be accomplished using standard Short Message Service (SMS), or by using logic based in a Service Control Point (SCP), or by modifying the the HLR or using a Proxy HLR entity. (See, e.g., U.S. Pat. Apl. 09/845,703, filed April 30, 2001 for an example of a proxy HLR, which application is hereby incorporated by reference in its entirety.) When the mobile station 310 registers with the MSC/HLR, the macro network can deliver the cell-id list, beacon search/stop instruction etc., as a SMS (short message service) with a specific type. The SMS message is sent after a successful response to the Location Update initiated by the mobile station 310. The MSC 302 can have switch based logic that initiates a trigger on location update that causes a switch resident or Service Control Point (SCP) resident application to generate the SMS message with the cell-ids. For example, a switch could be programmed to trigger an SCP on receipt of a location update. The SCP-resident logic may then send the location and sensing instructions to the mobile station. Alternatively, the HLR 114 can be modified to perform the same task on successful processing of an IS-41 REGNOT request or GSM-MAP UPDATE LOCATION request. In other embodiments, a Proxy HLR may be employed. The Proxy HLR intercepts all messages

intended for the HLR from the MSC. Registration messages received from the multimode WWAN and WLAN clients are handled by the Proxy HLR whereas messages from all the other clients are forwarded to the HLR without any modifications.

Figure 7 shows a handset 310 according to exemplary embodiments of the present invention. For example, the handsets include logic to communicate according to a WLAN air interface protocol (such as 802.xx) and to communicate according to a WWAN air interface protocol. As described herein, the mobile station may select to use one of the air interface logic unit based on its sensing of relevant radio spectrum. Moreover, a handset may support more than one WWAN macro network technology. For CDMA handsets it is assumed that a WLAN modem will be added to the handset. Additionally, the capability to transport voice as SIP/RTP/UDP/IP packets will be needed. The network sensing method discussed in the previous section along with the modifications required to reduce the detection and discovery traffic by utilizing cell-ids, in the preferred embodiment of the present invention, are to be captured by special computer programs running on the computing platform of the handset.

Figure 8 shows the movement of a mobile station 310 from a WLAN environment 200 to a WWAN environment 100. Under certain embodiments of the invention, the mobile station 310 registers in the WWAN environment 100 as it roams from the WLAN 200 into the WWAN. Likewise the appropriate handoff must be made as well. The mobile station 310, using the network sensing method described above, infers that it needs to register with the WWAN environment.

Mobile Station (MS) leaves WLAN and enters WWAN: Referring to figures 8 and 9, the registration and handoff are implemented in certain embodiments as follows. The logic starts at 900 and proceeds to 902 in which the mobile station 310 issues a registration request to the (new) serving base station controller (BSC) 106 in the WWAN. The BSC 106 transmits 904 a Location Update message to its serving MSC 110. The serving MSC 110 in the WWAN requests 906 a registration from the HLR 114. The HLR 114 sends 908 a de-registration request to the (previous) serving MSC 302 in WLAN. Optionally, the (previous) serving MSC 302 may send 910 a SIP registration cancel request to the mobile station 310 that will respond with a confirmation. This may facilitate "clean up" or "tear down" at the mobile station, since it is no longer communicating via the WLAN. The (previous) serving MSC 302 responds 912 to the de-

registration message to the HLR 114. The HLR confirms 914 the registration request to the (new) serving MSC 110 in the WWAN. The (new) serving MSC 110 accepts 916 the Location Update from the BSC 106. The BSC 106 acknowledges 918 the registration from the mobile station 310.

In an exemplary embodiment of the present invention, if the WWAN is an IS-41 network then the registration, de-registration and confirmatory messages will use IS-41 protocol elements. The various specific messages used, as explained with reference to figure 9, are shown in figure 10. In another exemplary embodiment, if the WWAN is a GSM-MAP network then the registration, de-registration and confirmatory messages will use GSM-MAP protocol elements. The various specific messages used as explained with reference to figure 9 are shown in figure 11.

Hard Handoff from WLAN to WWAN: In this case, the mobile station 310, while engaged in a telephone call, roams from WLAN 200 to WWAN 100. The WLAN environment needs to handoff 802 the mobile station 310 from the WLAN serving MSC 302 to WWAN serving MSC 110. Since the mobile station 310 is engaged in a call within WLAN, the SIP client is managing the call in the mobile station 310. This client needs to inform the WLAN serving MSC 302 the cell ids of the WWAN macro network. In the preferred embodiment of the present invention, the SIP command "SIP INFO" is overloaded with this cell id information. The overloaded information elements are so indicated in the logic described below in connection with figure 12.

The logic starts at 1200 and proceeds to 1202 in which the mobile station 310 informs the WLAN serving MSC (Source MSC) 302 that a handoff is required. This may be based on the network sensing method. As discussed above, in the network sensing method, the mobile station 310 senses both the WLAN and the WWAN networks and chooses one of them based on the relative RF strengths. During the sensing procedure, the cell id of the WWAN network becomes known to the mobile station 310. The mobile station 310 uses the cell id to initiate a hard handoff to the WWAN network from the WLAN network. In the handoff required message the cell id of the WWAN network is sent to the WLAN switch. This is an overloaded SIP command. The cell id is used so that the MSC that was serving the WLAN and is now the anchor knows which other MSC to connect to. The source MSC 302 issues 1204 a facility directive (FD) to the WWAN MSC (Target MSC) 110 that allows it open a bearer channel on PSTN 112 (for example)

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from Source MSC 302 to Target MSC 110. This allows the source MSC to serve as an anchor for the communication, having a new "leg" to the target MSC and an existing pathway to the other entity(ies) on the existing call. The Target MSC 110 sends 1206 a handoff request to the (Target) BSC 106. The Target BSC 106 commences 1208 RF channel signaling with the mobile station 310. The Target BSC 106 sends 1210 handoff request acknowledgement to Target MSC 110. The Target MSC 110 responds 1212 to the facility directive request back to the Source MSC. The Source MSC 302 sends 1214 a message to the mobile station 310 indicating that a handoff may be commenced. For example, this message may be sent as an overloaded SIP message. This message effectively informs the mobile station that it may select and start using the appropriate RF and modulation circuitry to communicate with the WWAN. The mobile station 310 sends 1216 a message to the source MSC 302 to commence handoff. Again, this message may be sent as an overloaded SIP message. The mobile station 310 commences 1218 RF channel signaling with Target BSC 106. The mobile station 310 sends 1220 handoff completion message to Target BSC 106. Again, this message may be sent as an overloaded SIP message. The Target BSC 106 acknowledges 1222 handoff order to the mobile station 310. The Target BSC 106 sends 1224 handoff complete message to Target MSC 110. The Target MSC 110 sends 1226 message to Source MSC 302 indicating that the mobile station 310 is on channel with Target BSC 106. The Source MSC 302 sends 1228 a message to the mobile station 310 indicating that it may clear any resources assigned this transaction. The mobile station 310 responds 1230 with OK acknowledgement.

In an exemplary embodiment of the present invention, if the WWAN is an IS-41 network then the messages, excluding the overloaded messages, will use IS-41 protocol elements. The various specific messages used as explained with reference to figure 12 are shown in figure 13. In another exemplary embodiment, if the WWAN network is a GSM-MAP network, the protocol elements used will be GSM-MAP. The various specific messages used as explained with reference to figure 12 are shown in figure 14.

Figure 15 shows the case of the mobile station 310 roaming from a WWAN 100 to WLAN 200 environment. The mobile station 310, using the network sensing method described above, senses the RF strength in the proximity of the WLAN and decides to start using the WLAN environment, thus initiating a registration request. As outlined

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above, the mobile station may use the cell id information to determine when to start sensing the WLAN.

Mobile Station (MS) enters WLAN from WWAN: As the mobile station 310 enters a WLAN 200 from a WWAN 100, the logic of figure 16 is followed. The logic starts in 1600 and proceeds to 1602 in which the mobile station 310 issues 1602 a registration request to the WLAN Serving MSC 302 upon sensing the WLAN RF energy strength, as described above. This is done via a SIP message (e.g., a broadcast message), which the WLAN Serving MSC receives. The WLAN Serving MSC 302 sends 1604 a registration request to the HLR 114. The HLR issues 1606 a de-registration request to the (previously) Serving WWAN MSC 110. Upon confirmation of de-registration, the HLR sends 1608 a registration response confirmation to the WLAN MSC 302. The WLAN MSC 302 confirms 1610 the registration to the mobile station 310.

In an exemplary embodiment of the present invention, a mobile station 310 roams from IS-41 WWAN to 802.11 WLAN. The various specific messages used as explained with reference to figure 16 are shown in figure 17. In a preferred embodiment of the present invention, the mobile station 310 issues a "SIP Register" message to the WLAN Serving MSC 302 that sends a IS-41 Registration Notification (REGNOT) to the HLR 114. The HLR sends a Registration Cancellation request to the WWAN MSC 110 that was serving the mobile station 310 (to de-register the mobile station) and upon receiving a confirmation of the de-registration, sends a confirmation of registration to the WLAN Serving MSC 302 which then sends a "SIP 200 OK" (confirmation) message back to the mobile station 310, completing the transaction. In another exemplary embodiment of the present invention, if the mobile station 310 enters 802.11 WLAN from GSM-MAP WWAN, the registration, de-registration and confirmation messages from the HLR will employ the corresponding GSM-MAP protocol elements. The various specific messages used as explained with reference to figure 16 are shown in figure 18.

Hard Handoff from WWAN to WLAN: In this case the mobile station 310, while engaged in a telephone call, roams from WWAN 100 to WLAN 200. The unified WLAN and WWAN environment needs to handoff 1502 the mobile station 310 from the WWAN Serving MSC 110 to WLAN Serving MSC 302. Certain embodiments of the invention implement such a handoff using the logic of figure 19.

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The logic begins at 1900 and proceeds to 1902 in which the BSC 106 serving the mobile station 310 (Serving BSC) decides 1902, based upon information received from the mobile station 310 that may be using the Network Sensing Method described above, that a handoff is required. It sends a handoff required message to the Source MSC 110. The Source MSC 110 issues 1904 a facility directive to the WLAN MSC (Target MSC) 302 that allows it to open a bearer channel on PSTN 112 from Source MSC 100 to Target MSC 302. The mobile station 310 sends 1906 a handoff request to the Target MSC 302; under certain embodiments of the present invention, this message is sent using SIP with overloaded commands. The Target MSC 302 acknowledges 1908 the request. The mobile station 310 acknowledges 1910 the response of the Target MSC 302. The Target MSC 302 responds 1912 to facility directive request to Source MSC 110. The Source MSC 110 sends 1914 a message to Source BSC 106 that a handoff may be commenced. The Source BSC 106 sends 1916 a handoff directive to mobile station 310. The mobile station 310 sends 1918 a message to acknowledge. The Source BSC 106 sends 1920 a message to Source MSC 110 that handoff has commenced. The mobile station 310 sends 1922 handoff completion message to Target MSC, again via an overloaded SIP message. The target MSC acknowledges 1924 handoff order to mobile station 310. The Target MSC 302 sends 1926 message to Source MSC 110 indicating that the mobile station 310is on channel with target MSC. The Source MSC 110 sends 1928 a message to Source BSC 106 to clear facilities. The Source BSC 106 responds 1930 with OK clear complete.

In an exemplary embodiment of the present invention, if the WWAN is an IS-41 network then the messages, excluding the overloaded messages, will use IS-41 protocol elements. The various specific messages used as explained with reference to figure 19 are shown in figure 20. In another exemplary embodiment, if the WWAN network is a GSM-MAP network, the protocol elements used will be GSM-MAP. The various specific messages used as explained with reference to figure 19 are shown in figure 21.

Delivery of Short Message Service (SMS) in WLAN: SMS is a service that is typically supported in the WWAN 100 by a network entity known as the Short Messaging Service Center (SMSC). A mobile station 310 while roaming in a WLAN 200 preferably supports SMS service. Under certain embodiments the logic of figure 22 implements the SMS service in WLAN 200.

The SMS Messaging Center sends 2202 a SMS request (Short Message Delivery Point to Point –SMDPP) to the WLAN Serving MSC 302. In certain embodiments of the present invention the Serving MSC 302 overloads and sends 2204 the SIP INVITE message with SMS payload to the mobile station 310. The mobile station 310 responds 2206 with an OK acknowledgement. Serving MSC 302 indicates 2208 to the MS that the transaction is complete. The mobile station 310 responds 2210 OK. The Serving MSC 302 responds 2212 with SMDPP Request Response to the SMS Message Center.

Delivery of IS-41 Message Wait Notification (MWN) in WLAN: MWN is a feature of WWAN 100. A mobile station 310 while roaming in WLAN 200 preferably supports MWN service. Under certain embodiments the logic of figure 23 provides MWN in WLAN.

The IS-41 HLR 114 sends 2302 a Qualification Directory Notification (with MWN Type) to the WLAN Serving MSC 302. In certain embodiments of the present invention the Serving MSC 302 overloads 2304 the SIP INVITE message with MWN info to the mobile station 310. The mobile station 310 responds 2306 with an OK acknowledgement. The Serving MSC 302 indicates 2308 to the mobile station 310 that the transaction is complete. The mobile station 310 responds 2310 OK. The Serving MSC 302 responds 2312 with Qualification Directive Notification Response Request to the IS-41 HLR.

Intra Enterprise Telephone Call: In this case a mobile station 310 (MS1) while roaming in the WLAN 200 initiates an intra enterprise call to another mobile station (MS2). Under certain embodiments, all interactions with MS1 and MS2 are carried out in SIP. The logic to implement such calls is described in connection with figure 24.

MS1 initiates 2402 a call request to the WLAN Serving MSC 302. The MSC 302 receives the request and asks 2404 the HLR 114 to locate MS2. HLR 114 responds 2406 with location of MS2. The MSC 302 issues 2408 an invitation to MS2. MS2 acknowledges 2410 request. The MSC 302 acknowledges 2412 the acknowledgement of MS2. The MSC 302 sends 2414 acknowledgement to MS1 indicating that the call may now proceed. MS1 acks 2416, and the call between MS1 and MS2 proceeds.

In an exemplary embodiment of the present invention, the intra enterprise call proceeds using EVRC (Extended Variable Rate Coding) on RTP/UDP/IP packets. The

requests to locate MS2 in IS-41 networks may use IS-41 protocol elements. Figure 25 shows another exemplary embodiment in which the call proceeds by using GSM EFR (Extended Full Rate Coding) on RTP/UDP/IP packets with HLR inquiries using GSM-MAP protocol elements.

Enterprise to PSTN Telephone Call: In this case a mobile station 310 initiates a telephone call to a PSTN handset. The logic of certain embodiments of the invention to support such a call is described in connection with figure 26.

The mobile station 310 using SIP sends 2602 a call request to the Serving WLAN MSC 302. The Serving MSC 302 asks 2604 the HLR 114 to locate the called party. The HLR 114 responds 2606 with the location (PSTN switch) of the called party. The Serving MSC 302 requests 2608 a connection capable of carrying voice traffic from the Media Gateway of the MSC 302. The Media Gateway responds 2610 with a connection response. The Serving MSC 302 sends 2612 a connection request to the PSTN switch associated with the called telephone number (i.e., the switch to which the called party is connected). The PSTN Switch acknowledges 2614 receipt of request. The Serving MSC 302 tells 2616 the mobile station 310 that it is trying the called party. The PSTN Switch responds 2618 with connection information. The Serving MSC 302 sends 2620 a message to mobile station 310 indicating it is OK to proceed with call. The mobile station 310 acknowledges 2622 and conversation may now begin.

In an exemplary embodiment of the present invention the voice traffic may be carried as EVRC on RTP/UDP/IP packets between the mobile station 310 and the Serving MSC 302 and as 64K PCM voice between the Serving MSC 302 and the PSTN switch. The HLR interactions may be carried out using IS-41 protocol elements. Figure 27 shows another exemplary embodiment in which the HLR interactions may be carried out using GSM-MAP protocol elements and the voice between the mobile station 310 and the Serving MSC 302 may be carried as GSM EFR on RTP/UDP/IP packets, and as 64K PCM voice circuits between the Serving MSC and the PSTN switch.

Enterprise to WWAN GSM telephone Call with Tandem Free Operation (TFO): In this case a mobile station 310 (MS1) initiates a telephone call to another mobile station (MS2) roaming in a GSM network. Since only mobile stations are involved in this call, it is possible to carry this call in a tandem-free operation; i.e., carry the call as GSM EFR

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without having to uncompress/decompress to 64K PCM. The logic of certain embodiments to implement such a call is described in connection with figure 28.

The mobile station 310 using SIP sends 2802 a call request to the Serving WLAN MSC 302. The Serving MSC 302 asks 2804 the HLR 114 to locate the called party using GSM MAP. The HLR 114 asks 2806 the Serving GSM MSC 110 to locate MS2, i.e., provide roaming number associated with MS2. The GSM MSC 2808 responds with MS2's roaming number to HLR 114. The HLR 114 sends 2810 routing response to WLAN Serving MSC 302. The Serving MSC 302 requests 2812 a connection capable of carrying voice traffic from the Media Gateway with TFO on trunk side. The Media Gateway responds 2814 with a connection response. The Serving MSC 302 sends 2816 a connection request to the GSM MSC. The GSM MSC 110 acknowledges 2818 receipt of request. The Serving WLAN MSC 302 tells 2820 the mobile station 310 that it is trying the called party. The GSM MSC 110 responds 2822 with connection information. The Serving MSC 302 sends 2824 a message to mobile station 310 indicating it is OK to proceed with call. The mobile station 310 acknowledges and conversation may now begin.

In this exemplary embodiment of the present invention the voice traffic may be carried as GSM EFR on RTP/UDP/IP packets between the MS and the Serving MSC and as GSM EFR in 64K DS0 as a TFO channel between the WLAN Serving MSC (Media Gateway) and the GSM MSC (or the GSM Radio Access Network).

Other Variations

A basic mechanism of the present invention is the handoff of the mobile station as it roams during a call from a WLAN to the WWAN environment. This mechanism assumes the existence of trunks connecting the WLAN and WWAN switches using a standard mobility management protocol such as IS-41. Figure 29 shows an exemplary embodiment of a method that may be used to affect handoffs in the absence of such connectivity, and exemplary logic is discussed in connection with figure 30. As shown in the figure and in accordance to the present invention as described previously, the mobile station 310 (MS) while engaged in a telephone call with Party A, who may be using a PSTN handset 2902 or a WWAN mobile handset 2904, senses both the WLAN and WWAN environments and determines that the WLAN environment is waning in intensity whereas the WWAN environment is gaining in intensity. Under such an arrangement,

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mobile station 310 may determine 3002 that handoff is imminent. Upon making this determination mobile station 310 requests 3004 the WLAN switch 302 to issue it a Temporary Local Directory Number (TLDN). As is well known to practitioners in the art a TLDN may be used by other telephone exchanges to route a call to the switch issuing the TLDN. Having received the TLDN the mobile station 310 continues roaming and the mobile station 310 or the WLAN switch or both may find 3006 that the connectivity between the mobile station 310 and the WLAN switch has been lost. In such an eventuality the WLAN switch temporarily places 3008 party A on hold (WLAN may inform Party A about the on going state of affairs by playing a pre-recorded announcement). The mobile station 310 upon sensing the WWAN environment and upon successful completion of registration in the WWAN environment, requests a call to be placed using the TLDN as the destination (called party). The WWAN switch routes 3010 the call to the WLAN switch using its routing logic dependent on the TLDN. The WLAN switch recognizes 3012 the TLDN and connects Party A to the incoming call. Thus, Party A and the MS resume the on going call albeit with an interruption.

Many enterprises make use of a Private Branch Exchange (PBX). PBX systems typically provide a feature-rich environment to the attached telephones, such as abbreviated dialing, multi-party calls and the like. In certain embodiments of the present invention a WLAN switch may be used in conjunction with a PBX system.

Figure 31 shows an exemplary embodiment of this arrangement. The WLAN 200 is connected to the PBX 3102 via standard supported interfaces such as ISDN PRI. Telephone calls originating from a handset connected to the PBX and destined for a WLAN-controlled handset may be delivered to the WLAN switch 3104 via the standard interface. The WLAN switch may use the standard interface to deliver telephone calls to the PBX.

A mobile station 310 may make calls using the WLAN air interface, and such calls will be communicated over the wired LAN 206 to WLAN switch 2904 via the IP links of LAN 206. Switch 3104 will then communicate the call signaling (and eventually voice or other data) over ISDN PRI link 3106 to the PBX switch 3102 which will handle the call as if it were from a PBX phone 3108 and thus provide the PBX services to the mobile station. For example, if the mobile station used an abbreviated dialing scheme,

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the PBX would make the appropriate connections and communication would be conducted via the PBX switch 3102.

For internal calls, the WLAN switch 3104 essentially acts as a protocol converter, receiving the mobile station signaling and data as IP and providing it to the PBX via the ISDN PRI links as ISDN information.

For external calls, certain embodiments operate as follows. The WLAN switch 3104 detects that the mobile station desires to call an outside party. This may be done by analyzing the called party information, for example, to see if certain numbering plan information is used, such as prefixing the called number with the number '9'. In such case, the switch 3104 communicates with the WWAN switch 3112 and requests a TLDN to be later associated with the called party information e.g., called party number "123." When it receives such TLDN, the switch 3104 then makes a request to the PBX switch 3102 via link 3106 to connect the circuits associated with the mobile station to the WWAN switch 3112 using the TLDN i.e., requests the PBX to connect a call to the TLDN as the called party. The WWAN switch 3112 recognizes that the incoming call request with TLDN is for the previously remembered called party number 123 (i.e., WWAN switch 3104 associates the issued TLDN with previously received called party number "123" from WLAN switch 3104) and proceeds to route call to called party number "123" as dictated by standard routing logic. Thus, PBX 3102 requests call to destination TLDN but WWAN switch 3112 recognizes that the call is actually meant for destination "123" and routes the call to "123". The TLDN serves as a tag identifying the "signaling" on IP link 3114 and the request from the PBX on ISDN PRI link 3110. In this fashion, any subsequent signaling or link 3114 associated with mobile station 310 will be associated with the correct bearer circuits on link 3110.

In terms of mobility management, roaming may proceed as explained above. Hard handoffs may proceed as explained above if there exist mobility management trunks between the WWAN switch 3312 and the WLAN switch 3104. This logic is shown in figures 12-14 and 19-21 with the associated descriptions of hard handoffs under various network conditions. In the absence of such trunks a handoff may proceed with regard to the use of TLDN as a handoff mechanism – namely as the mobile station roams into a WWAN area and loses radio contact with the WLAN, the mobile station will perform a handoff by automatically reconnecting with the call by using the TLDN. In this instance,

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the WLAN switch may inform the mobile station of the TLDN to use either during call set up, or as explained above in response to the mobile station's request (e.g., the WLAN switch 3104 may cache the TLDN and await the request of the mobile station).

In this arrangement the WWAN MSC 3112 anchors the call. Certain variations are possible. For example, during handoffs the WWAN MSC may tear down the links previously used to the PBX. This is efficient for two party calls. However to support calls in which multiple parties in the PBX domain participate, the links to the PBX must remain up. In this situation, the WWAN MSC 3112 must patch in the mobile station to the existing call.

The above discussion and the following claims at times refer to specific WLAN standards such as 802.11. This is typically done to use a very specific example. In many instances reference is made to 802.x. The designation of 'x' is used to indicate a wider applicability, i.e., to any of the 802 WLAN standards.

Though some of the discussion is with reference to voice calls, persons skilled in the art that the above teachings and following claims are also directed to data calls as well.

It will be further appreciated that the scope of the present invention is not limited to the above-described embodiments, but rather is defined by the appended claims, and that these claims will encompass modifications of and improvements to what has been described.

What is claimed is:

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1. A method of selecting an air interface protocol for a mobile station to use, wherein the mobile station includes (a) logic to communicate according to an 802.xx wireless local area network air interface protocol (WLAN logic), (b) logic to communicate according to a wireless wide area network air interface protocol (WWAN logic), and (c) logic to select one of the WLAN logic and the WWAN logic to communicate on an air interface, the method comprising:

the mobile station detecting RF energy in the 802.xx spectrum;

in response to the energy detection step, determining whether there is an 802.xx WLAN capable of servicing the mobile station by performing a scanning operation; and

if there is an 802.xx WLAN capable of servicing the mobile station, the mobile station selecting the WLAN logic.

2. The method of claim 1 wherein the scanning operation is a passive scanning operation in which the mobile station searches for a beacon frame broadcast by a 802.xx WLAN.

3. The method of claim 1 wherein the scanning operation is an active scanning operation in which the mobile station transmits probe request frames and waits for probe responses from the 802.xx WLAN.

4. The method of claim 2 wherein the beacon frame includes a SSID identifying an access point of the 802.xx WLAN.

5. The method of claim 3 wherein the probe response includes a SSID identifying an access point of the 802.xx WLAN.

6. The method of claim 4 wherein the mobile station compares the SSID within the beacon frame with a set of SSIDs to determine if the SSID within the beacon frame is within the set of SSIDs and if so determining that the 802.xx WLAN sensed is a valid 802.xx WLAN to service the mobile station.

7. The method of claim 5 wherein the mobile station compares the SSID within the probe response with a set of SSIDs to determine if the SSID within the probe

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response is within the set of SSIDs and if so determining that the 802.xx WLAN sensed is a valid 802.xx WLAN to service the mobile station.

8. The method of claim 6 wherein the mobile station and the 802.xx WLAN authenticate the identity of each other.

9. The method of claim 7 wherein the mobile station and the 802.xx WLAN authenticate the identity of each other.

10. The method of claim 1 wherein the WWAN has information identifying the areas in which capable WLANs operate and wherein the WWAN provisions the mobile station with at least a subset of such information, and wherein the mobile station uses such area-identifying information to determine whether to perform the RF energy detection operation.

11. The method of claim 10 wherein the area-identifying information is cell ids and wherein the mobile station compares the cell id information in which it is operating with the provisioned cell ids.

12. The method of claim 10 wherein the area-identifying information is geographical positioning satellite (GPS) information and wherein the mobile station determines its GPS coordinates and compares it against the provisioned GPS information.

13. The method of claim 1 wherein the mobile station compares the RF energy value with a threshold value and wherein the mobile station detects the RF energy of the WWAN and compares said RF energy of the WWAN with a predetermined value and wherein the comparisons of the RF energy values with corresponding thresholds is used by the mobile station in selecting whether to communicate with the 802.xx WLAN and the WWAN.

14. The method of claim 1 wherein the WWAN has information identifying the areas in which capable WLANs operate and wherein the WWAN provisions the mobile station with at least a subset of such information, and wherein the mobile station uses such area-identifying information to determine whether to perform the RF energy detection operation.

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15. The method of claim 10 wherein the area-identifying information includes information identifying WLANs other than that used by a service plan of the mobile station.

16. The method of claim 15 wherein the information identifying WLANs includes information identifying WLANs of enterprises accepting service of the mobile station.

17. The method of claim 10 wherein the mobile station is provisioned with the area information via SMS messages from the WWAN.

18. The method of claim 10 wherein the provisioning of area information in response to the multimode mobile station causing location update messages to a HLR of the WWAN.

19. A multimode mobile station, comprising

first air interface logic to communicate according to an 802.xx wireless local area network air interface protocol;

second air interface logic to communicate according to a wireless wide area network air interface protocol;

logic to sense RF energy in the 802.xx spectrum;

logic, responsive to the sensing logic, to determine whether there is an 802.xx WLAN capable of servicing the multimode mobile station by performing a scanning operation; and

logic, responsive to the determining logic, to select the first air interface logic if there is an 802.xx WLAN capable of servicing the multimode mobile station.

20. A wireless communication system, comprising:

a wireless local area network (WLAN),

a wireless wide area network (WWAN), including at least one MSC;

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a multimode mobile station including logic to determine whether to communicate according to an air interface protocol for the WLAN or to communicate according to an air interface protocol for the WWAN.

21. The system of claim 20 wherein the WWAN includes logic to provide information to the multimode mobile station to inform the mobile station of geographic areas of WLANs, and wherein the logic to determine utilizes said information to determine whether to communicate according to the air interface protocol for the WLAN or to communicate according to the air interface protocol for the WWAN.

22. A method of managing mobility of a mobile station across an 802.xx wireless local area network (WLAN) and a wireless wide area network (WWAN) in which a mobile switching center (MSC) has been provisioned to act as a serving MSC for the WLAN, comprising:

(a) the mobile station detecting the RF energy of the WLAN and validating its ability to be a member of the WLAN;

(b) in response to step (a), the mobile station issuing a registration request to the serving MSC for the WLAN;

(c) in response to step (b), the serving MSC for the WLAN causing the WWAN to recognize that the mobile station is registered with the serving MSC for the WLAN and that the mobile station is no longer served by a prior MSC;

(d) the mobile station communicating to entities outside of the WLAN by communicating with the WLAN via a WLAN protocol and the WLAN communicating with the WWAN via the serving MSC for the WLAN.

23. The method of claim 22 wherein the mobile station issues a registration request by sending a SIP Register message on the WLAN via a WLAN air interface protocol to request registration therein, and the WLAN communicates the registration request to the MSC serving the WLAN.

24. The method of claim 22 further including the MSC serving the WLAN sending a de-registration request to an MSC that previously served the mobile station.

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25. The method of claim 22 wherein the MSC serving the WLAN sends a registration notification message to an HLR to update the WWAN with location information of the mobile station, and wherein the HLR communicates with a prior MSC to cancel service thereat of the mobile station,

26. The method of claim 22 wherein the MSC serving the WLAN sends an update location message to an HLR to update the WWAN with location information of the mobile station, and wherein the HLR communicates with a prior MSC to cancel service thereat of the mobile station, and wherein the HLR communicates with the MSC serving the WLAN to insert thereat the mobile station as a subscriber for service.

27. The method of claim 22 wherein a mobile station detects the RF energy of the WLAN and validates its ability to be a member of the WLAN while the mobile station is participating in a call using a WWAN air interface protocol and in response thereto

sending a message to a source MSC that is servicing the call that a handoff is desired;

the source MSC analyzing the message, establishing itself as an anchor MSC, and establishing communication channels with a target MSC servicing the detected WLAN;

the mobile station beginning communication with the WLAN via a WLAN air interface;

the WLAN forwarding messages to the target MSC serving the WLAN via IP communication; and

the target MSC relaying those communication to the anchor MSC.

28. The method of claim 27 wherein the mobile stations sends via a WLAN air interface protocol a handoff request message as an overloaded SIP command and the WLAN communicates the handoff request message to the target MSC.

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29. The method of claim 22 further including

a mobile station determining that it should communicate via a WWAN air interface protocol and not via a WLAN air interface protocol;

the mobile station issuing a registration request to the WWAN via a base station controller (BSC) and MSC corresponding to a location in which the mobile station resides;

the corresponding MSC causing the WWAN to recognize that the mobile station is registered with the corresponding MSC and that the mobile station is no longer served by a prior MSC which served the mobile station when it was communicating according to a WLAN air interface protocol.

30. The method of claim 29 wherein a mobile station determines that it should communicate according to a WWAN air interface protocol while the mobile station is participating in a call under a WLAN air interface protocol and in response thereto

sending a message to a source MSC that is servicing the call that a handoff is desired;

the source MSC analyzing the message, establishing itself as an anchor MSC, and establishing communication channels with a target MSC servicing a geographic WWAN area in which the mobile station resides;

the mobile station beginning communication with the WWAN and the target MSC relaying those communication to the anchor MSC.

31. The method of claim 30 wherein the mobile station informs the MSC serving the WLAN of the cell ids of the WWAN geographic area, and wherein the source MSC uses the cell ids information to establish communication channels with the target MSC.

32. The method of claim 31 wherein the mobile station uses an overloaded SIP Info message to communicate the cell id information to the source MSC.

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33. The method of claim 29 wherein a mobile station determines that it should communicate according to a WWAN air interface protocol while the mobile station is participating in a call under a WLAN air interface protocol and in response thereto

sending a message to a source MSC to request a temporary local directory number (TLDN)

the source MSC providing a TLDN to the mobile station;

the source MSC causing a called party of the call to be placed on hold and the mobile station requests a call to be made using the TLDN as a called party;

the WWAN causing call connections to be made connecting the mobile station with the TLDN to resume the call.

34. A wireless communication system, including

a wireless local area network (WLAN) including logic to communicate according to a WLAN air interface protocol;

a wireless wide area network (WWAN) including logic to communicate according to a WWAN air interface protocol, the WWAN including at least one MSC for serving the WLAN and in IP communication therewith;

a mobile station including logic to communicate according to the WLAN air interface protocol, logic to communicate according to the WWAN air interface protocol, and logic to communicate mobility management messages to the WLAN as overloaded SIP messages for forwarding to the at least one MSC.

35. A method of providing a wireless wide area network (WWAN) service to a mobile station serviced in a wireless local area network (WLAN), comprising:

provisioning a MSC to serve the WLAN;

the MSC that serves the WLAN receiving WWAN messages that provide the WWAN service;

the MSC forming SIP messages using the received WWAN messages;

the MSC delivering the SIP messages to the WLAN via an IP link;

the WLAN delivering the SIP messages to the mobile station via a WLAN air interface protocol.

36. The method of claim 35 wherein the WWAN service is a Short Message Service (SMS) and wherein the WWAN includes a SMS Center for delivering SMS messages on the WWAN and wherein the MSC forms SIP Invite messages with SMS payload and delivers said SIP Invite messages to the WLAN.

37. The method of claim 35 wherein the WWAN service is a Message Wait Notification (MWN) and wherein the WWAN provides MWN messages to the WWAN and wherein the MSC forms SIP Invite messages with MWN information and delivers said SIP Invite messages to the WLAN.

38. The method of claim 35 wherein the MSC that services the WLAN and an MSC servicing the WWAN cooperate to provide TFO call services between an mobile station operating in the WLAN and a mobile station operating in the WWAN.

39. A method of internetworking a mobile station to operate in a wireless wide area network (WWAN), comprising:

provisioning a switch to communicate with the WLAN via IP communication and to communicate with a PBX via a PBX interface;

the switch receiving mobile station communications via the WLAN;

the switch converting said mobile station communications to a format compatible with the PBX interface and forwarding the converted communications to the PBX;

the PBX receiving and handling the converted communications.

40. The method of claim 39 wherein the switch is further provisioned to communicate with a WWAN and wherein the switch analyzes the mobile station communications and determines that the communications address an entity external to a domain of the PBX and in response thereto

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the switch requesting a TLDN from a MSC serving the WWAN;

in response to receiving a TLDN from the MSC, the switch sending a message to the PBX to connect the mobile station call to the specified TLDN;

the PBX connecting the mobile station call to the specified TLDN.

41. The method of claim 40 further including

the mobile station roaming during the call,

the mobile station switching to an WWAN air interface protocol;

the mobile station reconnecting to the call by specifying the TLDN of the call.

42. The method of claim 41 wherein the mobile station automatically reconnects to the call without user intervention.

43. The method of claim 41 wherein the PBX tears down call connections to the MSC when the mobile station is detected as having lost communication with the switch.

44. The method of claim 41 wherein the PBX maintains call connections to the MSC when the mobile station is detected as having lost communication with the switch.

45. The method of claim 40 further including

the mobile station roaming during the call,

the mobile station determining that it should communicate according to a WWAN air interface protocol while the mobile station is participating in a call under a WLAN air interface protocol and in response thereto

sending a message to a source MSC that is servicing the WLAN that a handoff is desired;

the source MSC analyzing the message, establishing an anchor MSC, and establishing communication channels with a target MSC servicing a geographic WWAN area in which the mobile station resides;

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the mobile station beginning communication with the WWAN and the target MSC relaying those communication to the anchor MSC.

46. The method of claim 45 wherein the mobile station informs the MSC serving the WLAN of the cell ids of the WWAN geographic area, and wherein the source MSC uses the cell ids information to establish communication channels with the target MSC.

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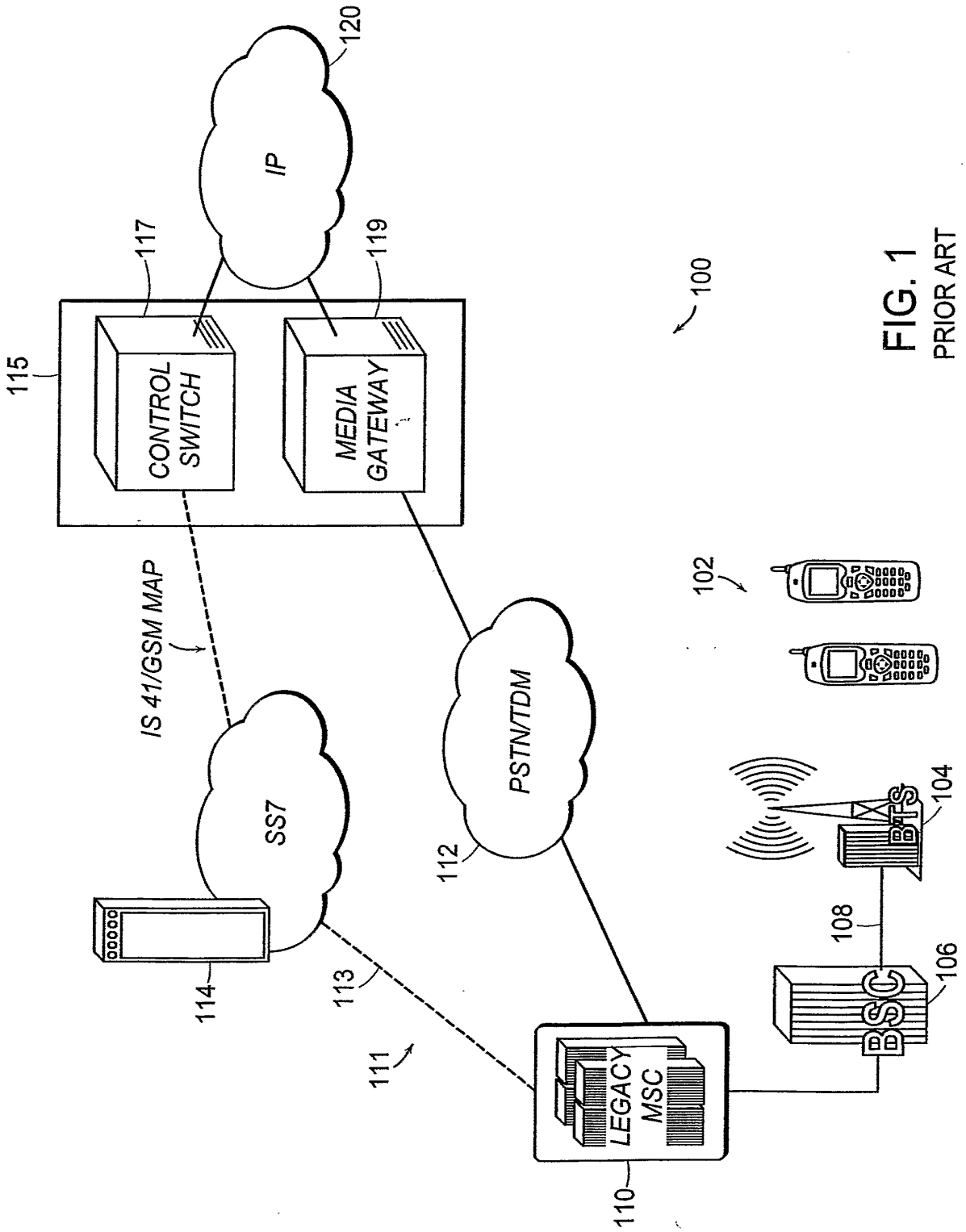


