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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	3119-113
First Inventor	Tao ZHANG
Title	SILENT PROACTIVE HANDOFF
Express Mail Label No.	ER 632109592 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. ☐ **Applicant claims small entity status.**
   See 37 CFR 1.27.
3. ☑ **Specification** [*Total Pages* 35]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
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5. **Oath or Declaration** [*Total Sheets* _____]
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   b. ☐ A copy from a prior application (37 CFR 1.63(d))
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   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
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9. ☐ **Assignment Papers** (cover sheet & document(s))
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Samsung v. Four Batons
IPR2025-00493
Exhibit 1004

SILENT PROACTIVE HANDOFF

BACKGROUND

Field of the Invention:

The present application relates to wireless networking and, in some preferred embodiments, to methods of improving handoff of a mobile device between neighboring networks and/or the like.

General Background Discussion:

Networks and Internet Protocol

There are many types of computer networks, with the Internet having the most notoriety. The Internet is a worldwide network of computer networks. Today, the Internet is a public and self-sustaining network that is available to many millions of users. The Internet uses a set of communication protocols called TCP/IP (i.e., Transmission Control Protocol/Internet Protocol) to connect hosts. The Internet has a communications infrastructure known as the Internet backbone. Access to the Internet backbone is largely controlled by Internet Service Providers (ISPs) that resell access to corporations and individuals.

With respect to IP (Internet Protocol), this is a protocol by which data can be sent from one device (e.g., a phone, a PDA [Personal Digital Assistant], a computer, etc.) to another device on a network. There are a variety of versions of IP today, including, e.g., IPv4, IPv6, etc. Each host device on the network has at least one IP address that identifies the host device's point of attachment to the IP networks.

IP is a connectionless protocol. The connection between end points during a communication is not continuous. When a user sends or receives data or messages,

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the data or messages are divided into components known as packets. Every packet is treated as an independent unit of data.

In order to standardize the transmission between points over the Internet or the like networks, an OSI (Open Systems Interconnection) model was established. The OSI model separates the communications processes between two points in a network into seven stacked layers, with each layer adding its own set of functions. Each device handles a message so that there is a downward flow through each layer at a sending end point and an upward flow through the layers at a receiving end point. The programming and/or hardware that provides the seven layers of function is typically a combination of device operating systems, application software, TCP/IP and/or other transport and network protocols, and other software and hardware.

Typically, the top four layers are used when a message passes from or to a user and the bottom three layers are used when a message passes through a device (e.g., an IP host device). An IP host is any device on the network that is capable of transmitting and receiving IP packets, such as a server, a router or a workstation. Messages destined for some other host are not passed up to the upper layers but are forwarded to the other host. In the OSI and other similar models, IP is in Layer-3, the network layer. The layers of the OSI model are listed below.

Layer 7 (i.e., the application layer) is a layer at which, e.g., communication partners are identified, quality of service is identified, user authentication and privacy are considered, constraints on data syntax are identified, etc.

Layer 6 (i.e., the presentation layer) is a layer that, e.g., converts incoming and outgoing data from one presentation format to another, etc.

Layer 5 (i.e., the session layer) is a layer that, e.g., sets up, coordinates, and terminates conversations, exchanges and dialogs between the applications, etc.

Layer-4 (i.e., the transport layer) is a layer that, e.g., manages end-to-end control and error-checking, etc.

Layer-3 (i.e., the network layer) is a layer that, e.g., handles routing and forwarding, etc.

Layer-2 (i.e., the data-link layer) is a layer that, e.g., provides synchronization for the physical level, does bit-stuffing and furnishes transmission protocol knowledge and management, etc. The Institute of Electrical and Electronics Engineers (IEEE) sub-divides the data-link layer into two further sub-layers, the MAC (Media Access Control) layer that controls the data transfer to and from the physical layer and the LLC (Logical Link Control) layer that interfaces with the network layer and interprets commands and performs error recovery.

Layer 1 (i.e., the physical layer) is a layer that, e.g., conveys the bit stream through the network at the physical level. The IEEE sub-divides the physical layer into the PLCP (Physical Layer Convergence Procedure) sub-layer and the PMD (Physical Medium Dependent) sub-layer.

Typically, layers higher than layer-2 (such as, e.g., layers including the network layer or layer-3 in the OSI model and the like) are referred to as the higher-layers.

Wireless Networks

Wireless networks can incorporate a variety of types of mobile devices, such as, e.g., cellular and wireless telephones, PCs (personal computers), laptop computers, wearable computers, cordless phones, pagers, headsets, printers, PDAs, etc. For example, mobile devices may include digital systems to secure fast wireless transmissions of voice and/or data. Typical mobile devices include some or all of the following components: a transceiver (i.e., a transmitter and a receiver, including, e.g., a single chip transceiver with an integrated transmitter, receiver and, if desired, other functions); an antenna; a processor; one or more audio transducers (for example, a speaker or a microphone as in devices for audio communications); electromagnetic data storage (such as, e.g., ROM, RAM, digital data storage, etc., such as in devices where data processing is provided); memory; flash memory; a full chip set or integrated circuit; interfaces (such as, e.g., USB, CODEC, UART, PCM, etc.); and/or the like.

Wireless LANs (WLANs) in which a mobile user can connect to a local area network (LAN) through a wireless connection may be employed for wireless communications. Wireless communications can include, e.g., communications that propagate via electromagnetic waves, such as light, infrared, radio, microwave. There are a variety of WLAN standards that currently exist, such as, e.g., Bluetooth, IEEE 802.11, and HomeRF.

By way of example, Bluetooth products may be used to provide links between mobile computers, mobile phones, portable handheld devices, personal digital assistants (PDAs), and other mobile devices and connectivity to the Internet. Bluetooth is a computing and telecommunications industry specification that details

how mobile devices can easily interconnect with each other and with non-mobile devices using a short-range wireless connection. Bluetooth creates a digital wireless protocol to address end-user problems arising from the proliferation of various mobile devices that need to keep data synchronized and consistent from one device to another, thereby allowing equipment from different vendors to work seamlessly together. Bluetooth devices may be named according to a common naming concept. For example, a Bluetooth device may possess a Bluetooth Device Name (BDN) or a name associated with a unique Bluetooth Device Address (BDA). Bluetooth devices may also participate in an Internet Protocol (IP) network. If a Bluetooth device functions on an IP network, it may be provided with an IP address and an IP (network) name. Thus, a Bluetooth Device configured to participate on an IP network may contain, e.g., a BDN, a BDA, an IP address and an IP name. The term "IP name" refers to a name corresponding to an IP address of an interface.

An IEEE standard, IEEE 802.11, specifies technologies for wireless LANs and devices. Using 802.11, wireless networking may be accomplished with each single base station supporting several devices. In some examples, devices may come pre-equipped with wireless hardware or a user may install a separate piece of hardware, such as a card, that may include an antenna. By way of example, devices used in 802.11 typically include three notable elements, whether or not the device is an access point (AP), a mobile station (STA), a bridge, a PCMCIA card or another device: a radio transceiver; an antenna; and a MAC (Media Access Control) layer that controls packet flow between points in a network.

In addition, Multiple Interface Devices (MIDs) may be utilized in some wireless networks. MIDs may contain two or more independent network interfaces, such as a Bluetooth interface and an 802.11 interface, thus allowing the MID to participate on two separate networks as well as to interface with Bluetooth devices. The MID may have an IP address and a common IP (network) name associated with the IP address.