FIG. 1
PRIOR ART

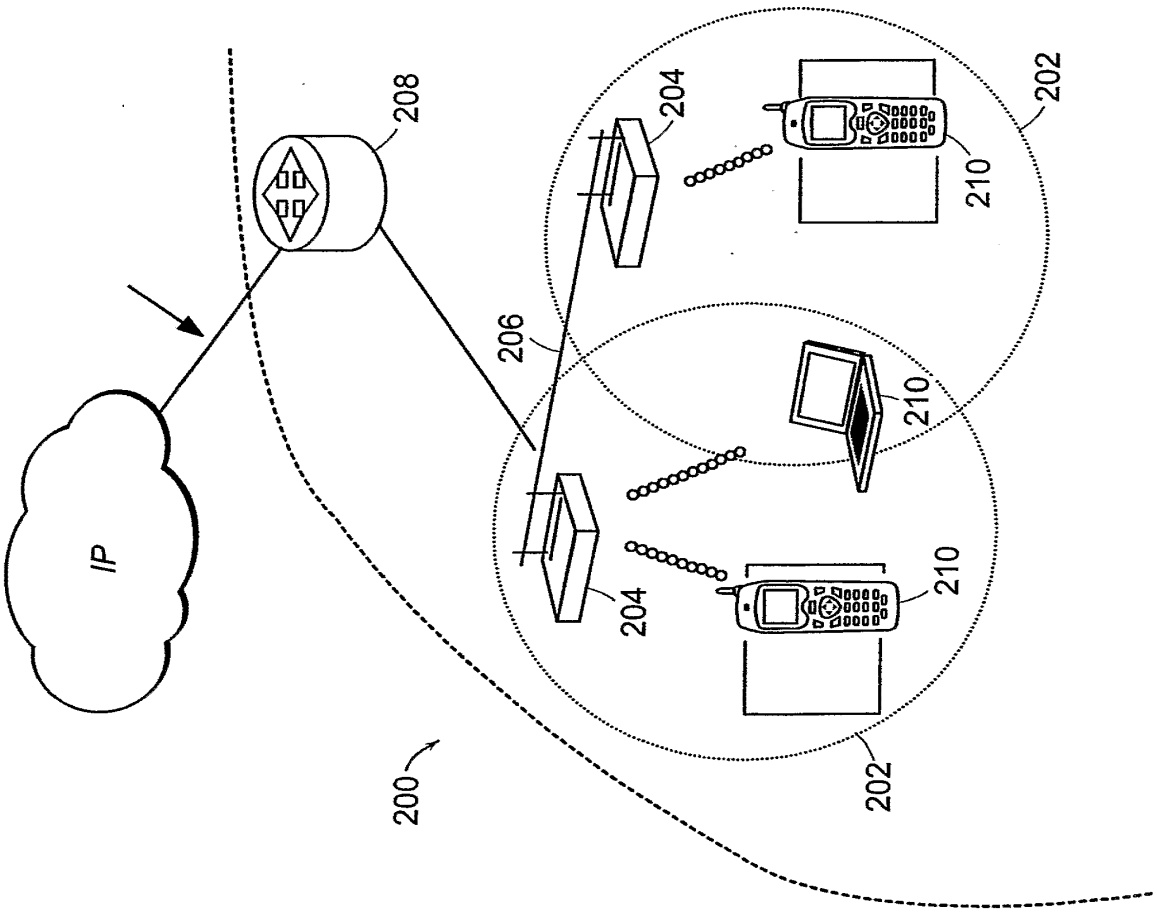


FIG. 2
PRIOR ART

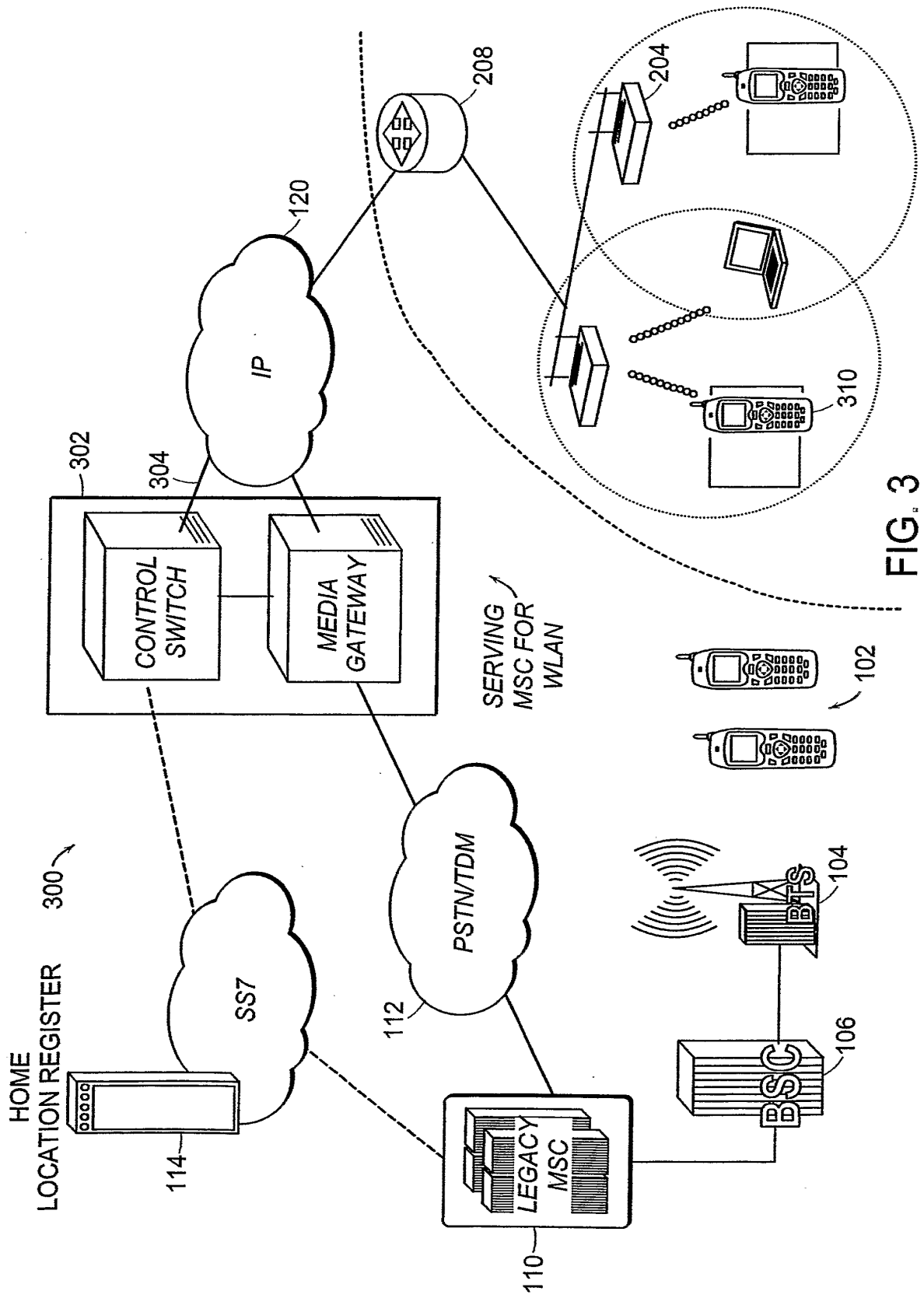

HOME LOCATION REGISTER
300
SS7
114
PSTN/TDM
112
IP
120
208
204
310
302
304
CONTROL SWITCH
MEDIA GATEWAY
SERVING MSC FOR WLAN
102
104
BTS
106
LEGACY MSC
110

FIG. 3

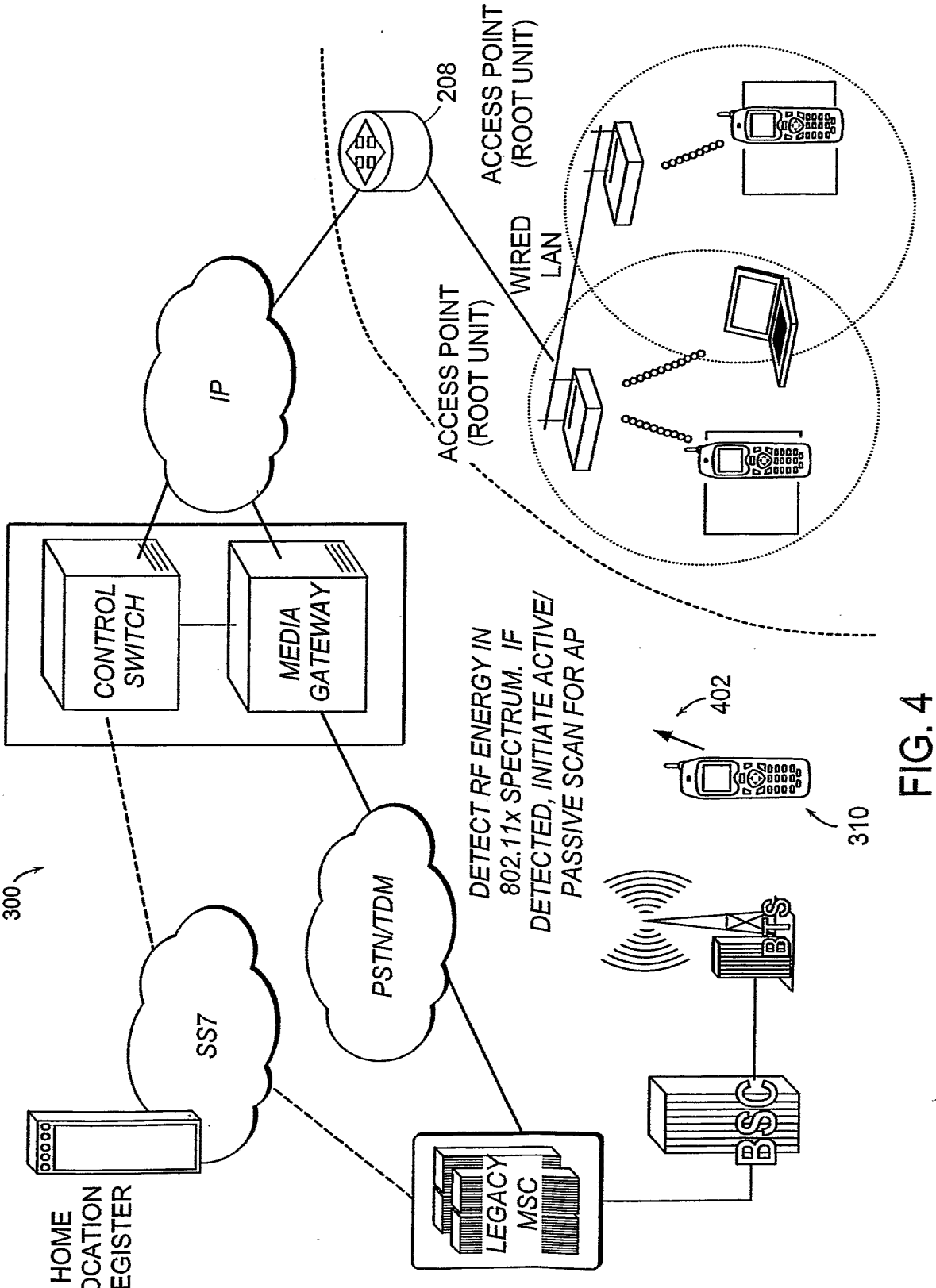

300
HOME LOCATION REGISTER
SS7
PSTN/TDM
LEGACY MSC
CONTROL SWITCH
MEDIA GATEWAY
IP
208
ACCESS POINT (ROOT UNIT)
WIRED LAN
ACCESS POINT (ROOT UNIT)
DETECT RF ENERGY IN 802.11x SPECTRUM. IF DETECTED, INITIATE ACTIVE/ PASSIVE SCAN FOR AP
402
310

FIG. 4

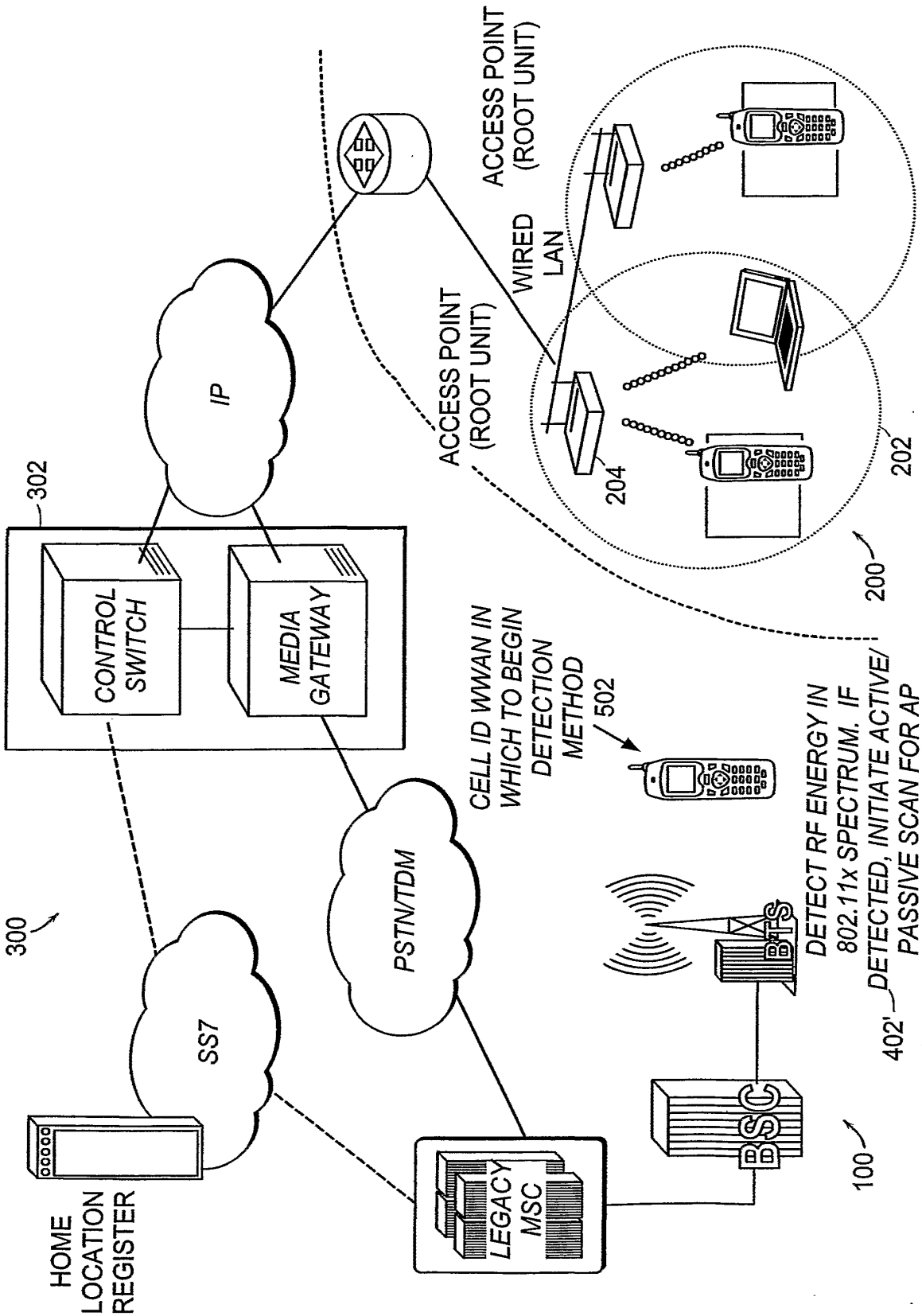

ACCESS POINT (ROOT UNIT)
WIRED LAN
ACCESS POINT (ROOT UNIT)
IP
302
CONTROL SWITCH
MEDIA GATEWAY
204
202
200
CELL ID WWAN IN WHICH TO BEGIN DETECTION METHOD
502
DETECT RF ENERGY IN 802.11x SPECTRUM. IF DETECTED, INITIATE ACTIVE/ PASSIVE SCAN FOR AP
402'
PSTN/TDM
300
SS7
HOME LOCATION REGISTER
LEGACY MSC
100

FIG. 5

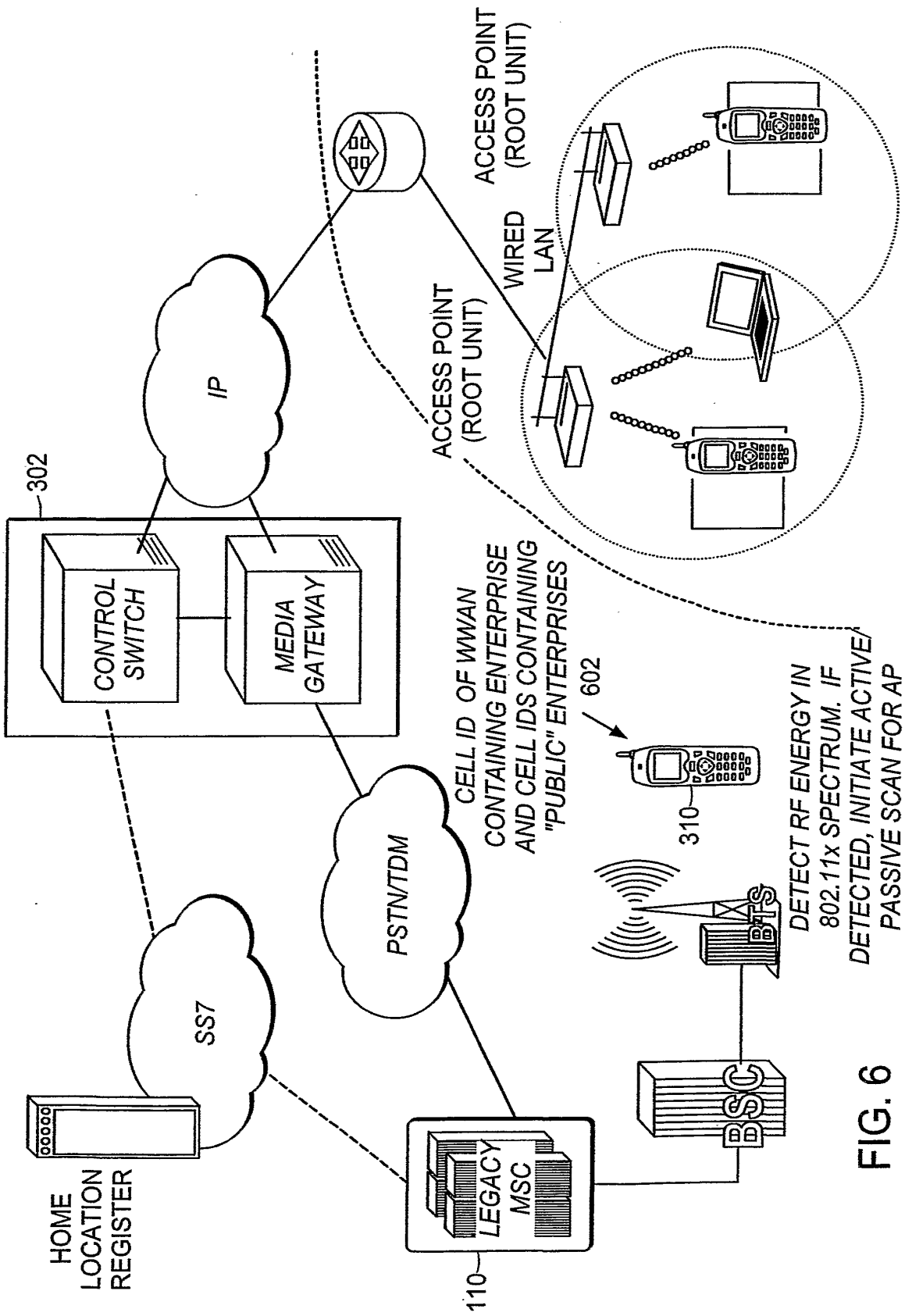

ACCESS POINT (ROOT UNIT)
WIRED LAN
ACCESS POINT (ROOT UNIT)
IP
302
CONTROL SWITCH
MEDIA GATEWAY
CELL ID OF WWAN CONTAINING ENTERPRISE AND CELL IDS CONTAINING "PUBLIC" ENTERPRISES
602
310
DETECT RF ENERGY IN 802.11x SPECTRUM. IF DETECTED, INITIATE ACTIVE/ PASSIVE SCAN FOR AP
PSTN/TDM
SS7
HOME LOCATION REGISTER
LEGACY MSC
110

FIG. 6

CDMA
MULTI-MODE PHONE
IS95/CDMA2000
+
WLAN MODEM
+
VoIP (SIP/RTP/UDP/IP)
+
MOBILITY VIA PREFERRED
EMBODIMENT CLIENT
GSM/UMTS
MULTI-MODE PHONE
GSM/UMTS
+
WLAN MODEM
+
VoIP (SIP/RTP/UDP/IP)
+
MOBILITY VIA PREFERRED
EMBODIMENT CLIENT
SANYO
310

FIG. 7

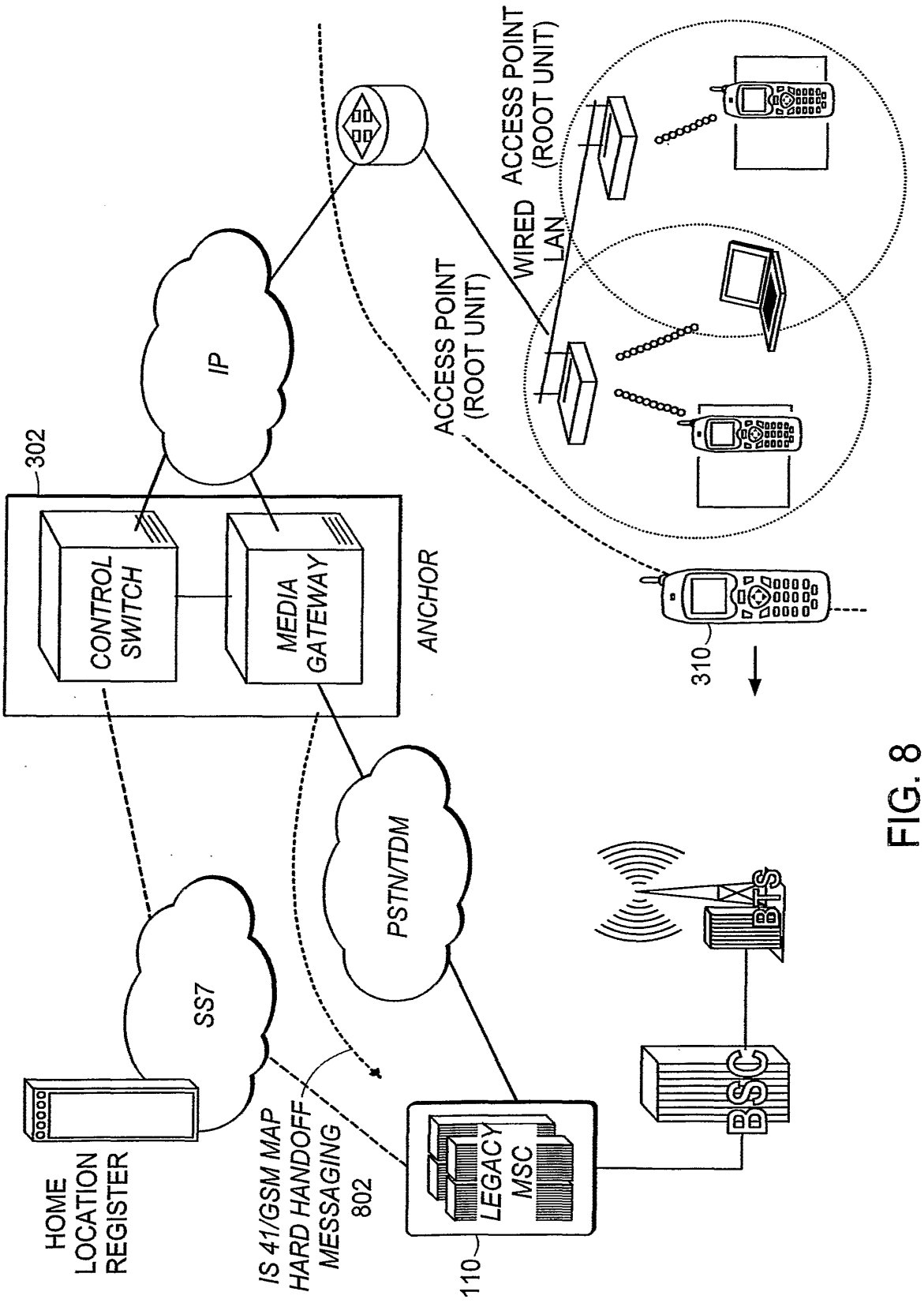

ACCESS POINT (ROOT UNIT)
WIRED LAN
ACCESS POINT (ROOT UNIT)
IP
302
CONTROL SWITCH
MEDIA GATEWAY
ANCHOR
310
PSTN/TDM
SS7
HOME LOCATION REGISTER
IS 41/GSM MAP HARD HANDOFF MESSAGING 802
LEGACY MSC
110
BTS
BSC

FIG. 8

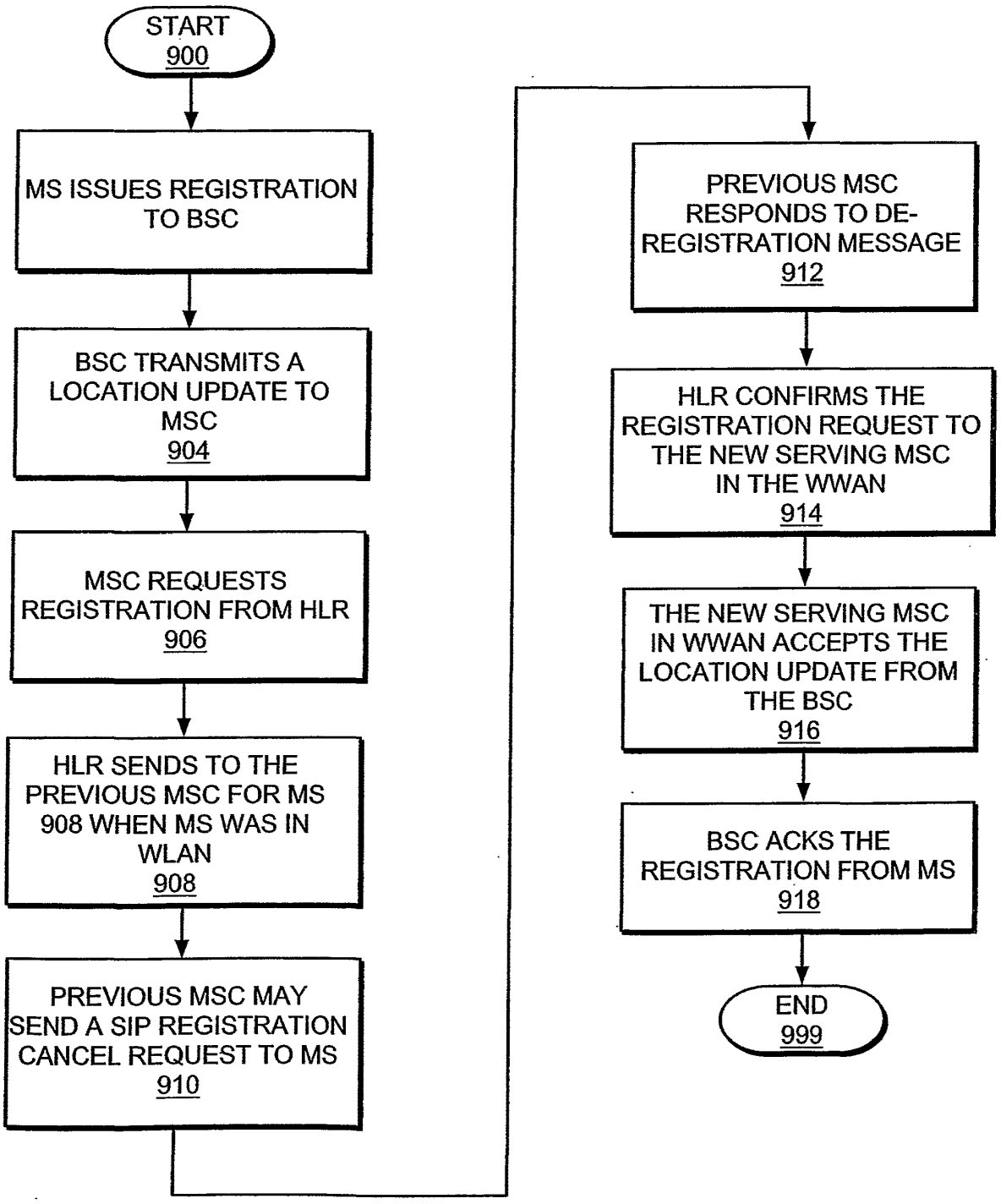

START
900
MS ISSUES REGISTRATION TO BSC
BSC TRANSMITS A LOCATION UPDATE TO MSC
904
MSC REQUESTS REGISTRATION FROM HLR
906
HLR SENDS TO THE PREVIOUS MSC FOR MS 908 WHEN MS WAS IN WLAN
908
PREVIOUS MSC MAY SEND A SIP REGISTRATION CANCEL REQUEST TO MS
910
PREVIOUS MSC RESPONDS TO DE-REGISTRATION MESSAGE
912
HLR CONFIRMS THE REGISTRATION REQUEST TO THE NEW SERVING MSC IN THE WWAN
914
THE NEW SERVING MSC IN WWAN ACCEPTS THE LOCATION UPDATE FROM THE BSC
916
BSC ACKS THE REGISTRATION FROM MS
918
END
999

FIG. 9

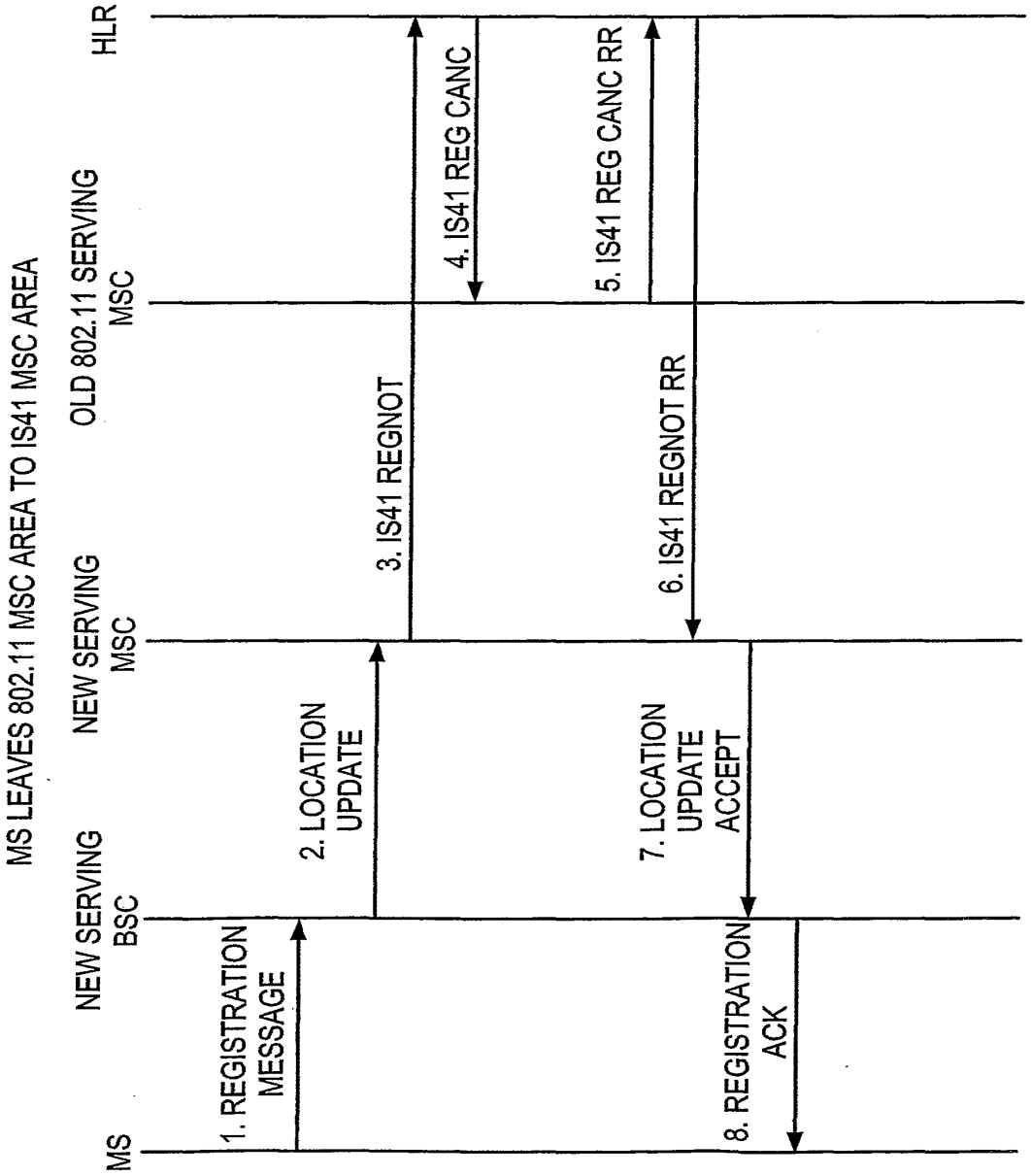

MS LEAVES 802.11 MSC AREA TO IS41 MSC AREA
MS
NEW SERVING BSC
NEW SERVING MSC
OLD 802.11 SERVING MSC
HLR
1. REGISTRATION MESSAGE
2. LOCATION UPDATE
3. IS41 REGNOT
4. IS41 REG CANC
5. IS41 REG CANC RR
6. IS41 REGNOT RR
7. LOCATION UPDATE ACCEPT
8. REGISTRATION ACK

FIG. 10

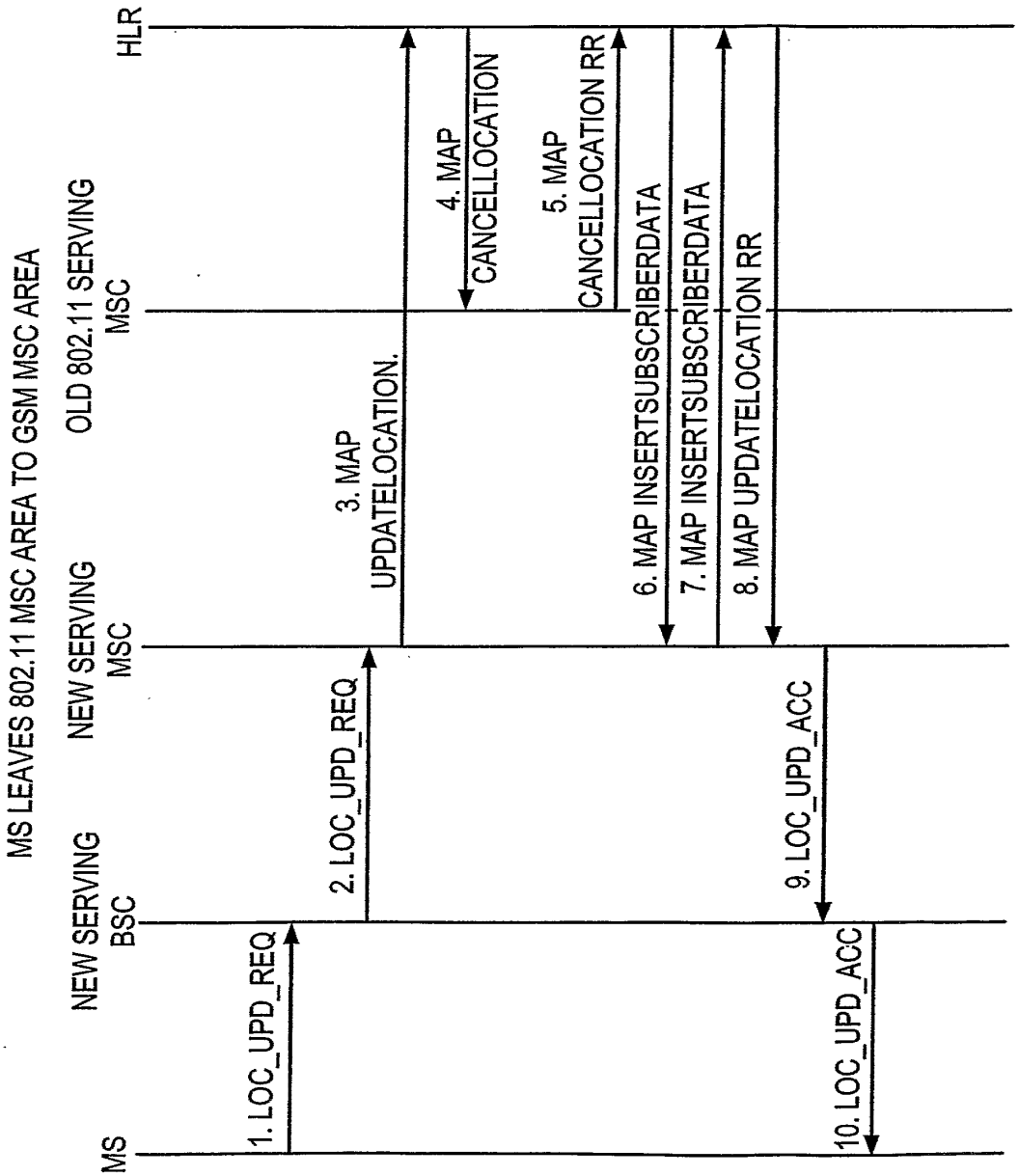

MS LEAVES 802.11 MSC AREA TO GSM MSC AREA
MS
NEW SERVING BSC
NEW SERVING MSC
OLD 802.11 SERVING MSC
HLR
1. LOC_UPD_REQ
2. LOC_UPD_REQ
3. MAP UPDATELOCATION.
4. MAP CANCELLOCATION
5. MAP CANCELLOCATION RR
6. MAP INSERTSUBSCRIBERDATA
7. MAP INSERTSUBSCRIBERDATA
8. MAP UPDATELOCATION RR
9. LOC_UPD_ACC
10. LOC_UPD_ACC

FIG. 11

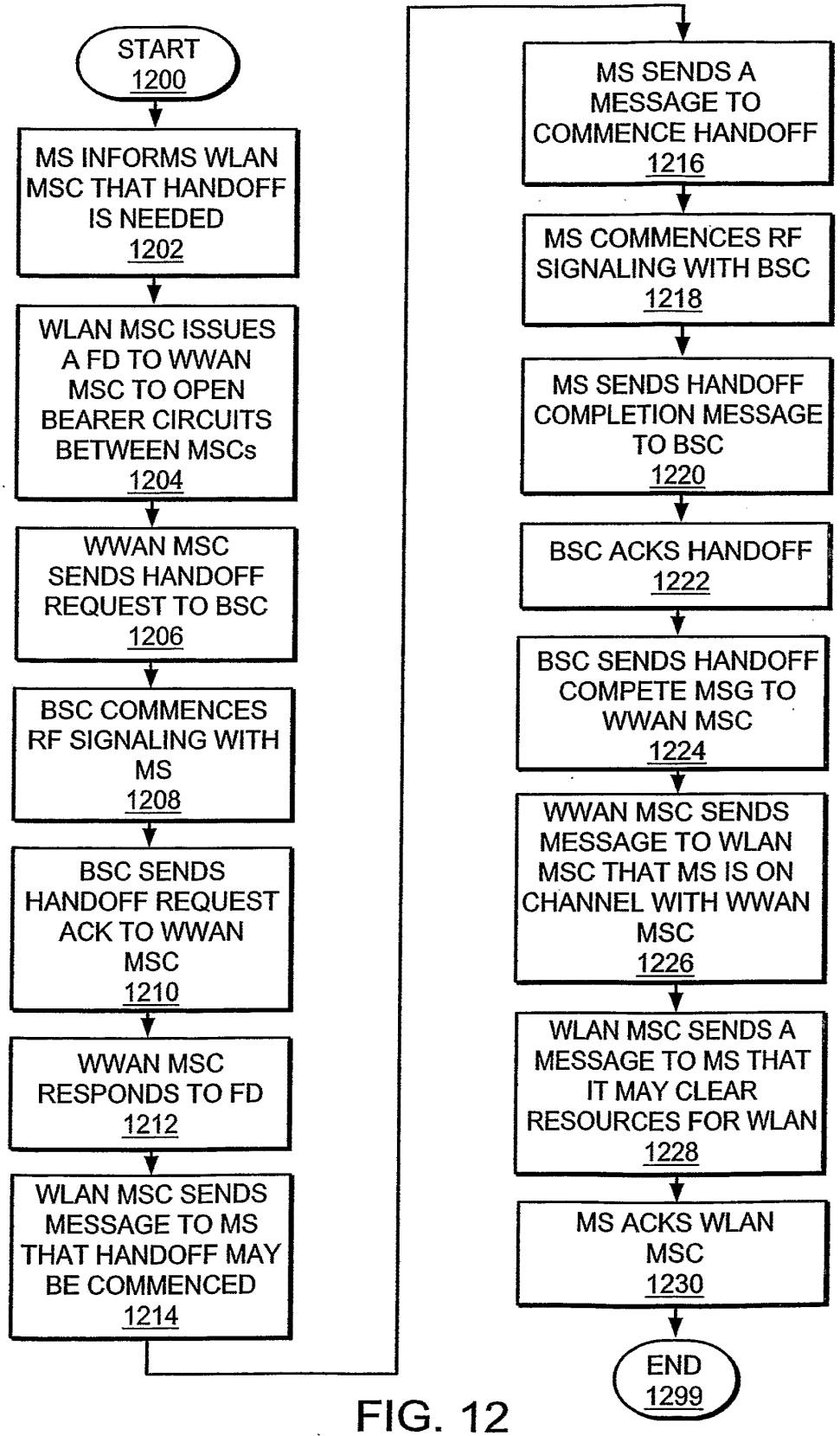

START
1200
MS INFORMS WLAN MSC THAT HANDOFF IS NEEDED
1202
WLAN MSC ISSUES A FD TO WWAN MSC TO OPEN BEARER CIRCUITS BETWEEN MSCs
1204
WWAN MSC SENDS HANDOFF REQUEST TO BSC
1206
BSC COMMENCES RF SIGNALING WITH MS
1208
BSC SENDS HANDOFF REQUEST ACK TO WWAN MSC
1210
WWAN MSC RESPONDS TO FD
1212
WLAN MSC SENDS MESSAGE TO MS THAT HANDOFF MAY BE COMMENCED
1214
MS SENDS A MESSAGE TO COMMENCE HANDOFF
1216
MS COMMENCES RF SIGNALING WITH BSC
1218
MS SENDS HANDOFF COMPLETION MESSAGE TO BSC
1220
BSC ACKS HANDOFF
1222
BSC SENDS HANDOFF COMPETE MSG TO WWAN MSC
1224
WWAN MSC SENDS MESSAGE TO WLAN MSC THAT MS IS ON CHANNEL WITH WWAN MSC
1226
WLAN MSC SENDS A MESSAGE TO MS THAT IT MAY CLEAR RESOURCES FOR WLAN
1228
MS ACKS WLAN MSC
1230
END
1299