Wireless network devices may include, but are not limited to Bluetooth devices, Multiple Interface Devices (MIDs), 802.11x devices (IEEE 802.11 devices including, e.g., 802.11a, 802.11b and 802.11g devices), HomeRF (Home Radio Frequency) devices, Wi-Fi (Wireless Fidelity) devices, GPRS (General Packet Radio Service) devices, 3G cellular devices, 2.5G cellular devices, GSM (Global System for Mobile Communications) devices, EDGE (Enhanced Data for GSM Evolution) devices, TDMA type (Time Division Multiple Access) devices, or CDMA type (Code Division Multiple Access) devices, including CDMA2000. Each network device may contain addresses of varying types including but not limited to an IP address, a Bluetooth Device Address, a Bluetooth Common Name, a Bluetooth IP address, a Bluetooth IP Common Name, an 802.11 IP Address, an 802.11 IP common Name, or an IEEE MAC address.

Wireless networks can also involve methods and protocols found in, e.g., Mobile IP (Internet Protocol) systems, in PCS systems, and in other mobile network systems. With respect to Mobile IP, this involves a standard communications protocol created by the Internet Engineering Task Force (IETF). With Mobile IP, mobile device users can move across networks while maintaining their IP Address assigned once. See Request for Comments (RFC) 3344. NB: RFCs are formal documents of the Internet Engineering Task Force (IETF). Mobile IP enhances Internet Protocol (IP) and adds means to forward Internet traffic to mobile devices when connecting outside their home network. Mobile IP assigns each mobile node a home address on its home network and a care-of-address (CoA) that identifies the current location of the device within a network and its subnets. When a device is moved to a different network, it receives a new care-of address. A mobility agent on the home network can associate each home address with its care-of address. The mobile node can send the home agent a binding update each time it changes its care-of address using, e.g., Internet Control Message Protocol (ICMP).

In basic IP routing (i.e. outside mobile IP), typically, routing mechanisms rely on the assumptions that each network node always has a constant attachment point to, e.g., the Internet and that each node's IP address identifies the network link it is attached to. In this document, the terminology "node" includes a connection point, which can include, e.g., a redistribution point or an end point for data transmissions, and which can recognize, process and/or forward communications to other nodes. For example, Internet routers can look at, e.g., an IP address prefix or the like identifying a device's network. Then, at a network level, routers can look at, e.g., a set of bits identifying a particular subnet. Then, at a subnet level, routers can look at, e.g., a set of bits identifying a particular device. With typical mobile IP communications, if a user disconnects a mobile device from, e.g., the Internet and tries to reconnect it at a new subnet, then the device has to be reconfigured with a new IP address, a proper netmask and a default router. Otherwise, routing protocols would not be able to deliver the packets properly.

Handoffs of Mobile Devices

In the context of, for example, a mobile device with an IP-based wireless network interface (such as, e.g., an IEEE 802.11 or an 802.16 interface), the mobile device needs to perform roaming or handoffs when it moves from one network into another network. With existing handoff methodologies, handoff is typically accomplished by performing the following sequence of protocol layer specific handoffs:

- First, handoff takes place at the physical layer. In this regard, the mobile device switches its radio channel to, e.g., a wireless base station or wireless access point in the target network.
- Second, handoff takes place at layer-2. In this regard, the mobile device switches its layer-2 (i.e., link-layer) connections to the target network. As explained above, the link layer or layer-2 refers to the protocol immediately below the IP-layer that carries user traffic. The mobile

device performs layer-2 authentication with the target network if the target network requires such authentication.

- Third, handoff takes place at the IP-layer. In this regard, the mobile device obtains a local IP address from the target network, performs IP-layer authentication if required by the target network, and then performs IP-layer location update so that IP packets destined to the mobile device can be routed by the IP network to the mobile device via the target network. In some instances, one way to support IP layer location update is to use Mobile IP defined by the Internet Engineering Task Force (IETF).

- Forth, handoff takes place at the application-layer. The mobile device performs necessary steps at the application layer to ensure that its application traffic will flow correctly to the applications on the mobile device via the target network. For example, when the mobile device uses the Session Initiation Protocol (SIP) defined by the IETF to manage its application-layer signaling, an application layer handoff can be achieved by the mobile device updating its current location with its home SIP server. The mobile device may also need to carry out application-layer authentication with the target network if required by the target network. This is the case, for example, when the mobile device is using the IP Multimedia Subsystem (IMS) in a visited 3GPP (3rd Generation Partnership Project) wireless network, where the IMS is a SIP-based system supporting application-layer signaling and management for multimedia applications over 3GPP networks.

Sometimes, either IP-layer handoff or application-layer handoff is sufficient. That is, it may be unnecessary to perform both IP-layer and application-layer handoff. These existing methods can lead to significant handoff delays when they are used in IP-based wireless networks. For example, in a geographical region where there are many wireless local area networks (WLANs) such as in cities, inside building

complexes or residential homes, or in other public places where multiple wireless LANs exist, a mobile device may receive strong radio signals from multiple radio networks at the same time. However, the mobile device may not be authorized to use some of these radio networks.

Under the existing handoff methods described above, a mobile device will select a target network based on, for example, radio signal strengths, and will go through the steps described above to connect to the target network and then discover, for example, if it is authorized to use the network or if the network does not provide the capabilities (e.g., sufficient available bandwidth) or the services that the mobile device needs. Consequently, the mobile device will have to try to connect to another network, and will repeat this process until it finally connects to a network that provides and that allows it to use the capabilities and services it needs (or until it has exhausted all possible networks). Accordingly, with existing systems, a handoff can take a long time that can be intolerable and can delay sensitive applications such as, as some examples, live voice and/or video applications.

While a variety of systems and methods are known, there remains a need for improved systems and methods for performing handoffs in wireless networks.

SUMMARY OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention can significantly improve upon existing systems and methods for performing handoffs in wireless networks.

In some embodiments, a silent proactive handoff is performed wherein a mobile device that is using a current network to transport its application traffic uses its silent periods to connect to at least one target network temporarily and uses this temporary connectivity to perform actions needed for handoff into the target network. Among

other things, with such a silent proactive handoff approach, e.g., if handoff actions to a target network fail during silent periods, there can still be essentially no impact on the applications.

According to some preferred embodiments, a method for performing silent proactive handoff of a mobile device to a target network while the mobile device is using a current network is performed that includes: while the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements, having the mobile device use at least one silent period to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network.

Preferably, the method further includes that the mobile device sends or receives substantially no traffic over the current access network during the at least one silent period. In addition, the method preferably includes having the mobile device use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network. In some embodiments, the method further includes having the mobile device use the at least one silent period to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network. In some embodiments, the method includes having the mobile device use the at least one silent period to perform layer-2, layer-3 or application layer authentication with the target network. Preferably, the method includes having the mobile device perform the following handoff actions during the at least one silent period: a) discovering neighboring network information; b) obtaining a local IP address from the target network; and c) performing authentication with the target network.

In some other embodiments, the method includes having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff

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action. For example, the method may include having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold.

In some preferred embodiments, the method further includes having the mobile device predict an actionable silent period based on monitoring of time periods and a prediction model. In some examples, the method includes dynamically estimating at least one actionable silent period threshold for at least one handoff action based on previous times the mobile device took to perform handoff actions, using the at least one threshold and inter-packet times determined from a traffic monitor to detect a next silent period, to predict if this next silent period will be an actionable silent period, and to predict a length of the next actionable silent period.