FIG. 12

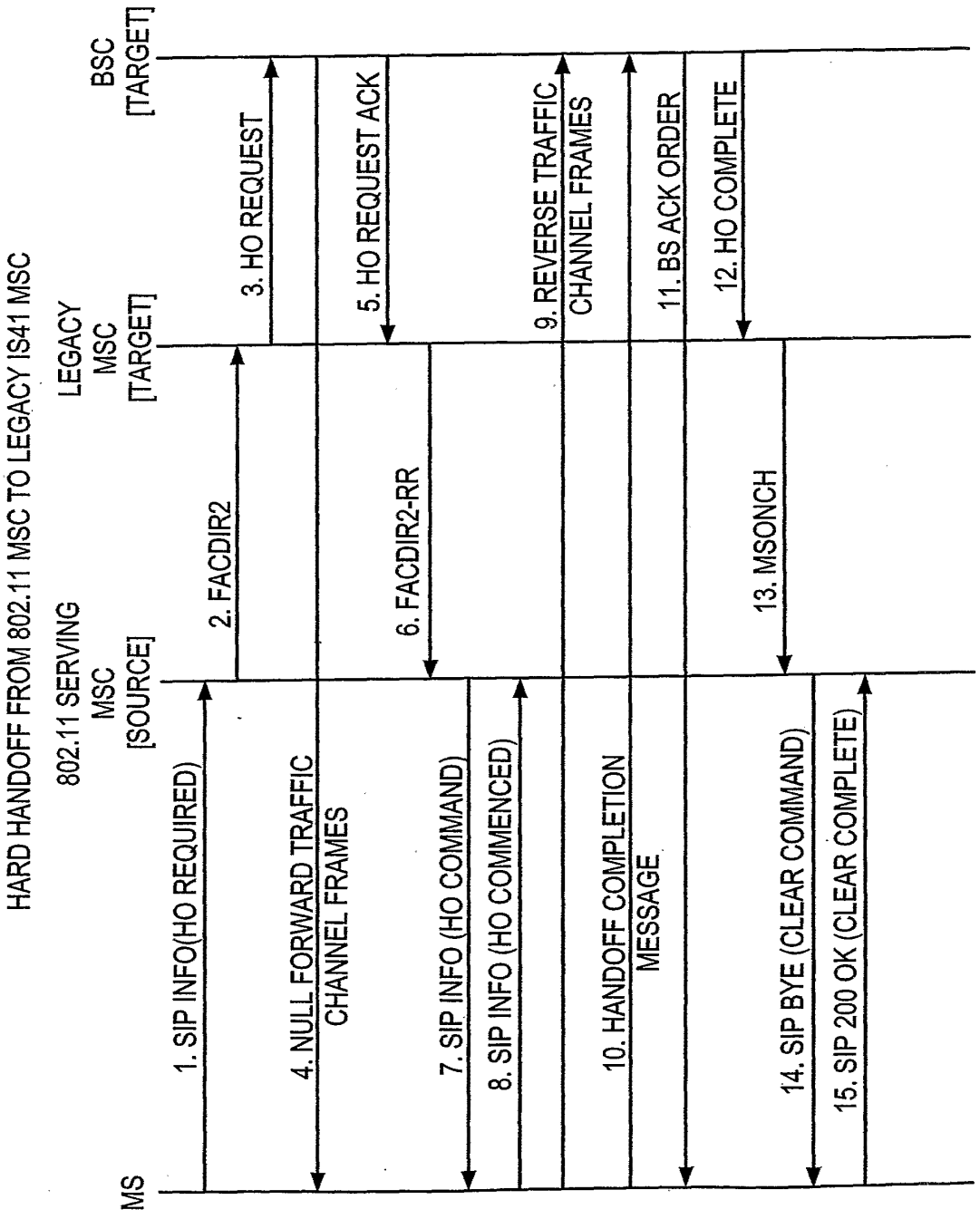

HARD HANDOFF FROM 802.11 MSC TO LEGACY IS41 MSC
MS
802.11 SERVING MSC [SOURCE]
LEGACY MSC [TARGET]
BSC [TARGET]
1. SIP INFO(HO REQUIRED)
2. FACDIR2
3. HO REQUEST
4. NULL FORWARD TRAFFIC CHANNEL FRAMES
5. HO REQUEST ACK
6. FACDIR2-RR
7. SIP INFO (HO COMMAND)
8. SIP INFO (HO COMMENCED)
9. REVERSE TRAFFIC CHANNEL FRAMES
10. HANDOFF COMPLETION MESSAGE
11. BS ACK ORDER
12. HO COMPLETE
13. MSONCH
14. SIP BYE (CLEAR COMMAND)
15. SIP 200 OK (CLEAR COMPLETE)

FIG. 13

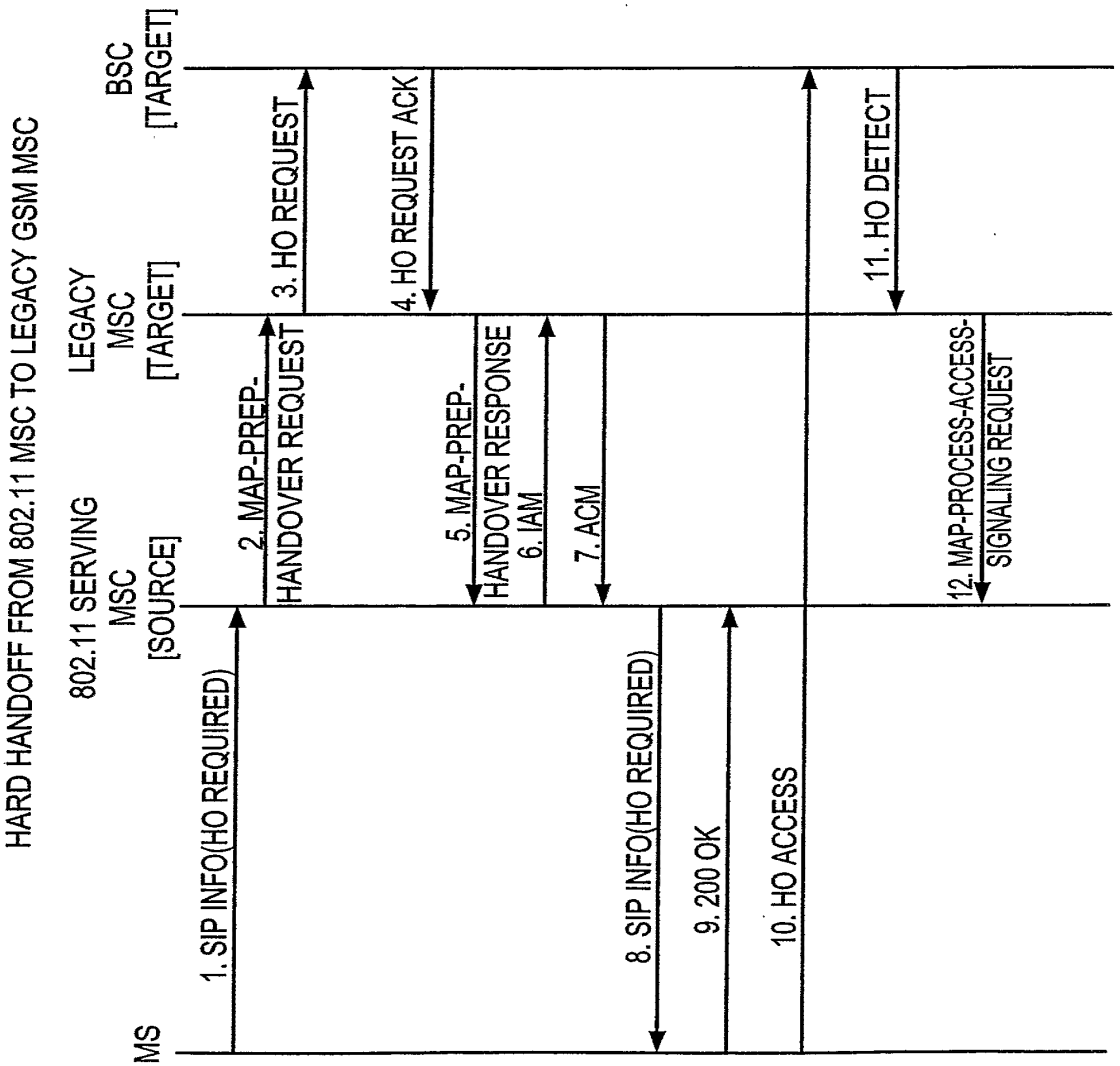


FIG. 14A

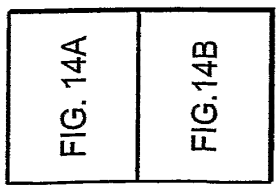


FIG. 14

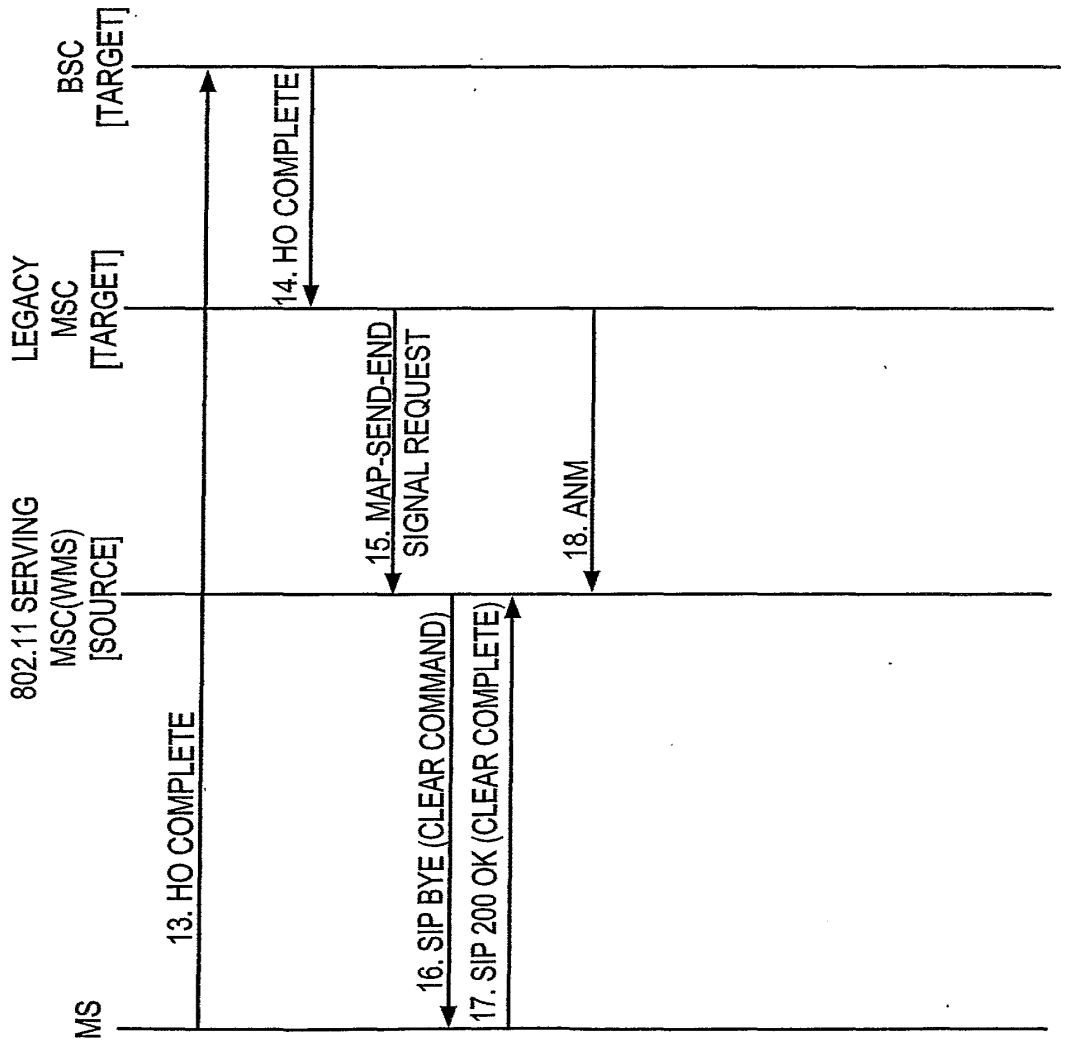

MS
802.11 SERVING MSC(WMS) [SOURCE]
LEGACY MSC [TARGET]
BSC [TARGET]
13. HO COMPLETE
14. HO COMPLETE
15. MAP-SEND-END SIGNAL REQUEST
16. SIP BYE (CLEAR COMMAND)
17. SIP 200 OK (CLEAR COMPLETE)
18. ANM

FIG. 14B

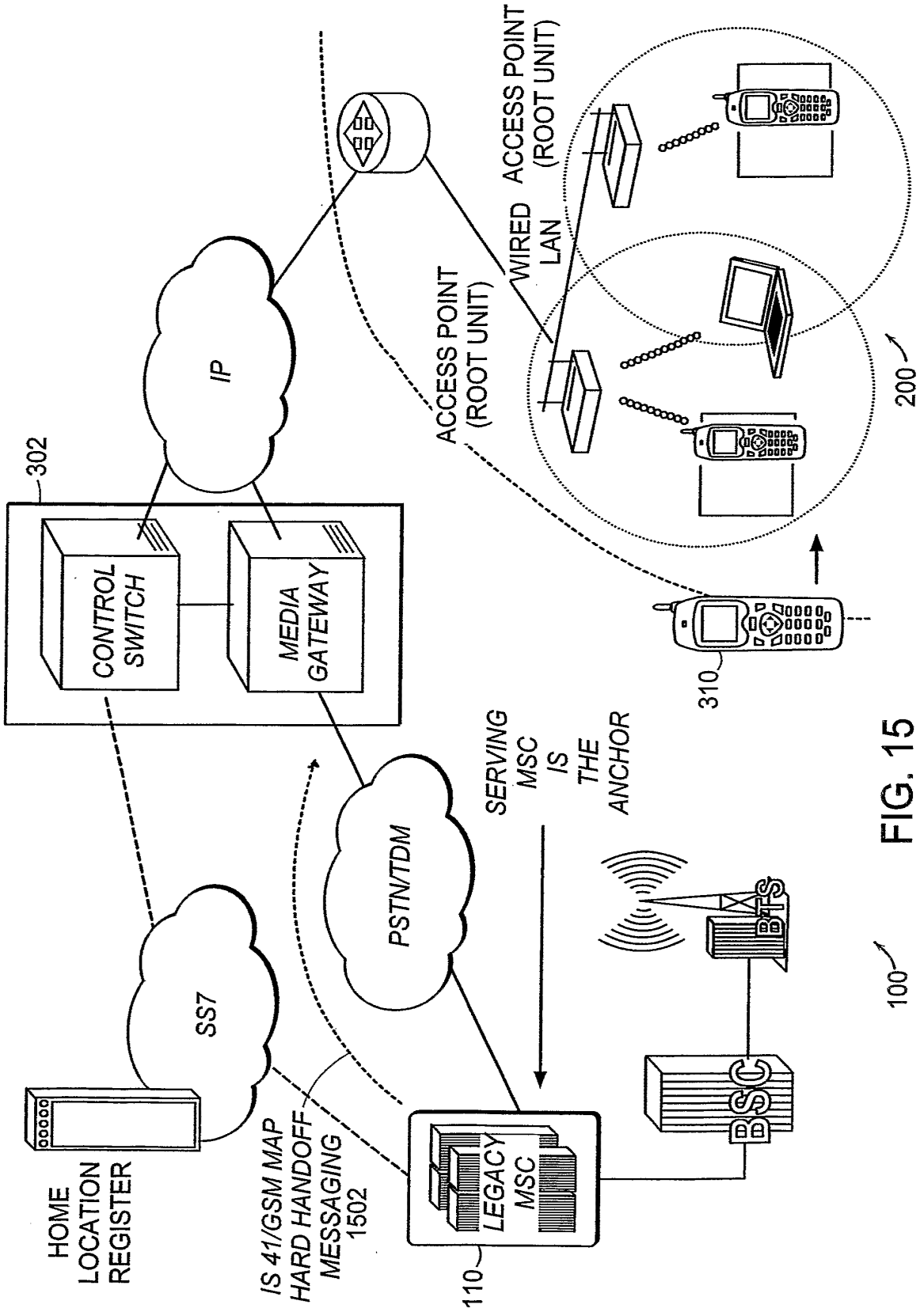

ACCESS POINT (ROOT UNIT)
WIRED LAN
ACCESS POINT (ROOT UNIT)
IP
302
CONTROL SWITCH
MEDIA GATEWAY
200
310
SERVING MSC IS THE ANCHOR
PSTN/TDM
SS7
HOME LOCATION REGISTER
IS 41/GSM MAP HARD HANDOFF MESSAGING 1502
110
LEGACY MSC
BTS
BSC
100

FIG. 15

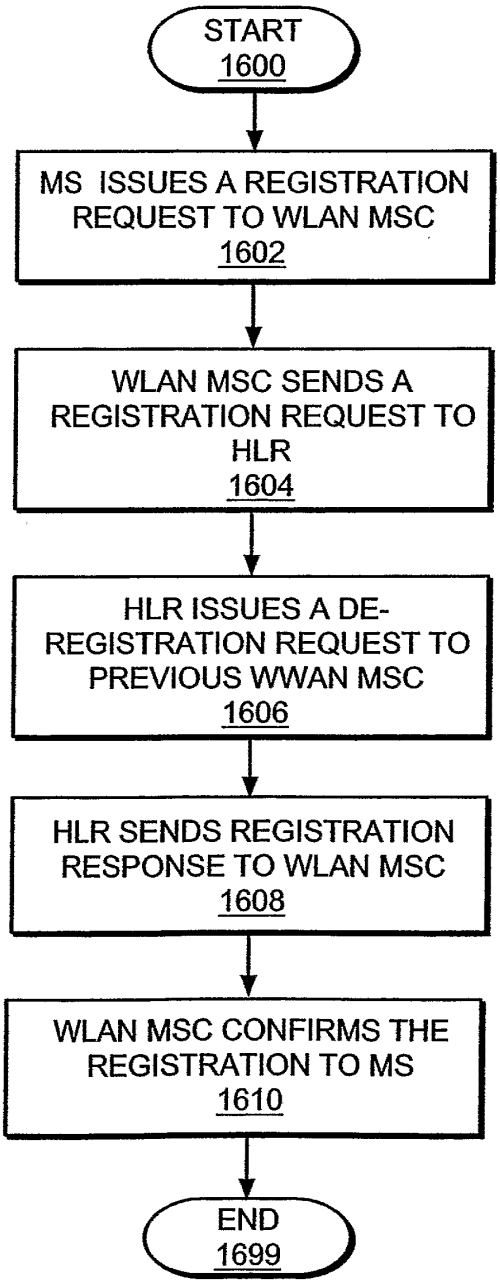

START
1600
MS ISSUES A REGISTRATION REQUEST TO WLAN MSC
1602
WLAN MSC SENDS A REGISTRATION REQUEST TO HLR
1604
HLR ISSUES A DE-REGISTRATION REQUEST TO PREVIOUS WWAN MSC
1606
HLR SENDS REGISTRATION RESPONSE TO WLAN MSC
1608
WLAN MSC CONFIRMS THE REGISTRATION TO MS
1610
END
1699

FIG. 16

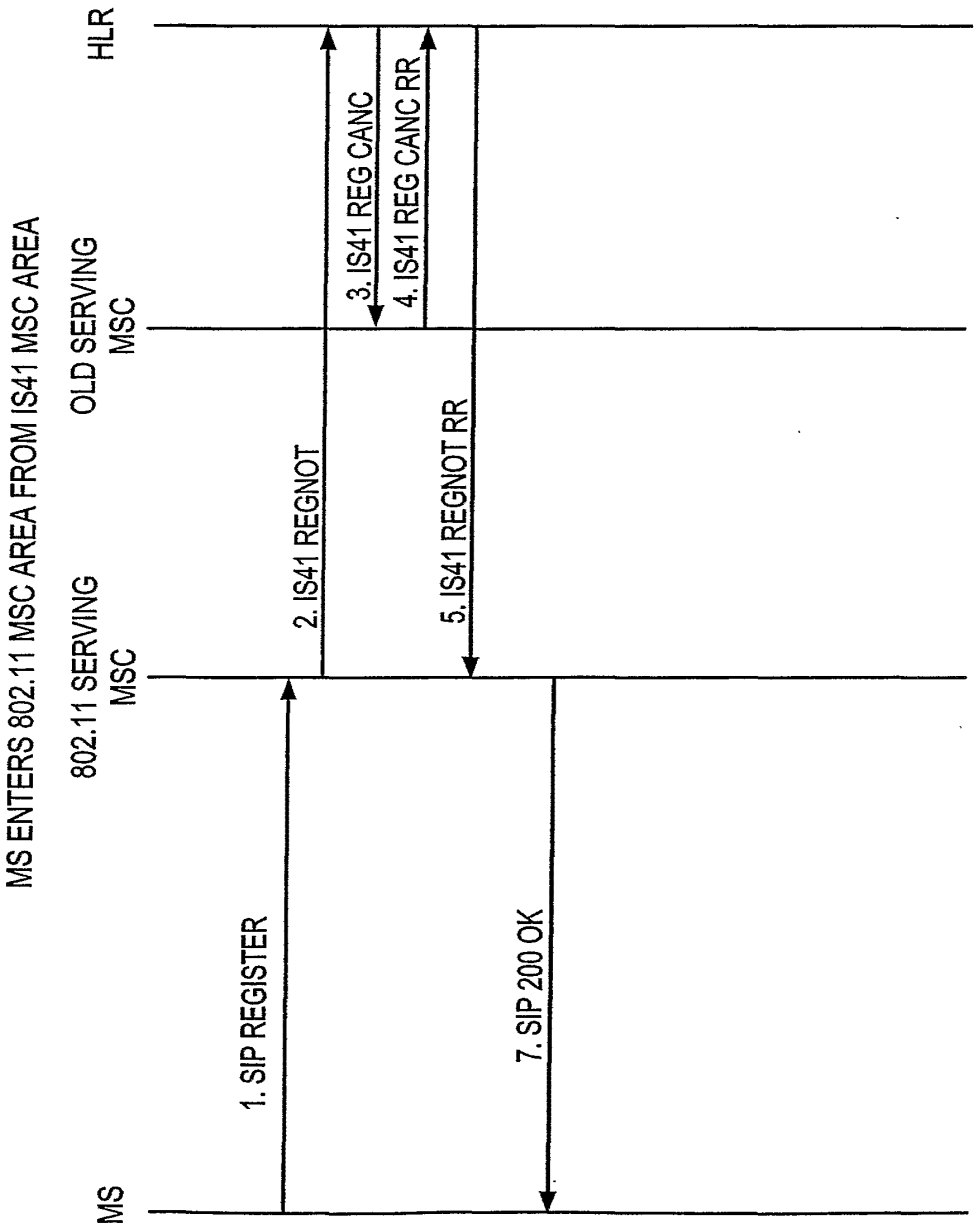

MS ENTERS 802.11 MSC AREA FROM IS41 MSC AREA
MS
802.11 SERVING MSC
OLD SERVING MSC
HLR
1. SIP REGISTER
2. IS41 REGNOT
3. IS41 REG CANC
4. IS41 REG CANC RR
5. IS41 REGNOT RR
7. SIP 200 OK

FIG. 17

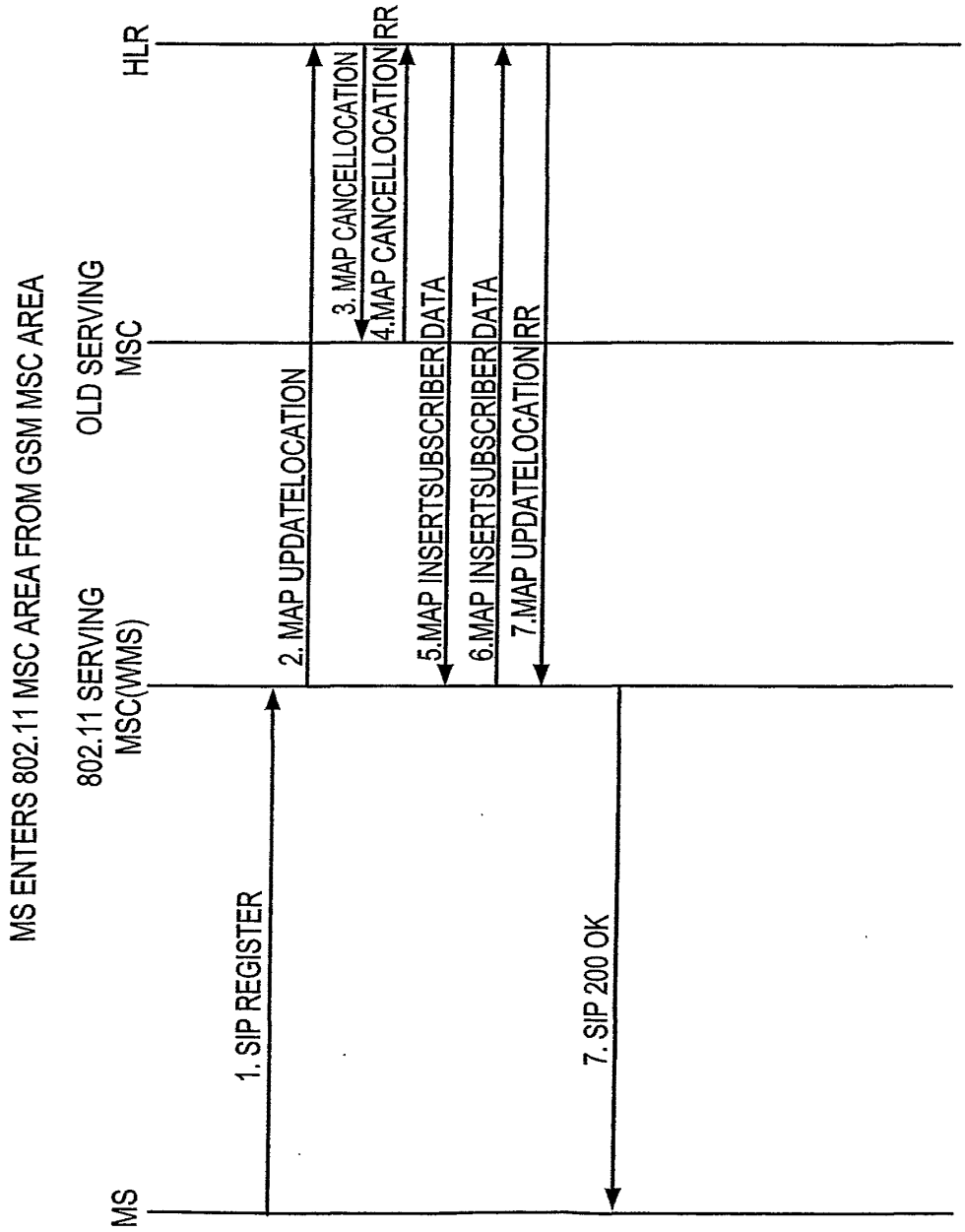

MS ENTERS 802.11 MSC AREA FROM GSM MSC AREA
802.11 SERVING MSC(WMS)
OLD SERVING MSC
HLR
MS
1. SIP REGISTER
2. MAP UPDATELOCATION
3. MAP CANCELLOCATION
4.MAP CANCELLOCATION RR
5.MAP INSERTSUBSCRIBER DATA
6.MAP INSERTSUBSCRIBER DATA
7.MAP UPDATELOCATION RR
7. SIP 200 OK

FIG. 18

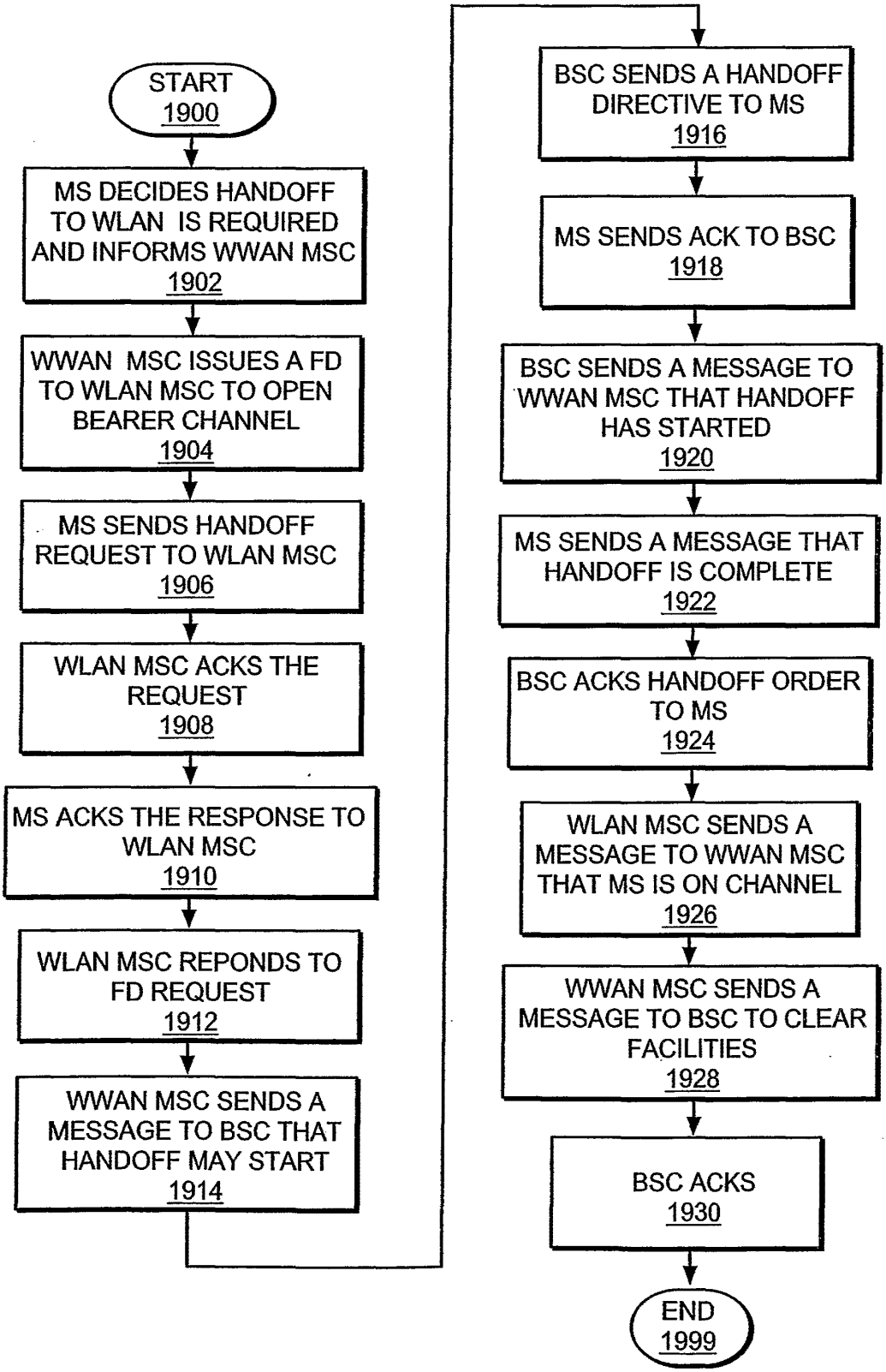

START
1900
MS DECIDES HANDOFF TO WLAN IS REQUIRED AND INFORMS WWAN MSC
1902
WWAN MSC ISSUES A FD TO WLAN MSC TO OPEN BEARER CHANNEL
1904
MS SENDS HANDOFF REQUEST TO WLAN MSC
1906
WLAN MSC ACKS THE REQUEST
1908
MS ACKS THE RESPONSE TO WLAN MSC
1910
WLAN MSC REPONDS TO FD REQUEST
1912
WWAN MSC SENDS A MESSAGE TO BSC THAT HANDOFF MAY START
1914
BSC SENDS A HANDOFF DIRECTIVE TO MS
1916
MS SENDS ACK TO BSC
1918
BSC SENDS A MESSAGE TO WWAN MSC THAT HANDOFF HAS STARTED
1920
MS SENDS A MESSAGE THAT HANDOFF IS COMPLETE
1922
BSC ACKS HANDOFF ORDER TO MS
1924
WLAN MSC SENDS A MESSAGE TO WWAN MSC THAT MS IS ON CHANNEL
1926
WWAN MSC SENDS A MESSAGE TO BSC TO CLEAR FACILITIES
1928
BSC ACKS
1930
END
1999

FIG. 19

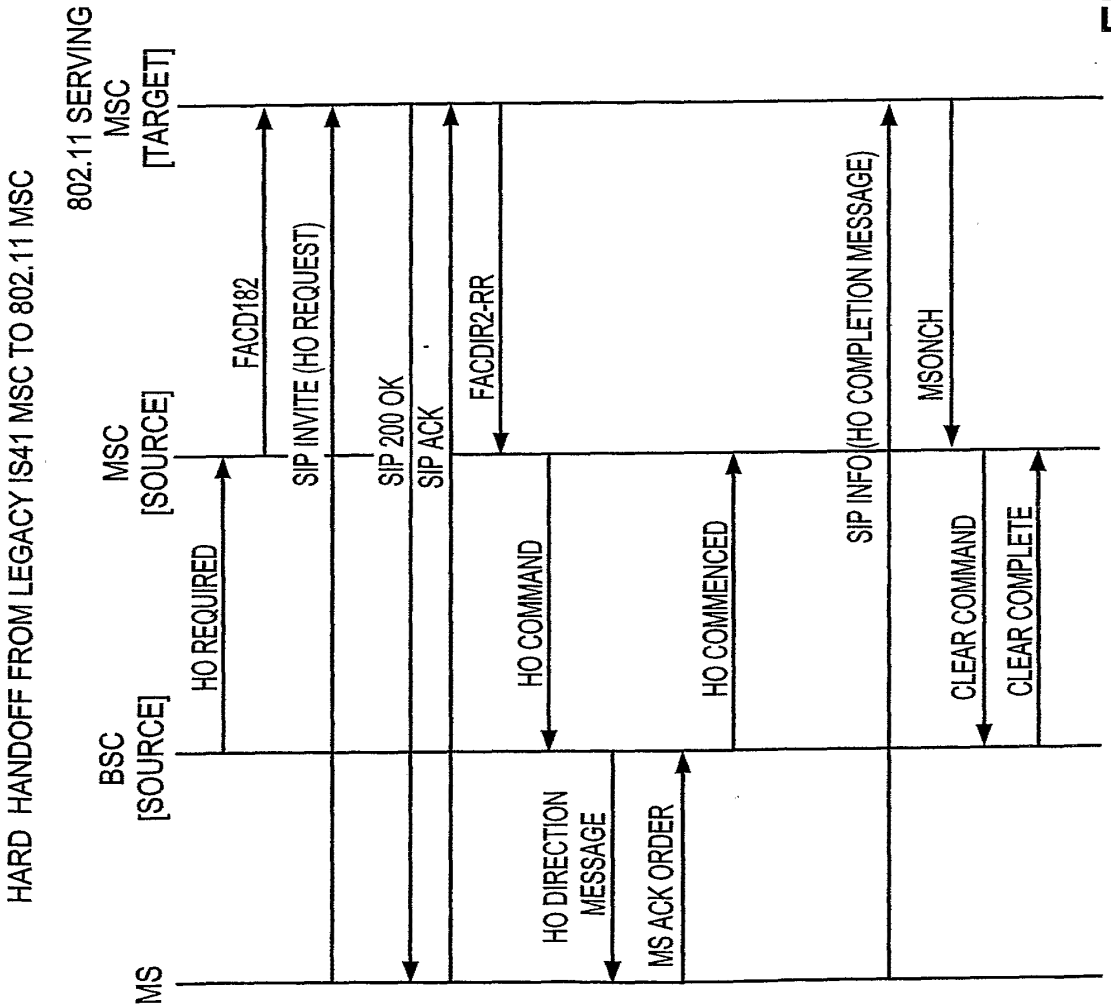

HARD HANDOFF FROM LEGACY IS41 MSC TO 802.11 MSC
MS
BSC [SOURCE]
MSC [SOURCE]
802.11 SERVING MSC [TARGET]
HO REQUIRED
FACD182
SIP INVITE (HO REQUEST)
SIP 200 OK
SIP ACK
FACDIR2-RR
HO COMMAND
HO DIRECTION MESSAGE
MS ACK ORDER
HO COMMENCED
SIP INFO(HO COMPLETION MESSAGE)
MSONCH
CLEAR COMMAND
CLEAR COMPLETE

FIG. 20

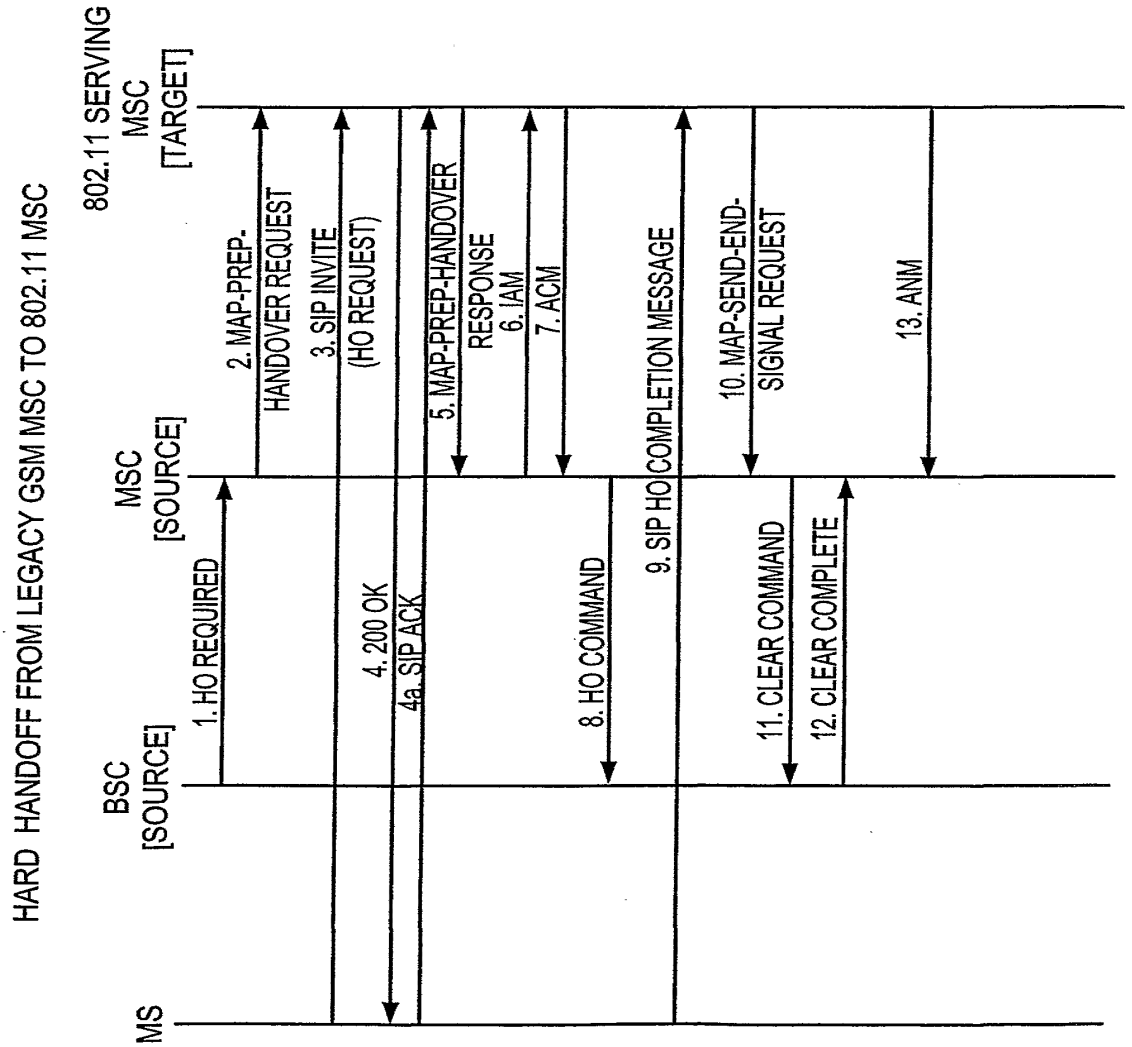

HARD HANDOFF FROM LEGACY GSM MSC TO 802.11 MSC
BSC [SOURCE]
MSC [SOURCE]
802.11 SERVING MSC [TARGET]
MS
1. HO REQUIRED
2. MAP-PREP-HANDOVER REQUEST
3. SIP INVITE (HO REQUEST)
4. 200 OK
4a. SIP ACK
5. MAP-PREP-HANDOVER RESPONSE
6. IAM
7. ACM
8. HO COMMAND
9. SIP HO COMPLETION MESSAGE
10. MAP-SEND-END-SIGNAL REQUEST
11. CLEAR COMMAND
12. CLEAR COMPLETE
13. ANM

FIG. 21

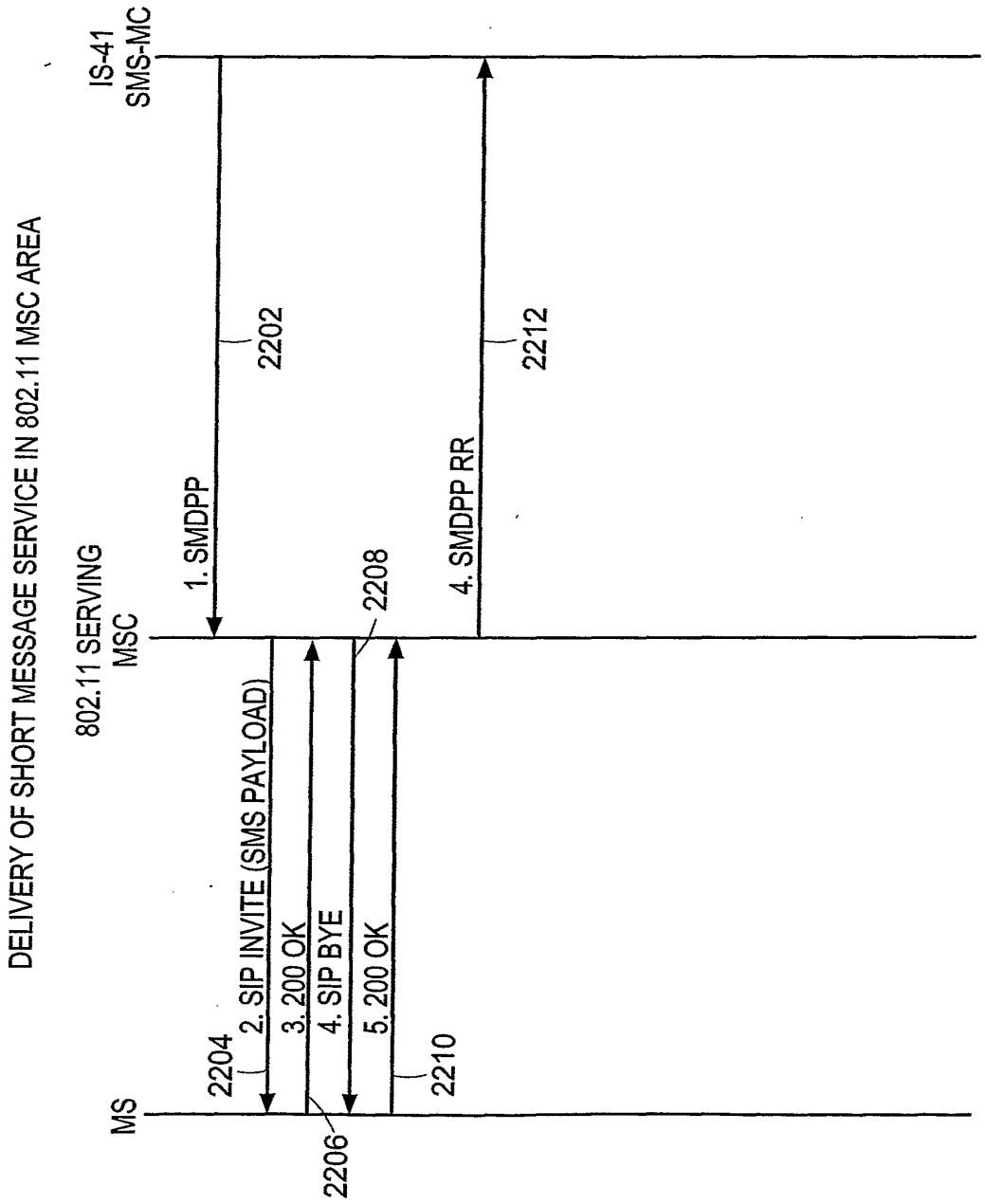

DELIVERY OF SHORT MESSAGE SERVICE IN 802.11 MSC AREA
IS-41 SMS-MC
802.11 SERVING MSC
MS
1. SMDPP
2202
4. SMDPP RR
2212
2208
2. SIP INVITE (SMS PAYLOAD)
3. 200 OK
4. SIP BYE
5. 200 OK
2204
2206
2210