In some preferred embodiments, the method further includes having the mobile device select a target network to which the mobile may switch to. Preferably, the method includes when a target network is selected and an actionable silent period is detected, switching the mobile device's layer-2 connection to the target network. In some embodiments, the method includes having the mobile device connect successfully to the target network and before a current actionable silent period expires, having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network, and if the current actionable silent period has not expired after the information discovery phase, having the mobile device start at least one handoff action.

In some embodiments, the method includes after having the mobile device start the at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements, having the mobile device switch its network connection back to the current network. In some embodiments, the method includes

after having the mobile device start the at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements, having the mobile device perform the remaining handoff steps to finish a handoff. In some embodiments, the method includes having the mobile device make a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network. In some exemplary embodiments, the method further includes having the mobile device make the determination based on one or more of the following parameters: types of user applications; relative speed at which the mobile device is moving; and a predicted size of a candidate network.

According to some other embodiments of the invention, a mobile device having silent proactive handoff capability is provided that includes: a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network; a target network selector component configured to select a target network to which the mobile device may potentially switch to; a silence predictor component configured to predict an actionable silence period; and a silent handoff controller configured to control a silent proactive handoff to a target network during the actionable silent period. Preferably, the silent handoff controller is configured to establish connections to a target network, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network.

The above and/or other aspects, features and/or advantages of various embodiments will be further appreciated in view of the following description in conjunction with the accompanying figures. Various embodiments can include and/or exclude different aspects, features and/or advantages where applicable. In addition, various embodiments can combine one or more aspect or feature of other embodiments where applicable. The descriptions of aspects, features and/or advantages of particular embodiments should not be construed as limiting other

embodiments or the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiments of the present invention are shown by a way of example, and not limitation, in the accompanying figures, in which:

FIG. 1 is a flow diagram illustrating some steps of an exemplary embodiment of a silent proactive handoff approach according to some embodiments of the present invention;

FIG. 2 is a schematic diagram depicting the structure of an actionable silent period predictor according to some embodiments of the present invention;

FIG. 3 is a schematic diagram demonstrating the use of silent periods for network discovery and for performing proactive handoff actions;

FIG. 4 is an architectural diagram showing components of a mobile device according to some illustrative embodiments of the invention; and

FIG. 5 is an architectural diagram showing movement of a mobile device along a path traversing a plurality of wireless networks for illustrative purposes.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention may be embodied in many different forms, a number of illustrative embodiments are described herein with the understanding that the present disclosure is to be considered as providing examples of the principles of the invention and that such examples are not intended to limit the invention to preferred embodiments described herein and/or illustrated herein.

According to the preferred embodiments of the invention, a new approach is used to significantly reduce the handoff delays, which approach is referred to herein as Silent Proactive Handoff (SPH). In some preferred embodiments, a silent proactive handoff operates as follows: when a mobile is using one network (referred to as the old network or the current network) to transport its application traffic and this network can satisfy the mobile device's requirements, the mobile device uses its silent periods to connect to one or more target neighboring network(s) temporarily (i.e., only during these silent periods) and uses this temporary connectivity to perform actions needed for handoff into the target network.

In the preferred embodiments, a silent period is a time period during which the mobile has no traffic to send or receive over the current access network. In some embodiments, a silent period can be defined as a time period during which the mobile has substantially no traffic to send or receive. In preferred embodiments, during a silent period, a mobile device would not be expecting incoming traffic at the IP and higher protocol layers. Moreover, in preferred embodiments, the mobile device will not control if and/or when there may be incoming traffic, but the mobile device will predict or estimate silent periods. Thus, in preferred embodiments, a silent period is a time period during which the mobile device does not need to send or receive IP or higher layer traffic (e.g., not just application layer traffic). In some instances, the mobile

device may send traffic at protocol layers below the IP layer during a silent period. In addition, in some examples, a silent period can include time periods during which the mobile device may send or receive only certain IP layer or higher layer traffic (such as, e.g., application layer traffic) which, when temporarily interrupted (e.g., delayed or discarded), will substantially not cause undesirable or unexpected effects to the user of a mobile device.

When a mobile device is inside overlapping radio coverage areas of multiple radio networks, existing network interface cards can receive radio beacons from these radio networks simultaneously. These radio beacons, however, do not provide IP or higher layer information, such as, e.g., IP addresses of the access IP routers, IP address allocation servers (e.g., DHCP servers), or authentication servers inside a target network, and do not provide the necessary IP and higher layer parameter values necessary to connect to or authenticate with a target network.

According to preferred embodiments, with a novel silent proactive handoff approach, the mobile device uses the silent periods to connect to a target network so that the mobile device can receive, e.g., IP-layer and/or high layer advertisement messages from the target network. Since these advertisement packets are typically broadcast over the local IP sub-networks, receiving these advertisement packets from a target network generally does not require the mobile device to obtain a local IP address from the target network.

Depending on the specific types of the radio networks, the mobile device may need to establish a layer-2 connection or an association to the target network for receiving IP-layer or high layer advertisements from the target network. In some embodiments, establishing a layer-2 connection to a target network may require the mobile device to perform layer-2 authentication with the target network if the target network implements layer-2 authentication mechanisms.

In this disclosure, the terminology "connected to a target network" refers to the establishment of the necessary connection or association with a target network to the extent that the mobile can receive IP-layer and/or high layer advertisement messages. Once connected to a target network, the mobile can perform a range of actions during the silent period that need to be done during an actual handoff. In some embodiments, these actions can include some or all of the following:

- Neighboring network information discovery: This may be done to discover the information needed by the mobile to handoff into the neighboring network. To do so, the mobile device can listen to advertisements at layer-2, the IP-layer and/or the application layer from the target network to obtain information regarding the target network. This information may include, e.g., the addresses of the access IP routers, addresses of the IP address allocation servers (e.g., Dynamic Host Configuration Protocol (DHCP) servers), addresses of the authentication routers, and other parameter values needed to perform authentication with the target network.

- Obtain local IP address from the target network: This may be done to obtain a local IP address from the target network that the mobile can use to receive from IP packets from the target network.

- Perform authentication with the target network: This may be done to perform layer-2, layer-3, and/or application-layer authentication with the target network if the target network requires such authentication(s).

In this disclosure, among other actions, the foregoing actions and the action to establish a connection to a target network as are referred to as types of Handoff

Actions.

In some instances, a silent period may be too short for the mobile device to perform one or more, or any, handoff action. In this disclosure, an Actionable Silent Period (ASP) is defined as a silent period that is long enough for the completion of one or more handoff action(s).

The mobile device may use any existing or new approaches to determine whether a silent period is expected to be an ASP. For example, a mobile can treat a silent period as an ASP if the silent period is expected to be longer than a pre-set (e.g., pre-configured) or dynamically determined threshold. This threshold, referred to as an ASP Threshold, can be different for different handoff actions.

In some embodiments, a dynamic threshold may be determined based on the times the mobile device took in the recent past to perform handoff actions. For example, a statistical model can be used to model the time series of the times the mobile took to perform handoff actions in the recent past and to estimate the minimum length of time needed to perform a handoff action. This minimum time period can then be used as a dynamically determined threshold to determine whether a silent period will be an ASP.

FIG. 1 illustrates some illustrative basic process steps that may be performed in some exemplary embodiments of the invention employing a silent proactive handoff approach. While FIG. 1 illustrates some preferred process steps, it should be appreciated by those in the art based on this disclosure that the process steps shown in FIG. 1 are illustrative in nature and various embodiments of the invention may employ alternative process steps, etc.

With reference to the embodiment shown in FIG. 1, the mobile device can include a functional component referred to herein as a silent proactive handoff processor (SPH Processor) 5, which can, e.g., be configured to perform processing functions of the silent proactive handoff methodologies. In addition, the mobile device can also include a component 6 that includes an algorithm or process to detect if enough information about a candidate network is available, as well as a component 7 that includes a mobile speed detection algorithm or process.

FIG. 1 shows some preferred process steps once an SPH processor 5 or the like initiates the silent proactive handoff process at step 10.

In the preferred embodiments, the mobile device has a functional component referred to in this disclosure as a Traffic Monitor that is configured to monitor the time periods between packets (e.g., inter-packet times) entering and/or leaving the mobile device over the current access network (i.e., the network the mobile uses currently to transport its application traffic), such as shown at step 20 in FIG. 1.

In the preferred embodiments, the mobile device also includes a functional component called an ASP Predictor that uses the output from the Traffic Monitor and a prediction model to detect the next ASP and to predict its length, such as, e.g., shown at step 40 in FIG. 1. While a variety of known prediction models may be used (as would be understood by those in the art based on this disclosure), some non-limiting examples of illustrative prediction models can include Wiener Process models and/or time series models, such as, e.g., auto-regression models.

In some embodiments, the ASP Predictor can dynamically estimate the ASP thresholds based on the times the mobile took to perform handoff actions in the recent past. To dynamically estimate the ASP thresholds, in some embodiments, the ASP Predictor includes components as depicted in FIG. 2. In this regard, according to the

embodiment shown in FIG. 2, an ASP Predictor 200 includes an ASP Threshold Estimator 210 and an ASP Prediction Model 220 as shown. In some embodiments, the ASP Threshold Estimator 210 receives as input the times the mobile device took to perform prior handoff actions (such as, e.g., handoff actions within the recent past) as schematically shown as inputs at arrows A1 in FIG. 2. In some preferred embodiments, the ASP Threshold Estimator 210 can then use any appropriate means (as would be understood by those in the art based on this disclosure), such as statistical models, to estimate the minimum time it has recently taken the mobile to perform each handoff action and use it as the ASP threshold for each handoff action.

In the preferred embodiments, the estimated ASP thresholds can then be transmitted to the ASP Prediction Model 220, such as, e.g., shown at arrow A2 in FIG. 2. Then, the ASP Prediction Model 220 can use these thresholds and the inter-packet times from the Traffic Monitor (see, e.g., step 20 in FIG. 1) to detect the next silent period (such as, e.g., $[T, T+\Delta]$ from the current time $t = T$), to predict if this next silent period will be an ASP, and to predict the length of the next ASP, such as, e.g., depicted at 220 in FIG. 2 and at 40 in FIG. 1. As shown at A3 in FIG. 2, the ASP Prediction Model 220 preferably outputs a next predicted ASP. Then, the mobile device or the SPH processor can preferably use this information to control silent proactive handoff during such a next ASP period.

As also shown in FIG. 1, the mobile device also preferably includes a functional component referred to in this disclosure as a Target Network Selector that selects a target network to which the mobile device may switch to, such as, e.g., shown at step 30 in FIG. 1. In some preferred embodiments, as shown in FIG. 1, the target network selector operates in parallel to the traffic monitor. In various embodiments, the target network selection can be based on any criteria deemed appropriate to satisfy the requirements of the mobile device and the applications running on the mobile device. These criteria may include, for example, the detection of a new radio network, when the radio signal strength of the current network drops to a threshold.

In the preferred embodiments, when a target network is selected and an actionable silent period is detected, the mobile device switches its radio connection and layer-2 connection to the target network. If it fails to establish a connection to the target network (e.g., if its layer-2 authentication fails), the target network selector is preferably notified. At that time, the target network selector will then preferably proceed to select a new target network. In some embodiments, as shown in FIG. 1, if at step 50 the mobile device fails to establish a connection, then an algorithm can be employed, such as, e.g., shown at 130 that increments a network identification value from, for example, "n" to a network identification value of "n = n +1". However, it should be appreciated that such an algorithm can be omitted as long as, for example, the target network selector can proceed to select another network.

In the preferred embodiments, after the mobile device connects successfully to the target network, and proceeds through step 50, and if the current ASP has not yet expired, the mobile device enters the information discovery phase at step 60 to listen to the target network's layer-2, IP-layer, and/or application-layer advertisement messages to learn about the necessary information needed to perform handoffs at different protocol layers to the target network. Preferably, if the mobile device has already acquired the information it needed about the target network, it will pass through or skip this information discovery phase (referred to as Step 1 in FIG. 1) and go directly to the next step 70 as shown in FIG. 1. On the other hand, if the mobile device has not already acquired the information, it will proceed to enter the information discovery phase at step 65.

In the illustrated embodiment, after passing through this step 65 (and, in particular, if the ASP period terminates), the process may move to the ASP Predictor in order to predict a net actionable silent period back at step 40 shown in FIG. 1. Then, upon prediction of an appropriate ASP (which, e.g., may be predicted in some embodiments based on the handoff action to be achieved), the system may again continue downward along the process steps as discussed above.

In some embodiments, as described further below, a counter C can be employed in order to evaluate the number of times the process moves around the loop from step 40, to step 50, to step 60, to step 65 and through the counter back to step 40. Among other things, a counter C can help to identify if the system is having difficulty achieving a certain handoff action, such as, e.g., an initial information discovery handoff action.

Preferably, if the current ASP does not expire after the information discovery phase, the mobile device starts a second handoff action, such as, for example, to obtain a local IP address from the target network (referred to as Step 2 in FIG. 1). In this regard, a local IP address from a target network may be an IP address the mobile can use to receive, e.g., unicast packets from the target network. Preferably, if the mobile already has a local IP address from this target network, the mobile will go directly to the next step as shown FIG. 1 at step 70. On the other hand, if the mobile device has not already acquired the information, it will proceed to enter this Step 2 handoff action phase at step 75.

In the illustrated embodiment, after passing through this step 75 (and, in particular, if the ASP period terminates), the process may move to the ASP Predictor in order to predict a net actionable silent period back at step 40 shown in FIG. 1. Then, upon prediction of an appropriate ASP (which, e.g., may be predicted in some embodiments based on the handoff action to be achieved), the system may again continue downward along the process steps as discussed above.

Preferably, if the current ASP does not expire after the mobile device moves through a particular handoff action, such as, e.g., a Step 1 or a Step 2 handoff action, the system will start to perform a next or new handoff action. For example, if the current ASP does not expire after the mobile device moves through the Step 2 handoff

action and acquires and configures itself with a local IP address from the target network, it will preferably start to perform a new handoff action (referred to as Step 3 in FIG. 1), such as, e.g., to perform the necessary authentication at the IP and application layers with the target network if these authentications are required by the target network, such as, e.g., shown at step 80 in FIG. 1. Preferably, if the mobile already authenticated with or does not require authentication with this target network, the mobile device will go directly to the next step as shown FIG. 1 at step 90. On the other hand, if the mobile device has not already acquired the authentication information, it will proceed to enter this Step 3 handoff action phase at step 85.

In the illustrated embodiment, after passing through this step 85 (and, in particular, if the ASP period terminates), the process may return to the ASP Predictor in order to predict a next actionable silent period back at step 40 shown in FIG. 1. Then, upon prediction of an appropriate ASP (which, e.g., may be predicted in some embodiments based on the handoff action to be achieved), the system may again continue downward along the process steps as discussed above.

Preferably, if the authentications fail (such as, e.g., indicating that the mobile may not be allowed to use the target network), the target network selector is so notified and the target network selector will start the selection of a new target network.