FIG. 22

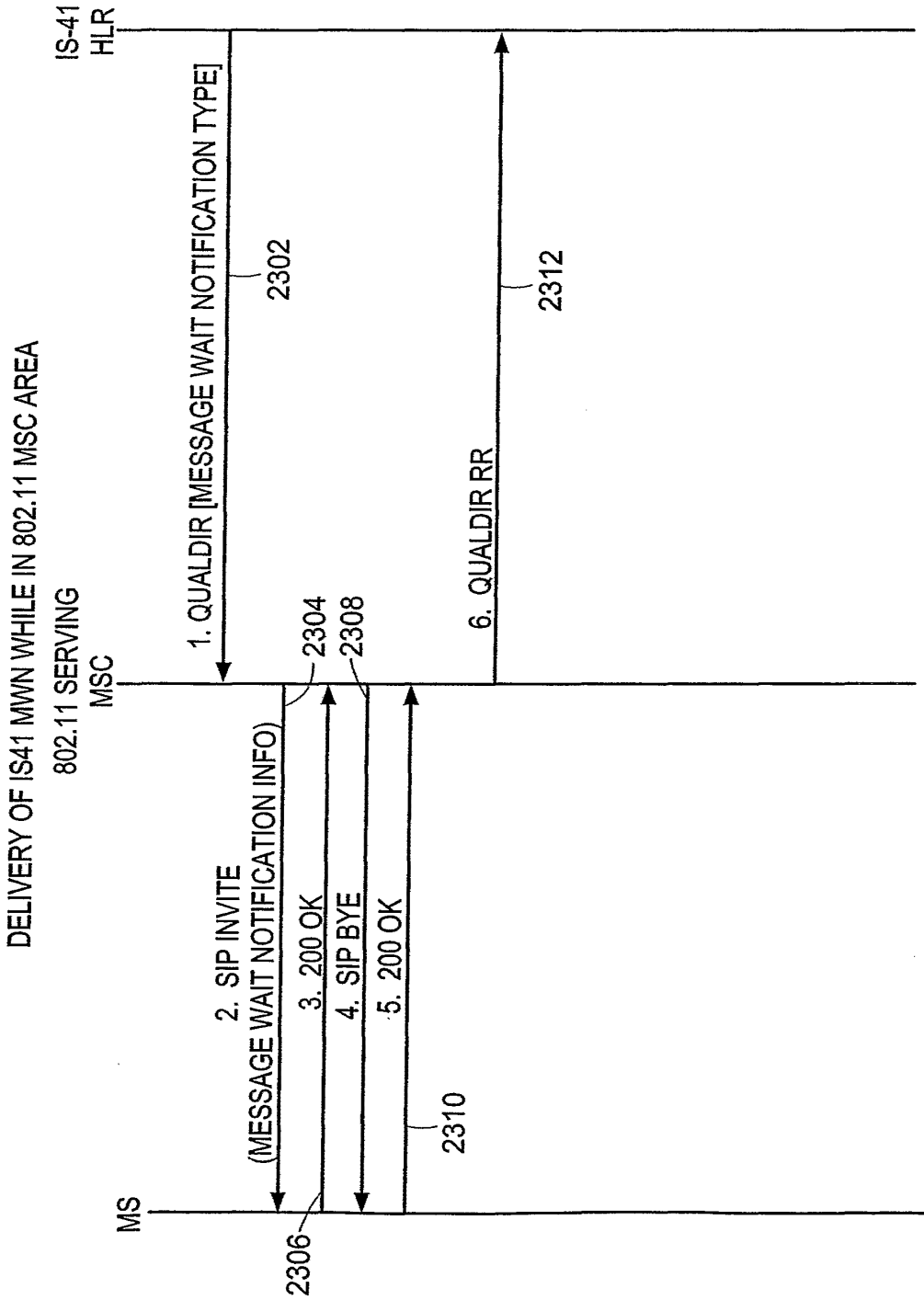

DELIVERY OF IS41 MWN WHILE IN 802.11 MSC AREA
IS-41 HLR
802.11 SERVING MSC
MS
1. QUALDIR [MESSAGE WAIT NOTIFICATION TYPE]
2. SIP INVITE (MESSAGE WAIT NOTIFICATION INFO)
3. 200 OK
4. SIP BYE
5. 200 OK
6. QUALDIR RR
2302
2304
2306
2308
2310
2312

FIG. 23

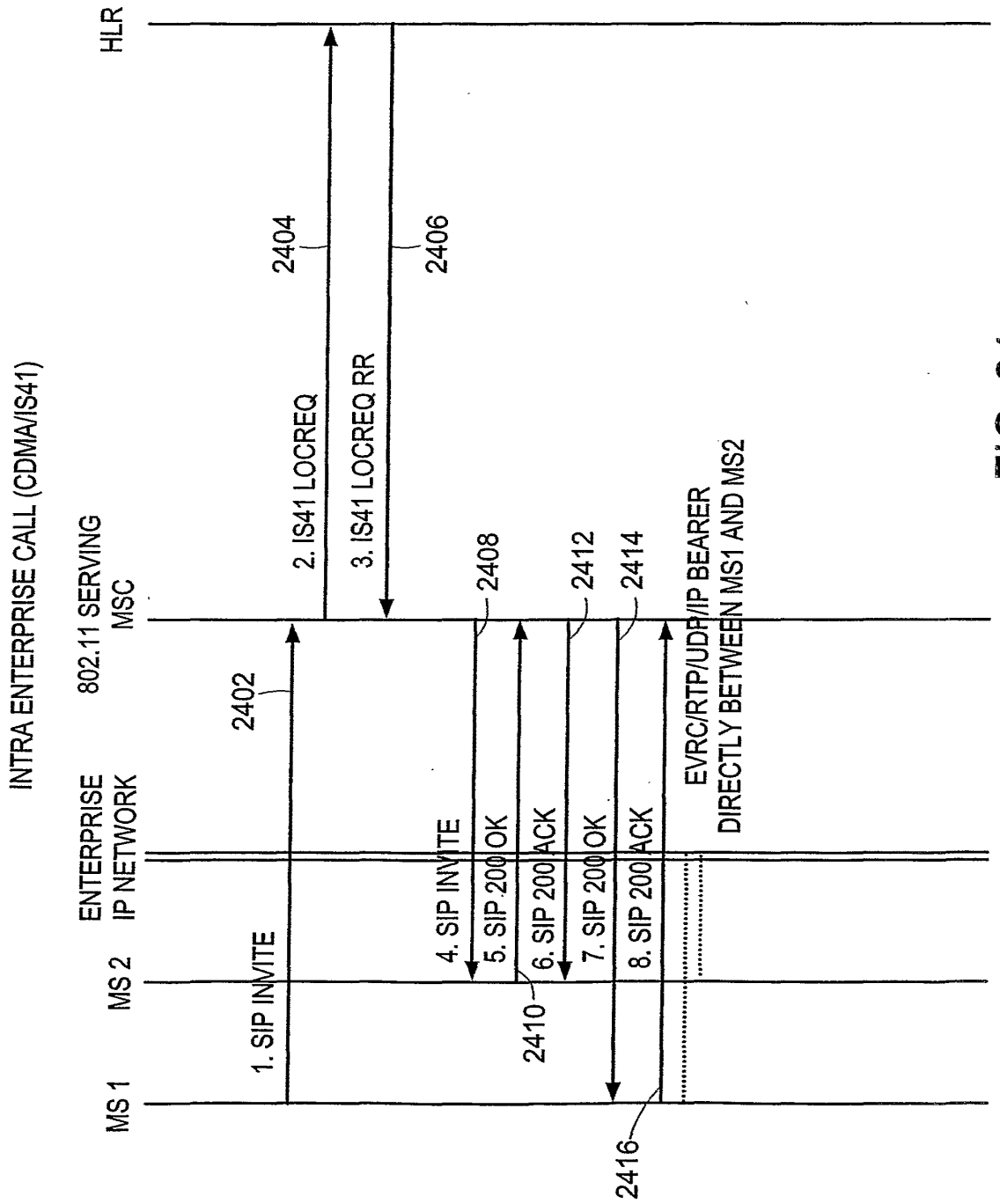

INTRA ENTERPRISE CALL (CDMA/IS41)
MS 1
MS 2
ENTERPRISE IP NETWORK
802.11 SERVING MSC
HLR
1. SIP INVITE
2. IS41 LOCREQ
3. IS41 LOCREQ RR
4. SIP INVITE
5. SIP 200 OK
6. SIP 200 ACK
7. SIP 200 OK
8. SIP 200 ACK
EVRC/RTP/UDP/IP BEARER DIRECTLY BETWEEN MS1 AND MS2
2402
2404
2406
2408
2410
2412
2414
2416

FIG. 24

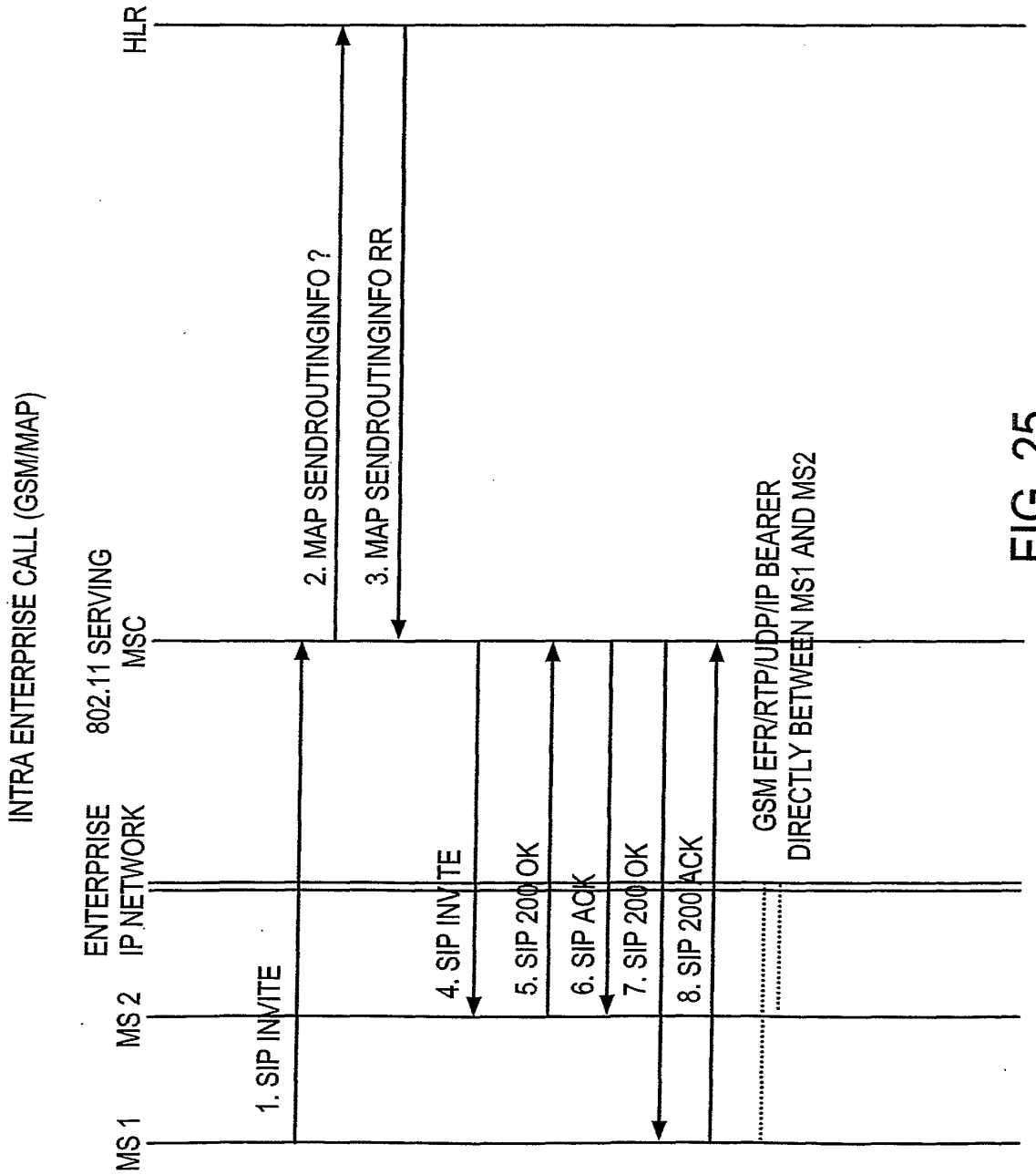

INTRA ENTERPRISE CALL (GSM/MAP)
MS 1
MS 2
ENTERPRISE IP NETWORK
802.11 SERVING MSC
HLR
1. SIP INVITE
2. MAP SENDROUTINGINFO ?
3. MAP SENDROUTINGINFO RR
4. SIP INVITE
5. SIP 200 OK
6. SIP ACK
7. SIP 200 OK
8. SIP 200 ACK
GSM EFR/RTP/UDP/IP BEARER DIRECTLY BETWEEN MS1 AND MS2

FIG. 25

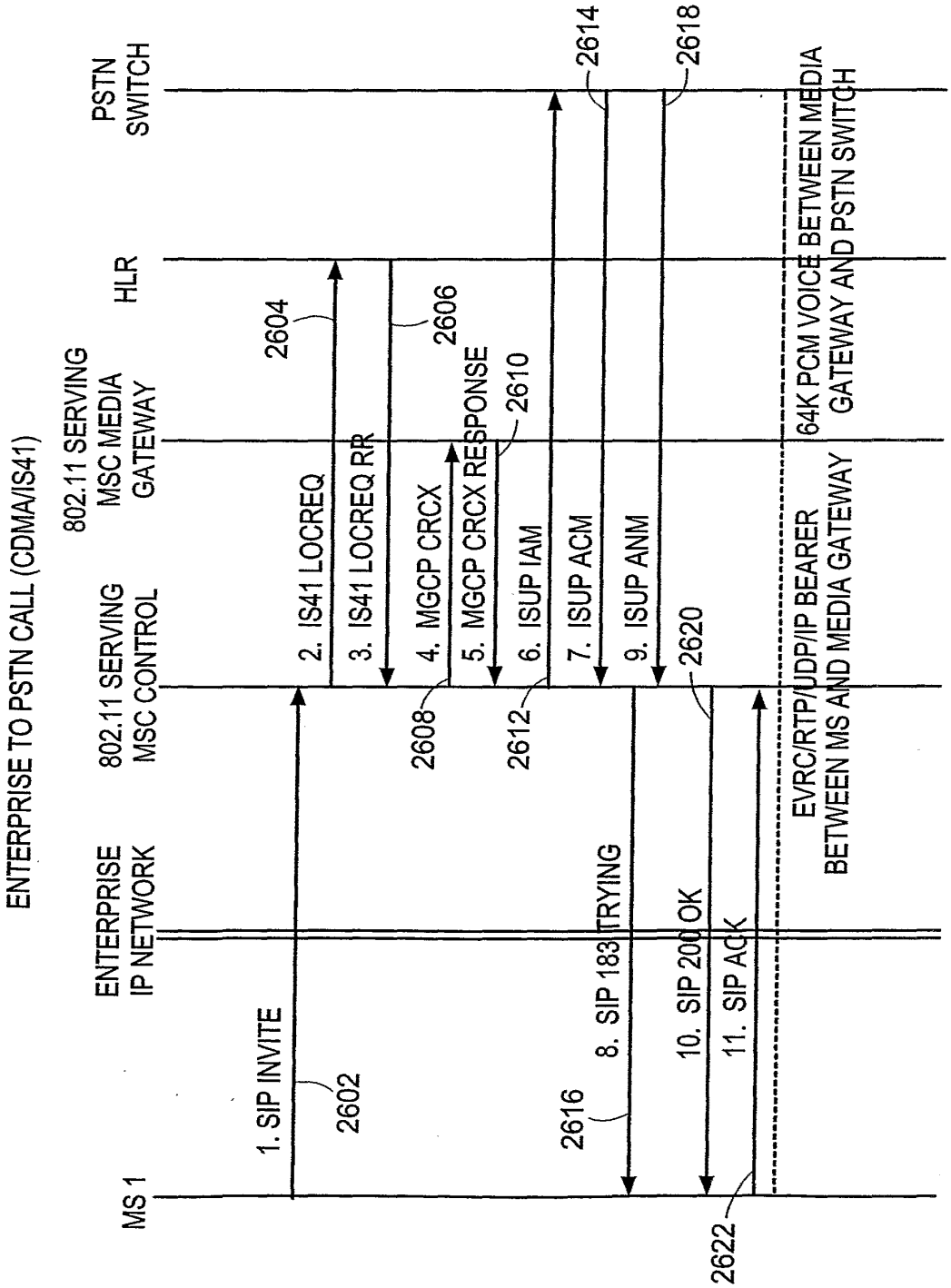

ENTERPRISE TO PSTN CALL (CDMA/IS41)
MS 1
ENTERPRISE IP NETWORK
802.11 SERVING MSC CONTROL
802.11 SERVING MSC MEDIA GATEWAY
HLR
PSTN SWITCH
1. SIP INVITE
2602
2. IS41 LOCREQ
3. IS41 LOCREQ RR
2604
2606
4. MGCP CRCX
5. MGCP CRCX RESPONSE
2608
2610
2612
6. ISUP IAM
7. ISUP ACM
9. ISUP ANM
2614
2618
2620
8. SIP 183 TRYING
2616
10. SIP 200 OK
11. SIP ACK
2622
EVRC/RTP/UDP/IP BEARER BETWEEN MS AND MEDIA GATEWAY
64K PCM VOICE BETWEEN MEDIA GATEWAY AND PSTN SWITCH

FIG. 26

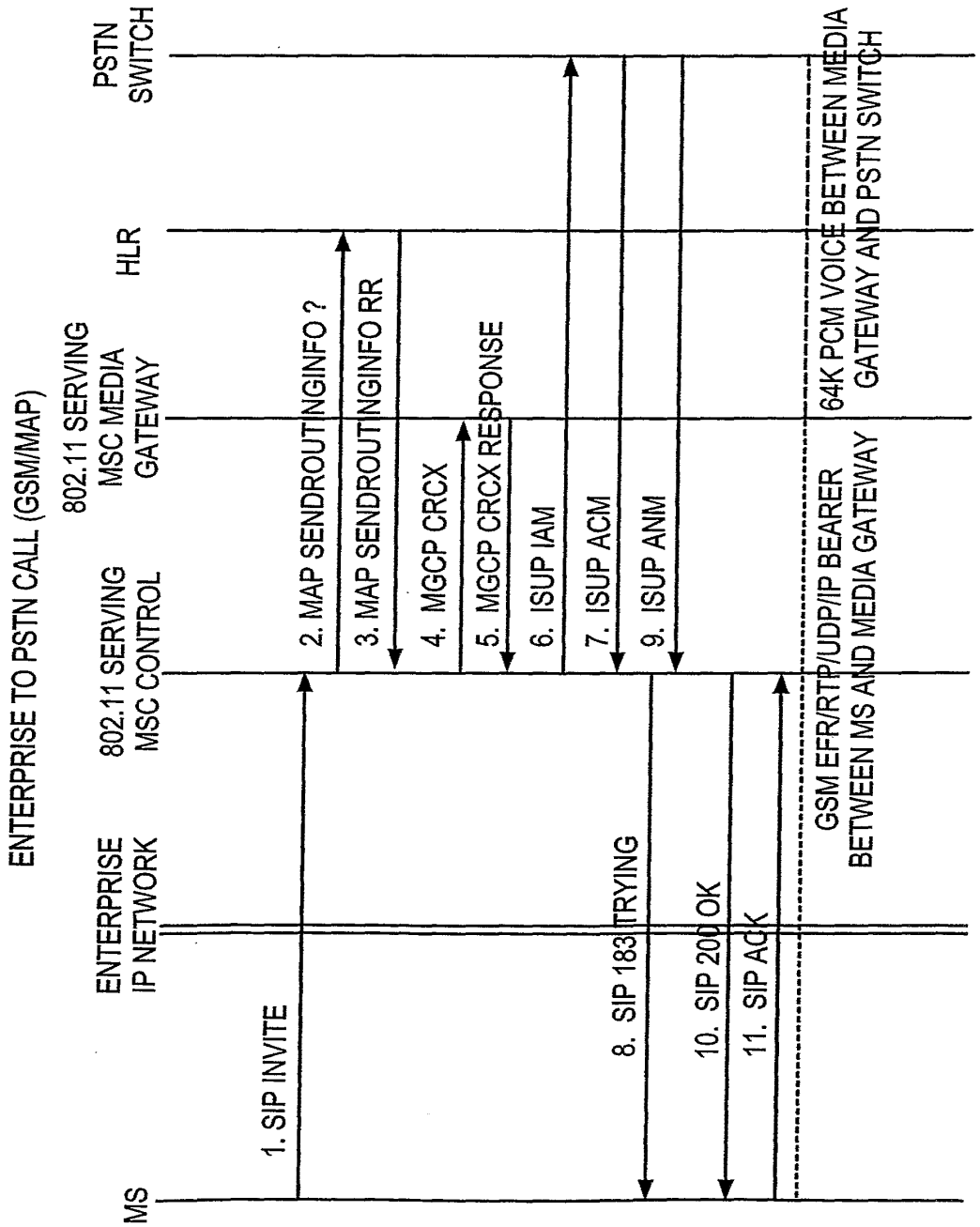

ENTERPRISE TO PSTN CALL (GSM/MAP)
MS
ENTERPRISE IP NETWORK
802.11 SERVING MSC CONTROL
802.11 SERVING MSC MEDIA GATEWAY
HLR
PSTN SWITCH
1. SIP INVITE
2. MAP SENDROUTINGINFO ?
3. MAP SENDROUTINGINFO RR
4. MGCP CRCX
5. MGCP CRCX RESPONSE
6. ISUP IAM
7. ISUP ACM
8. SIP 183 TRYING
9. ISUP ANM
10. SIP 200 OK
11. SIP ACK
GSM EFR/RTP/UDP/IP BEARER BETWEEN MS AND MEDIA GATEWAY
64K PCM VOICE BETWEEN MEDIA GATEWAY AND PSTN SWITCH

FIG. 27

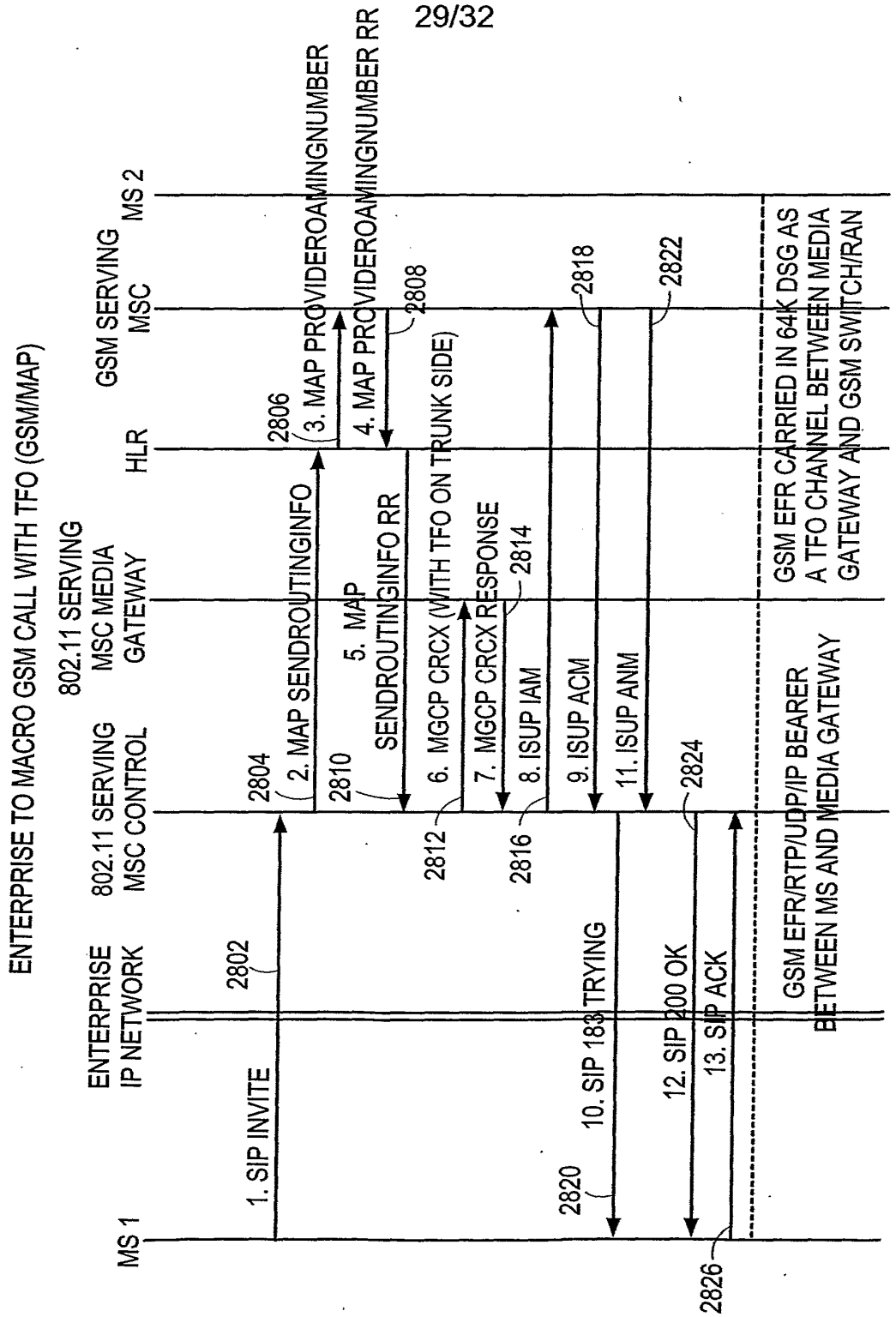

ENTERPRISE TO MACRO GSM CALL WITH TFO (GSM/MAP)
ENTERPRISE IP NETWORK
802.11 SERVING MSC CONTROL
802.11 SERVING MSC MEDIA GATEWAY
HLR
GSM SERVING MSC
MS 2
MS 1
1. SIP INVITE
2802
2804
2. MAP SENDROUTINGINFO
2806
3. MAP PROVIDEROAMINGNUMBER
4. MAP PROVIDEROAMINGNUMBER RR
2808
2810
5. MAP SENDROUTINGINFO RR
2812
6. MGCP CRCX (WITH TFO ON TRUNK SIDE)
2814
7. MGCP CRCX RESPONSE
2816
8. ISUP IAM
2818
9. ISUP ACM
2820
10. SIP 183 TRYING
2822
11. ISUP ANM
2824
12. SIP 200 OK
2826
13. SIP ACK
GSM EFR/RTP/UDP/IP BEARER BETWEEN MS AND MEDIA GATEWAY
GSM EFR CARRIED IN 64K DSG AS A TFO CHANNEL BETWEEN MEDIA GATEWAY AND GSM SWITCH/RAN

FIG. 28

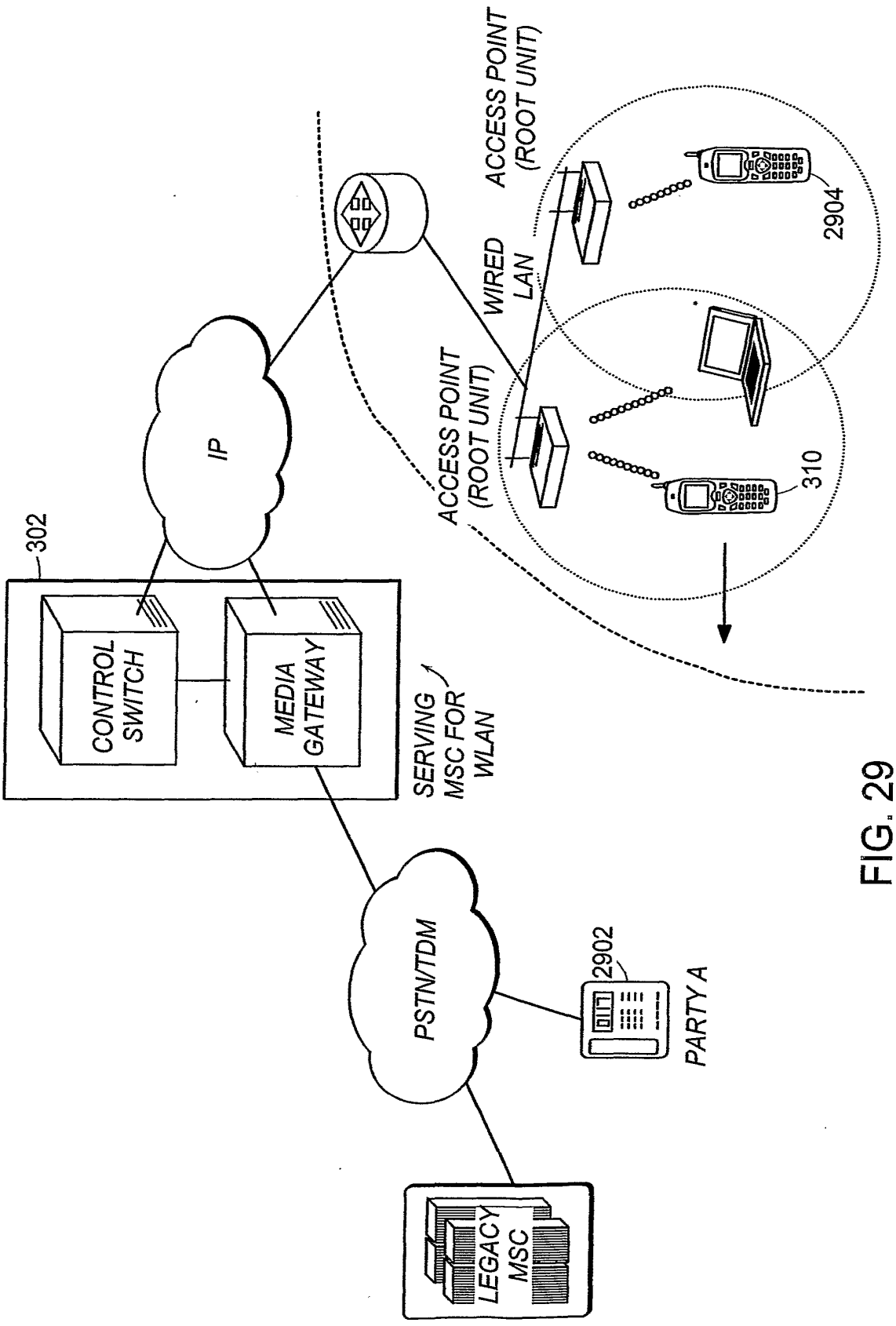

ACCESS POINT (ROOT UNIT)
WIRED LAN
ACCESS POINT (ROOT UNIT)
2904
310
IP
302
CONTROL SWITCH
MEDIA GATEWAY
SERVING MSC FOR WLAN
PSTN/TDM
2902
PARTY A
LEGACY MSC

FIG. 29

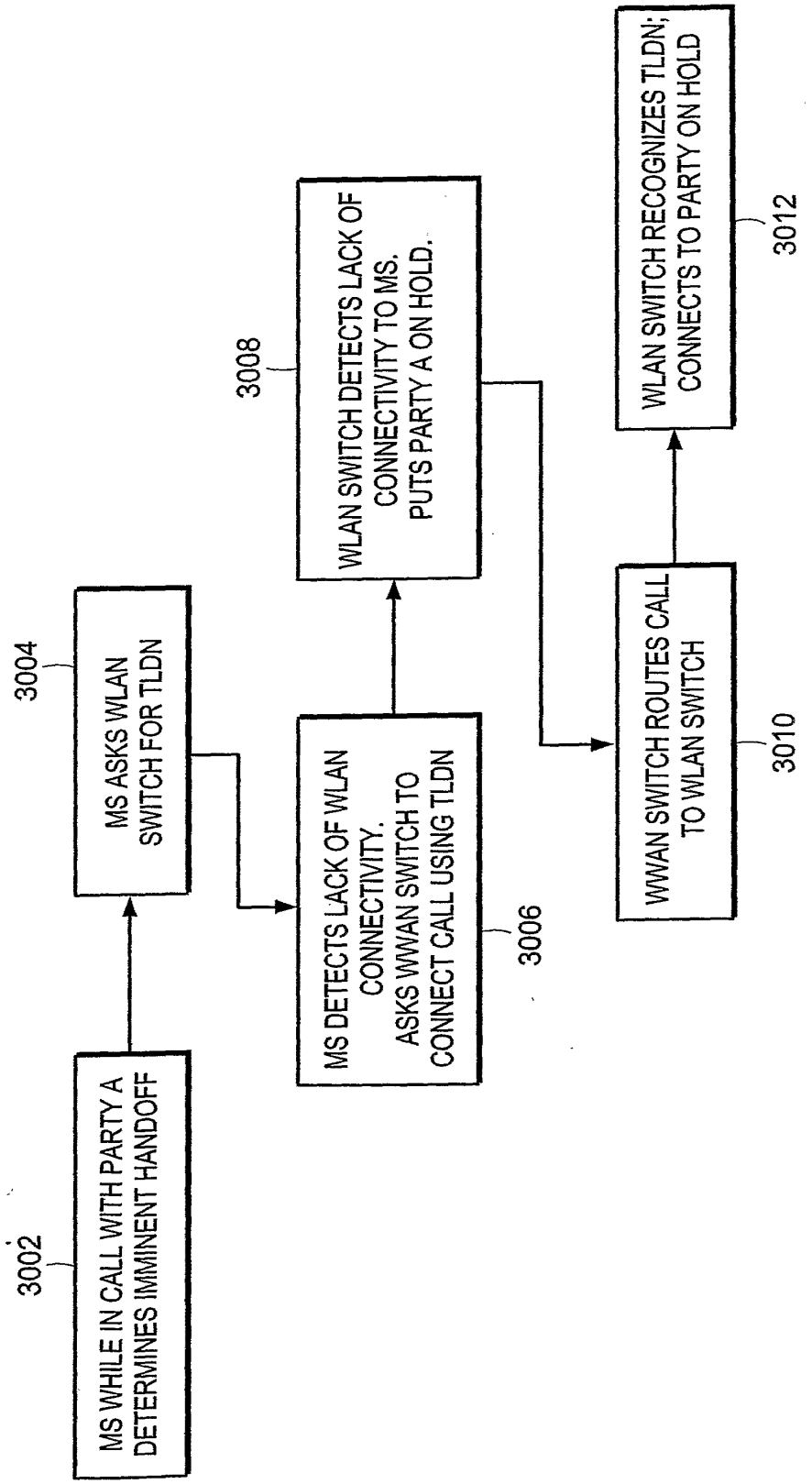

MS WHILE IN CALL WITH PARTY A DETERMINES IMMINENT HANDOFF
3002
MS ASKS WLAN SWITCH FOR TLDN
3004
MS DETECTS LACK OF WLAN CONNECTIVITY. ASKS WWAN SWITCH TO CONNECT CALL USING TLDN
3006
WLAN SWITCH DETECTS LACK OF CONNECTIVITY TO MS. PUTS PARTY A ON HOLD.
3008
WWAN SWITCH ROUTES CALL TO WLAN SWITCH
3010
WLAN SWITCH RECOGNIZES TLDN; CONNECTS TO PARTY ON HOLD
3012

FIG. 30

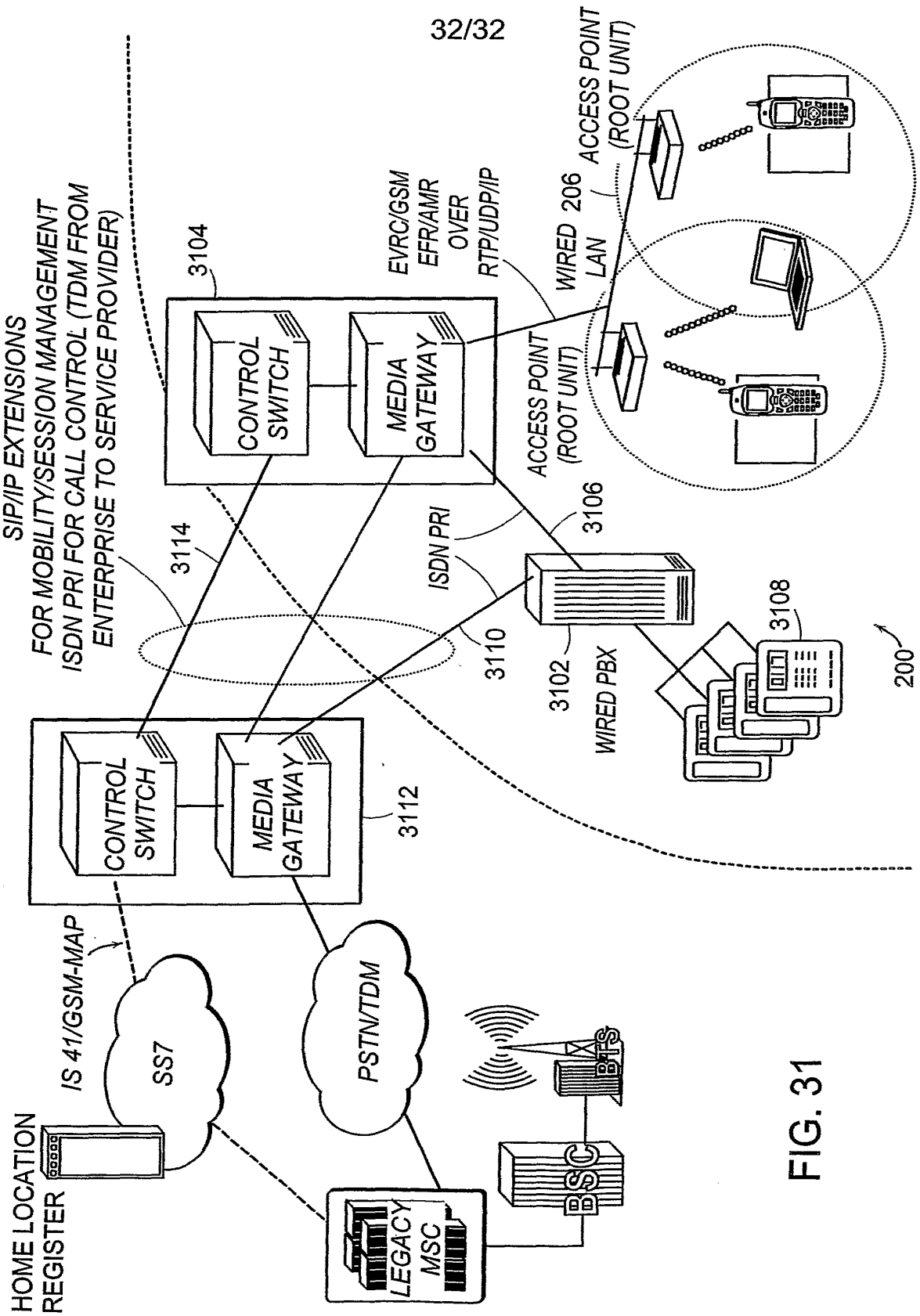

SIP/IP EXTENSIONS
FOR MOBILITY/SESSION MANAGEMENT
ISDN PRI FOR CALL CONTROL (TDM FROM
ENTERPRISE TO SERVICE PROVIDER)
3104
CONTROL SWITCH
MEDIA GATEWAY
EVRC/GSM
EFR/AMR
OVER
RTP/UDP/IP
WIRED LAN
206
ACCESS POINT
(ROOT UNIT)
ACCESS POINT
(ROOT UNIT)
3114
ISDN PRI
3106
3110
3102
WIRED PBX
3108
200
3112
CONTROL SWITCH
MEDIA GATEWAY
IS 41/GSM-MAP
SS7
PSTN/TDM
HOME LOCATION
REGISTER
LEGACY MSC
BSC
BTS

FIG. 31

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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10/052,080	17 January 2002 (17.01.2002)	US
10/052,081	17 January 2002 (17.01.2002)	US

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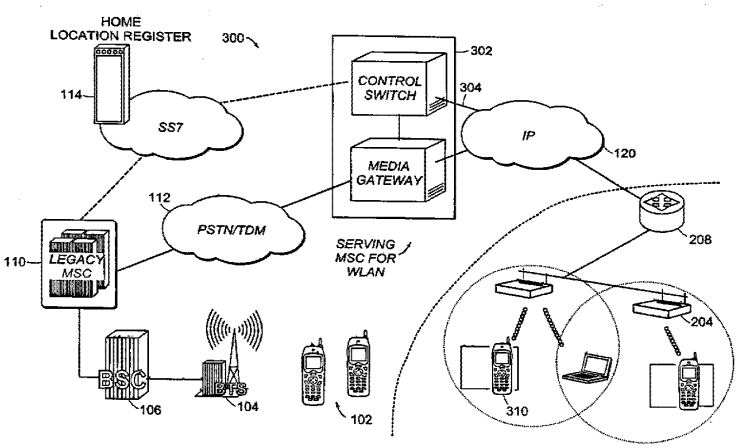
(74) Agent: DICHIARA, Peter, M.; Hale and Dorr LLP, 60 State Street, Boston, MA 02109 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

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[Continued on next page]

(54) Title: METHOD, SYSTEM AND APPARATUS FOR PROVIDING WWAN SERVICES TO A MOBILE STATION SERVICED BY A WLAN



(57) Abstract: A method, system and apparatus for internetworking a WWAN and a WLAN are disclosed. More specifically, a method, system and appparatus for providing WWAN services to a mobile station serviced by a WLAN are disclosed. An MSC (302) is provisioned to serve a WLAN. The MSC (302) that serves the WLAN receives WWAN messages that provide a WWAN service. The MSC (302) forms SIP messages using the received WWAN messages and delivers the SIP messages to the WLAN via an IP link (304). The WLAN delivers the SIP messages to the mobile station via a WLAN air interface protocol. Under one embodiment, the WWAN service is a Short Message Service (SMS). Under another embodiment, the WWAN service is a Message Wait Notification (MWN). Under another embodiment, an MSC (302) that services the WLAN and an MSC (302) servicing the WWAN cooperate to provide TFO call services between an mobile station operating in the WLAN and a mobile station operating in the WWAN.