If after finishing some or all of the above steps, the mobile device is still not yet ready to handoff into the target network at step 90 (e.g., if the current network continues to satisfy the mobile's requirements), the mobile device will preferably switch its network connection back to the current network (i.e., the old network), such as, e.g., shown at step 110 in FIG. 1.

Since the above process of switching to the target network and then switching back to the current or old network can be advantageously done during the otherwise

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silent periods of the mobile device, the switching can be effectively transparent to the applications on the mobile device and, hence, will avoid interruptions to such applications.

Reference is now made to FIG. 3 which schematically illustrates the use of silent periods for network discovery and for performing proactive handoff actions according to some preferred embodiments. As shown in FIG. 3, if during one ASP, the mobile device was only able to perform one or a subset of the handoff actions, the mobile device can use subsequent ASPs to perform the remaining handoff actions needed for the target network. In this manner, multiple ASPs can be utilized that are not concurrent in time in some embodiments. For example, during one ASP, the mobile device can discover the necessary information regarding a target network (e.g., addresses of the IP access router, the IP address allocation server, and the authentication server). And, for example, during another subsequent ASP (such as, e.g., a next ASP), the mobile device can obtain a local IP address from the target network and/or can perform IP or application-layer authentication with the target network.

Preferably, if the mobile device becomes ready for an actual handoff into the target network (such as, e.g., when the radio signal strength of the old network has degraded below a threshold), the mobile device can proceed to perform the rest of the handoff steps needed to finish the actual handoff, such as, e.g., shown at step 100 in FIG. 1. In some preferred embodiments, the mobile device will proceed to perform the rest of the needed handoff steps to finish the actual handoff without having to switch back to the old/current interface.

In some preferred embodiments, after each successful handoff action, the time the mobile device took to perform the handoff action is passed on to the ASP Predictor, which can be later used by the ASP Predictor to estimate a threshold used

to determine dynamically whether a silent period is an ASP.

Preferably, the mobile device can repeat the process steps (such as, e.g., process steps depicted in FIG. 3) for multiple radio networks. Preferably, at any given time, the mobile device can have one or more (e.g., multiple) target network(s) with which the mobile has completed one or more handoff actions.

As should be understood based on this disclosure, the present silent proactive handoff approach has significant advantages. For example, with the silent proactive handoff approach, if handoff actions to a target network fail during silent periods for any reason (e.g., the user is not authorized to use the target network), there can be essentially no impact on the applications.

In some instances, a mobile device may traverse a network too quickly for the network to be of any practical use for the mobile device user. For example, a vehicle traveling at 75 miles-per-hour may traverse a wireless LAN within about 5 seconds when the wireless LAN has a coverage area of about 150 meters. In such an illustrative case, the mobile device may receive no benefit by handing off into this wireless LAN when, for example, the user application is voice and/or the like. Therefore, there would be no need for the mobile device to perform such silent proactive handoff actions for this wireless LAN.

Accordingly, in some preferred embodiments, a mobile device is configured to determine when silent proactive handoff may not be needed. Accordingly, in this manner, the mobile device can be adapted to stop the silent proactive handoff for networks for which silent proactive handoff is not appropriate. Among other things, stopping the silent proactive handoff when it relates to a network that does not provide any benefit to the user can help to reduce unnecessary battery consumption,

unnecessary use of processing power, etc.

In some preferred embodiments, a software process, referred to in this disclosure as a Silent Proactive Handoff Activator (SPH Activator), is implemented on the mobile device to dynamically determine when to activate or deactivate the silent proactive handoff. In some illustrative embodiments, some illustrative ways to decide whether to run silent proactive handoff can be to use one or more of the following parameters:

1). types of user applications, such as, e.g., voice, data, video, etc.;

2). relative speed at which the mobile device is moving; and

3). predicted size (e.g., diameter) of the candidate network(s).

In some illustrative embodiments, the SPH Activator can use some or all of the above parameters (and/or any other appropriate parameters as would be apparent to those in the art based on this disclosure) to estimate the time it will take for the mobile device to traverse a candidate network. Preferably, if the estimated traversal time is lower than a threshold level Φ that represents the minimum amount of time a mobile device has to stay inside a network for the network to be useful for the user's applications, the SPH Activator stops the silent proactive handoff. On the other hand, if the estimated network traversal time is higher than the threshold level Φ, then the SPH Activator can preferably enable and/or start the silent proactive handoff.

To estimate the time it takes a mobile device to traverse a network, the mobile device can, in some instances, estimate its moving speed and direction. In some embodiments, a mobile device's moving speed and direction can be estimated using one or more of the following methods:

1). The amount of time that the mobile device took to traverse similar types of networks in the recent past can be recorded. For example, IEEE 802.11 networks have similar coverage ranges. Therefore, the mobile device can estimate the time it will spend in the next 802.11 network based on the times it spent in other 802.11 networks in the recent past. For example, if the predicted resident time is shorter than a threshold level Φ, the mobile can stop the silent proactive handoff for the next 802.11 network.

2). A counter C can be evaluated. In this regard, in some exemplary embodiments, as discussed briefly above, if the value of a counter reaches reasonably high in a fairly short interval of time without gathering even the first handoff action information, that can potentially demonstrate, among other things, that the mobile device is moving at fairly high speed and the silent proactive handoff algorithm may be stopped for some duration to save the battery power. In some embodiments, the value of this counter C could be hard fixed or may change dynamically based on some mathematical model. For example, a statistical or an exponential model could be used to model the instances that the mobile device tried but failed to get the first handoff action information in the recent past and could use this to estimate the minimum length of time on the mobile device to determine when to re-activate the SPH. By way of example, in some illustrative embodiments, a counter C could be procedurally located at the component C as shown in FIG. 1.

3). The MAC (Media Access Control) layer signals in most radio networks allow a mobile to determine when it will receive the next radio beacon from a certain network. For example, an IEEE 802.11 Basic Service Set (BSS), which is a set of Access Points that form a local area wireless network, typically sends beacons in 100 ms intervals. If the mobile receives all the consecutive beacon

signals at regular time intervals, such as for example at (100.+ ΔT) ms where ΔT is the beacon transmission time from an access point to the mobile, it indicates that the mobile device is stationary when ΔT is a constant. On the other hand, if ΔT is decreasing, it means the mobile is traveling in the direction of the AP from which the radio beacon is received. On yet the other hand, if ΔT is increasing, it means the mobile is going away from that access point that is sending the beacons. Thus, in some embodiments, the rate at which ΔT increases or decreases can therefore be the predictor of the mobile device's speed as well as its direction. Thus, in some embodiments, using the mobile device's estimated moving speed and the estimated coverage range of a network, the mobile device can estimate the time it will take to go through the network.

In some embodiments, the foregoing predictor can also be used to down select the candidate networks. In particular, networks that the mobile device is moving closer to can receive higher preference than networks that the mobile device is moving farther away from, when the mobile device decides which candidate networks to select to perform proactive handoff processing.

In some embodiments, a decision to stop or to continue to run the ASP algorithm can also be made if the gathered information about the candidate networks is sufficient. That is, if the information collected about the available networks is already enough, in some embodiments, the algorithm can be stopped from gathering further information.

FIG. 4 shows an illustrative, and non-limiting, architecture of an exemplary mobile device 400 having silent proactive handoff capabilities. As shown, in some preferred embodiments, the mobile device 400 includes application functionality 410,

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IP layer functionality 420, a traffic monitor 430, a radio network interface card 440, a policy database 450, a silence predictor 460, a target network selector 470, and a silent handoff controller 480. As also generally indicated in FIG. 4, the radio network interface card of the mobile device can connect to an Access Point or the like within one of the networks N1, N2 and N3 in the illustrated example.

In the illustrated example, the functional entity or component referred to as the silent handoff controller 480 implements the functionality the mobile device performs during an actionable silent period, such as:

- establishing connections to a target networks;
- discovering network information about the target networks;
- obtaining local IP address from the target networks; and/or
- performing the require authentications with the target networks.

In various embodiments, the functions incorporated as part of the silent handoff controller 480 could be implemented in hardware, firmware and/or software and/or could also be implemented in, e.g., separate software entities.

In the preferred embodiments, a policy database 450 is provided that maintains user policies regarding how different networks should be used. As some illustrative and non-limiting examples, a policy may specify one or more of the following: a) that a wireless LAN is always preferred over a cellular network; b) that a wireless LAN is always preferred over a cellular network for voice applications; c) that a network with a higher signal strength is always preferred; d) that a network is preferred if it can provide a higher available bandwidth or lower delay; and/or e) other policy specifications.

In the embodiment shown in FIG. 4, a traffic monitor 430 is preferably

implemented as a layer between the IP layer 420 and the network device drivers 440. In other embodiments, a variety of other ways of implementing a traffic monitor 430 can be used. By way of example, a traffic monitor could be an application process that obtains traffic information by polling the device drivers or by periodically receiving traffic information from the device drivers.

As indicated above, the various functional components of the mobile device can be implemented in a variety of ways, as would be understood by those in the art based on this disclosure. For example, some or all of the functional components can be implemented in software at the application layer and/or at the kernel layer. Additionally, some or all of the functional components can be implemented in hardware, firmware and/or on micro-chips.

Thus, as depicted in the exemplary system shown in FIG. 5 for illustrative purposes only, a mobile device (e.g., mobile station) MS can begin inside the radio coverage of a first network N1 having an access point AP1 at a position A. Then, upon moving into a position B, the mobile device MS can simultaneously be situated within the radio coverage of a second network N2 and a third network N3, having respective access points AP2 and AP3. As a result, in this region B, the mobile device can perform silent proactive handoff functionality as described above (e.g., performing handoff actions during silent periods while the mobile station is still satisfied by the network N1), such that upon a later movement of the mobile device MS to the position C, a very fast handoff can be achieved (e.g., from network N1 to either of network N2 or N3 in the illustrated exemplary path).

Broad Scope of the Invention

While illustrative embodiments of the invention have been described herein, the present invention is not limited to the various preferred embodiments described herein, but includes any and all embodiments having equivalent elements, modifications,

omissions, combinations (e.g., of aspects across various embodiments), adaptations and/or alterations as would be appreciated by those in the art based on the present disclosure. The limitations in the claims are to be interpreted broadly based on the language employed in the claims and not limited to examples described in the present specification or during the prosecution of the application, which examples are to be construed as non-exclusive. For example, in the present disclosure, the term "preferably" is non-exclusive and means "preferably, but not limited to." In this disclosure and during the prosecution of this application, means-plus-function or step-plus-function limitations will only be employed where for a specific claim limitation all of the following conditions are present in that limitation: a) "means for" or "step for" is expressly recited; b) a corresponding function is expressly recited; and c) structure, material or acts that support that structure are not recited. In this disclosure and during the prosecution of this application, the terminology "present invention" or "invention" may be used as a reference to one or more aspect within the present disclosure. The language present invention or invention should not be improperly interpreted as an identification of criticality, should not be improperly interpreted as applying across all aspects or embodiments (i.e., it should be understood that the present invention has a number of aspects and embodiments), and should not be improperly interpreted as limiting the scope of the application or claims. In this disclosure and during the prosecution of this application, the terminology "embodiment" can be used to describe any aspect, feature, process or step, any combination thereof, and/or any portion thereof, etc. In some examples, various embodiments may include overlapping features. In this disclosure, the following abbreviated terminology may be employed: "e.g." which means "for example."

What is claimed is:

1. A method for performing silent proactive handoff of a mobile device to a target network while the mobile device is using a current network, comprising: while the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements, having the mobile device use at least one silent period to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network.

2. The method of claim 1, wherein said mobile device sends or receives substantially no traffic over the current access network during the at least one silent period.

3. The method of claim 1, further including having the mobile device use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network.

4. The method of claim 1, further including having the mobile device use the at least one silent period to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network.

5. The method of claim 1, further including having the mobile device use the at least one silent period to perform layer-2, layer-3 or application layer authentication with the target network.

6. The method of claim 1, further including having the mobile device perform the following handoff actions during the at least one silent period: a) discovering neighboring network information; b) obtaining a local IP address from the target network; and c) performing authentication with the target network.

7. The method of claim 1, further including having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action.

8. The method of claim 1, further including having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold.

9. The method of claim 8, further including comparing different threshold values for different handoff actions.

10. The method of claim 1, further including the mobile device monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic.

11. The method of claim 1, further including having the mobile device predict an actionable silence period based on said monitoring of time periods and a prediction model.

12. The method of claim 1, further including dynamically estimating at least one actionable silence period threshold for at least one handoff action based on previous times the mobile device took to perform handoff actions, using the at least one threshold and inter-packet times determined from a traffic monitor to detect a next silent period, to predict if this next silent period will be an actionable silent period, and to predict a length of the next actionable silent period.

13. The method of claim 1, further including having said mobile device select a target network to which the mobile may switch to.

14. The method of claim 13, further including when a target network is selected and an actionable silent period is detected, switching the mobile device's layer-2 connection to the target network.

15. The method of claim 1, further including having the mobile device connect successfully to the target network and before a current actionable silent period expires, having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network, and if the current actionable silent period has not expired after the information discovery phase, having the mobile device start at least one handoff action.

16. The method of claim 15, further including after having the mobile device start said at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements, having the mobile device switch its network connection back to the current network.

17. The method of claim 15, further including after having the mobile device start said at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements, having the mobile device perform the remaining handoff steps to finish a handoff.

18. The method of claim 1, further including having said mobile device make a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network.

19. The method of claim 18, further including having said mobile device make said determination based on one or more of the following parameters: types of user

applications; relative speed at which the mobile device is moving; and a predicted size of a candidate network.

20. A mobile device having silent proactive handoff capability, comprising:

a) a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network;

b) a target network selector component configured to select a target network to which the mobile device may potentially switch to;

c) a silence predictor component configured to predict an actionable silence period; and

d) a silent handoff controller configured to control a silent proactive handoff to a target network during the actionable silent period.

21. The mobile device of claim 20, wherein said silent handoff controller is configured to establish connections to a target network, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network.

ABSTRACT

In some embodiments, a silent proactive handoff is performed wherein a mobile device that is using a current network to transport its application traffic uses its silent periods to connect to at least one target network temporarily and uses this temporary connectivity to perform actions needed for handoff into the target network. Among other things, with such a silent proactive handoff approach, e.g., if handoff actions to a target network fail during silent periods, there can still be essentially no impact on the applications.