WO 2003/061177 A3

Published:
— *with international search report*

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25 March 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/00086

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : H04Q 7/24
US CL : 370/331, 337, 338
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)
U.S. : 370/331, 337, 338

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

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.
Y	US 6,243,581 B1 (JAWANDA) 05 June 2001 (05. 06. 2001), column 1, lines 25-27, column 2, lines 38-80	1, 2, 3, 19, 20
Y, P	US 6,377,608 B1 (ZYREN) 23 April 2002 (23. 04. 2002), column 1, lines 45-46, column 2, lines 28-40	1, 2, 3, 19, 20
A , P	US 6,486,832 B1 (ABRAMOV et al) 26 November 2002 (26.11.2002), see entire reference.	4- 18, 21-46
A , E	US 6,549,768 B1 (FRACCAROLI) 15 April 2003 (15. 04. 2003), see entire reference.	4-18, 21-46
A , E	US 6,525,648 B1 (KUBLER et al) 25 February 2003 (25. 02. 2003), see entire reference	4-18, 21-46

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search
24 May 2003 (24.05.2003)

Date of mailing of the international search report
01 JUL 2003

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Electronic Acknowledgement Receipt

EFS ID:	26499386
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	29-JUL-2016
Filing Date:	09-OCT-2014
Time Stamp:	17:04:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_7_29_2016.pdf	612391 ce3f0a367defc7c22255eafc01c89b575bee3879	no	4

Warnings:

Information:					
2	Foreign Reference	WO2003061177A2.pdf	2842250 c3c3f681715f87ed49f6c9b95dbefff576d56f11	no	71
Warnings:					
Information:					
3	Foreign Reference	WO2003061177A3.pdf	138554 95173c2fcbbc95e9910e21aa43d0335d70bcbda4	no	3
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

28960 7590 05/09/2017

HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
05/09/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 14/510,766	Applicant(s) GANESAN, VASUDEVAN	
	Examiner HICHAM FOUD	Art Unit 2467	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/09/2014*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-18 and 38-94* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☐ Claim(s) _____ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☒ Claim(s) *1-18 and 38-94* are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

1. The 1st group of claims, drawn to soft handover based on signal strength, classified in class H04W36/18.
2. The 2nd group of claims, drawn to roaming by the use of a nomadic server, classified in class H04W8/02.
3. The 3rd group of claims, drawn to providing communications between mobile stations through the network (base stations and controllers) that connects the stations, classified in class H04L12/66.

The inventions are distinct, each from the other because of the following reasons:

Inventions 1-3 are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)).

The subcombination has separate utility such as:

1. For the first group of claims, enabling a soft handover,

2. For the second group of claims, enabling roaming,

3. For the third group of claims, enabling the routing of communications between stations,

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because at least the following reason(s) apply: there is an examination and search burden for these patentably distinct inventions due to their mutually exclusive characteristics. The inventions require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search queries); and/or the prior art applicable to one invention would not likely be applicable to another invention.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention(s).

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

A telephone call was made to Mr. Owens on May 5th, 2017 to request an oral election to the above restriction requirement, but did not result in an election being made.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HICHAM FOUD whose telephone number is (571)270-1463. The examiner can normally be reached on Monday - Friday 10-6 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HICHAM FOUD/
Primary Examiner, Art Unit 2467

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2467
Vasudevan Ganesan	Examiner: Foud, Hicham B.
Serial No.: 14/510,766	
Filed: October 9, 2014	**RESPONSE TO ELECTION/ RESTRICTION REQUIREMENT DATED May 9, 2017**
For: **MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER**	162 North Wolfe Road Sunnyvale, California 94086 (408) 530-9700
	Customer No.: 28960

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

Please amend the above-titled application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins of page 2 of this paper.

Remarks begin on page 8 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (previously presented) A method of providing communications for a mobile communication device that roams between multiple wireless networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a first wireless communication link between the mobile communication device and a first wireless network;

monitoring a signal strength of the first wireless communication link;

when the signal strength drops below a threshold, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link;

notifying the mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second wireless communication link between the mobile communication device and a second wireless network.

2. (previously presented) The method of claim 1 wherein the first wireless communication link comprises a WiFi communication link, and the first wireless network comprises a WiFi network access point.

3. (previously presented) The method of claim 2 wherein the second wireless network comprises a wireless cellular network.

4. (original) The method of claim 1 wherein establishing the first communication link includes routing through a VOIP network.

5 (original) The method of claim 1 wherein establishing the first communication link includes routing through a cellular network.

6. (original) The method of claim 1 wherein establishing the second communication link includes routing through a VOIP network.

7. (original) The method of claim 1 wherein establishing the second communication link includes routing through a cellular network.

8. (previously presented) The method of claim 1 further comprising providing a connectivity status by the mobile communication device to the interface server while the mobile communication device is within a first coverage area of the first wireless network.

9. (previously presented) The method of claim 8 further comprising providing a routing association to a mobile switching center within the second wireless network, wherein the routing association associates the mobile communication device to the interface server.

10. (previously presented) The method of claim 9 further comprising routing a termination communication intended for the mobile communication device from the mobile switching center to the interface server according to the routing association when the connectivity status is active, and routing the termination communication from the interface server to the mobile communication device over the first wireless network.

11. (original) The method of claim 10 further comprising when the connectivity status is not provided to the interface server, the router association is removed from the mobile switching center.

12. (previously presented) The method of claim 1 further comprising registering the mobile communication device with a mobile switching center within the second wireless network when the signal strength drops below the threshold.

13. (original) The method of claim 12 further comprising setting up the second communication link with the end destination device and forwarding the second communication link to the interface server.

Claims 14-38 (canceled)

39. (previously presented) The method of claim 1, wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

40. (previously presented) The method of claim 1 wherein the communications comprise a secured telephone call.

41. (previously presented) The method of claim 1 wherein the communications comprise an unsecured telephone call.

42. (previously presented) The method of claim 1 wherein the communications comprise a secured transmission of broadband content.

43. (previously presented) The method of claim 42 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

44. (previously presented) The method of claim 1 wherein the communications comprise an unsecured transmission of broadband content.

45. (previously presented) The method of claim 44 wherein the broadband content comprises at least one of fixed broadband and mobile broadband.

46. (previously presented) The method of claim 1 wherein the communications comprise a secured data transmission.

47. (previously presented) The method of claim 1 wherein the communications comprise an unsecured data transmission.

48. (previously presented) The method of claim 1 wherein the interface server is coupled to a gateway device.

49. (previously presented) The method of claim 48 wherein the gateway device is bi-directionally coupled to a packet network.

50. (previously presented) The method of claim 49 wherein the packet network comprises packet switched telephone network.

51. (previously presented) The method of claim 48 wherein the gateway device comprises a softswitch.

Claims 52-78 (canceled)

79. (previously presented) A method of providing communications for a mobile communication device that roams between multiple wireless networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a first wireless communication link between the mobile communication device and a first wireless network;

monitoring a first context of a signal of the first wireless communication link;

when a second wireless network is detected as available and a second context of a second communication link corresponding to the second wireless network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link;

notifying the mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second wireless communication link between the mobile communication device and the second wireless network.

80. (previously presented) The method of claim 79 wherein the first context comprises signal strength characteristics.

81. (previously presented) The method of claim 79 wherein the first context comprises first characteristics of the first wireless communication link and the second context comprises second characteristics of the second wireless communication link.

82. (previously presented) The method of claim 79 wherein the interface server is coupled to a gateway device.

83. (previously presented) The method of claim 82 wherein the gateway device is bi-directionally coupled to a packet network.

84. (previously presented) The method of claim 83 wherein the packet network comprises packet switched telephone network.

85. (previously presented) The method of claim 82 wherein the gateway device comprises a softswitch.

86. (previously presented) A method of providing communications for a mobile communication device that roams between multiple wireless networks, the method comprising:

establishing a first communication link between a first mobile communication device and an end destination device, wherein the first communication link comprises a first wireless communication link between the first mobile communication device and a first wireless network;

monitoring a first context of a signal of the first wireless communication link;
when a second wireless network is detected as available and a second context of a second communication link corresponding to the second wireless network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link;
notifying the first mobile communication device to terminate transmission over the first communication link; and
re-directing the second communication link from the interface server to a second mobile communication device, thereby establishing a second wireless communication link between the first mobile communication device and the second wireless network.

87. (previously presented) The method of claim 86 wherein the first context comprises signal strength characteristics.

88. (previously presented) The method of claim 86 wherein the first context comprises first characteristics of the first wireless communication link and the second context comprises second characteristics of the second wireless communication link.

89. (previously presented) The method of claim 86, wherein the first wireless communication link comprises a first WiFi communication link, and the first wireless network comprises a first WiFi network access point.

90. (previously presented) The method of claim 89, wherein the second wireless communication link comprises a second WiFi communication link, and the second wireless network comprises a second WiFi network access point.

Claims 91-94 (canceled)

Remarks

The Applicants respectfully request further examination and consideration of the claims in view of the above amendments. Within the Office Action, the Claims 1-18 and 38-94 have been subject to a restriction requirement. The Applicants elect Group I, including Claims 1-13, 39-51 and 79-90. By the above amendment, Claims 14-18, 38, 52-78 and 91-94 have been canceled. It is noted within the Office Action that the claims of Group I are drawn to soft handover based on signal strength, the claims of Group II are drawn to roaming by the use of a nomadic server and the Claims of Group III are drawn to providing communications between mobile stations through the network (base stations and controllers) that connects the stations. Applicants have canceled Claims 14-18, 38, 52-78 and 91-94 without prejudice.

The Applicants expressly reserve the right to continue prosecution of the canceled Claims 14-18, 38, 52-78 and 91-94 in one or more Divisional Patent Applications claiming priority of the above captioned patent application. Therefore, Claims 1-13, 39-51 and 79-90 are now pending.

Applicants respectfully submit that the claims are in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: July 6, 2017

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg. No.: 37,902
Attorneys for Applicants

Electronic Acknowledgement Receipt

EFS ID:	29706951
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	06-JUL-2017
Filing Date:	09-OCT-2014
Time Stamp:	16:24:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response_7_6_2017.pdf	125163 8fe0911cbd8861064cbb3a7e03ff5baad4320aec	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	7
	Applicant Arguments/Remarks Made in an Amendment	8	8
Warnings:			
Information:			
	Total Files Size (in bytes):	125163	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/510,766	Filing Date 10/09/2014	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 = *		X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 = *		X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	07/06/2017	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 38	Minus	** 75	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***7	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**0**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
ANTJUAN RIVERA

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030058876	A1	2003-03-27	Patrick L. Connor	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

	1		

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2017-09-20
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	30425941
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	20-SEP-2017
Filing Date:	09-OCT-2014
Time Stamp:	17:18:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_9_20_2017.pdf	612180 b5ae21cdf3d5bdab0a44cd07b463a2a93ac0b5c3	no	4

Warnings:

Information:	
Total Files Size (in bytes):	612180

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

28960 7590 10/12/2017

HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
10/12/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 14/510,766	Applicant(s) GANESAN, VASUDEVAN	
	Examiner HICHAM FOUD	Art Unit 2467	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07/06/2017*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-13,39-51 and 79-90* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-13,39-51 and 79-90* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 07-06-2017 has been entered and considered.

Group I was elected without traverse.

Claims 1-13, 39-51 and 79-90 are pending in this application.

Claim Objections

2. Claim**s (79-80)** and **(86-87)** are objected under **37 CFR 1.75** as being a substantial duplicate of claim **1**. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See **MPEP § 706.03(k)**.

Double Patenting

3. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process... may obtain a patent therefor..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the claims that are directed to the same invention so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

4. Claims 1-13 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-13 of prior U.S. Patent No. 8,886,181. This is a statutory double patenting rejection.

5. Claims 79-80 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 1 of prior U.S. Patent No. 8,886,181. This is a statutory double patenting rejection.

6. Claims 86-87 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 1 of prior U.S. Patent No. 8,886,181. This is a statutory double patenting rejection.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of

activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

7. Claims 1-13 and 39-51 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 8,078,164. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is obvious to remove parts or elements of an invention and/or change the format of claim(s) from system/apparatus to method steps or vice-versa.

Claims 1-23 of U.S. Patent No. 8,078,164 contain(s) every element of claim(s) 1-13 and 39-51 of the instant application and thus anticipate the claims of the instant application. Claims of the instant application therefore are not patently distinct from the earlier patent claims and as such are unpatentable over obvious-type double patenting. A later patent/application claim is not patentably distinct from an earlier claim if the later claim is anticipated by the earlier claim. “A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896,225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness type double patenting where a patent

application claim to a genus is anticipated by a 35 patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001). "*Claim 12 and Claim 13 are generic to the species of invention covered by claim 3 of the patent. Thus, the generic invention is* ***"anticipated"*** *by the species of the patented invention. Cf., Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (holding that an earlier species disclosure in the prior art defeats any generic claim) 4 . This court's predecessor has held that, without a terminal disclaimer, the species claims preclude issuance of the generic application. In re Van Ornum, 686 F.2d 937, 944, 214 USPQ 761, 767 (CCPA 1982). Accordingly, absent a terminal disclaimer, claims 12 and 13 were properly rejected under the doctrine of obviousness-type double patenting.*" (In re Goodman (CA FC) 29 USPQ2d 2010 (12/3/1993).

8. Claims 79-90 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-11 of U.S. Patent No. 8,078,164. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is obvious to remove parts or elements of an invention and/or change the format of claim(s) from system/apparatus to method steps or vice-versa.

Claims 1-11 of U.S. Patent No. 8,078,164 contain(s) every element of claim(s) 79-90 of the instant application and thus anticipate the claims of the instant application. Claims of the instant application therefore are not patently distinct from the earlier patent claims and as such are unpatentable over obvious-type double patenting. A later patent/application claim is not patentably distinct from an earlier claim if the later claim

is anticipated by the earlier claim. "A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896,225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness type double patenting where a patent application claim to a genus is anticipated by a 35 patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001). "*Claim 12 and Claim 13 are generic to the species of invention covered by claim 3 of the patent. Thus, the generic invention is* ***"anticipated"*** *by the species of the patented invention. Cf., Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (holding that an earlier species disclosure in the prior art defeats any generic claim) 4 . This court's predecessor has held that, without a terminal disclaimer, the species claims preclude issuance of the generic application. In re Van Ornum, 686 F.2d 937, 944, 214 USPQ 761, 767 (CCPA 1982). Accordingly, absent a terminal disclaimer, claims 12 and 13 were properly rejected under the doctrine of obviousness-type double patenting.*" (In re Goodman (CA FC) 29 USPQ2d 2010 (12/3/1993).

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 86-90 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 86 recites "re-directing the second communication link from the interface server *to a second mobile communication device*" which is vague and indefinite because the redirection should be back to the first mobile device and not to another device (second device) to establish the second communication link between the first mobile device and the second network. Thus, it is not known the metes and the bounds of the claimed invention.

Claims 87-90 are rejected because of their dependency on the rejected claim.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HICHAM FOUD whose telephone number is (571)270-1463. The examiner can normally be reached on Monday - Friday 9-6 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HICHAM FOUD/
Primary Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 14/510,766	Applicant(s)/Patent Under Reexamination GANESAN, VASUDEVAN	
	Examiner HICHAM FOUD	Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2004/0030791 A1	02-2004	Dorenbosch, Jheroen P.	H04W36/0033	709/230
*	B	US-2007/0026862 A1	02-2007	Hicks; John Alson III	H04W36/30	455/436
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not Yet Assigned
Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8514867	B2	2013-08-20	Ganesan	
	2	8958434	B2	2015-02-17	Ganesan	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	10/04/2017

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2015-11-17
Name/Print	Jonathan O.Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
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	Attorney Docket Number	HAVA-00402

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Examiner Signature	/HICHAM B FOUD/	Date Considered	10/04/2017

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Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2015-06-19
Name/Print	Jonathan O. Owens	Registration Number	37902

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	1	8520605	B2	2013-08-27	Ganesan	
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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not yet assigned
	Attorney Docket Number	HAVA-00402

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	1	2287858	GB	A	1995-09-27	Crichton et al.		☐
	2	1471665	EP	A1	2004-10-27	Sun et al.		☐
	3	03056719	WO	A1	2003-10-07	Sun et al.		☐

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OR

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2015-03-20
Name/Print	Jonathan O. Owens	Registration Number	37902

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	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6009328		1999-12-28	Muszynski	
	2	6175737	B1	2001-01-16	Kao	
	3	6195543	B1	2001-02-27	Granberg	
	4	6473413	B1	2002-10-29	Chiou et al.	
	5	6515983	B1	2003-02-04	Utas	
	6	6553022	B2	2003-04-22	Hartmaier	
	7	6754833	B1	2004-06-22	Black et al.	
	8	6584087	B1	2003-06-24	Czaja et al.	

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	9	6795700	B2	2004-09-21	Karaoguz et al.	
	10	6862444	B2	2005-03-01	Karaoguz et al.	
	11	6996107	B2	2006-02-07	Janoska	
	12	7127232	B2	2006-10-24	O'Neil et al.	
	13	7142847	B2	2006-11-28	Umeda et al.	
	14	7254119	B2	2007-08-07	Jiang et al.	
	15	7382763	B2	2008-06-03	Ludwig et al.	
	16	7398088	B2	2008-07-07	Belkin et al.	
	17	7483984	B1	2009-01-27	Jonker et al.	
	18	7512796	B2	2009-03-31	Haverninen et al.	
	19	8041360	B2	2011-10-18	Ibe et al.	

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	20	6754833	B1	2004-06-22	Black et al.	

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	1	20010049790	A1	2001-12-06	Faccin et al.	
	2	20020078174	A1	2002-06-20	Sim et al.	
	3	20020085516	A1	2002-07-04	Bridgelall	
	4	20020114305	A1	2002-08-22	Oyama et al.	
	5	20020147008	A1	2002-10-10	Kallio	
	6	20020150228	A1	2002-10-17	Umeda et al.	
	7	20030083079	A1	2003-05-01	Clark et al.	
	8	20030086366	A1	2003-05-08	Branlund et al.	

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	9	20030087629		2003-05-08	Juitt et al.	
	10	20030112766	A1	2003-06-19	Riedel et al.	
	11	20030157899	A1	2003-08-21	Trossen et al.	
	12	20030177196	A1	2003-09-18	Bhasin et al.	
	13	20030185172	A1	2003-10-02	Rue	
	14	20030217007	A1	2003-11-20	Fukushima et al.	
	15	20030217091	A1	2003-11-20	Echigo et al.	
	16	20030224792	A1	2003-12-04	Verma et al.	
	17	20030232615	A1	2003-12-18	Kim et al.	
	18	20040005878	A1	2004-01-08	Olin et al.	
	19	20040030791	A1	2004-02-12	Dorenbosch et al.	

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	20	20040085959	A1	2004-05-06	Ohkawa	
	21	20040087307	A1	2004-05-06	Ibe et al.	
	22	20040105424	A1	2004-06-03	Skoczkowski	
	23	20040114559	A1	2004-06-17	Wang	
	24	20040127208	A1	2004-07-01	Nair et al.	
	25	20040132427	A1	2004-07-08	Lee et al.	
	26	20040137902	A1	2004-07-15	Chaskar et al.	
	27	20040174880	A1	2004-09-09	White et al.	
	28	20040203666	A1	2004-10-14	Foster et al.	
	29	20040203788	A1	2004-10-14	Fors et al.	
	30	20040203802	A1	2004-10-14	McCormick et al.	

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	31	20040204097	A1	2004-10-14	Scheinert et al.	
	32	20040218575	A1	2004-11-04	Ibe et al.	
	33	20040229618	A1	2004-11-18	Adatrao et al.	
	34	20050044138	A1	2005-02-24	Albert et al.	
	35	20050059400	A1	2005-03-17	Jagadeesan et al.	
	36	20050147049	A1	2005-07-07	Ganesan	
	37	20050149740	A1	2005-07-07	Kotzin et al.	
	38	20060040711	A1	2006-02-23	Whistler	
	39	20060050663	A1	2006-03-09	Ganesan	
	40	20060050687	A1	2006-03-09	Ganesan	
	41	20060050721	A1	2006-03-09	Ganesan	

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	42	20060080423	A1	2006-03-09	Brewer et al.	
	43	20060146767	A1	2006-07-06	Moganti	
	44	20060234678	A1	2006-10-19	Juitt et al.	
	45	20060291455	A1	2006-12-28	Katz et al.	
	46	20070076665	A1	2007-04-05	Nair et al.	
	47	20070112948	A1	2007-05-17	Uhlik	
	48	20070124490	A1	2007-05-31	Kalavade et al.	
	49	20070249390	A1	2007-10-25	Parkayastha et al.	
	50	20090070489	A1	2009-03-12	Lu et al.	
	51	20100074228	A1	2010-03-25	Hicks, III et al.	
	52	20110010282	A1	2011-01-13	Olinet et al.	

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	53	20030012350	A1	2003-01-16	Wong et al.	

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	1	200310113	DE	UI	2004-01-15	InterDigital Technology Corporation		☐
	2	0936777	EP	A1	1999-08-18	Lucent Technologies Inc.		☐
	3	1471665	EP	A1	2004-10-27	Legend(Beijing) Limited		☐
	4	2287858	GB	A	1995-09-27	Motorola Limited		☐
	5	200226994	JP	A	2002-01-25	Nec Corporation		☐
	6	2004320473	JP	A	2004-11-11	ISHIKURA KATSUTOSHI		☐
	7	03056719	WO	A1	2003-07-10	Legend(Beijing) Limited		☐
	8	2004013998	WO	A2	2004-02-12	Motorola, Inc.		☐

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	9	2004057903	WO	A1	2004-07-08	Fujitsu Limited		☐

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	1	3GPP Organization Project, "3rd Generation Partnership Project;Technical Specification Group Services and System Aspects Service aspects; Handover requirements between UTRAN and GERAN or other radio systems (Release 8)", 2006-03, pages 1-20	☐
	2	3GPP Organization Project, "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects Service aspects; Service principles (Release 8)", 2006-03, pages 1-45	☐
	3	3GPP Organization Project, "3rd Generation Partnership Projects;Technical Specification Group Service and System Aspects; Service Requirements for the All-IP Network (AIPN); V8.0.0, Stage 1, (Release 8), page 1-24	☐
	4	" Unlicensed Mobile Access (UMA);Protocols (Stage 3)", R1.0.4, 2005-05-02, pages 1-162	☐

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Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2014-11-04
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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030058876	A1	2003-03-27	Patrick L. Connor	

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Examiner Signature	/HICHAM B FOUD/	Date Considered	10/04/2017

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Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2017-09-20
Name/Print	Jonathan O. Owens	Registration Number	37902

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Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not yet assigned
Attorney Docket Number	HAVA-00402

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	1	20040181811	A1	2004-09-16	Rakib	
	2	20060098643	A1	2006-05-11	Pfeffer	

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	1	20040176128	A1	2004-09-09	Grabelsky et al.	
	2	20040192294	A1	2004-09-30	Pan et al.	
	3	20040246990	A1	2004-12-09	Krishnamurthi et al.	

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	1	2003061177	WO	A2	2004-07-24	Winphoria Networks Inc.		

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2414
Examiner Name	Not Yet Assigned
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030053632	A1	2003-03-20	Bousis	
	2	20040141484	A1	2004-07-22	Rogalski et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	10/04/2017

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2016-04-26
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040205158	A1	2004-10-14	Hsu	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	10/04/2017

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Name/Print	Jonathan O.Owens	Registration Number	37902

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14510766	GANESAN, VASUDEVAN
	Examiner	Art Unit
	HICHAM FOUD	2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	10/4/2017	
Limited text search in east	10/4/2017	
Limited text search in east in (H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02)	10/7/2017	
Limited text search in east	10/7/2017	

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/HICHAM FOUD/ Primary Examiner.Art Unit 2467

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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/07/2017								
	1	✓								
	2	✓								
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CLAIM		DATE								
Final	Original	10/07/2017								
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	38	✓								
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CLAIM		DATE								
Final	Original	10/07/2017								
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	74	-								
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	88	✓								
	89	✓								
	90	✓								
	91	-								
	92	-								
	93	-								
	94	-								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("20040030791").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/07 15:40
L2	0	L1 and server	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 15:40
S1	33	(("GANESAN") near3 ("Vasudevan")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/01 16:45
S2	5985	((signal adj1 strength) with threshold).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/01 16:46
S3	4	S1 and S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/01 16:46
S4	2	(11/330675).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/01 16:58
S5	0	("(notif$4same((redirect$3(readj1direct$3))withlinkwithserver)).clm.").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:04
S6	6	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:05
S7	33	(("GANESAN") near3 ("Vasudevan")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/04 16:05
S8	4	S6 and S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:05
S9	144230	((H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02).CPC.)	US-PGPUB; USPAT; USOCR;	OR	OFF	2017/10/04 16:06

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
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S11	1	S10 and predetermined	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:07
S12	4	S8 and predetermined	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:07
S13	0	S8 and (second adj1 mobile adj1 communication adj1 device)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:09
S14	4	S8 and (second adj3 mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:10
S15	2	(11/031498).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/04 16:12
S16	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 16:21
S17	5	("20040176128" | "20040181811" | "20040192294" | "20040246990" | "20060098643").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 16:21
S18	2	("20030053632" | "20040141484").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 16:21
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S21	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 16:22
S22	1	("8520605").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 16:22
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S24	72	("20010049790" | "20020078174" | "20020085516" | "20020114305" | "20020147008" | "20020150228" | "20030012350" | "20030083079" | "20030086366" | "20030087629" | "20030112766" | "20030157899" | "20030177196" | "20030185172" | "20030217007" | "20030217091" | "20030224792" | "20030232615" | "20040005878" | "20040030791" | "20040085959" | "20040087307" | "20040105424" | "20040114559" | "20040127208" | "20040132427" | "20040137902" | "20040174880" | "20040203666" | "20040203788" | "20040203802" | "20040204097" | "20040218575" | "20040229618" | "20050044138" | "20050059400" | "20050147049" | "20050149740" | "20060040711" | "20060050663" | "20060050687" | "20060050721" | "20060080423" | "20060146767" | "20060234678" | "20060291455" | "20070076665" | "20070112948" |	US-PGPUB; USPAT	OR	OFF	2017/10/04 16:22

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S25	87	S15 S16 S17 S18 S19 S20 S21 S22 S23 S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:23
S26	321408	(signal near5 threshold)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:23
S27	4284	(signal near5 threshold) same (roam$3 handover handoff)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:24
S28	10	S25 and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:24
S29	6	S25 and S27	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:24
S30	4859	(signal near5 threshold) same (roam$3 handover handoff switchover (switch adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:24
S31	5218	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 16:24
S32	2	(11/031498).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/04 18:25
S33	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
S34	5	("20040176128" | "20040181811" | "20040192294" | "20040246990" | "20060098643").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
S35	2	("20030053632" | "20040141484").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
S36	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
S37	2	("8514867" | "8958434").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25

S38	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
S39	1	("8520605").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
S40	1	("20050090259").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/04 18:25
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S42	87	S32 S33 S34 S35 S36 S37 S38 S39 S40 S41	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 18:25
S43	5218	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 18:25
S44	6	S42 and S43	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/04 18:25
S45	2	(11/031498).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/05 23:08
S46	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/05 23:08
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S49	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/05 23:08
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S51	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2017/10/05 23:08
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S55	87	S45 S46 S47 S48 S49 S50 S51 S52 S53 S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/05 23:08
S56	5220	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/05 23:08
S57	1	S55 and S56 and nomadic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/05 23:08
S58	1	S55 and S56 and nomadic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/05 23:09
S59	0	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:21
S60	0	(signal with threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:22
S61	2	(signal with threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:22
S62	144308	((H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/10/07 14:22

			IBM_TDB			
S63	0	S61 and S62	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:22
S64	5221	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:25
S65	1900	S64 and S62	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:25
S66	932	((signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))).ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:25
S67	388	S66 and S62	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:26
S68	103723	((wi adj1 fi) wifi) with cellular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:26
S69	15	S66 and S68	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:27
S70	9	S69 and S62	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:27
S71	11	(roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/07 14:29
S72	10	S71 and S62	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2017/10/07 14:29

			EPO; JPO; DERWENT; IBM_TDB			
S73	1	("20040030791").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/10/07 14:33

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S74	6	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	US-PGPUB; USPAT	OR	OFF	2017/10/07 14:20

10/7/2017 3:47:02 PM
C:\Users\hfoud\Documents\EAST\Workspaces\14510766.wsp

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CONFIRMATION NO. 2888

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
14/510,766	10/09/2014	370	2467	HAVA-00402

APPLICANTS
Vasu Networks Corporation, Cupertino, CA;

INVENTORS
Vasudevan Ganesan, Cupertino, CA;

**** CONTINUING DATA **************************
This application is a CON of 13/240,776 09/22/2011 PAT 8886181
which is a DIV of 11/330,675 01/11/2006 PAT 8078164 *
which claims benefit of 60/643,829 01/14/2005
and is a CIP of 11/031,498 01/06/2005 PAT 7991399
which claims benefit of 60/534,466 01/06/2004
(*)Data provided by applicant is not consistent with PTO records.

**** FOREIGN APPLICATIONS **************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
10/15/2014

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /HICHAM B FOUD/ Examiner's Signature	☐ Met after Allowance hf Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	2	19	3

ADDRESS
HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086
UNITED STATES

TITLE
MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020152305	A1	2002-10-17	Jackson et al.	
	2	20030133421	A1	2003-07-17	Rangamani Sundar	
	3	20040076144	A1	2004-04-22	Takashi Ishidoshiro	
	4	20040083360	A1	2004-04-29	Rod Walsh	
	5	20040095916	A1	2004-05-20	Makoto Maki	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2017-12-19
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	31280350
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	19-DEC-2017
Filing Date:	09-OCT-2014
Time Stamp:	19:14:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_12_19_2017.pdf	612368 9344dbf26eb116851a7a76fa123bf969a516b781	no	4

Warnings:

Information:	
Total Files Size (in bytes):	612368

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed	PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	14510766
Filing Date	09-Oct-2014
First Named Inventor	Vasudevan Ganesan
Attorney Docket Number	HAVA-00402
Title of Invention	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Vasu Networks Corporation	100%

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

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as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ◉ Small Entity ○ Micro Entity ○ Regular Undiscounted I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number 37902 ○ A sole inventor ○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ○ A joint inventor; all of whom are signing this request	
Signature	/Jonathan O. Owens/
Name	Jonathan O. Owens

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**160**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 14510766

Filing Date: 09-Oct-2014

Applicant/Patent under Reexamination: Ganesan

Electronic Terminal Disclaimer filed on January 12, 2018

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	31493855
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	12-JAN-2018
Filing Date:	09-OCT-2014
Time Stamp:	17:33:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$160
RAM confirmation Number	011618INTEFSW17334000
Deposit Account	081275
Authorized User	Jonathan Owens
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	33545 2734f47971eb75917585705b325cc1f9dfa99143	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30557 fbe09e6b13a2221b28af362302876f9dadb3753d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	64102		

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New International Application Filed with the USPTO as a Receiving Office

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PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2467
Vasudevan Ganesan	Examiner: Foud, Hicham B.
Serial No.: 14/510,766	
Filed: October 9, 2014	**AMENDMENT AND RESPONSE TO OFFICE ACTION MAILED October 12, 2017**
For: **MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER**	162 North Wolfe Road Sunnyvale, California 94086 (408) 530-9700
	Customer No.: 28960

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

Please amend the above-titled application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins of page 2 of this paper.

Remarks begin on page 10 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (currently amended) A method of providing communications for a mobile communication device that roams between multiple ~~wireless~~ networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a first ~~wireless~~ communication link between the mobile communication device and a first ~~wireless~~ network;

monitoring a ~~signal strength~~ context of the first ~~wireless~~ communication link;

when a second context is preferred over the context ~~signal strength drops below a threshold~~, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with the client;

notifying the mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second ~~wireless~~ communication link between the mobile communication device and a second ~~wireless~~ network, wherein the second context is within a set of known networks or from a newly discovered network.

2. (currently amended) The method of claim 1 wherein the first ~~wireless~~ communication link comprises a WiFi communication link, and the first ~~wireless~~ network comprises a WiFi network access point.

3. (currently amended) The method of claim 2 wherein the second ~~wireless~~ network comprises a ~~wireless~~ cellular network.

4. (original) The method of claim 1 wherein establishing the first communication link includes routing through a VOIP network.

5 (original) The method of claim 1 wherein establishing the first communication link includes routing through a cellular network.

6. (original) The method of claim 1 wherein establishing the second communication link includes routing through a VOIP network.

7. (original) The method of claim 1 wherein establishing the second communication link includes routing through a cellular network.

8. (currently amended) The method of claim 1 further comprising providing a connectivity status by the mobile communication device to the interface server while the mobile communication device is within a first coverage area of the first ~~wireless~~ network.

9. (currently amended) The method of claim 8 further comprising providing a routing association to a mobile switching center within the second ~~wireless~~ network, wherein the routing association associates the mobile communication device to the interface server.

10. (currently amended) The method of claim 9 further comprising routing a termination communication intended for the mobile communication device from the mobile switching center to the interface server according to the routing association when the connectivity status is active, and routing the termination communication from the interface server to the mobile communication device over the first ~~wireless~~ network.

11. (original) The method of claim 10 further comprising when the connectivity status is not provided to the interface server, the router association is removed from the mobile switching center.

12. (currently amended) The method of claim 1 further comprising registering the mobile communication device with a mobile switching center within the second ~~wireless~~ network when the ~~signal strength~~ context changes ~~drops below the threshold~~.

13. (original) The method of claim 12 further comprising setting up the second communication link with the end destination device and forwarding the second communication link to the interface server.

Claims 14-38 (canceled)

39. (previously presented) The method of claim 1, wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

40. (currently amended) The method of claim 1 wherein the communications comprise a ~~secured~~ telephone call.

41. (canceled)

42. (currently amended) The method of claim 1 wherein the communications comprise a secured transmission of ~~broadband~~ content.

43. (currently amended) The method of claim 42 wherein the ~~broadband~~ content comprises at least one of fixed ~~broadband~~ and mobile ~~broadband~~.

44. (currently amended) The method of claim 1 wherein the communications comprise an unsecured transmission of ~~broadband~~ content.

45. (currently amended) The method of claim 44 wherein the ~~broadband~~ content comprises at least one of fixed ~~broadband~~ and mobile ~~broadband~~.

46. (currently amended) The method of claim 1 wherein the communications comprise a secured data ~~transmission~~ exchange.

47. (currently amended) The method of claim 1 wherein the communications comprise an unsecured data ~~transmission~~ exchange.

48. (previously presented) The method of claim 1 wherein the interface server is coupled to a gateway device.

49. (previously presented) The method of claim 48 wherein the gateway device is bi-directionally coupled to a packet network.

50. (previously presented) The method of claim 49 wherein the packet network comprises packet switched telephone network.

51. (previously presented) The method of claim 48 wherein the gateway device comprises a softswitch.

Claims 52-78 (canceled)

79. (currently amended) A method of providing communications for a ~~mobile~~ communication device that roams between multiple ~~wireless~~ networks, the method comprising:

establishing, with a client, a first communication link between the ~~mobile~~ communication device and an end destination device, wherein the first communication link comprises a first ~~wireless~~ communication link between the ~~mobile~~ communication device and a first ~~wireless~~ network;

monitoring, with the client, a first context of a signal of the first ~~wireless~~ communication link;

when a second ~~wireless~~ network is detected as available and a second context of a second communication link corresponding to the second ~~wireless~~ network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with the client;

notifying the ~~mobile~~ communication device to terminate transmission over the first communication link; and

re-directing, with the client, the second communication link from the interface server to the ~~mobile~~ communication device, thereby establishing a second ~~wireless~~ communication link between the ~~mobile~~ communication device and the second ~~wireless~~ network, wherein the second context is within a set of known networks or from a newly discovered network.

80. (previously presented) The method of claim 79 wherein the first context comprises signal strength characteristics.

81. (currently amended) The method of claim 79 wherein the first context comprises first characteristics of the first ~~wireless~~ communication link and the second context comprises second characteristics of the second ~~wireless~~ communication link.

82. (previously presented) The method of claim 79 wherein the interface server is coupled to a gateway device.

83. (previously presented) The method of claim 82 wherein the gateway device is bi-directionally coupled to a packet network.

84. (previously presented) The method of claim 83 wherein the packet network comprises packet switched telephone network.

85. (previously presented) The method of claim 82 wherein the gateway device comprises a softswitch.

86. (currently amended) A method of providing communications for a ~~mobile~~ communication device that roams between multiple ~~wireless~~ networks, the method comprising:

establishing, with a client, a first communication link between a first ~~mobile~~ communication device and an end destination device, wherein the first

communication link comprises a first ~~wireless~~ communication link between the first ~~mobile~~ communication device and a first ~~wireless~~ network;
monitoring, with the client, a first context of a signal of the first ~~wireless~~ communication link;
when a second ~~wireless~~ network is detected as available and a second context of a second communication link corresponding to the second ~~wireless~~ network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with the client;
notifying the first ~~mobile~~ communication device to terminate transmission over the first communication link; and
re-directing, with the client, the second communication link from the interface server to the first ~~a second mobile~~ communication device, thereby establishing a second ~~wireless~~ communication link between the first ~~mobile~~ communication device and the second ~~wireless~~ network, wherein the second context is within a set of known networks or from a newly discovered network.

87. (previously presented) The method of claim 86 wherein the first context comprises signal strength characteristics.

88. (currently amended) The method of claim 86 wherein the first context comprises first characteristics of the first ~~wireless~~ communication link and the second context comprises second characteristics of the second ~~wireless~~ communication link.

89. (currently amended) The method of claim 86, wherein the first ~~wireless~~ communication link comprises a first WiFi communication link, and the first ~~wireless~~ network comprises a first WiFi network access point.

90. (currently amended) The method of claim 89, wherein the second ~~wireless~~ communication link comprises a second WiFi communication link, and the second ~~wireless~~ network comprises a second WiFi network access point.

Claims 91-94 (canceled)

95. (new) The method of claim 1 wherein the context comprises a signal strength.

96. (new) The method of claim 1 wherein the context comprises a signal strength and one or more additional criteria.

97. (new) The method of claim 1 wherein the context comprises a criterion beside signal strength.

98. (new) The method of claim 1 wherein the communications comprise data streaming.

99. (new) The method of claim 79 wherein the communications comprise data streaming.

100. (new) The method of claim 86 wherein the communications comprise data streaming.

101. (new) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by a client, wherein the client is stored within the mobile communication device.

102. (new) The method of claim 101 wherein the client comprises software, firmware and/or hardware.

103. (new) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by a client, wherein the client comprises an access point or a base station.

104. (new) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by a network-based device, a switch, a router, a network-based switch or a network-based router.

105. (new) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by a client, wherein the client is not stored within the mobile communication device, and the client is re-directed from an access point or a network device.

106. (new) The method of claim 1, wherein the communications comprise at least one of a telephone call, a voice call/communication, a video call/communication, a multimedia communication, or data streaming/exchange.

107. (new) The method of claim 1 wherein the communications comprise: a cellular communication, a VoIP communication / session, a voice communication / session, a video communication / session, a multimedia communication /session, a data communication / session and/or a WiFi communication.

108. (new) The method of claim 1 wherein the communications include content which is pushed or pulled.

109. (new) The method of claim 1 wherein the first network comprises a cellular network, a WiFi network, the Internet, and/or another network, and the second network comprises a cellular network, a WiFi network, the Internet, and/or another network.

110. (new) The method of claim 1 wherein the communications are received by the mobile communication device from a server device.

111. (new) The method of claim 1 wherein the communications are sent by the mobile communication device to a server device.

112. (new) The method of claim 1 wherein the communications are received by the mobile communication device from a second device via a server or proxy device.

113. (new) The method of claim 1 wherein the communications are received by the mobile communication device from a second mobile communication device in a peer to peer configuration.

REMARKS

The Applicant respectfully requests further examination and consideration of the claims in view of the above amendments and the arguments set forth fully below. Claims 1-13, 39-51 and 79-90 were pending in this application. Within the Office Action, Claims 1-13, 39-51 and 79-90 have been rejected. By the above amendments, Claims 1-3, 8-10, 12, 40, 42-47, 79, 81, 86 and 88-90 have been amended; Claim 40 has been canceled and new Claims 95-113 have been added. Accordingly, Claims 1-13, 39, 41-51, 79-90 and 95-113 are now pending.

Claim Objections

Within the Office Action, Claims 79, 80, 86 and 87 have been objected to as being a substantial duplicate of Claim 1. Applicants respectfully disagree. However, by the above amendments, the differences between the claims are clearer. Furthermore, Claims 79 and 86 include the limitations: when a second network is detected as available and a second context of a second communication link corresponding to the second network is preferable, notifying... Therefore, Claims 79 and 86 are clearly different from Claim 1. Furthermore, to distinguish Claims 79 and 86, the term "mobile" has been removed from Claim 86. Thus, the claims are sufficiently distinct, and the objections should be withdrawn.