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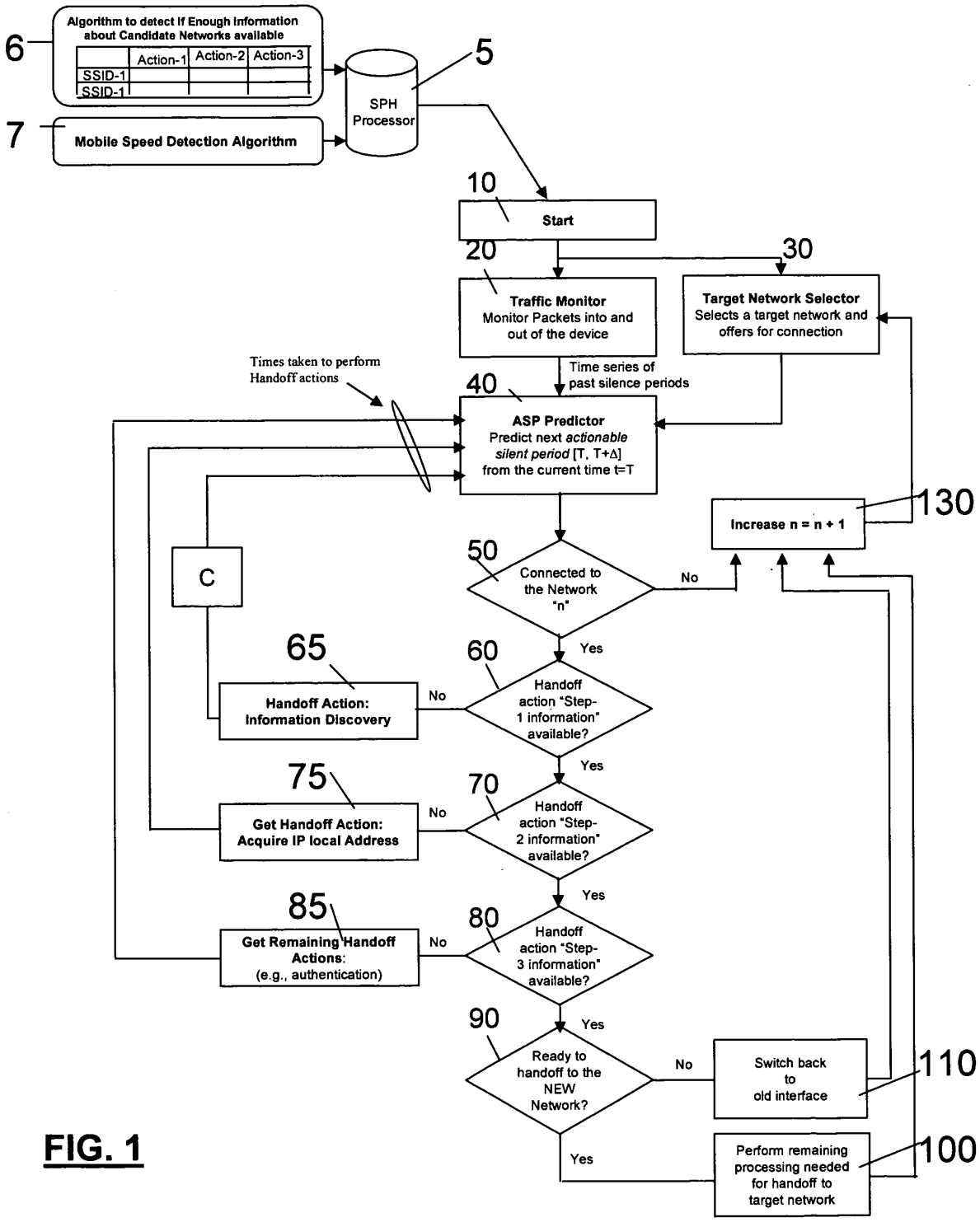

6
Algorithm to detect if Enough Information about Candidate Networks available
Action-1
Action-2
Action-3
SSID-1
SSID-1
7
Mobile Speed Detection Algorithm
SPH Processor
5
10
Start
20
Traffic Monitor
Monitor Packets into and out of the device
30
Target Network Selector
Selects a target network and offers for connection
Times taken to perform Handoff actions
Time series of past silence periods
40
ASP Predictor
Predict next actionable silent period [T, T+Δ] from the current time t=T
C
130
Increase n = n + 1
50
Connected to the Network "n"
No
Yes
65
Handoff Action: Information Discovery
No
60
Handoff action "Step-1 information" available?
Yes
75
Get Handoff Action: Acquire IP local Address
No
70
Handoff action "Step-2 information" available?
Yes
85
Get Remaining Handoff Actions: (e.g., authentication)
No
80
Handoff action "Step-3 information" available?
Yes
90
Ready to handoff to the NEW Network?
No
Switch back to old interface
110
Yes
Perform remaining processing needed for handoff to target network
100