Double Patenting

Within the Office Action, Claims 1-13, 79, 80, 86 and 87 have been rejected under 35 U.S.C. §101 as claiming the same invention as that of Claims 1-13 of prior U.S. Patent No. 8,886,181. By the above amendments, Claims 1-13, 79, 80, 86 and 87 are clearly distinguishable from Claims 1-13 of U.S. Patent No. 8,886,181. Therefore, the rejection should be withdrawn.

Within the Office Action, Claims 1-13 and 39-51 have been rejected on the ground of nonstatutory obviousness-type double patenting over Claims 1-23 of U.S. Patent No. 8,078,164. A terminal disclaimer is filed herewith. Thus, the rejection should be withdrawn.

Rejections Under 35 U.S.C. § 112, second paragraph

Within the Office Action, Claims 86-90 have been rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully disagree.

However, to place the application in a condition for allowance, Claim 86 has been clarified. Therefore, the rejection should be withdrawn.

New Claims

By the above amendments, new Claims 95-113 have been added. Claims 95-98 and 101-113 depend on the independent Claim 1. As described above, the independent Claim 1 is allowable. Accordingly, Claims 95-98 and 101-113 are all allowable as being dependent upon an allowable base claim.

Claim 99 is dependent on the independent Claim 79. Claim 100 is dependent on the independent Claim 86. As described above, the independent Claims 79 and 86 are allowable. Accordingly, Claims 99 and 100 are both allowable as being dependent upon an allowable base claim.

Applicants respectfully submit that the claims are in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: January 12, 2018

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg. No.: 37,902
Attorneys for Applicants

Electronic Acknowledgement Receipt

EFS ID:	31493946
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	12-JAN-2018
Filing Date:	09-OCT-2014
Time Stamp:	17:36:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response_1_12_2018.pdf	133067 f7cb37338e8d8c3066ed6534e1274b08058f11c6	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	9
	Applicant Arguments/Remarks Made in an Amendment	10	11
Warnings:			
Information:			
	Total Files Size (in bytes):	133067	

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/510,766	Filing Date 10/09/2014	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	01/12/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 56	Minus	** 75	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 7	= 0		x $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	tina J barden
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040170173	A1	2004-09-02	Pan, Ping	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-03-27
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	32175671
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	27-MAR-2018
Filing Date:	09-OCT-2014
Time Stamp:	20:10:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_3_27_2018.pdf	1034929 d1107506e6e5b087968afcae1c52428fe44ed3fc	no	4

Warnings:

Information:	
Total Files Size (in bytes):	1034929

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

28960 7590 04/26/2018
HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
04/26/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 14/510,766	Applicant(s) GANESAN, VASUDEVAN	
	Examiner HICHAM FOUD	Art Unit 2467	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03-27-2018*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-13,39,40,42-51,79-90 and 95-113* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-13, 39-40, 42-51, 79-90 and 95-113* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 03-27-2018 has been entered and considered.

Claims 1-13, 39-40, 42-51, 79-90 and 95-113 are pending in this application.

Claim Objections

2. Claim**s 79** and **86** are objected under **37 CFR 1.75** as being a substantial duplicate of claim **1**. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See **MPEP § 706.03(k)**.

3. Claims 101, 103 and 105 are objected to because of the following informalities:

The claims recite the term “a client” which seems to refer back to the same term in claim 1. If this is true, it is suggested to change the term to --the client--.

Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been

obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

4. Claims 1-13, 79-90 and 95 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 8,886,181. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is obvious to remove parts or elements of an invention and/or change the format of claim(s) from system/apparatus to method steps or vice-versa, and wherein at least the claimed context is mapped to the signal strength.

Claims 1-13 of U.S. Patent No. 8,886,181 contain(s) every element of claim(s) 1-13, 79-90 and 95 of the instant application and thus anticipate the claims of the instant application. Claims of the instant application therefore are not patently distinct from the earlier patent claims and as such are unpatentable over obvious-type double patenting. A later patent/application claim is not patentably distinct from an earlier claim if the later claim is anticipated by the earlier claim. “A later patent claim is not patentably distinct

from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896,225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness type double patenting where a patent application claim to a genus is anticipated by a 35 patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001). "*Claim 12 and Claim 13 are generic to the species of invention covered by claim 3 of the patent. Thus, the generic invention is* ***"anticipated"*** *by the species of the patented invention. Cf., Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (holding that an earlier species disclosure in the prior art defeats any generic claim) 4 . This court's predecessor has held that, without a terminal disclaimer, the species claims preclude issuance of the generic application. In re Van Ornum, 686 F.2d 937, 944, 214 USPQ 761, 767 (CCPA 1982). Accordingly, absent a terminal disclaimer, claims 12 and 13 were properly rejected under the doctrine of obviousness-type double patenting.*" (In re Goodman (CA FC) 29 USPQ2d 2010 (12/3/1993).

5. Claims 39-40, 42-51 and 96-113 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 8,886,181.

For claims 39-40, 42-51 and 96-113, claims 1-13 of U.S. Patent No. 8,886,181 discloses all the claimed subject matter with the exception of explicitly disclosing the above claims. However, the limitations of the above claims are obvious variants over the claims of U.S. Patent No. 8,886,181 such as at least mobile device can be any

portable or fixed device and/or communications can be comprised any content (streamed, secured/unsecured, call, VOIP…). Thus, it would have been obvious to the one ordinary skill in the art at the time of the invention to use/implement these variants for the purpose of at least establishing the communication session and/or properly exchanging information.

Claim Rejections - 35 USC § 112

> The following is a quotation of 35 U.S.C. 112(b):
> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.
>
> The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-13, 39-40, 42-51, 79-90 and 95-113 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 1 recites "when a second context is preferred over the context" which is vague and indefinite because it is not clear what second context the claim is referring to. Moreover, second context requires the recitation of a first context. The claim(s) was clear before the amendment and wherein the amendment to the claim(s) creates confusion. Moreover, the recitation “wherein the second context is within a set of known networks or from a newly discovered network" is confusion and it is not known what of set of known networks or a newly discovered network is referred to. Furthermore, the

term “the client” in line 12, has no antecedent basis. Thus, it is not known the metes and the bounds of the claimed invention. Similar issue(s) occur in claims 79 and 86.

Claims 102, 106-107 and 109 are vague and indefinite because of the use of “/” and “and/or” that mean both “and” and “or” at the same time. It is suggested to use either --and-- or --or-- to overcome the rejection.

Claims 2-13, 39-40, 42-51, 80-85, 87-90 and 95-113 are rejected because of their dependency on the rejected claim.

Response to Arguments

7. Applicant's arguments filed have been fully considered but they are not persuasive.

The ODP in regard of the US patent 8,078,164 is withdrawn since a terminal disclaimer was filed.

The objection is maintained because removing the term “mobile" does not differentiate between the independent claims and wherein the claim**s 79** and **86** are substantial duplicates of claim **1** because they are so close in content that they both cover the same thing, despite a slight difference in wording (all are method claims). Therefore, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim.

In regard of 112 rejection, besides the applicant failure to show support of the added limitation(s) to the claims in the specification and indicate that in the Remarks, he created confusion by amending the claim(s) in an attempt to broaden the scope of the claim(s). Therefore, the claim(s) is/are rejected under 112 for indefiniteness.

Allowable Subject Matter

8. Claims 1-13, 39-40, 42-51, 79-90 and 95-113 would be allowable if filing a terminal disclaimer and/or rewritten and/or amended to overcome the objection(s) and the rejections under Obviousness Double Patenting and under 112(b), set forth in this Office action.

9. The following is an examiner's statement of reasons for allowance:

The claims are allowed for the same reason(s) as the parent application 13/240,776 corresponding to the US patent 8,886,181.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HICHAM FOUD whose telephone number is (571)270-1463. The examiner can normally be reached on Monday - Friday 9-6 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HICHAM FOUD/
Primary Examiner, Art Unit 2467
`

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14510766	GANESAN, VASUDEVAN
	Examiner	Art Unit
	HICHAM FOUD	2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	4/25/2018	hf
Limited text search in east	4/25/2018	hf
Limited text search in east in (H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02)	4/25/2018	hf
Limited text search in east	4/25/2018	hf

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/HICHAM FOUD/ Primary Examiner.Art Unit 2467

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040170173	A1	2004-09-02	Pan, Ping	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	04/25/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-03-27
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F./

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	5	("20020152305" | "20030133421" | "20040076144" | "20040083360" | "20040095916").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 14:23
L2	1	("20040170173").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 14:23
L3	6	L1 L2	US-PGPUB; USPAT	OR	OFF	2018/04/25 14:23
S77	34	(("GANESAN") near3 ("Vasudevan")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/25 01:22
S78	6449	((signal adj1 strength) with threshold).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S79	4	S77 and S78	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S80	2	("11330675").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/25 01:22
S81	0	(" (notif$4same((redirect$3(readj1direct$3))withlinkwithserver)).clm.").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S82	7	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S83	34	(("GANESAN") near3 ("Vasudevan")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/25 01:22
S84	4	S82 and S83	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S85	150304	((H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22

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S87	1	S86 and predetermined	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S88	4	S84 and predetermined	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S89	0	S84 and (second adj1 mobile adj1 communication adj1 device)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S90	4	S84 and (second adj3 mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
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S92	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
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S94	2	("20030053632" | "20040141484").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
S95	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
S96	2	("8514867" | "8958434").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
S97	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
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S103	4463	(signal near5 threshold) same (roam$3 handover handoff)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S104	10	S101 and S102	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S105	6	S101 and S103	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S106	5051	(signal near5 threshold) same (roam$3 handover handoff switchover (switch adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S107	5415	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
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S112	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
S113	2	("8514867" | "8958434").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
S114	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
S115	1	("8520605").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
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S119	5415	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S120	6	S118 and S119	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
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S122	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
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S125	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22
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S131	87	S121 S122 S123 S124 S125 S126 S127 S128 S129 S130	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S132	5415	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S133	1	S131 and S132 and nomadic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S134	1	S131 and S132 and nomadic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/04/25 01:22
S135	0	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S136	0	(signal with threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S137	2	(signal with threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S138	150304	((H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S139	0	S137 and S138	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22

S140	5415	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S141	1977	S140 and S138	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S142	967	((signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))).ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S143	401	S142 and S138	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S144	117589	((wi adj1 fi) wifi) with cellular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S145	16	S142 and S144	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S146	10	S145 and S138	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S147	11	(roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S148	10	S147 and S138	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S149	1	("20040030791").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/25 01:22
S150	1	("20040030791").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/25 01:22

S151	0	S150 and server	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:22
S152	1	14/510766	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:44
S153	1	S152 and context	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/04/25 01:44
S154	5	("20020152305" | "20030133421" | "20040076144" | "20040083360" | "20040095916").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 02:17
S155	1	("20040170173").PN.	US-PGPUB; USPAT	OR	OFF	2018/04/25 02:17

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S156	7	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	US-PGPUB; USPAT	OR	OFF	2018/04/25 01:22

4/25/2018 2:29:45 PM
C:\Users\hfoud\Documents\EAST\Workspaces\14510766.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14510766	GANESAN, VASUDEVAN
	Examiner	Art Unit
	HICHAM FOUD	2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/25/2018								
	1	✓								
	2	✓								
	3	✓								
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CLAIM		DATE								
Final	Original	04/25/2018								
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	38	✓								
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CLAIM		DATE								
Final	Original	04/25/2018								
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	74	-								
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	102	✓								
	103	✓								
	104	✓								
	105	✓								
	106	✓								
	107	✓								
	108	✓								

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CLAIM		DATE								
Final	Original	04/25/2018								
	109	✓								
	110	✓								
	111	✓								
	112	✓								
	113	✓								

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2467
Examiner Name	Hicham B. Foud
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020152305	A1	2002-10-17	Jackson et al.	
	2	20030133421	A1	2003-07-17	Rangamani Sundar	
	3	20040076144	A1	2004-04-22	Takashi Ishidoshiro	
	4	20040083360	A1	2004-04-29	Rod Walsh	
	5	20040095916	A1	2004-05-20	Makoto Maki	

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	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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	1		

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EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	04/25/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2017-12-19
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hichman B.
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	1723719	CN	A	2006-01-18	Motorola Inc		

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hichman B.
	Attorney Docket Number	HAVA-00402

	1	Copy of Office Action from Chinese Patent Application No.: 201510039302.4, dated February 8, 2018.	X

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-05-03
Name/Print	Jonathan O. Owens	Registration Number	37902

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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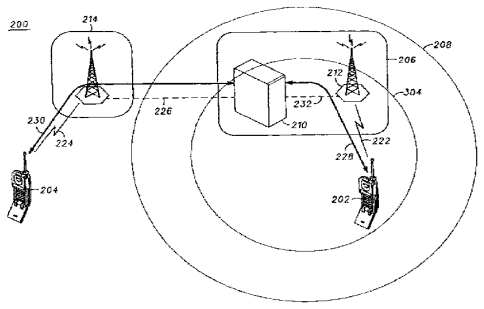
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[54] 发明名称

经媒体网关控制在无线网络之间实现双向软切换的方法和设备

[57] 摘要

本发明提供一种允许移动站在蜂窝网络和无线网络之间切换，而无需来自蜂窝网络的控制介入并独立于所采用的空中接口技术的方法和设备。更具体的，通过媒体网关(210)连接移动站(202)和远程站(204)之间的呼叫。该媒体网关经第一连接线连接到移动站并经第二连接线连接到远程站。然后，接收(520)移动站指向预定号码的通信，或在替代方案中，包括呼叫头部的连接信号被发送到移动站。然后建立(524)媒体网关和移动站之间的第三连接线，将通信从第一连接线切换(526，528)到第三连接线。



1. 一种用于管理具有覆盖区域的通信网络的方法，所述通信网络和与多个移动站通信的媒体网关相关联，该方法包括以下步骤：

通过所述媒体网关连接移动站和远程站之间的呼叫，所述媒体网关经第一连接线连接到所述移动站，经第二连接线连接到所述远程站；

确定移动站进入所述覆盖区域的过渡区域；

接收移动站的指向预定号码的通信，以建立到所述媒体网关的第三连接线；

在所述媒体网关和移动站之间建立第三连接线；以及

将所述媒体网关和移动站之间的通信从第一连接线切换到第三连接线。

2. 如权利要求 1 的方法，其中，所述到预定号码的通信是指向所述媒体网关的。

3. 如权利要求 1 的方法，进一步包括步骤：命令移动站呼叫所述预定号码，以建立到所述媒体网关的第三连接线。

4. 如权利要求 1 的方法，其中，所述建立第三连接线的步骤是响应接收到指向所述预定号码的通信而发生的。

5. 如权利要求 1 的方法，其中，所述建立第三连接线的步骤是响应接收到指向所述预定号码的通信，并确定在所述媒体网关和移动站之间连接的第一连接线当前正活动而发生的。

6. 如权利要求 1 的方法，其中，所述预定号码是移动站的识别号码和预先分配的切换号码之一。

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7. 如权利要求 1 的方法，其中，所述媒体网关切换媒体网关和移动站之间的通信，无需协调和不同于所述通信网络的另一个网络的呼叫的控制。

8. 如权利要求 1 的方法，在所述切换通信步骤中，第一和第三连接线同时存在，从而所述媒体网关可将媒体网关和移动站之间的通信从第一连接线切换到第三连接线。

9. 如权利要求 1 的方法，其中，第一连接线在非载波网络和载波网络之一内操作，第三连接线在非载波网络和载波网络中的另一个内操作。

10. 一种用于管理具有覆盖区域的通信网络的方法，所述通信网络和与多个移动站通信的媒体网关相关联，该方法包括以下步骤：

通过所述媒体网关连接移动站和远程站之间的呼叫，所述媒体网关经第一连接线连接到所述移动站，经第二连接线连接到所述远程站；

确定移动站进入所述覆盖区域的过渡区域；

发送连接信号到所述移动站以在所述媒体网关和移动站之间建立第三连接线，所述连接信号包括通知移动站将进行从第一连接线到第三连接线的切换的呼叫头部；以及

将所述媒体网关和移动站之间的通信从第一连接线切换到第三连接线。

11. 一种无线通信系统，其包括：

移动站，能和远程站进行通信；

载波网络，用于在载波覆盖区域内允许移动站和远程站之间的无线通信；以及

非载波网络，用于在非载波覆盖区域内允许移动站和远程站之间的无线通信；

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媒体网关，和所述非载波网络相关联，用于连接移动站和远程站之间的呼叫，所述媒体网关能够经载波网络和非载波网络之一和移动站连接第一连接线，接收移动站指向预定号码以建立到所述媒体网关的第二连接线的通信，以及在接收到移动站到预定号码的通信后，经载波网络和非载波网络中的另一个建立和移动站的第二连接线。

12. 如权利要求 11 的方法，其中，所述到预定号码的通信是指向所述媒体网关的。

13. 如权利要求 11 的方法，其中，所述媒体网关进一步能命令移动站呼叫所述预定号码，以建立到媒体网关的第三连接线。

14. 如权利要求 11 的方法，其中，所述媒体网关响应接收到指向所述预定号码的通信而建立第三连接线。

15. 如权利要求 11 的方法，其中，所述媒体网关响应接收到指向所述预定号码的通信，并确定在媒体网关和移动站之间连接的第一连接线当前正活动，而建立第三连接线。

16. 如权利要求 11 的方法，其中，所述预定号码是移动站的识别号码和预先分配的切换号码之一。

17. 如权利要求 11 的方法，其中，所述媒体网关切换媒体网关和移动站之间的通信，无需协调和不同于所述通信网络的另一个网络的呼叫的控制。

18. 如权利要求 11 的方法，其中，第一和第三连接线同时存在，从而所述媒体网关可将媒体网关和移动站之间的通信从第一连接线切换到第三连接线。

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经媒体网关控制在无线网络之间实现双向软切换的方法和设备

技术领域

本发明总的来说涉及移动通信系统，更具体的，涉及在蜂窝网络和另一个无线网络之间实现双向切换而无需蜂窝网络控制干预的设备和方法。

背景技术

在蜂窝电话领域中切换处理是众所周知的。移动用户单元（即移动站）通常通过检测基本收发机站（BTS）发射的某种形式的信标信号连接到蜂窝网络，然后将其自身和该 BTS 同步。在呼叫期间，在移动站和/或基站的移动站和/或网络监测器标准（例如无线信号强度指示（RSSI））确定移动站何时应当切换到另一 BTS。在进行切换的决定中也经常使用和语音质量相关的更复杂的标准，例如误比特率（BER）或帧擦除率（FER）。

使用蜂窝空中接口技术并允许移动站从蜂窝网络移动交换中心（MSC）切换到专用分组交换机（PBX）的覆盖区域的无线网络是已知的。此种类型的网络被采用为在“园区内（on campus）”覆盖提供商务的企业网络。例如，当移动到企业场地的无线覆盖区域时，同时是企业用户的使用 GSM 蜂窝网络的移动通信全球系统（GSM）移动用户，当移动到企业园区的无线覆盖区域时，可以切换到企业 GSM 网络。本地 PBX 功能被用于切换内部呼叫到 PBX 网络，或将外部呼叫切换到公共交换电话网络（PSTN），从而减少了由于本领域公知的外部蜂窝网络切换所强加的企业成本。

移动站在蜂窝网络和结合相同无线接口技术的企业网络之间的切换通常通过协调移动站、蜂窝网络和企业网络的通信以及控制链路实

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现。这些已知的切换方法要求无线网络采用和蜂窝网络相同的无线接口技术，还要求 MSC 和 PBX 例如经 SS7 信令通信。因此，企业用户必须预订特定的蜂窝提供商从而在两个网络中使用相同的移动站。现有的企业网需要使用诸如 SS7 信令的协议和蜂窝网络协调，从而在企业和蜂窝网络之间切换移动站。这些和蜂窝网络协调的要求对企业网络操作员来说负担巨大。首先，蜂窝操作员的空中接口技术限制了企业操作员可在企业中使用的移动站的选择。其次，两个网络之间所需的协调将企业限制到蜂窝操作员，蜂窝操作员用各自提供的服务提供园区内解决方案。

如果移动站能以无缝方式在蜂窝和独立于蜂窝空中接口和控制协调技术的无线网络之间操作，这会有益于企业网络操作员和用户。当它的用户在企业园区内和外都能使用单个移动站时，企业会得益于较高的生产率和成本节约。个人用户会得益于可用于多种目的的单个个人装置，这些目的例如是和工作相关的以及私人通信。当各个企业用户为个人用途使用时，企业用户通常还能不采用相同的蜂窝操作员。通常商业根据成本而被受限于选择提供商。诸如企业和外部网络的未来可用性和互操作性的其他考虑也是商业的考虑事项。在这些方面难以实现两个方面都是最佳的。

此外，如果存在独立于移动站采用的蜂窝技术而使用无线网络的装置，其他服务增强模式或服务增强业务也可以存在。它是蜂窝网络切换控制的一方面，蜂窝网络是实现移动站的此种无缝移动性的限制因素。

因此，需要一种实现蜂窝网络和无线网络之间双向软切换而无需蜂窝网络控制介入的设备和方法。

附图说明

图 1 是显示根据本发明的呼叫建立的框图。

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图 2 是显示根据本发明优选实施例的位于通信网络内的移动站以及和该移动站经一条通信链路通信的媒体网关的框图。

图 3 是显示图 2 的移动站和媒体网关的框图，其中移动站在通信网络边缘迁移，媒体网关正经两条通信链路和移动站通信。

图 4 是显示图 2 和 3 的移动站以及媒体网关的框图，其中该移动站位于通信网络之外，媒体网关经一条通信链路和该移动站通信。

图 5 是显示图 2 到 4 的媒体网关的优选操作的流程图。

图 6 是显示图 2 到 4 的移动站的内部组件的框图。

图 7 是显示图 6 的移动站的优选操作的流程图。

具体实施方式

本发明涉及移动站在两个网络之间实现双向软切换而无需网络之间网络控制介入的方法和设备。更具体的，本发明允许移动站从一个无线网络到另一个无线网络的无缝操作，而不考虑移动站用于无线通信的空中接口技术。

本发明用于移动站在不同网络的控制区域之间移动的情形，例如载波网络和非载波网络。载波网络操作在蜂窝网络上，并通常由包括（但不限于）AT&T Wireless of Redmond, Washington； Cingular Wireless of Atlanta ,Georgia,； Sprint PCS of Overland Park, Kansas； Verizon wireless of New York, New York；以及 VoiceStream Wireless of Bellevue, Washington 的蜂窝载波控制。载波网络通常采用基于模拟的空中接口和/或一个或多个基于数字的空中接口。基于数字的空中接口使用包括（但不限于）码分多址（CDMA）、时分多址（TDMA）、移动通信全球系统（GSM）、宽带码分多址（WCDMA）、第三代码分多址（CDMA2000）等数字通信技术。非载波网络操作在无线网络上，并通常不由蜂窝载波控制。非载波网络采用基于无线局域网（WLAN）的空中接口，包括（但不限于）由电子和电气工程师协会支持的 IEEE802.11™（诸如无线以太网兼容联盟支持的 Wi-Fi），蓝牙 SIG, Inc. 支持的 Bluetooth™，HomeRF Working Group Inc.支持的 HomeRF 等。

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现在回到附图，其中相同标记表示相同组件，图 1 是显示根据本发明的呼叫建立和切换的图。对于该图示，在第一位置 102 的移动站使用载波网络 104 建立呼叫，并在移动站移到非载波网络的无线覆盖区域（未示出）的第二位置 108 之后将该呼叫切换到非载波网络 106。相似的，在第二位置 108 的移动站可以使用非载波网络 106 建立呼叫，并在移动站移到载波网络 104 的无线覆盖区域（未示出）内的第一位置 102 之后将呼叫切换到载波网络 104。当然，虽然在图 1 中显示了载波网络和非载波网络，本发明还可用于载波网络之间和非载波网络之间的通信。

参考图 1 图示，每个网络包括多个用于和移动站通信的收发机，用于网络间通信的双向通信组件，以及用于在该多个收发机和该双向通信组件之间通信的互操作配置。如图 1 所示，载波网络 104 包括多个基站 110，移动交换中心（MSC）112，以及在基站和 MSC 之间通信的蜂窝接入网络 114；非载波网络 106 包括多个接入点 116，媒体网关 118，以及在接入点和媒体网关之间通信的无线接入网络 120。网络 104，106 经 MSC112 和媒体网关 118 来相互通信。

如上所述，本发明允许移动站不考虑移动站用于无线通信的空中接口技术，在网络之间无缝操作。关键是要理解本发明注意到，站和/或装置之间建立的载荷信道通常通过媒体网关建立，而不管该呼叫是从载波网络发起到非载波网络、从非载波网络发起到载波网络、从非载波网络发起到另一个非载波网络还是从载波网络发起到另一个载波网络。同样，参与该呼叫的一个或多个站和/或装置都被分配和每个网络相关的电话号码，例如一个用于载波网络的号码和另一个用于非载波网络的号码。对于本发明，分配多个号码的移动站能够切换而不考虑呼叫发起人以及呼叫发起网络。

关键一点还在于理解，因为所有的呼叫都通过媒体网关路由，网

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络之间的各个移动站切换都是“断开之前进行”的软切换，而各个切换的控制是由媒体网关实现的，无需载波网络的介入或控制。因此，不需要传统的交换系统使用的 SS7 或其他控制信令来实现本发明的目标。例如，参考图 1，本发明无需在 MSC112 和媒体网关 118 之间传送 SS7 或其他控制信令。

用另一种方式表述，本发明的媒体网关不是将和移动站相关的通信控制切换到载波网络，而是当移动站从一个网络重新定位到另一个网络时媒体网关保持该通信控制。更具体的，当移动站和远程站具有通过媒体网关指向的呼叫时，媒体网关具有到移动站的一个连接和到远程站的另一个连接。在此，媒体网关和移动站之间的连接被称为第一呼叫支路。媒体网关然后建立和移动站的第二呼叫支路，从而第一和第二呼叫支路同时存在，将通信从第一呼叫支路切换到第二呼叫支路，并在切换完成之后断开第一呼叫支路。通过保持和移动站的通信控制，媒体网关能无需载波网络的介入或控制实现切换。

图 2 到 4 表示和远程站 204 通信的移动站 202，它具有相对于通信网络 206 的三个不同位置。更具体的，图 2 显示了位于通信网络 206 内（或更具体的，在该通信网络的通信范围内）的移动站 202，图 3 显示在通信网络 206 边缘 208 迁移的移动站 202，以及图 4 显示了位于通信网络 206 之外（或更具体的，在该通信网络的通信范围之外）的移动站 202。虽然图 2 到 4 显示了远程站 204 在通信网络 206 通信范围或边缘 208 之外，应当理解，远程站的位置不是本发明的限制因素。因此，远程站 204 可位于该通信网络的通信范围或边缘 208 之内，而不会显著改变本发明的功能。正如在此使用的，术语通信网络 206 指的是该网络的组件以及该网络的覆盖区域。

图 2 到 4 显示了移动站 202 相对通信网络 206 迁移的至少两种方式。一种方式是，移动站可在如图 2 所示的通信网络 206 之内开始，移动到如图 3 所示的通信网络的外部边缘 208，并如图 4 所示移动到

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超出该外部边缘。在另一种方式中，移动站可以在如图 4 所示的通信网络 206 之外开始，迁移到如图 3 所示的通信网络的外部边缘 208，并进入如图 2 所示的通信网络内。在两种例子中，远程站 204 可位于通信网络 206 之内或之外。因此，应当理解，本发明的操作顺序不必用附图的顺序编号表示。

参考图 2 到 4，通信网络 206 包括用媒体网关 210 表示的一个或多个媒体网关，以及用接入点 212 表示的一个或多个接入点。虽然通信网络 206 可以是载波网络或非载波网络，对于该优选实施例，该通信网络是非载波网络，例如企业网络。例如，通信网络 206 可以采用蜂窝空中接口，诸如模拟、CDMA、TDMA，GSM、 WCDMA 和 CDMA2000，或可以采用基于 WLAN 的空中接口，诸如 IEEE802.11™、Bluetooth™ 以及 HomeRF。

媒体网关 210 能管理两个或多个站之间的呼叫，而不管该站的位置。例如，对于优选实施例，媒体网关 210 连接到通信网络覆盖区域内的接入点 212，能和位于该覆盖区域内的站 202 通信，并能和位于该覆盖区域之外的站 204 通信。媒体网关 210 能通过经第二网络 214 传送来和在覆盖区域之外的站 204 通信。

第二网络 214 包括一个或多个在媒体网关 210 和远程站 204 之间提供通信的基站，以及通信网络 206 包括一个或多个在媒体网关和移动站 202 之间提供通信的接入点 212。例如，对于优选实施例，接入点 212 具有和移动站 202 的无线连接，具有和媒体网关 210 的有线连接，并将来自移动站的通信转发到媒体网关，反之亦然。虽然在图 2 到 4 中没有显示，第二网络 214 可以包括多个支持组件，特别是管理基站以及提供基站到其他基站或网络的互操作性的组件，例如移动交换中心（MSC）。

参考图 2，移动站 202 能和远程站 204 通过通信网络 206 和第二

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网络 214 来通信，从而形成从移动站到远程站的载荷信道。对于优选实施例，移动站 202 具有到通信网络 206 的第一链路 222，远程站 204 具有到第二网络 214 的第二链路 224，以及该通信和第二网络之间具有有线链路。虽然图 2 所示第二链路 224 为优选实施例提供无线通信，应当理解，远程站 204 和第二网络 214 之间的有线连接也适用于本发明。

移动站 202 通过媒体网关 210 和远程站 204 通信。更具体的，媒体网关 210 通过第一连接线和移动站 202 通信，并通过第二连接线和远程站 204 通信。对于优选实施例，如图 2 所示，仅当移动站 202 进入通信网络 206 时，第二连接线一部分用第二链路 224 表示，第一连接线一部分用第一链路 222 表示。如以下详细讨论的，如果移动站 202 退出通信网络 206，第一链路 222 表示第三连接线。

媒体网关 210 可位于任何位置，只要它能和通信网络 206 以及第二网络 214 通信。对于优选实施例，媒体网关 210 和通信网络 206 在一起并作为其一部分，因此，媒体网关处理地址转换并在通信网络的外部边缘 208 内路由。因此，媒体网关 210 经第一链路 222 和移动站 202 通信，并经第二链路 224 和有线链路 226 与远程站 204 通信。

移动站 202 和远程站 204 之间的呼叫通过载荷信道被路由到媒体网关 210。因此，载荷信道包括从移动站 202 延伸到媒体网关 210 的内部移动线 228，以及从媒体网关 210 延伸到移动站 204 的外部远程线 230，还有内部移动和外部远程线之间通过媒体网关 210 的连接。对于优选实施例，内部移动线 228 通过第一无线连接或链路 222、接入点 212 以及网络内部链路 232 连接媒体网关 210 和移动站 202，外部远程线 230 经有线链路 226、第二网络 214 以及第二无线连接或链路 224 连接媒体网关和远程站。

媒体网关 210 可以从一个站（即呼叫站）接收对另一个站（即被

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呼叫站）的呼叫。例如，移动站 202 试图呼叫远程站 204，反之亦然。当媒体网关 210 接收到来自呼叫站的呼叫时，媒体网关根据呼叫站的电话号码以及电子序列号（ESN）或用户识别模块（SIM）信息查询无缝移动寄存器对应该呼叫站的呼叫方 ID 信息。无缝移动寄存器是驻留在媒体网关 210 内或连接到该媒体网关的远程服务器上的数据库。此外，无缝移动寄存器可在多个无线网络内并行存在。该无缝移动寄存器包含用于各个预订无线网络的站的数据纪录。存储的数据包括 ESN 或 SIM 信息、用户名称以及和每个站相关的所有电话号码。

当接收到呼叫站的用户信息时，媒体网关 210 将呼叫站的网络使用的用户信息翻译为被叫站的网络使用的电话号码和用户名称，并发送该翻译的信息到被叫站。随后在被叫站的显示器上显示呼叫站的呼叫方 ID 信息。

图 3 和图 2 类似，但显示移动站 202 移动到通信网络 206 的过渡区域 302。媒体网关 210 能检测到参与呼叫的移动站 202 进入通信网络 206 覆盖区域的过渡区域 302。过渡区域 302 被定义为覆盖区域的外部边缘 208 和内部边缘 304 之间的区域。外部边缘 208 的位置是根据接入点 212 的通信范围（或多个接入点的通信范围）确定的，内部边缘 304 的位置是根据其到外部边缘的相对距离确定的。如果移动站 202 进入过渡区域 302，媒体网关 210 知道移动站可能进入或退出覆盖区域。通过监测移动站 202 在过渡区域 302 内的活动，特别是相对于外部和内部边缘 208、304，媒体网关 210 能更进一步的知道并确定移动终端会进入或退出覆盖范围的概率。外部和内部边缘 208、304 之间较大距离会比较小距离在确定进入或退出概率时具有更大精确性，但较大距离也需要较多资源来监测边缘之间的较大过渡区域 302。

在图 3 中，通信网络 206，更具体的是媒体网关 210，通过测量接入点 212 感知的移动站无线信号强度，检测出移动站 202 到达外部边缘 208。当该无线信号强度到达第一预定最小阈值时，媒体网关 210

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确定移动站是否会移回接入点 212，从而它的信号改善，或是否从接入点移开，从而为了维护建立的呼叫，和移动站的通信必须被切换到第二网络 214。例如，可以设定计时器来确定移动站 202 是否会返回覆盖区域，从而它的信号改善，或会从覆盖区域移开，从而它必须切换到蜂窝网络。一旦通信网络 206 检测到来自移动站 202 的无线信号强度达到低于第一预定最小阈值的第二预定最小阈值，则开始切换处理。

图 3 代表可能有两种不同情形的优选实施例：（1）第一呼叫上的移动站 202 在退出通信网络 206 之前进入过渡区域 302，以及（2）第一呼叫上的移动站在进入该通信网络之前进入过渡区域。对于第一种情形，媒体网关 210 具有到移动站 202 的第一连接线，即内部移动线 228，并响应检测到移动站已经到达过渡区域 302，尝试建立到该移动站的第三连接线，即外部移动线 306。对于第二种情形，媒体网关 306 具有到移动站 202 的第一连接线，即外部移动线 306，并响应检测到移动站已经到达过渡区域 302，尝试建立到移动站的第三连接线，即内部移动线 228。在两种情形中，媒体网关 210 将第三连接线和第一连接线同步，从而可以实际上无缝的方式实现从一个连接到另一个连接的切换。

对于优选实施例，媒体网关 210 命令移动站 202 发送第二呼叫到媒体网关。作为响应，移动站 202 呼叫预定号码以建立第二呼叫，并因此建立到媒体网关 210 的第三连接线。该预定号码可以是移动站的识别号码，例如它的电话号码或预分配的切换号码，例如指定的免费号码（例如“800”，“888”或“877”）或长途号码（例如“900”）。由于移动站和远程站 202、204 之间的呼叫必须通过媒体网关 210 传送，任何到该预定号码的通信都会被导向该媒体网关。

媒体网关 210 可以响应在命令移动站 202 呼叫该预定号码之后的一段预定时间内接收到导向该预定号码的通信来建立第三连接线。在

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替换方案中，媒体网关可以响应接收到导向该预定号码的通信并确定在媒体网关和移动站 202 之间的内部移动线 228 仍然是活动的来建立第三连接线。作为另一个替换方案，媒体网关 210 可以通过呼叫移动站 202，并经此呼叫通知移动站要进行切换操作来建立第三连接线。例如，媒体网关 210 可将头部消息包括到输出呼叫中，通知移动站 202 媒体网关打算将通信从内部移动线 228 切换到外部移动线 306。

参考图 4，显示移动站 202 在通信网络 206 的外部边缘 208 之外。移动站 202 可以通过退出通信网络 206 或准备进入该通信网络而到达此位置。如果移动站 202 退出该通信网络 206，则先前具有到移动站 202 的第一连接线（即内部移动线 228）（图 3 所示）的媒体网关 210 现在具有到移动站的第三连接线，即外部移动线 306。因此，在建立第三通信线之后，媒体网关 210 必须将通信从第一连接线切换到第三连接线并断开第一通信线。对于第二种情形，则媒体网关当前具有第一连接线，即到移动站 202 的外部移动线 306，并尝试建立到移动站的第三连接线，即内部移动线 228。然后，在第三通信线建立之后，媒体网关 210 将通信从第一连接线切换到第三连接线并断开第一通信线。对于优选实施例，假定移动站 202 保留在通信网络 206 之内一段预定时间，第一通信线被断开。

对于图 4 所示优选实施例，移动站 202 经外部移动线 306 和媒体网关 210 通信，远程站 204 经外部远程线和媒体网关通信。理解本发明的要点在于由媒体网关 210 建立并控制外部移动线 306，即使如图 4 所示的站 202、204 采用第二网络 214。如果站 202、204 经第二网络 214 通信而不导向媒体网关 210，媒体网关 210 就不能控制通信，因此当移动站移进和移出通信网络 206 时，不和第二网络 214 传送诸如 SS7 的通信控制信号就不能切换通信。通过维持和媒体网关 210 的外部移动线 306，当移动站 202 在通信和第二网络 206、214 之间移动时，不和第二网络传送通信控制信号，媒体网关也能以无缝方式交替切换给定呼叫。

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远程站 204 可以预订或不预订通信网络 206。如果远程站 204 没有预订通信网络 206（非预订远程站）但发起了到移动站 202 的呼叫，为了能够切换移动站，仍然必须通过媒体网关 210 建立载荷信道。移动站 202 预订通信和第二网络 206、214，因此它具有操作在通信网络中的通信网络号码，诸如企业号码，以及操作在第二网络中的第二网络号码，诸如蜂窝号码。对于该特定情形，如果非预订远程站 204 呼叫通信网络号码，则通过媒体网关 210 建立载荷信道。因此，媒体网关 210 能切换用于移动站 202 的通信。对于另一种情形，如果非预订远程站 204 呼叫第二网络号码，可直接通过第二网络 214 连接远程站和移动站 202 之间的呼叫。因此，媒体网关 210 不控制该呼叫，也不能切换用于移动站 202 的通信。

例如，参考图 4，远程站 204 不是通信网络 206 的用户，仅是第二网络 214 的用户。虽然远程站 204 可位于通信网络 206 之内或之外，该例中远程站位于通信网络之外。移动站 202 是通信网络 206 和第二网络 214 的用户，因此具有至少两个电话号码。移动站 202 还有存储在媒体网关 210 的无缝移动寄存器数据库内的数据。远程站 204 使用移动站的通信网络号码通过第二网络 214 发起到移动站 202 的呼叫，从而建立第二连接线，即外部远程线 230。媒体网关 210 接收该呼叫，并检索用于移动站 202 的用户信息，特别是移动站的第二网络号码。媒体网关 210 然后使用呼叫重定向，从而通信网络 206 通过第二网络 214 呼叫移动站 202 以建立第一连接线，即外部移动线 306。因为移动站 202 位于通信网络 206 的覆盖区域之外，移动站经第二网络 214 接收该呼叫。

对于该例，移动站 202 的呼叫方识别显示器将会显示远程站 204 的第二网络号码和用户名称，因为在媒体网关 210 内未存储用于该远程站 204 的信息。在替换方案中，移动站 202 的显示器将会显示特定消息，例如“区域之外”。外部远程线 230 由媒体网关 210 在整个呼

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叫中维护，因为远程站 204 不是通信网络 206 的用户，而且关于远程站的信息没有存储在媒体网关的无缝移动寄存器中。同样，此例中的远程站 204 也不能切换通信到通信网络 206。媒体网关 210 维持用于该呼叫的载荷信道，移动站 202 预订通信和第二网络 206、214。因此，移动站 202 可使用在此公开的处理过程在通信和第二网络之间切换通信。

参考和图 2 到 4 有关的图 5，提供显示媒体网关 210 优选操作的流程图 500。在步骤 502 开始操作之后，在步骤 504，移动站 202（MS）或远程站 204（RS）中的任一个尝试呼叫移动站或远程站中的另一个。更具体的，移动站 202 可能尝试呼叫远程站 204 的通信网络号码，或远程站 204 可能尝试呼叫移动站的通信网络号码。无论是移动站 202 还是远程站 204 的对通信网络号码的呼叫尝试都在步骤 506 被发送到媒体网关 210。如上所述，在移动站 202 和远程站 204 之间建立的载荷信道总是通过媒体网关 210 建立。然后，媒体网关 210 在步骤 508 通过媒体网关连接移动站 202 和远程站 204 之间的呼叫。媒体网关 210 经第一连接线（即线 1）连接到移动站 202，媒体网关经第二连接线（即线 2）连接到远程站。如图 2 到 4 所示，第一连接线用内部移动线 228 和外部移动线 306 之一表示，第二连接线用外部远程线 230 表示。

在连接呼叫之后，媒体网关 210 在步骤 510 监测移动站 202 相对于覆盖区域的过渡区域 302 的位置。如果当监测移动站 202 位置时，媒体网关 210 在步骤 512 确定终止该呼叫，则操作在步骤 534 结束。否则，如果移动站在步骤 514 没有进入覆盖区域的过渡区域 302，或在步骤 516 移动站将要进入或退出覆盖区域，媒体网关 210 在步骤 510 继续监测移动站 202 的位置。如果到达步骤 512 时呼叫还没有结束，移动站 202 在步骤 514 进入覆盖区域的过渡区域，并且移动站可能在步骤 516 进入或退出覆盖区域，则媒体网关 210 在步骤 524 建立和移动站的第三连接线。如图 2 到 4 所示，第三连接线用内部移动线 228

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和外部移动线 306 之一表示，无论哪条线都不代表第一连接线。因此，在步骤 524 期间，媒体网关 210 和移动站 202 之间同时存在两条连接线。

媒体网关 210 可能响应一个或多个条件在步骤 524 建立第三连接线。例如，媒体网关 210 可能命令移动站 202 呼叫媒体网关，从而建立第三连接线，或媒体网关可以呼叫移动站，从而建立第三连接线。如果媒体网关 210 命令移动站 202 呼叫指向媒体网关的预定号码，则媒体网关响应接收到该呼叫建立第三连接线。例如，如果媒体网关 210 在媒体网关命令移动站 202 呼叫该预定号码后的一段特定时间周期阈值内接收到该呼叫，则建立第三连接线。同样，例如，如果媒体网关 210 从其接收该呼叫的预定号码是专用于开始第三连接线目的的，则建立第三连接线。如果媒体网关 210 呼叫移动站 202 以建立第三连接线，则该呼叫可以包括通知移动站正建立第三连接线的信息。例如，当媒体网关 210 呼叫移动站 202 时，该呼叫可以包括呼叫信号，该呼叫信号指示第三连接线和第一连接线同时存在。

对于优选实施例，媒体网关 210 在步骤 518 可以命令移动站 202 呼叫预定号码以建立到媒体网关的第三连接线，然后在步骤 520 确定移动站是否确认了呼叫该预定号码的命令。例如，移动站 202 可以通过呼叫该预定号码来确认该命令。如果移动站 202 未在步骤 520 确认该命令，媒体网关 210 通过循环步骤 520 和 522 来继续等待来自移动站 202 的确认或呼叫结束的指示。如果在步骤 522 呼叫结束，则操作在步骤 534 终止。

如果移动站 202 在步骤 520 确认了该命令，则媒体网关 210 在步骤 524 建立媒体网关和移动站之间的第三连接线，即线 3。然后，媒体网关 210 在步骤 526 将媒体网关和移动站 202 之间的通信从第一连接线切换到第三连接线。如由步骤 526 和 528 所表示的，媒体网关 210 在步骤 528 继续尝试媒体网关和移动站 202 之间的通信切换，直至切

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换成功。在步骤 528 切换成功之后，媒体网关 210 在步骤 530 通过断开第一连接线断开媒体网关和移动站 202 之间的通信。如果在到达步骤 532 时呼叫没有结束，媒体网关再次在步骤 510 监测移动站 202 相对于覆盖区域的过渡区域 302 的位置。否则，如果呼叫结束，操作在步骤 534 结束。

参考图 6，显示了移动站 202 的不同组件。移动站 202 通常包括至少一个天线 602，两个收发机电路 604、606 以及多个其他组件 608-614。移动站 202 的各个组件可以部分集成或集成为一个整体。例如，虽然图 6 所示收发机电路 604、606 是分离电路，它们可被组合成一个单个电路。

如图 6 所示，移动站 202 包括第一收发机电路 604（收发机 1）和第二收发机电路 606（收发机 2）。第一收发机电路 604 在第一覆盖区域内和第一网络通信，第二收发机电路 606 在第二覆盖区域内和第二网络通信。第二覆盖区域不同于第一覆盖区域，且优选的第二网络不同于第一网络。对于移动站 202 的优选实施例，第一网络是载波网络和非载波网络之一，第二网络是载波网络和非载波网络的另一个。非载波网络是不由载波管理的无线局域网。例如，载波网络可以是蜂窝网络，非载波网络可以是企业网。

移动站 202 还包括含有处理器 608 的主电路，以及连接到处理器的存储部分 610、显示器 612 和用户接口 614。处理器根据存储在存储部分 610 的应用程序以及存储在该存储部分的数据操作提供移动站 202 的通用操作。存储在存储部分 610 的应用程序包括（但不限于）：用于管理通过媒体网关 210 和远程站 204 的呼叫的处理器代码，用于同时经第一和第二收发机电路 604、606 和媒体网关通信的处理器代码，用于将和媒体网关的通信从第一收发机电路切换到第二收发机电路的处理器代码，以及用于断开经第一收发机电路和媒体网关的通信的处理器代码。因此，处理器提供如以下参考图 7 所述的操作，允许

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第一和第二网络之间的无缝转换。同样，在执行上述处理器代码的同时，显示器 612 和用户接口 614 提供促进移动装置 202 操作的用户交互。

主电路连接到第一和第二收发机电路 604、606，并用于管理和远程站的呼叫。对于优选实施例，处理器 608 连接到第一和第二收发机电路 604、606。主电路能同时操作第一和第二收发机电路 604、606，并将用于呼叫的通信从第一收发机电路 604 切换到第二收发机电路 606。更具体的，主电路能经第一收发机电路 604 或第二收发机电路 606 中的任一个连接第一连接线到远程站 204，经第一收发机电路和第二收发机电路中的另一个开始到远程站的第二连接线，并断开第一连接线。主电路在操作第一收发机电路 604 时，响应接收到指示移动站 202 进入过渡区域或覆盖区域的第二区域的信号，开始第二收发机电路 606 的操作。移动站 202 可以通过位于进入或退出非载波覆盖区域的特定范围内来进入该过渡区域。

由于移动站 202 包括两个收发机电路 604、606，移动站能够接收到其通信网络号码和第二网络号码的呼叫。主电路能够和媒体网关 210 同步的切换通信。对于优选实施例，主电路能切换用于呼叫的通信，如果（a）远程站 204 开始指向媒体网关 210 的到移动站 202 的通信网络号码或预定号码的呼叫，或（b）移动站开始指向媒体网关 210 的到移动站 202 的通信网络号码或预定号码的呼叫。同样，对于优选实施例，如果远程站 204 开始到移动站 202 的第二网络号码的呼叫，主电路不能切换用于该呼叫的通信。

如果移动站 202 开始到远程站 204 的第二网络号码的呼叫，主电路能或不能切换用于该呼叫的通信。如上所述，如果移动站呼叫建立到媒体网关 210 的连接的预定号码，且媒体网关 210 建立到远程站 204 的第二网络号码的呼叫，则移动站 202 的主电路能够切换。用户还可以通过经移动站 202 的用户接口输入远程站 204 的第二网络号码开始

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该呼叫。移动站 202 随后使用预定号码或远程站 204 的通信网络号码建立到媒体网关 210 的呼叫，对于用户是明显的。例如，对于优选实施例，无论何时移动站 202 位于通信网络 206 的覆盖区域之内，对通信网络连接给予优先级（相对于第二网络连接）。也可以在移动站 202 位于通信网络 206 之内或之外出现此种情形。只要移动站 202 经媒体网关 210 建立呼叫，以便建立从移动站 202 到媒体网关 210 的内部或外部通信线，移动站就能在通信和第二网络 206、214 之间切换通信。

图 6 还可以表示远程装置 204。远程站 204 可以在所有方面和移动站 202 类似。然而，本发明的正常操作不要求移动和远程站 202、204 相同。更具体的，远程站 204 无需如上所述用于移动站 202 的第二收发机电路 606 和存储在存储部分 610 的应用程序或处理器代码。实际上，现有通信装置可操作为远程装置 204。

参考和图 6 相关的图 7，提供显示移动站 202 优选操作的流程图 700。在步骤 702 开始操作之后，在步骤 708 建立移动站 202（MS）和远程站 204（RS）之间的呼叫。更具体的，在媒体网关 210 和移动站 202 的第一收发机电路 604 之间建立通信。在连接呼叫之后，移动站 202 在步骤 712 确定呼叫是否结束或在步骤 714 确定移动站是否进入覆盖区域的过渡区域 302。如果媒体网关 210 在步骤 712 确定呼叫结束，则操作在步骤 734 结束。

如果到达步骤 712 时呼叫没有结束，移动站 202 在步骤 714 进入覆盖区域的过渡区域，则在步骤 724 在媒体网关 210 和移动站的第二收发机电路 606 之间建立通信。在步骤 724 期间，第一和第二收发机电路同时和媒体网关 210 以及移动站 202 通信。

响应一个或多个条件在步骤 724 建立媒体网关 210 和第二收发机电路 606 之间的通信。例如，媒体网关 210 可以命令移动站 202 呼叫指向媒体网关的预定号码，或媒体网关可以呼叫移动站并通知移动站

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正建立连接。

移动站 202 然后在步骤 726 将媒体网关 210 和移动站之间的通信从第一收发机电路 604 切换到第二收发机电路 606。该移动站 202 的切换操作是和媒体网关 210 执行的类似切换操作（图 5 步骤 526）同步执行的。如步骤 726 和 728 所示，移动站 202 继续尝试媒体网关和移动站 202 之间的通信切换，直至在步骤 728 该切换成功。在步骤 728 切换成功之后，媒体网关 210 在步骤 730 断开媒体网关和移动站 202 的第一收发机电路 604 之间的通信。如果到达步骤 712 时呼叫没有结束，则移动站 202 再次在步骤 714 确定移动站是否进入覆盖区域的过渡区域 302。否则，如果呼叫结束，操作在步骤 734 结束。

应当理解，在本发明优选实施例中，至少给移动站 202 分配两个号码，以允许网络间的切换。然而，可为移动站 202 分配多于两个的号码。例如，可为移动站 202 分配通用号码，并存储在和媒体网关 210 相关的无缝移动寄存器中。此时，在此说明的使用情况是相同的，除了发起呼叫的站可能采用被叫站的通用号码而不是通信网络号码。媒体网关 210 如所需要的翻译通用号码，和在此说明的例子一样，以建立呼叫，从而总是如在此所述的通过媒体网关维护载荷信道。

虽然图示和说明了本发明的优选实施例，应当理解本发明不限于此。本领域技术人员可以作出多种修改、改变、变化、替换以及等效，而不背离如附随权利要求所定义的本发明的精神和范围。

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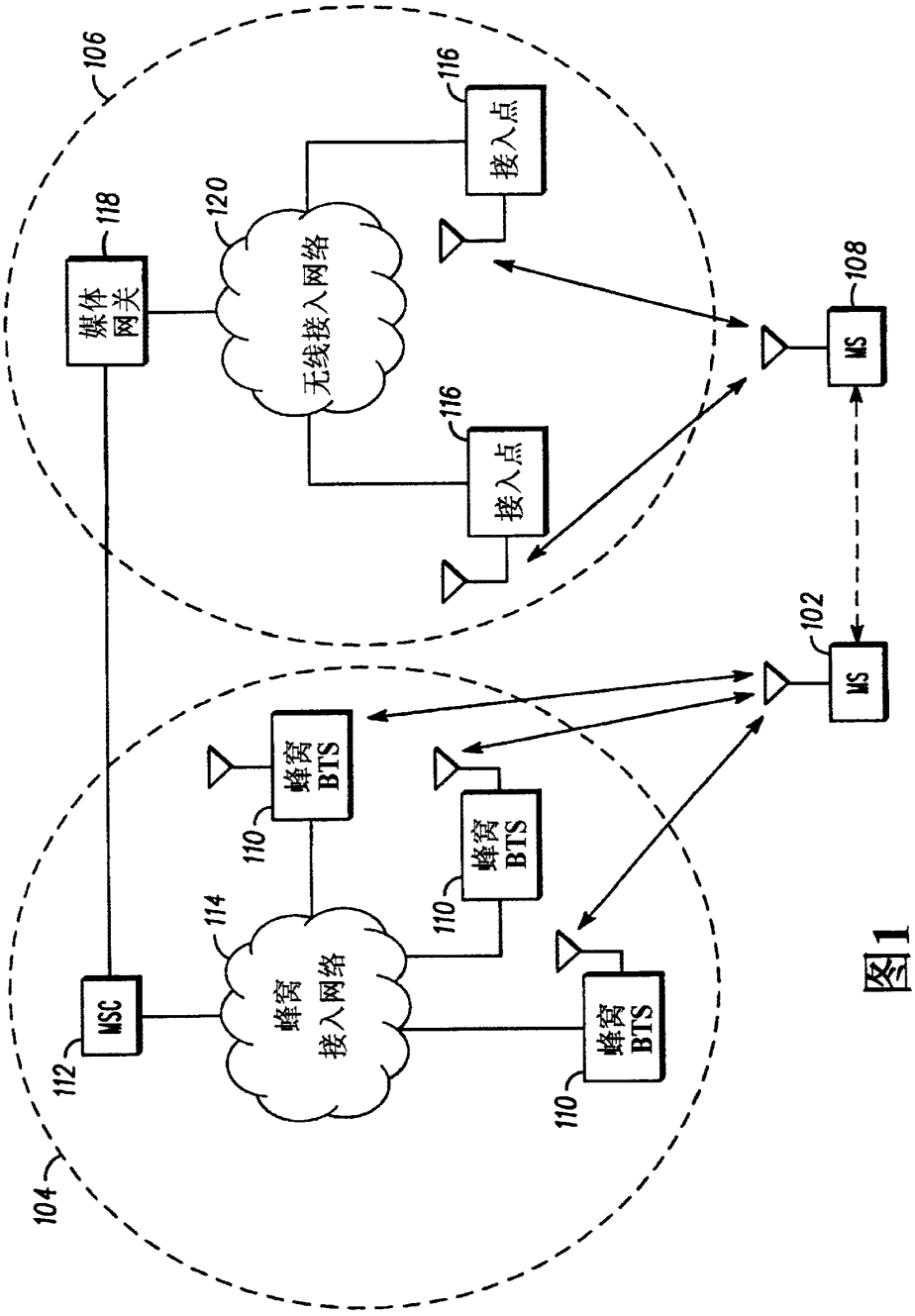


图1

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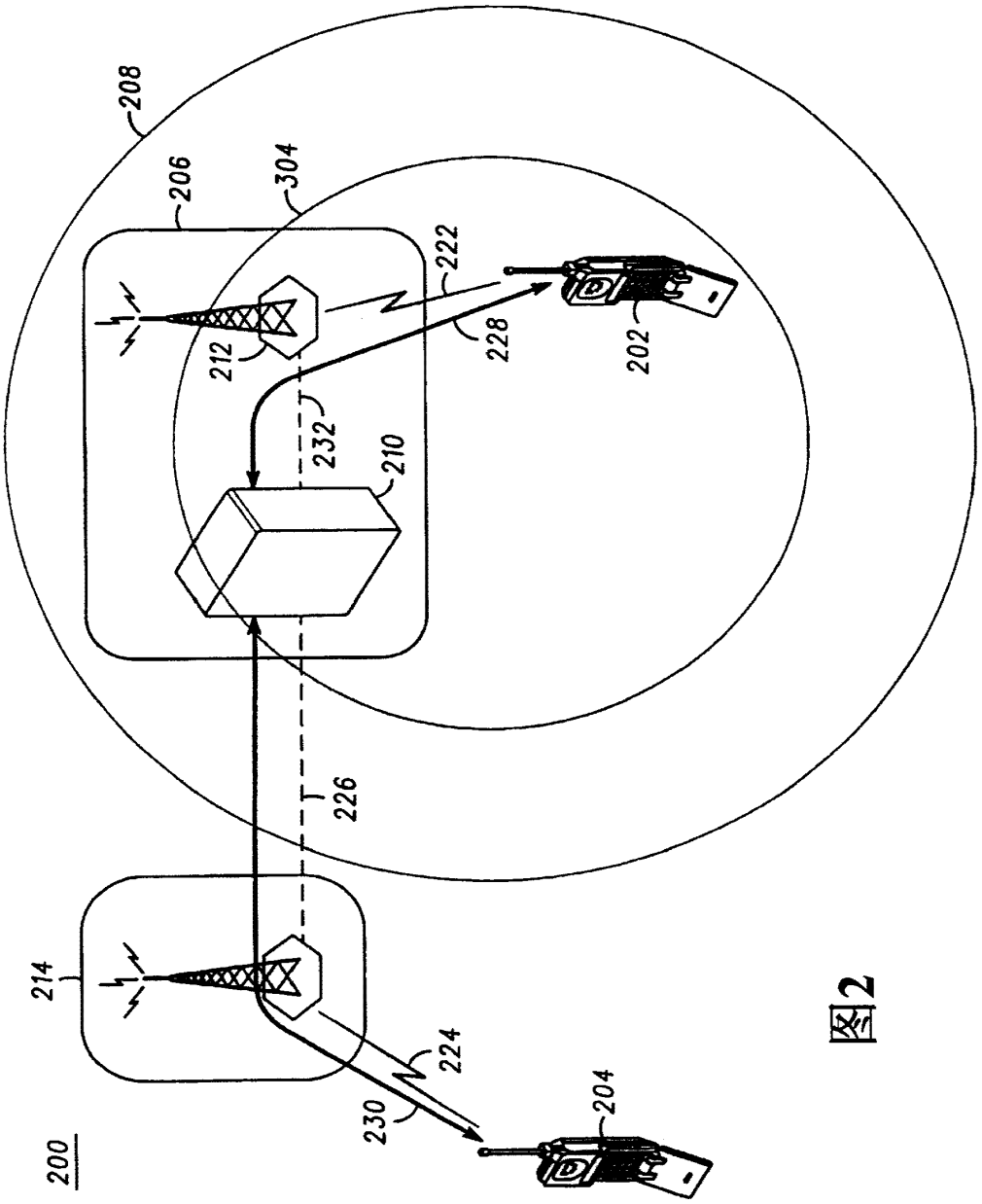


图2

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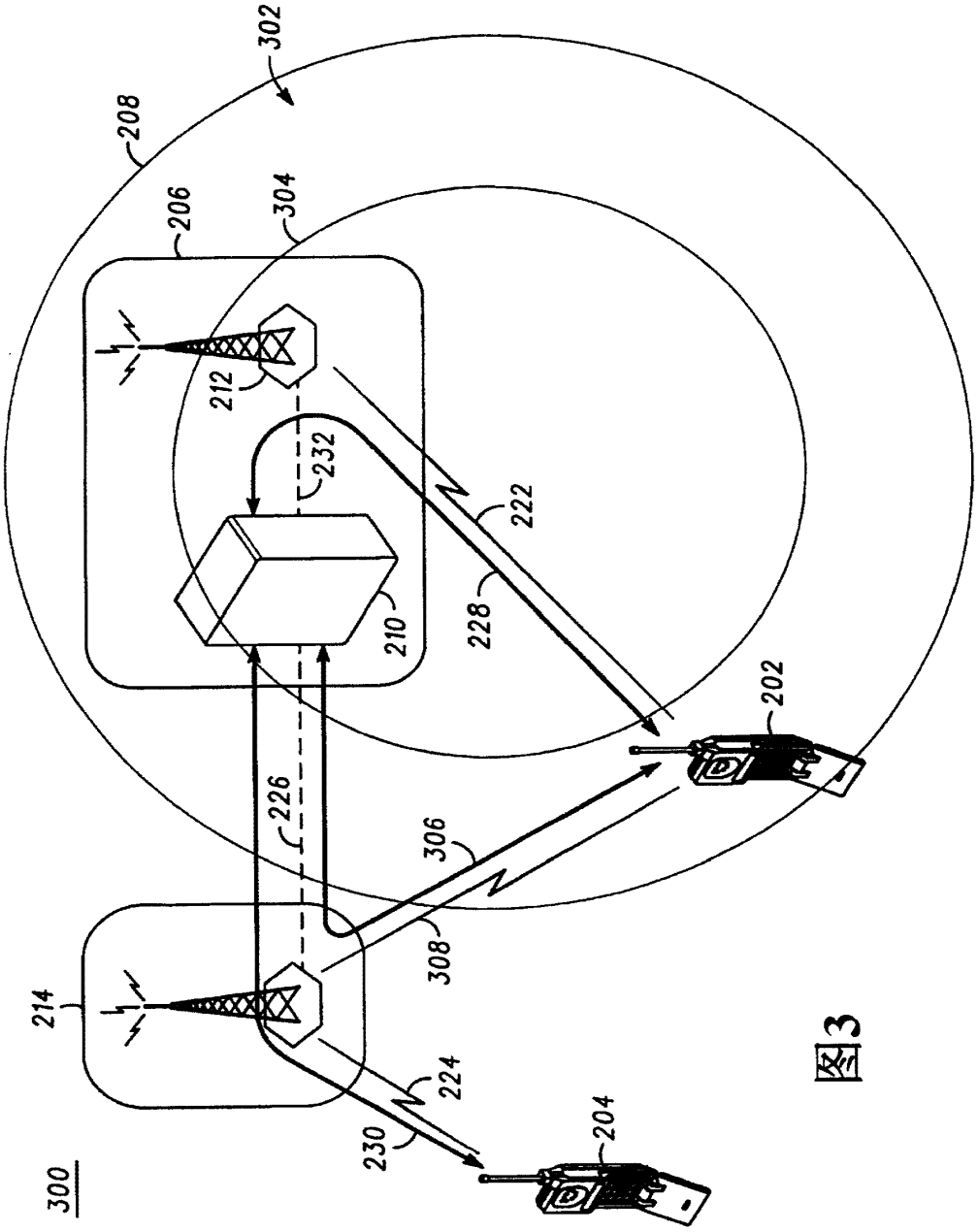


图3

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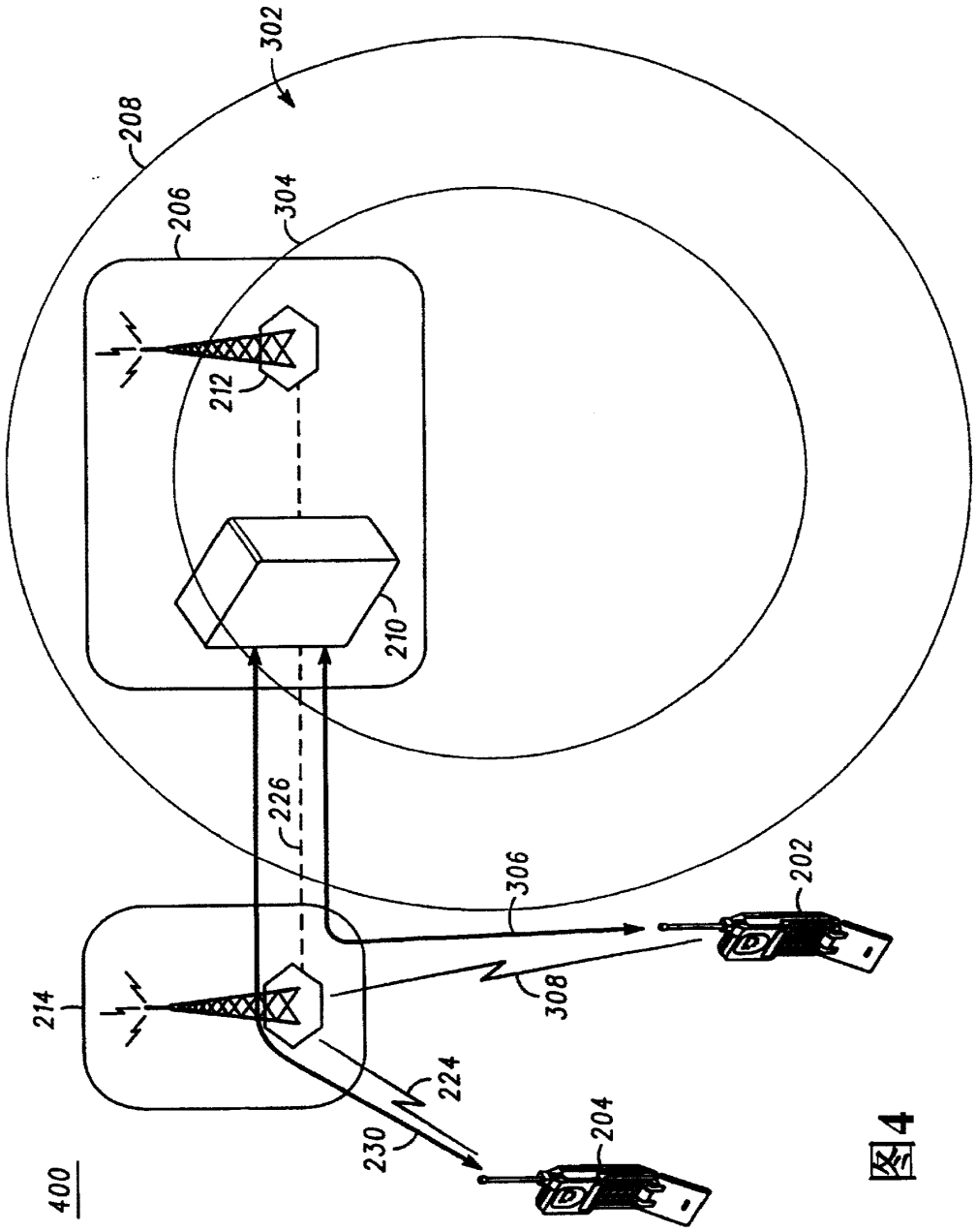


图4

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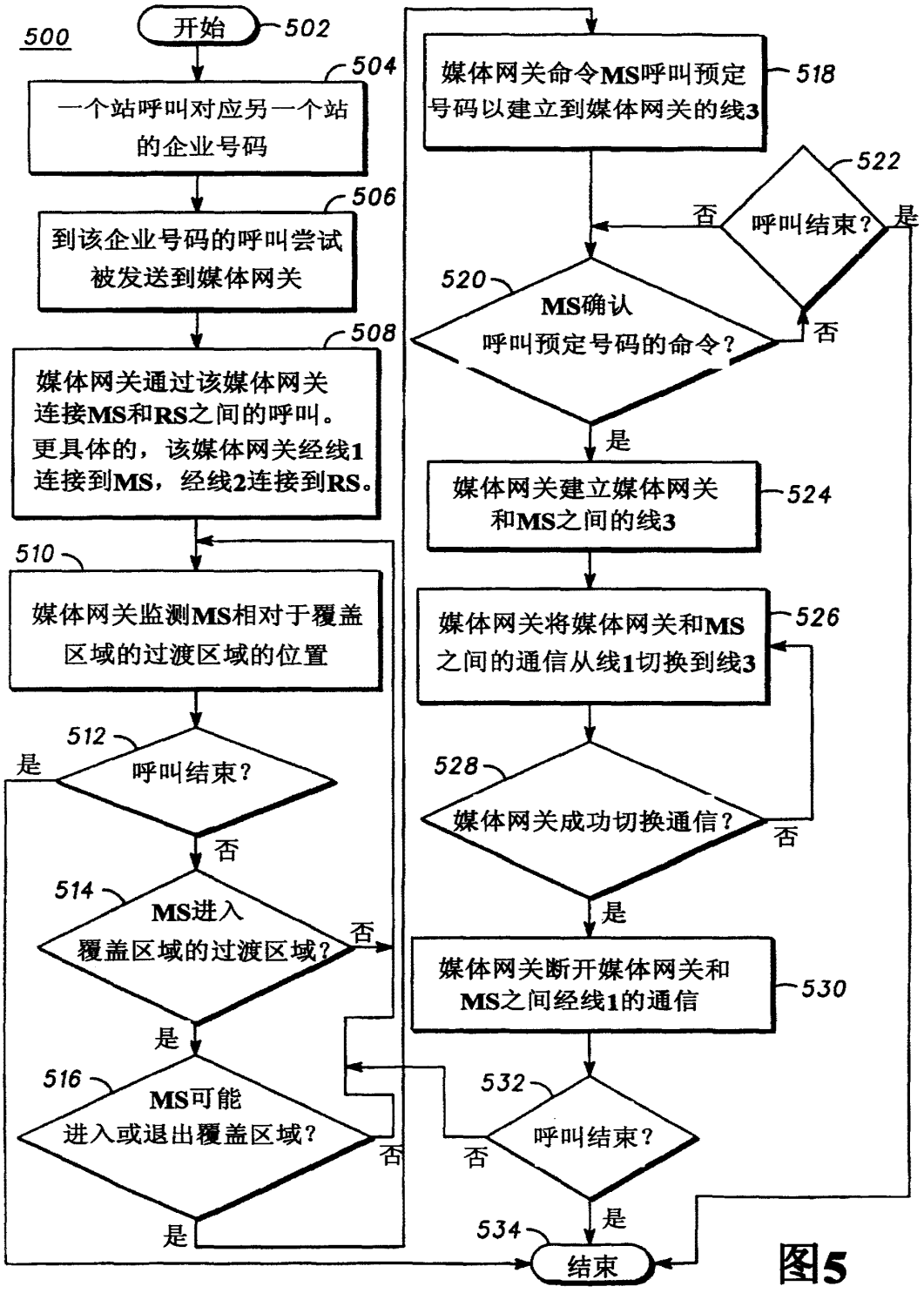


图5

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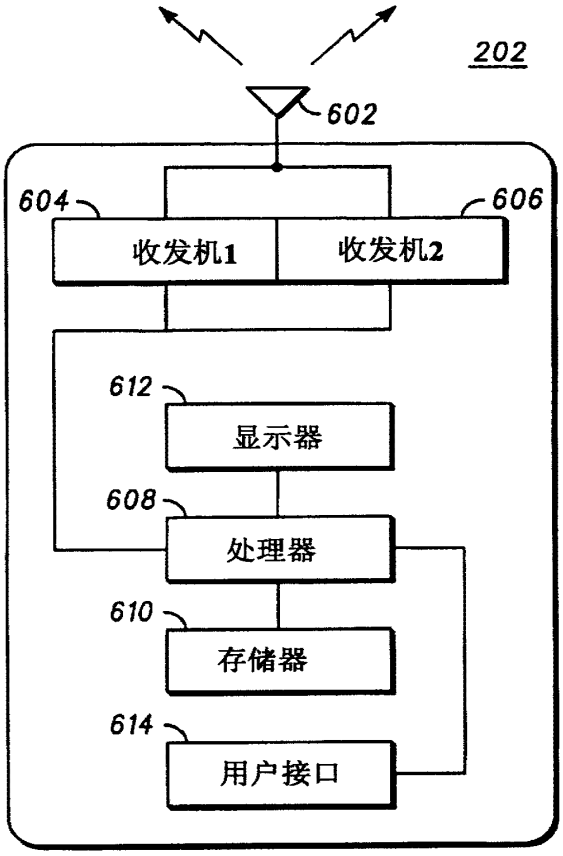
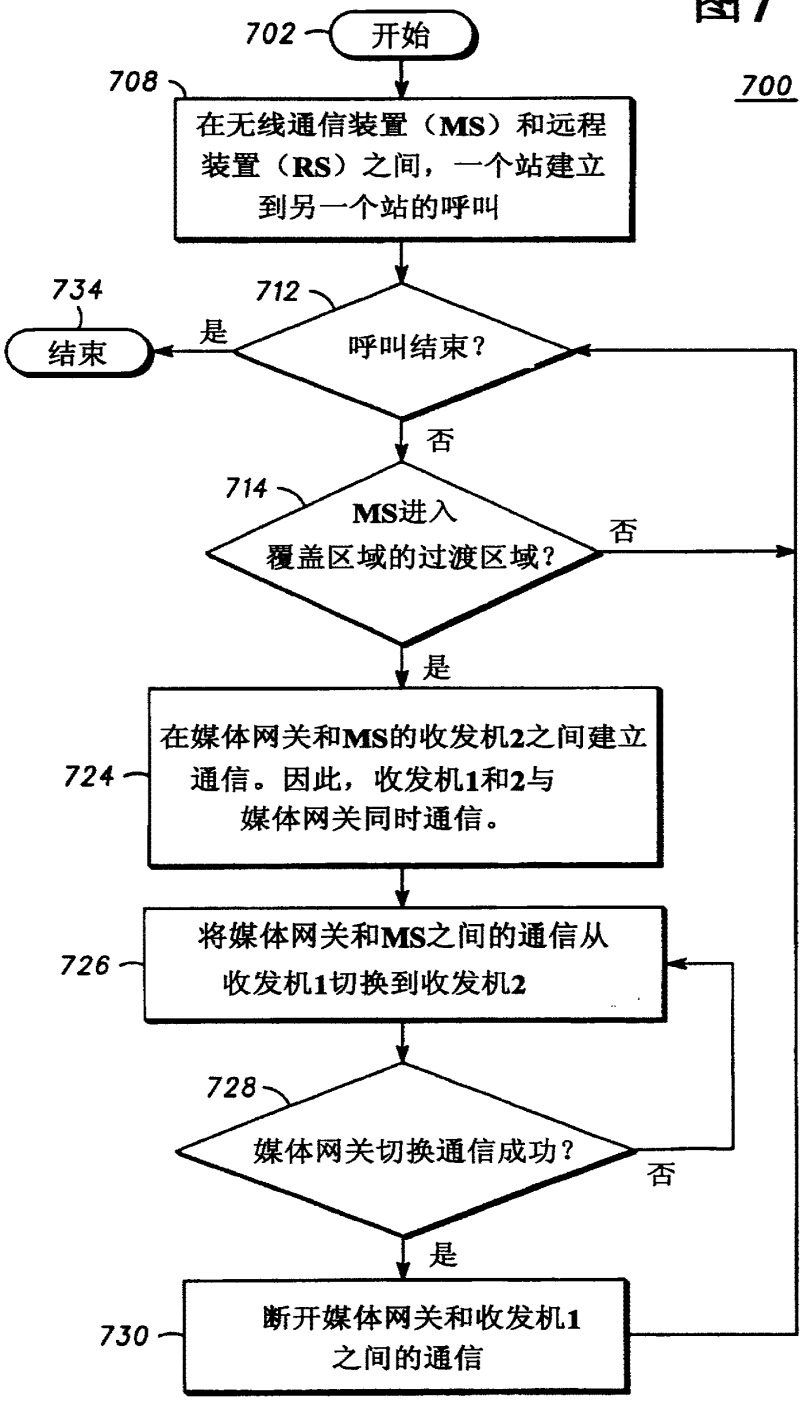


图6

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图7



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Electronic Acknowledgement Receipt

EFS ID:	32523626
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	03-MAY-2018
Filing Date:	09-OCT-2014
Time Stamp:	14:15:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_5_3_2018.pdf	612301 900874b52f50c06ffc4bd274ceee5e9fe70fec1c	no	4

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2	Foreign Reference	CN1723719.pdf	1391677 dda967dbcdd9600e1ebf99eafef0bd6d2ab02ed8	no	28
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3	Other Reference-Patent/App/Search documents	Other1.pdf	5233178 0923b8ffe8a3c3a60df7d0497d5ce37c2413d823	no	24
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Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	14510766
Filing Date	09-Oct-2014
First Named Inventor	Vasudevan Ganesan
Attorney Docket Number	HAVA-00402
Title of Invention	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Vasu Networks Corporation	100%

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

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as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

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○	I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

◉ Small Entity

○ Micro Entity

○ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 37902

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

Signature	/Jonathan O. Owens/
Name	Jonathan O. Owens

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**160**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 14510766

Filing Date: 09-Oct-2014

Applicant/Patent under Reexamination: Ganesan

Electronic Terminal Disclaimer filed on May 23, 2018

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Electronic Acknowledgement Receipt	
EFS ID:	32701397
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	23-MAY-2018
Filing Date:	09-OCT-2014
Time Stamp:	12:13:24
Application Type:	Utility under 35 USC 111(a)

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Payment was successfully received in RAM	$160
RAM confirmation Number	052318INTEFSW12132200
Deposit Account	081275
Authorized User	Jonathan Owens
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	33544 a171b3bbd42e3d34a55f813aeb7e7e61b1a1104d	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30557 e90d4857b2e98e5e3e75b17ae64387fa60c886ec	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	64101		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2467
Vasudevan Ganesan	Examiner: Foud, Hicham B.
Serial No.: 14/510,766	
Filed: October 9, 2014	**AMENDMENT AND RESPONSE TO OFFICE ACTION MAILED April 26, 2018**
For: **MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER**	162 North Wolfe Road Sunnyvale, California 94086 (408) 530-9700
	Customer No.: 28960

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

Please amend the above-titled application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins of page 2 of this paper.

Remarks begin on page 11 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (currently amended) A method of providing communications for a mobile communication device that roams between multiple networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a first communication link between the mobile communication device and a first network;

monitoring a context of the first communication link;

when a second context is preferred over the context of the first communication link, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with ~~the~~ a client;

notifying the mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second communication link between the mobile communication device and a second network, wherein the second ~~context~~ network is within a set of known networks or from a newly discovered network.

2. (previously presented) The method of claim 1 wherein the first communication link comprises a WiFi communication link, and the first network comprises a WiFi network access point.

3. (previously presented) The method of claim 2 wherein the second network comprises a cellular network.

4. (original) The method of claim 1 wherein establishing the first communication link includes routing through a VOIP network.

5 (original) The method of claim 1 wherein establishing the first communication link includes routing through a cellular network.

6. (original) The method of claim 1 wherein establishing the second communication link includes routing through a VOIP network.

7. (original) The method of claim 1 wherein establishing the second communication link includes routing through a cellular network.

8. (previously presented) The method of claim 1 further comprising providing a connectivity status by the mobile communication device to the interface server while the mobile communication device is within a first coverage area of the first network.

9. (previously presented) The method of claim 8 further comprising providing a routing association to a mobile switching center within the second network, wherein the routing association associates the mobile communication device to the interface server.

10. (previously presented) The method of claim 9 further comprising routing a termination communication intended for the mobile communication device from the mobile switching center to the interface server according to the routing association when the connectivity status is active, and routing the termination communication from the interface server to the mobile communication device over the first network.

11. (original) The method of claim 10 further comprising when the connectivity status is not provided to the interface server, the router association is removed from the mobile switching center.

12. (previously presented) The method of claim 1 further comprising registering the mobile communication device with a mobile switching center within the second network when the context changes.

13. (original) The method of claim 12 further comprising setting up the second communication link with the end destination device and forwarding the second communication link to the interface server.

Claims 14-38 (canceled)

39. (previously presented) The method of claim 1, wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

40. (previously presented) The method of claim 1 wherein the communications comprise a telephone call.

41. (canceled)

42. (previously presented) The method of claim 1 wherein the communications comprise a secured transmission of content.

43. (previously presented) The method of claim 42 wherein the content comprises at least one of fixed and mobile.

44. (previously presented) The method of claim 1 wherein the communications comprise an unsecured transmission of content.

45. (previously presented) The method of claim 44 wherein the content comprises at least one of fixed and mobile.

46. (previously presented) The method of claim 1 wherein the communications comprise a secured data exchange.

47. (previously presented) The method of claim 1 wherein the communications comprise an unsecured data exchange.

48. (previously presented) The method of claim 1 wherein the interface server is coupled to a gateway device.

49. (previously presented) The method of claim 48 wherein the gateway device is bi-directionally coupled to a packet network.

50. (previously presented) The method of claim 49 wherein the packet network comprises packet switched telephone network.

51. (previously presented) The method of claim 48 wherein the gateway device comprises a softswitch.

Claims 52-78 (canceled)

79. (currently amended) A method of providing communications for a communication device that roams between multiple networks, the method comprising:

establishing, with a client, a first communication link between the communication device and an end destination device, wherein the first communication link comprises a first communication link between the communication device and a first network;

monitoring, with the client, a first context of a signal of the first communication link;

when a second network is detected as available and a second context of a second communication link corresponding to the second network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with the client;

notifying the communication device to terminate transmission over the first communication link; and

re-directing, with the client, the second communication link from the interface server to the communication device, thereby establishing a second communication link between the communication device and the second network, wherein the second ~~context~~ network is within a set of known networks or from a newly discovered network.

80. (previously presented) The method of claim 79 wherein the first context comprises signal strength characteristics.

81. (previously presented) The method of claim 79 wherein the first context comprises first characteristics of the first communication link and the second context comprises second characteristics of the second communication link.

82. (previously presented) The method of claim 79 wherein the interface server is coupled to a gateway device.

83. (previously presented) The method of claim 82 wherein the gateway device is bi-directionally coupled to a packet network.

84. (previously presented) The method of claim 83 wherein the packet network comprises packet switched telephone network.

85. (previously presented) The method of claim 82 wherein the gateway device comprises a softswitch.

86. (currently amended) A method of providing communications for a communication device that roams between multiple networks, the method comprising:

establishing, with a client, a first communication link between a first communication device and an end destination device, wherein the first communication link comprises a first communication link between the first communication device and a first network;

monitoring, with the client, a first context of a signal of the first communication link;

when a second network is detected as available and a second context of a second communication link corresponding to the second network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with the client;
notifying the first communication device to terminate transmission over the first communication link; and
re-directing, with the client, the second communication link from the interface server to the first communication device, thereby establishing a second communication link between the first communication device and the second network, wherein the second ~~context~~ network is within a set of known networks or from a newly discovered network.

87. (previously presented) The method of claim 86 wherein the first context comprises signal strength characteristics.

88. (previously presented) The method of claim 86 wherein the first context comprises first characteristics of the first communication link and the second context comprises second characteristics of the second communication link.

89. (previously presented) The method of claim 86, wherein the first communication link comprises a first WiFi communication link, and the first network comprises a first WiFi network access point.

90. (previously presented) The method of claim 89, wherein the second communication link comprises a second WiFi communication link, and the second network comprises a second WiFi network access point.

Claims 91-94 (canceled)

95. (previously presented) The method of claim 1 wherein the context comprises a signal strength.

96. (previously presented) The method of claim 1 wherein the context comprises a signal strength and one or more additional criteria.

97. (previously presented) The method of claim 1 wherein the context comprises a criterion beside signal strength.

98. (previously presented) The method of claim 1 wherein the communications comprise data streaming.

99. (previously presented) The method of claim 79 wherein the communications comprise data streaming.

100. (previously presented) The method of claim 86 wherein the communications comprise data streaming.

101. (currently amended) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by [[a]] the client, wherein the client is stored within the mobile communication device.

102. (currently amended) The method of claim 101 wherein the client comprises software, firmware ~~and/or~~ or hardware.

103. (currently amended) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by [[a]] the client, wherein the client comprises an access point or a base station.

104. (previously presented) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by a network-based device, a switch, a router, a network-based switch or a network-based router.

105. (currently amended) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by [[a]] the client, wherein the client is not stored within the mobile communication device, and the client is re-directed from an access point or a network device.

106. (previously presented) The method of claim 1, wherein the communications comprise at least one of a telephone call, a voice ~~call/communication~~ communication, a video ~~call/communication~~ communication, a multimedia communication, or data ~~streaming/exchange~~ exchange.

107. (currently amended) The method of claim 1 wherein the communications comprise: a cellular communication, a VoIP communication [[/]] session, a voice communication [[/]] session, a video communication [[/]] session, a multimedia communication [[/]] session, a data communication [[/]] session ~~and/or~~ or a WiFi communication.

108. (previously presented) The method of claim 1 wherein the communications include content which is pushed or pulled.

109. (currently amended) The method of claim 1 wherein the first network comprises a cellular network, a WiFi network, the Internet, ~~and/or~~ or another network, and the second network comprises a cellular network, a WiFi network, the Internet, ~~and/or~~ or another network.

110. (previously presented) The method of claim 1 wherein the communications are received by the mobile communication device from a server device.

111. (previously presented) The method of claim 1 wherein the communications are sent by the mobile communication device to a server device.

112. (previously presented) The method of claim 1 wherein the communications are received by the mobile communication device from a second device via a server or proxy device.

113. (previously presented) The method of claim 1 wherein the communications are received by the mobile communication device from a second mobile communication device in a peer to peer configuration.

Electronic Acknowledgement Receipt

EFS ID:	32701772
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	23-MAY-2018
Filing Date:	09-OCT-2014
Time Stamp:	12:33:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response_5_23_2018.pdf	132535 020054c965720ae1b8e50ad831f8b4e0bbfa51b1	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	11	12
	Amendment/Req. Reconsideration-After Non-Final Reject	1	10
Warnings:			
Information:			
	Total Files Size (in bytes):	132535	

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New Applications Under 35 U.S.C. 111
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New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REMARKS

The Applicant respectfully requests further examination and consideration of the claims in view of the above amendments and the arguments set forth fully below. Claims 1-13, 39, 40, 42-51, 79-90 and 95-113 were pending in this application. Within the Office Action, Claims 1-13, 39, 40, 42-51, 79-90 and 95-113 have been rejected. By the above amendments, Claims 1, 79, 86, 101-103, 105, 107 and 109 have been amended. Accordingly, Claims 1-13, 39, 41-51, 79-90 and 95-113 are now pending.

Claim Objections

Within the Office Action, Claims 79 and 86 have been objected to as being a substantial duplicate of Claim 1. The Applicants respectfully disagree. The differences between Claims 79 and 86 and Claim 1 are significant. Claims 79 and 86 include the limitations: when a second network is detected as available and a second context of a second communication link corresponding to the second network is preferable, notifying... Therefore, Claims 79 and 86 are clearly different from Claim 1. Thus, the claims are sufficiently distinct, and the objections should be withdrawn.

Within the Office Action, Claims 101, 103 and 105 are objected to because the term "a client" should be changed to the "the client." By the above amendments, Claims 101, 103 and 105 have been amended to include "the client" as suggested within the Office Action.

Double Patenting

Within the Office Action, Claims 1-13, 79-90 and 95 have been rejected on the ground of nonstatutory obviousness-type double patenting over Claims 1-13 of U.S. Patent No. 8,886,181. Within the Office Action, Claims 39, 40, 42-51 and 96-113 have been rejected on the ground of nonstatutory double patenting over Claims 1-13 of U.S. Patent No. 8,886,181. A terminal disclaimer is filed herewith. Thus, the rejection should be withdrawn.

Rejections Under 35 U.S.C. § 112, second paragraph

Within the Office Action, Claims 1-13, 39, 40, 42-51, 79-90 and 95-113 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Applicants respectfully disagree. Within the Office Action, it is stated that "when a second

context is preferred over the context" is vague and indefinite. By the above amendments, this phrase has been amended to "when a second context is preferred over the context of the first communication link." Accordingly, this phrase is definite.

Within the Office Action, it is stated that the recitation in Claim 1 "wherein the second context is within a set of known networks or from a newly discovered network" is confusing. By the above amendments, Claim 1 has been amended to specify "wherein the second network is within a set of known networks or from a newly discovered network."

Within the Office Action, it is also stated that the term "the client" in line 12 of Claim 1 has no antecedent basis. By the above amendments, Claim 1 has been amended to specify "a client."

Within the Office Action, it is stated that Claims 102, 106, 107 and 109 are vague and indefinite because of the use of "/" and "and/or". By the above amendments, Claims 102, 106, 107 and 109 have been amended to remove "/" and "and/or."

Therefore, the rejections should be withdrawn.

Applicants respectfully submit that the claims are in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: May 23, 2018

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg. No.: 37,902
Attorneys for Applicants

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/510,766	Filing Date 10/09/2014	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	05/23/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 57	Minus	** 75	= 0	X $50 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***7	= 0	X $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SLIE
ADRIENE SELLMAN

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

28960 7590 06/27/2018

HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
06/27/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 14/510,766	**Applicant(s)** GANESAN, VASUDEVAN	
	Examiner HICHAM FOUD	**Art Unit** 2467	**AIA (First Inventor to File) Status** No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 05/23/2018 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires _____months from the mailing date of the final rejection.
   b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☒ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
13. ☒ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: 1-13,39,40,42-51,95-98 and 101-104.
    Claim(s) objected to: 79-90,99 and 100.
    Claim(s) rejected: .
    Claim(s) withdrawn from consideration: .

/HICHAM FOUD/
Primary Examiner, Art Unit 2467

Continuation of 12. does NOT place the application in condition for allowance because: The terminal disclaimer and amending the claims overcome the ODP and 112 rejections, respectively. However, the objected claims were not cancelled nor amended to overcome the objection under 37 CFR 1.75. Therefore, the objection is maintained.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2467
Examiner Name	Foud, Hichman B.
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	1723719	CN	A	2006-01-18	Motorola Inc		

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hichman B.
	Attorney Docket Number	HAVA-00402

	1	Copy of Office Action from Chinese Patent Application No.: 201510039302.4, dated February 8, 2018.	X

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	06/20/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hichman B.
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-05-03
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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OK TO ENTER: /H.B.F/

06/20/2018

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2467
Vasudevan Ganesan	Examiner: Foud, Hicham B.
Serial No.: 14/510,766	
Filed: October 9, 2014	**AMENDMENT AND RESPONSE TO OFFICE ACTION MAILED April 26, 2018**
For: **MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER**	162 North Wolfe Road Sunnyvale, California 94086 (408) 530-9700
	Customer No.: 28960

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

Please amend the above-titled application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins of page 2 of this paper.

Remarks begin on page 11 of this paper.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

28960 7590 06/28/2018

HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
06/28/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Examiner-Initiated Interview Summary	Application No.	Applicant(s)	
	14/510,766	GANESAN, VASUDEVAN	
	Examiner	Art Unit	
	HICHAM FOUD	2467	

All participants (applicant, applicant's representative, PTO personnel):

(1) *HICHAM FOUD*. (3)_____.

(2) *Jonathan Owens*. (4)_____.

Date of Interview: *20 June 2018*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☐103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1,79 and 86*.

Identification of prior art discussed: *None*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The examiner objected to claims 79 and 86 as substantial duplicate of claim 1 and wherein the limitation "when a second network is detected as available" is inherent since when MS is roaming from a first network to a second network and prior to handover, the availability of the second network must be detected to perform the handover. However, no agreement was reached.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/HICHAM FOUD/ Primary Examiner, Art Unit 2467	

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2467
Vasudevan Ganesan	Examiner: Foud, Hicham B.
Serial No.: 14/510,766	**SUPPLEMENTAL AMENDMENT AND RESPONSE TO OFFICE ACTION MAILED April 26, 2018**
Filed: October 9, 2014	
For: **MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER**	162 North Wolfe Road Sunnyvale, California 94086 (408) 530-9700
	Customer No.: 28960

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

Please amend the above-titled application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins of page 2 of this paper.

Remarks begin on page 9 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (previously presented) A method of providing communications for a mobile communication device that roams between multiple networks, the method comprising:

establishing a first communication link between the mobile communication device and an end destination device, wherein the first communication link comprises a first communication link between the mobile communication device and a first network;

monitoring a context of the first communication link;

when a second context is preferred over the context of the first communication link, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with a client;

notifying the mobile communication device to terminate transmission over the first communication link; and

re-directing the second communication link from the interface server to the mobile communication device, thereby establishing a second communication link between the mobile communication device and a second network, wherein the second network is within a set of known networks or from a newly discovered network.

2. (previously presented) The method of claim 1 wherein the first communication link comprises a WiFi communication link, and the first network comprises a WiFi network access point.

3. (previously presented) The method of claim 2 wherein the second network comprises a cellular network.

4. (original) The method of claim 1 wherein establishing the first communication link includes routing through a VOIP network.

5 (original) The method of claim 1 wherein establishing the first communication link includes routing through a cellular network.

6. (original) The method of claim 1 wherein establishing the second communication link includes routing through a VOIP network.

7. (original) The method of claim 1 wherein establishing the second communication link includes routing through a cellular network.

8. (previously presented) The method of claim 1 further comprising providing a connectivity status by the mobile communication device to the interface server while the mobile communication device is within a first coverage area of the first network.

9. (previously presented) The method of claim 8 further comprising providing a routing association to a mobile switching center within the second network, wherein the routing association associates the mobile communication device to the interface server.

10. (previously presented) The method of claim 9 further comprising routing a termination communication intended for the mobile communication device from the mobile switching center to the interface server according to the routing association when the connectivity status is active, and routing the termination communication from the interface server to the mobile communication device over the first network.

11. (original) The method of claim 10 further comprising when the connectivity status is not provided to the interface server, the router association is removed from the mobile switching center.

12. (previously presented) The method of claim 1 further comprising registering the mobile communication device with a mobile switching center within the second network when the context changes.

13. (original) The method of claim 12 further comprising setting up the second communication link with the end destination device and forwarding the second communication link to the interface server.

Claims 14-38 (canceled)

39. (previously presented) The method of claim 1, wherein the mobile communication device is selected from the group consisting of a personal computer, a laptop computer, a computer workstation, a server, a mainframe computer, a handheld computer, a personal digital assistant, a cellular/mobile telephone, a smart appliance, a gaming console, a digital camera, a digital camcorder, a camera phone, a tablet, a video player, a video viewing device, transportation vehicle computer and transportation vehicle communication device.

40. (previously presented) The method of claim 1 wherein the communications comprise a telephone call.

41. (canceled)

42. (previously presented) The method of claim 1 wherein the communications comprise a secured transmission of content.

43. (previously presented) The method of claim 42 wherein the content comprises at least one of fixed and mobile.

44. (previously presented) The method of claim 1 wherein the communications comprise an unsecured transmission of content.

45. (previously presented) The method of claim 44 wherein the content comprises at least one of fixed and mobile.

46. (previously presented) The method of claim 1 wherein the communications comprise a secured data exchange.

47. (previously presented) The method of claim 1 wherein the communications comprise an unsecured data exchange.

48. (previously presented) The method of claim 1 wherein the interface server is coupled to a gateway device.

49. (previously presented) The method of claim 48 wherein the gateway device is bi-directionally coupled to a packet network.

50. (previously presented) The method of claim 49 wherein the packet network comprises packet switched telephone network.

51. (previously presented) The method of claim 48 wherein the gateway device comprises a softswitch.

Claims 52-78 (canceled)

79. (currently amended) A method of providing communications for a communication device that roams between multiple networks, the method comprising:

establishing, with a client, a first communication link between the communication device and an end destination device, wherein the first communication link comprises a first communication link between the communication device and a first network;

monitoring, with the client, a first context of a signal of the first communication link, wherein the first context comprises signal strength characteristics;

when a second network is detected as available and a second context of a second communication link corresponding to the second network is preferable, notifying an interface server and establishing a second communication link between the interface server and the end destination device without disrupting the first communication link, with the client;

notifying the communication device to terminate transmission over the first communication link; and

re-directing, with the client, the second communication link from the interface server to the communication device, thereby establishing a second communication link between the communication device and the second network, wherein the second network is within a set of known networks or from a newly discovered network.

80. (canceled)

81. (previously presented) The method of claim 79 wherein the first context comprises first characteristics of the first communication link and the second context comprises second characteristics of the second communication link.

82. (previously presented) The method of claim 79 wherein the interface server is coupled to a gateway device.

83. (previously presented) The method of claim 82 wherein the gateway device is bi-directionally coupled to a packet network.

84. (previously presented) The method of claim 83 wherein the packet network comprises packet switched telephone network.

85. (previously presented) The method of claim 82 wherein the gateway device comprises a softswitch.

Claims 86-94 (canceled)

95. (previously presented) The method of claim 1 wherein the context comprises a signal strength.

96. (previously presented) The method of claim 1 wherein the context comprises a signal strength and one or more additional criteria.

97. (previously presented) The method of claim 1 wherein the context comprises a criterion beside signal strength.

98. (previously presented) The method of claim 1 wherein the communications comprise data streaming.

99. (previously presented) The method of claim 79 wherein the communications comprise data streaming.

100. (canceled)

101. (previously presented) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by the client, wherein the client is stored within the mobile communication device.

102. (previously presented) The method of claim 101 wherein the client comprises software, firmware or hardware.

103. (previously presented) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by the client, wherein the client comprises an access point or a base station.

104. (previously presented) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by a network-based device, a switch, a router, a network-based switch or a network-based router.

105. (previously presented) The method of claim 1 wherein monitoring, notifying and re-directing are performed, in part, by the client, wherein the client is not stored within the mobile communication device, and the client is re-directed from an access point or a network device.

106. (previously presented) The method of claim 1, wherein the communications comprise at least one of a telephone call, a voice communication, a video communication, a multimedia communication, or data exchange.

107. (previously presented) The method of claim 1 wherein the communications comprise: a cellular communication, a VoIP communication session, a voice communication session, a video communication session, a multimedia communication session, a data communication session or a WiFi communication.

108. (previously presented) The method of claim 1 wherein the communications include content which is pushed or pulled.

109. (previously presented) The method of claim 1 wherein the first network comprises a cellular network, a WiFi network, the Internet, or another network, and the second network comprises a cellular network, a WiFi network, the Internet, or another network.

110. (previously presented) The method of claim 1 wherein the communications are received by the mobile communication device from a server device.

111. (previously presented) The method of claim 1 wherein the communications are sent by the mobile communication device to a server device.

112. (previously presented) The method of claim 1 wherein the communications are received by the mobile communication device from a second device via a server or proxy device.

113. (previously presented) The method of claim 1 wherein the communications are received by the mobile communication device from a second mobile communication device in a peer to peer configuration.

REMARKS

The Applicant respectfully requests further examination and consideration of the claims in view of the above amendments and the arguments set forth fully below. Claims 1-13, 39, 40, 42-51, 79-90 and 95-113 were pending in this application. After entering of the previous response, within the Advisory Action, Claims 1-13, 39, 40, 42-51, 95-98 and 101-104 have been allowed and Claims 79-90, 99 and 100 have been rejected. By the above amendments, Claim 79 has been amended and Claims 86-90 and 100 have been canceled. Accordingly, Claims 1-13, 39, 40, 42-51, 79, 81-85, 95-99 and 101-113 are now pending.

Claim Objections

Within the previous Office Action and the Advisory Action, Claims 79 and 86 have been objected to as being a substantial duplicate of Claim 1. The Applicants respectfully disagree. The differences between Claims 79 and 86 and Claim 1 are significant. Claims 79 and 86 include the limitations: when a second network is detected as available and a second context of a second communication link corresponding to the second network is preferable, notifying... Therefore, Claims 79 and 86 are clearly different from Claim 1. However, in order to further the prosecution of the present application, Claim 86 and its dependent Claims 87-90 and 100 have been canceled and Claim 79 has been amended to add the limitation specifying that the first context comprises signal strength characteristics. This added limitation further distinguishes the Claim 79 from Claim 1. Accordingly, the independent Claim 79 and its dependent Claims 81-85 and 99 are allowable and this objection should be withdrawn.

Applicants respectfully submit that the claims are in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: July 6, 2018

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg. No.: 37,902
Attorneys for Applicants

Electronic Acknowledgement Receipt

EFS ID:	33108110
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	06-JUL-2018
Filing Date:	09-OCT-2014
Time Stamp:	14:17:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response_7_6_2018.pdf	127776 983b428b0b4f6361f7d39a189f3d001ba8726d5a	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	8
	Applicant Arguments/Remarks Made in an Amendment	9	10
Warnings:			
Information:			
	Total Files Size (in bytes):	127776	

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B
	Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030009580	A1	2003-01-09	Chen, Xiaobao X.	
	2	20040053599	A1	2004-03-18	Karaoguz, Jeyhan	
	3	20040267880	A1	2004-12-30	Patiejunas, Kestutis	
	4	20060092901	A1	2006-05-04	Parantainen	
	5	20110044310		2011-02-24	Uhlik, Christopher	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B
	Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-07-13
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	33177639
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	13-JUL-2018
Filing Date:	09-OCT-2014
Time Stamp:	17:37:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_7_13_2018.pdf	612424 0a95d1fb8ee9ee821631790953 8a9962ed8f8493	no	4

Warnings:

Information:	
Total Files Size (in bytes):	612424

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (08/08)
Approved for use through 09/30/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	14510766	Filing Date	2014-10-09	Docket Number (if applicable)	HAVA-00402	Art Unit	2467
First Named Inventor	Vasudevan Ganesan			Examiner Name	Foud, Hicham B.		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☒ Other Please enter the Supplemental Amendment and Response previously filed on July 6, 2018.

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 081275

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

X Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (08/08)
Approved for use through 09/30/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-09-25
Name	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 2 months with $0 paid	2252	1	300	300
Miscellaneous:				
RCE- 1ST REQUEST	2801	1	650	650
		Total in USD ($)		**950**

Electronic Acknowledgement Receipt	
EFS ID:	33818860
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	25-SEP-2018
Filing Date:	09-OCT-2014
Time Stamp:	13:18:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$950
RAM confirmation Number	092518INTEFSW13205400
Deposit Account	081275
Authorized User	Jonathan Owens
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCE_form_SB_30e_9_25_2018.pdf	699653 3288ae049dfaa38940e06101d947dc8c14bbfc93	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32518 ef91a3ad7e5b094048bf4ceee416556c928ed1c3	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	732171		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030163697	A1	2003-08-28	Kuldip singh Pabla	
	2	20040052223	A1	2004-03-18	Jeyhan Karaoguz	
	3	20050135286	A1	2005-06-23	Jukka K. Nurminen	
	4	20060003796	A1	2006-01-05	Richard P. Vireday	
	5	20060141984	A1	2006-06-29	Claudio Taglienti	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Application Number	14510766
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	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

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OR

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-09-25
Name/Print	Jonathan O. Owens	Registration Number	37902

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	33819712
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	25-SEP-2018
Filing Date:	09-OCT-2014
Time Stamp:	13:56:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_9_25_2018.pdf	612421 665d51a1ef211f8fa7685f3c5d82be8efa492783	no	4

Warnings:

Information:	
Total Files Size (in bytes):	612421

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

28960 7590 10/01/2018

HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER
FOUD, HICHAM B

ART UNIT	PAPER NUMBER
2467	

DATE MAILED: 10/01/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

TITLE OF INVENTION: MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	01/02/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

28960 7590 10/01/2018
HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

TITLE OF INVENTION: MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	01/02/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
FOUD, HICHAM B	2467	370-331000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

IPR2025-00447 Page 00854

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

28960 7590 10/01/2018

HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

DATE MAILED: 10/01/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice Requiring Inventor's Oath or Declaration	Application No. 14/510,766	Applicant(s) Vasudevan Ganesan	
	Examiner FOUD, HICHAM B	Art Unit 2467	

This notice is an attachment to the Notice of Allowability (PTOL-37), or the Notice of Allowability For A Design Application (PTOL-37D).

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor (for any inventor for which a compliant oath, declaration, or substitute statement has not yet been submitted) MUST be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application.

A properly executed inventor's oath to declaration has not been received for the following inventor(s):

If applicant previously filed one or more oaths, declarations, or substitute statements, applicant may have received an informational notice regarding deficiencies therein.

The following deficiencies are noted:

INFORMAL ACTION PROBLEMS

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration: **Vasudevan Ganesan**.

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/510,766	Applicant(s) Ganesan, Vasudevan	
	Examiner HICHAM B FOUD	Art Unit 2467	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 09/25/2018.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☑ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/HICHAM B FOUD/
Primary Examiner, Art Unit 2467

Continuation of 3. The allowed claim(s) is/are: 1-13,39-40,42-51,79,81-85,95-99 and 101-113

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-13, 39-40, 42-51, 79, 81-85, 95-99 and 101-113 are allowed.

2. The following is an examiner's statement of reasons for allowance:

As to the above claims, there is no prior art reference, alone or in combination, that teaches or fairly suggests a method for at least "***establishing a second communication link between the interface server and the end destination***" and "***redirecting the second communication link from the interface server to the mobile communication device***", in a combination with other recited claimed limitations. And wherein U.S. Pat. PG Pub. No. 2009/0191864 to Mousseau et al is considered the closest prior art that teaches the roaming of a device from a first network to a second network by establishing a second communication link from the call control equipment 112 (interface server) to the roaming mobile 100 and therefore no second link is being established from the equipment 112 to end destination ([0023]).

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HICHAM B FOUD whose telephone number is (571)270-1463. The examiner can normally be reached on Monday-Friday, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HICHAM B FOUD/
Primary Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 14/510,766	Applicant(s)/Patent Under Reexamination Ganesan, Vasudevan	
	Examiner HICHAM B FOUD	Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20090191864-A1	07-2009	Mousseau; Gary P.	H04W36/0066	455/426.1
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	**Art Unit**
	HICHAM B FOUD	2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/25/2018								
1	1	=								
2	2	=								
3	3	=								
4	4	=								
5	5	=								
6	6	=								
7	7	=								
8	8	=								
9	9	=								
10	10	=								
11	11	=								
12	12	=								
13	13	=								
	14	-								
	15	-								
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	37	-								
	38	=								
14	39	=								
15	40	=								
	41	-								
16	42	=								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	**Art Unit**
	HICHAM B FOUD	2467

CLAIM		DATE								
Final	Original	04/25/2018								
17	43	=								
18	44	=								
19	45	=								
20	46	=								
21	47	=								
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	93	-								
	94	-								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	Art Unit
	HICHAM B FOUD	2467

CLAIM		DATE								
Final	Original	04/25/2018								
26	95	=								
27	96	=								
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29	98	=								
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36	107	=								
37	108	=								
38	109	=								
39	110	=								
40	111	=								
41	112	=								
42	113	=								

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	**Art Unit**
	HICHAM B FOUD	2467

CPC								
Symbol							**Type**	**Version**
H04W	/	36	/	18			F	2013-01-01
H04W	/	88	/	18			I	2013-01-01
H04M	/	7	/	006			I	2013-01-01
H04W	/	24	/	08			I	2013-01-01
H04W	/	36	/	30			I	2013-01-01
H04W	/	36	/	14			A	2013-01-01
H04W	/	60	/	04			A	2013-01-01
H04W	/	80	/	04			A	2013-01-01
H04W	/	92	/	02			A	2013-01-01
H04W	/	8	/	02			A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	49	
/HICHAM B FOUD/ Primary Examiner, Art Unit 2467	28 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20180928

IPR2025-00447 Page 00866

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	**Art Unit**
	HICHAM B FOUD	2467

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04W	/	36/18	/		

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	49	
/HICHAM B FOUD/ Primary Examiner, Art Unit 2467	28 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20180928

IPR2025-00447 Page 00867

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	**Art Unit**
	HICHAM B FOUD	2467

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		16		31	20	46		61		76		91	35	106
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5	5		20		35	24	50		65		80	26	95	39	110
6	6		21		36	25	51		66	44	81	27	96	40	111
7	7		22		37		52		67	45	82	28	97	41	112
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11	11		26		41		56		71		86	30	101		
12	12		27	16	42		57		72		87	31	102		
13	13		28	17	43		58		73		88	32	103		
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	15		30	19	45		60		75		90	34	105		

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	49	
/HICHAM B FOUD/ Primary Examiner, Art Unit 2467	28 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office Part of Paper No.: 20180928

IPR2025-00447 Page 00868

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/510,766	Ganesan, Vasudevan
	Examiner	Art Unit
	HICHAM B FOUD	2467

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventorship search	09/27/2018	hf
Limited text search in east	09/27/2018	hf
Limited text search in east in (H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02)	09/27/2018	hf
Limited text search in east	09/28/2018	hf

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	Interference search (see east printout)	09/28/2018	hf

/HICHAM FOUD/ Primary Examiner.Art Unit 2467	

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2467
Examiner Name	Foud, Hicham B
Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030009580	A1	2003-01-09	Chen, Xiaobao X.	
	2	20040053599	A1	2004-03-18	Karaoguz, Jeyhan	
	3	20040267880	A1	2004-12-30	Patiejunas, Kestutis	
	4	20060092901	A1	2006-05-04	Parantainen	
	5	20110044310		2011-02-24	Uhlik, Christopher	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2467
Examiner Name	Foud, Hicham B
Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	09/28/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.B.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-07-13
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L2	5	("20030009580" | "20040053599" | "20040267880" | "20060092901" | "20110044310").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/28 12:51
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L4	10	L1 L2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 12:51
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L7	0	4 and 6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 12:53
L14	6	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server) same establish$5 with link).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 13:39
L16	9	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 13:40
S160	36	((("GANESAN") near3 ("Vasudevan")).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/27 13:22
S161	6782	((signal adj1 strength) with threshold).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2018/09/27 13:22

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S164	0	("(notif$4same((redirect$3(readj1direct$3))withlinkwithserver)).clm.").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
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S167	6	S165 and S166	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
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S169	1	("14510766").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/27 13:22
S170	1	S169 and predetermined	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S171	5	S167 and predetermined	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S172	1	S167 and (second adj1 mobile adj1 communication adj1 device)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S173	5	S167 and (second adj3 mobile)	US-PGPUB; USPAT;	OR	OFF	2018/09/27 13:22

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S176	5	("20040176128" | "20040181811" | "20040192294" | "20040246990" | "20060098643").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S177	2	("20030053632" | "20040141484").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S178	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
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S180	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S181	1	("8520605").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S182	1	("20050090259").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
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S184	87	S174 S175 S176 S177 S178 S179 S180 S181 S182 S183	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S185	348063	(signal near5 threshold)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S186	4609	(signal near5 threshold) same (roam$3 handover handoff)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S187	10	S184 and S185	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2018/09/27 13:22

			IBM_TDB			
S188	6	S184 and S186	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S189	5214	(signal near5 threshold) same (roam$3 handover handoff switchover (switch adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S190	5585	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S191	2	("11031498").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/27 13:22
S192	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S193	5	("20040176128" | "20040181811" | "20040192294" | "20040246990" | "20060098643").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S194	2	("20030053632" | "20040141484").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S195	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S196	2	("8514867" | "8958434").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S197	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S198	1	("8520605").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S199	1	("20050090259").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S200	72	("20010049790" | "20020078174" | "20020085516" | "20020114305" | "20020147008" | "20020150228" | "20030012350" | "20030083079" | "20030086366" | "20030087629" | "20030112766" | "20030157899" | "20030177196" | "20030185172" | "20030217007" | "20030217091" | "20030224792" | "20030232615" | "20040005878" | "20040030791" | "20040085959" | "20040087307" | "20040105424" | "20040114559" | "20040127208" | "20040132427" | "20040137902" | "20040174880" | "20040203666" | "20040203788" | "20040203802" | "20040204097" | "20040218575" | "20040229618" | "20050044138" | "20050059400" | "20050147049" | "20050149740" | "20060040711" | "20060050663" | "20060050687" | "20060050721" | "20060080423" | "20060146767" | "20060234678" | "20060291455" | "20070076665" | "20070112948" | "20070124490" | "20070249390" | "20090070489" | "20100074228" | "20110010282" | "6009328" | "6175737" | "6195543" | "6473413" | "6515983" | "6553022" | "6584087" | "6754833" | "6795700" | "6862444" | "6996107" | "7127232" | "7142847" | "7254119" | "7382763" | "7398088" | "7483984" | "7512796" | "8041360").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S201	87	S191 S192 S193 S194 S195 S196 S197 S198 S199 S200	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S202	5585	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT;	OR	OFF	2018/09/27 13:22

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S203	6	S201 and S202	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S204	2	("11031498").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/27 13:22
S205	1	("20030058876").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S206	5	("20040176128" | "20040181811" | "20040192294" | "20040246990" | "20060098643").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S207	2	("20030053632" | "20040141484").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S208	1	("20040205158").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S209	2	("8514867" | "8958434").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S210	1	("20020183038").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S211	1	("8520605").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S212	1	("20050090259").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S213	72	("20010049790" | "20020078174" | "20020085516" | "20020114305" | "20020147008" | "20020150228" | "20030012350" | "20030083079" | "20030086366" | "20030087629" | "20030112766" | "20030157899" | "20030177196" | "20030185172" | "20030217007" | "20030217091" | "20030224792" | "20030232615" | "20040005878" | "20040030791" | "20040085959" | "20040087307" | "20040105424" | "20040114559" | "20040127208" | "20040132427" | "20040137902" | "20040174880" | "20040203666" | "20040203788" | "20040203802" | "20040204097" | "20040218575" | "20040229618" | "20050044138" | "20050059400" | "20050147049" | "20050149740" | "20060040711" | "20060050663" | "20060050687" | "20060050721" | "20060080423" | "20060146767" | "20060234678" | "20060291455" | "20070076665" | "20070112948" | "20070124490" | "20070249390" | "20090070489" | "20100074228" | "20110010282" | "6009328" | "6175737" | "6195543" | "6473413" | "6515983" | "6553022" | "6584087" | "6754833" | "6795700" | "6862444" | "6996107" | "7127232" | "7142847" | "7254119" | "7382763" | "7398088" | "7483984" | "7512796" | "8041360").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S214	87	S204 S205 S206 S207 S208 S209 S210 S211 S212 S213	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S215	5585	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S216	1	S214 and S215 and nomadic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2018/09/27 13:22

			IBM_TDB			
S217	1	S214 and S215 and nomadic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/27 13:22
S218	0	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S219	0	(signal with threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S220	2	(signal with threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S221	160228	((H04M7/006 OR H04W24/08 OR H04W36/14 OR H04W36/18 OR H04W36/30 OR H04W60/04 OR H04W80/04 OR H04W88/18 OR H04W8/02 OR H04W92/02).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S222	0	S220 and S221	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S223	5585	(signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S224	2062	S223 and S221	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S225	994	((signal near5 threshold) same (roam$3 handover handoff switchover (switch$3 adj1 over))).ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S226	417	S225 and S221	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2018/09/27 13:22

			DERWENT; IBM_TDB			
S227	129141	((wi adj1 fi) wifi) with cellular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S228	17	S225 and S227	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S229	11	S228 and S221	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S230	12	(roam$3 handover handoff switchover (switch$3 adj1 over)) same (nomadic adj1 server)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S231	11	S230 and S221	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S232	1	("20040030791").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/27 13:22
S233	1	("20040030791").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/27 13:22
S234	0	S233 and server	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S235	2	14/510766	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S236	2	S235 and context	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/27 13:22
S237	5	("20020152305" | "20030133421" | "20040076144" | "20040083360" | "20040095916").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S238	1	("20040170173").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22

S239	5	("20020152305" | "20030133421" | "20040076144" | "20040083360" | "20040095916").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S240	1	("20040170173").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S241	6	S239 S240	US-PGPUB; USPAT	OR	OFF	2018/09/27 13:22
S243	10	2009/0191864	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 07:22
S244	0	(2009/0191864).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 07:23
S245	2	("20090191864").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 07:23
S246	12	((establish$3 near3 second near6 destination) same roam$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 07:29
S247	0	((establish$3 with second near6 destination) same roam$3 same ((redirect$3 "re-direct$3") with server))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/09/28 07:31
S248	5	("20030163697" | "20040052223" | "20050135286" | "20060003796" | "20060141984").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/28 07:35
S249	5	("20030009580" | "20040053599" | "20040267880" | "20060092901" | "20110044310").PN.	US-PGPUB; USPAT	OR	OFF	2018/09/28 07:35

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	2	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	USPAT	OR	OFF	2018/09/28 13:01
L13	1	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server) and roam$3).clm.	USPAT	OR	OFF	2018/09/28 13:30
L15	1	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server) same establish$5 with link).clm.	USPAT	OR	OFF	2018/09/28 13:39
L17	1	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server) same establish$5 with link).clm.	USPAT	OR	OFF	2018/09/28 14:12
S250	3	((establish$3 near3 second near6 destination) same roam$3).clm.	USPAT	OR	OFF	2018/09/28 07:29
S251	0	((establish$3 with second near6 destination) same roam$3 same ((redirect$3 "re-direct$3") with server)).clm.	USPAT	OR	OFF	2018/09/28 07:31
S252	2	(notif$4 same ((redirect$3 (re adj1 direct$3))with link with server)).clm.	USPAT	OR	OFF	2018/09/28 07:31

9/ 28/ 2018 2:21:44 PM

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2467
Examiner Name	Hicham B. Foud
Attorney Docket Number	HAVA-00402

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030163697	A1	2003-08-28	Kuldip singh Pabla	
	2	20040052223	A1	2004-03-18	Jeyhan Karaoguz	
	3	20050135286	A1	2005-06-23	Jukka K. Nurminen	
	4	20060003796	A1	2006-01-05	Richard P. Vireday	
	5	20060141984	A1	2006-06-29	Claudio Taglienti	

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(Not for submission under 37 CFR 1.99)

Application Number	14510766
Filing Date	2014-10-09
First Named Inventor	Vasudevan Ganesan
Art Unit	2467
Examiner Name	Hicham B. Foud
Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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EXAMINER SIGNATURE

Examiner Signature	/HICHAM B FOUD/	Date Considered	09/28/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Hicham B. Foud
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-09-25
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/510,766	10/09/2014	2467	3840	HAVA-00402	19	3

CONFIRMATION NO. 2888

CORRECTED FILING RECEIPT

28960
HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086



Date Mailed: 10/12/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Vasudevan Ganesan, Cupertino, CA;

Applicant(s)

Vasu Networks Corporation, Cupertino, CA;

Power of Attorney: The patent practitioners associated with Customer Number 28960

Domestic Priority data as claimed by applicant

This application is a CON of 13/240,776 09/22/2011 PAT 8886181
which is a DIV of 11/330,675 01/11/2006 PAT 8078164 *
which claims benefit of 60/643,829 01/14/2005
and is a CIP of 11/031,498 01/06/2005 PAT 7991399
which claims benefit of 60/534,466 01/06/2004
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 10/15/2014
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/510,766**
Projected Publication Date: Not Applicable
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040153676	A1	2004-08-05	Anton W. Krantz	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2467
	Examiner Name	Foud, Hicham B.
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2018-12-12
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	34569443
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	12-DEC-2018
Filing Date:	09-OCT-2014
Time Stamp:	19:20:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_12_12_2018.pdf	612301 5f0a5604a3b7a0c0dff03c64db2f09ff4b006d1f	no	4

Warnings:

Information:	
Total Files Size (in bytes):	612301

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

7590 12/14/2018

HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

EXAMINER	
FOUD, HICHAM B	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
12/14/2018	PAPER

NOTICE OF NON-COMPLIANT INFORMATION DISCLOSURE STATEMENT

An Information Disclosure Statement (IDS) filed 12.12.2018 in the above-identified application fails to meet the requirements of 37 CFR 1.97(d) for the reason(s) specified below. Accordingly, the IDS will be placed in the file, but the information referred to therein has not been considered.

The IDS is not compliant with 37 CFR 1.97(d) because:

☐ The IDS lacks a statement as specified in 37 CFR 1.97(e).

✱ The IDS lacks the fee set forth in 37 CFR 1.17(p).

☐ The IDS was filed after the issue fee was paid. Applicant may wish to consider filing a petition to withdraw the application from issue under 37 CFR 1.313(c) to have the IDS considered. See MPEP 1308.

/bc/ Bernice Crittenden

571-272-4200 or 1-888-786-0101
Application Assistance Unit
Office of Data Management

FORM PTOM327-B (Rev. 02/08)

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Art Unit: 2414
Vasudevan Ganesan	Examiner: Hicham B. Foud
Serial No.: 14/510,766	**TRANSMITTAL LETTER**
Filed: October 9, 2014	
For: **MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER**	162 N. Wolfe Road Sunnyvale, CA 94086 (408) 530-9700 Customer No. 28,960

MS: Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed please find the executed Declaration, for filing in the U.S. Patent and Trademark Office.

The Commissioner is hereby authorized to charge any additional fee or credit overpayment to our Deposit Account No. 08-1275.

Respectfully submitted,

HAVERSTOCK & OWENS LLP

Dated: December 28, 2018

By: /Jonathan O. Owens/
Jonathan O. Owens
Reg No.: 37,902

Attorneys for Applicant

PATENT
Attorney Docket No.: HAVA-00402

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Vasudevan Ganesan et al.	)	
	)	
Serial No.: 14/510,766	)	**DECLARATION**
	)	
Filed: October 9, 2014	)	162 North Wolfe Road
	)	Sunnyvale, CA 94086
For: **MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER**	)	(408) 530-9700
	)	
	)	Customer No. 28960
	)	
	)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450.

As a below named inventor, I hereby declare that:

IDENTIFICATION OF APPLICATION

This declaration is directed to:

[ ] the application filed herewith, including any Preliminary Amendment filed herewith.
[X] the application identified above.
[ ] the application identified above, as amended by Preliminary Amendment filed herewith.
[ ] the application identified above, and which was amended on _____.
[ ] PCT International Application No.: _____ filed on_____, and amended under PCT Article 19 on _____ (if applicable).

APPLICATION AUTHORIZATION

The above-identified application was made or authorized to be made by me.

INVENTORSHIP STATEMENT

I believe I am the original inventor or an original joint inventor of a claimed invention in the application.

ACKNOWLEDGMENT OF PENALTIES

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above. I acknowledge the duty to disclose information known to me which is material to patentability as defined in 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

PATENT
Attorney Docket No.: HAVA-00402

POWER OF ATTORNEY

I hereby appoint the following as my attorneys with full power of substitution to prosecute this application and transact all business in the Patent and Trademark Office in connection therewith:

Thomas B. Haverstock	32,571	Jonathan O. Owens	37,902
David A. Hall	44,153	Tina T. Wang	64,265
Jack R. Harris (Agent)	51,145	Lucas J. Myslinski	56,418

Please direct all correspondence regarding this application to the following:

Jonathan O. Owens
HAVERSTOCK & OWENS LLP
162 North Wolfe Road
Sunnyvale, California 94086
Customer No.: 28960

WARNING

Petitioner /applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. Petitioner/applicant is advised that documents which form the record of a patent application (such as the PTO/SB/01) are placed into the Privacy Act system of records DEPARTMENT OF COMMERCE, COMMERCE-PAT-7, System name: Patent Application Files. Documents not retained in an application file (such as PTO-2038) are placed in the Privacy Act System of COMMERCE/PAT-TM-10, System name: Deposit Accounts and Electronic Funds Transfer Profiles.

SIGNATURE(S)

Legal Name of Inventor: Vasudevan Ganesan
Inventor's Signature: [signature]
Date: July 24, 15
Residence: Cupertino, CA
Post Office Address: 19500 Pruneridge Ave., #6208, Cupertino CA 95014

IPR2025-00447 Page 00899

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	80	80
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**80**

Electronic Acknowledgement Receipt	
EFS ID:	34720061
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	28-DEC-2018
Filing Date:	09-OCT-2014
Time Stamp:	17:49:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$80
RAM confirmation Number	123118INTEFSW17501500
Deposit Account	081275
Authorized User	Jonathan Owens
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	Declaration_Tran_12_28_2018.pdf	37144 fdb99c86cc3af77639a9cfcbfacd6ce36add2bd3	no	1
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration_Ganesan_12_28_2018.pdf	633547 9790fc8d0a074aec6ab90f465603acf426b32dba	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30571 5fe3ced5847a697450d0ed28713094c63b29d67a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	701262		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

28960 7590 10/01/2018
HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	10/09/2014	Vasudevan Ganesan	HAVA-00402	2888

TITLE OF INVENTION: MOBILE TELEPHONE VOIP/CELLULAR SEAMLESS ROAMING SWITCHING CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	01/02/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
FOUD, HICHAM B	2467	370-331000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Haverstock & Owens LLP
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Vasu Networks Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Cupertino, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 08-1275 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Jonathan O. Owens/ Date December 28, 2018

Typed or printed name Jonathan O. Owens Registration No. 37,9025

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Electronic Patent Application Fee Transmittal

Application Number:	14510766
Filing Date:	09-Oct-2014
Title of Invention:	MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Filer:	Jonathan O Owens
Attorney Docket Number:	HAVA-00402

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**500**

Electronic Acknowledgement Receipt	
EFS ID:	34720102
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	28-DEC-2018
Filing Date:	09-OCT-2014
Time Stamp:	17:52:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$500
RAM confirmation Number	123118INTEFSW17525300
Deposit Account	081275
Authorized User	Jonathan Owens
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFee_Transmittal_12_28_2018.pdf	316312 e1c0561547ad77fef23e3a36cd9169b63a56cbba	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30370 e24c3c8f8182cc80c0a44b35cf4b381136a42d8b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	346682		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/510,766	02/12/2019	10206154	HAVA-00402	2888

28960 7590 01/23/2019

HAVERSTOCK & OWENS LLP
162 NORTH WOLFE ROAD
SUNNYVALE, CA 94086

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 787 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Vasudevan Ganesan, Cupertino, CA;
Vasu Networks Corporation, Cupertino, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Hichman B. Foud
	Attorney Docket Number	HAVA-00402

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050025164	A1	2005-02-03	Alan Kavanagh	
	2	20060009219	A1	2006-01-12	Mikko Jaakkola	
	3	20060010272	A1	2006-01-12	Doron Solomon	
	4	20060105766	A1	2006-05-18	Maria RG Azad	
	5	20140204902	A1	2014-07-24	Alexander Maltsev	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Hichman B. Foud
	Attorney Docket Number	HAVA-00402

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	14510766
	Filing Date	2014-10-09
	First Named Inventor	Vasudevan Ganesan
	Art Unit	2414
	Examiner Name	Hichman B. Foud
	Attorney Docket Number	HAVA-00402

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jonathan O. Owens/	Date (YYYY-MM-DD)	2019-02-05
Name/Print	Jonathan O. Owens	Registration Number	37902

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	35067559
Application Number:	14510766
International Application Number:	
Confirmation Number:	2888
Title of Invention:	MOBILE DEVICE WIFI/CELLULAR SEAMLESS ROAMING, SEAMLESS SESSION CONTINUITY, ALWAYS CONNECTED SWITCHING CONTROLLER
First Named Inventor/Applicant Name:	Vasudevan Ganesan
Customer Number:	28960
Filer:	Jonathan O Owens
Filer Authorized By:	
Attorney Docket Number:	HAVA-00402
Receipt Date:	05-FEB-2019
Filing Date:	09-OCT-2014
Time Stamp:	17:48:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_2_5_2019.pdf	612405 549d3b3e6ba481bc2b250928247e855dbc221493	no	4

Warnings:

Information:	
Total Files Size (in bytes):	612405

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.