FIG. 1

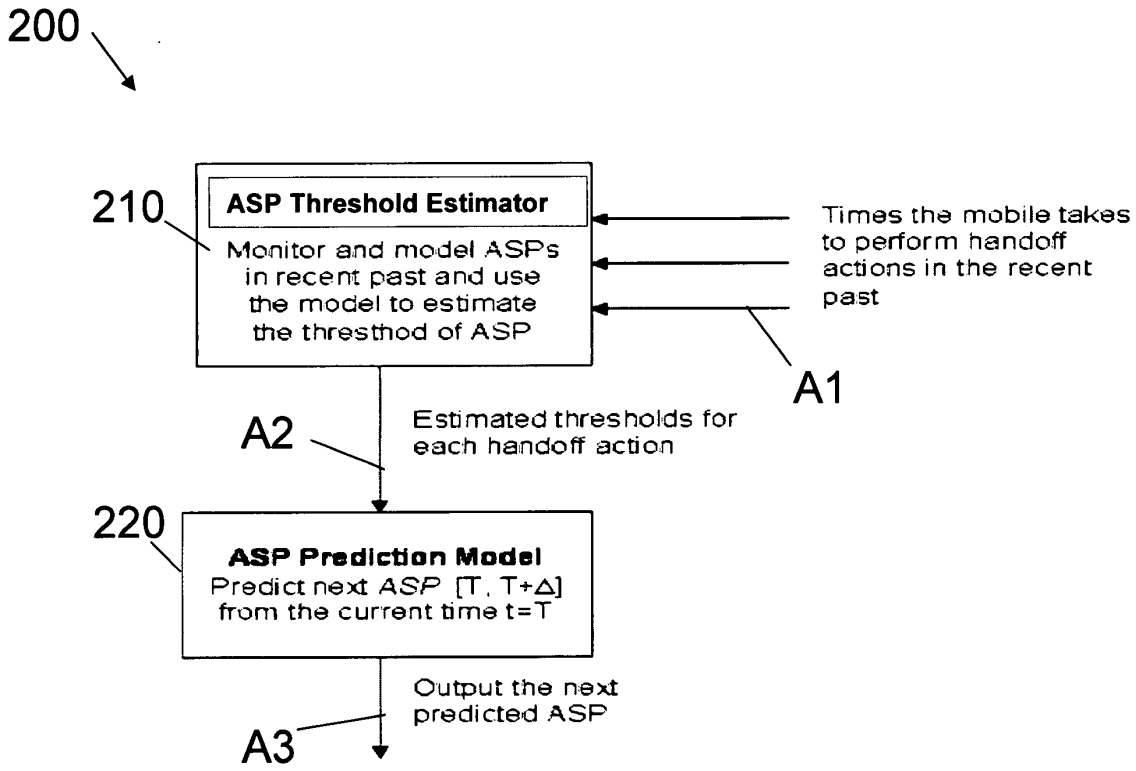


FIG. 2

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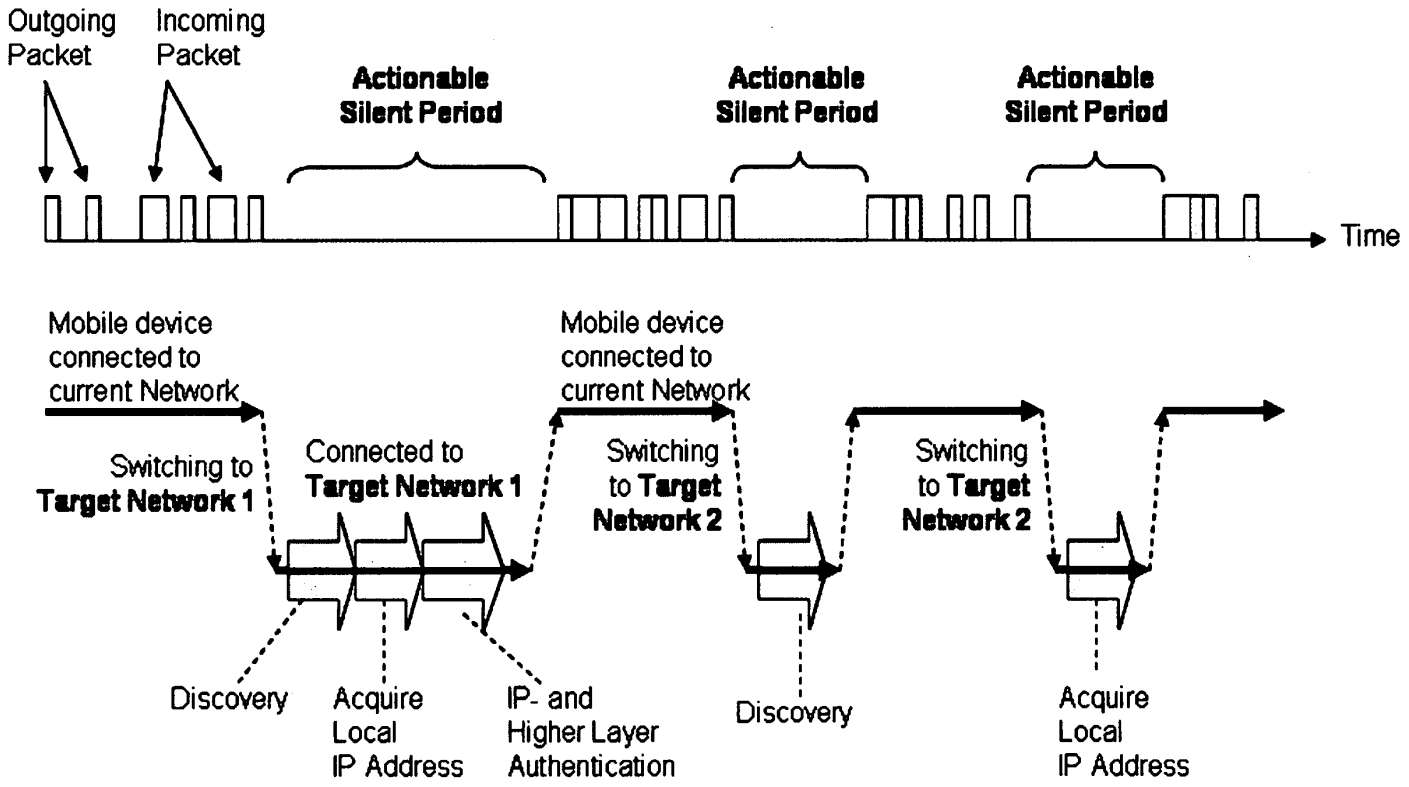


FIG. 3

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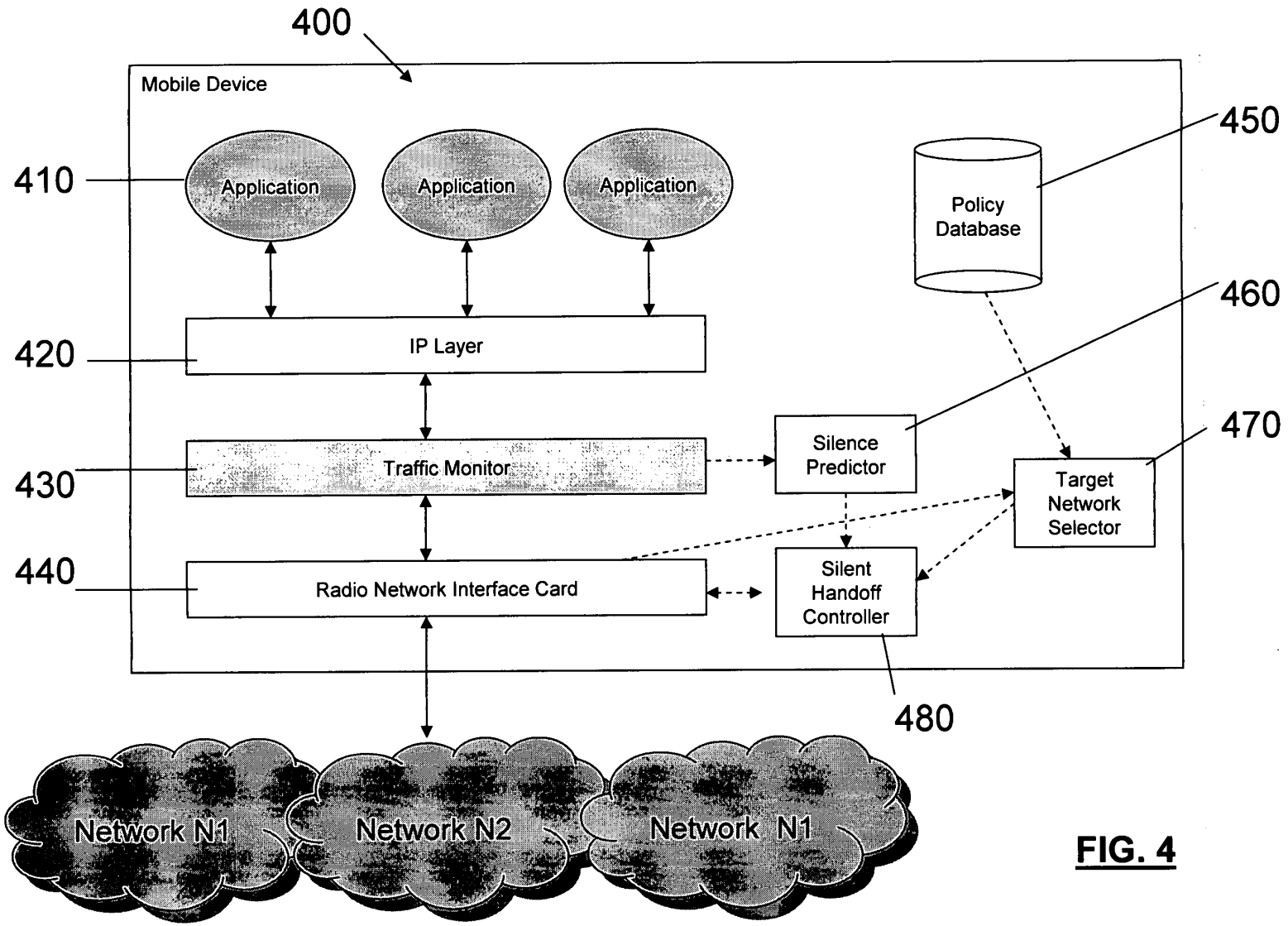


FIG. 4

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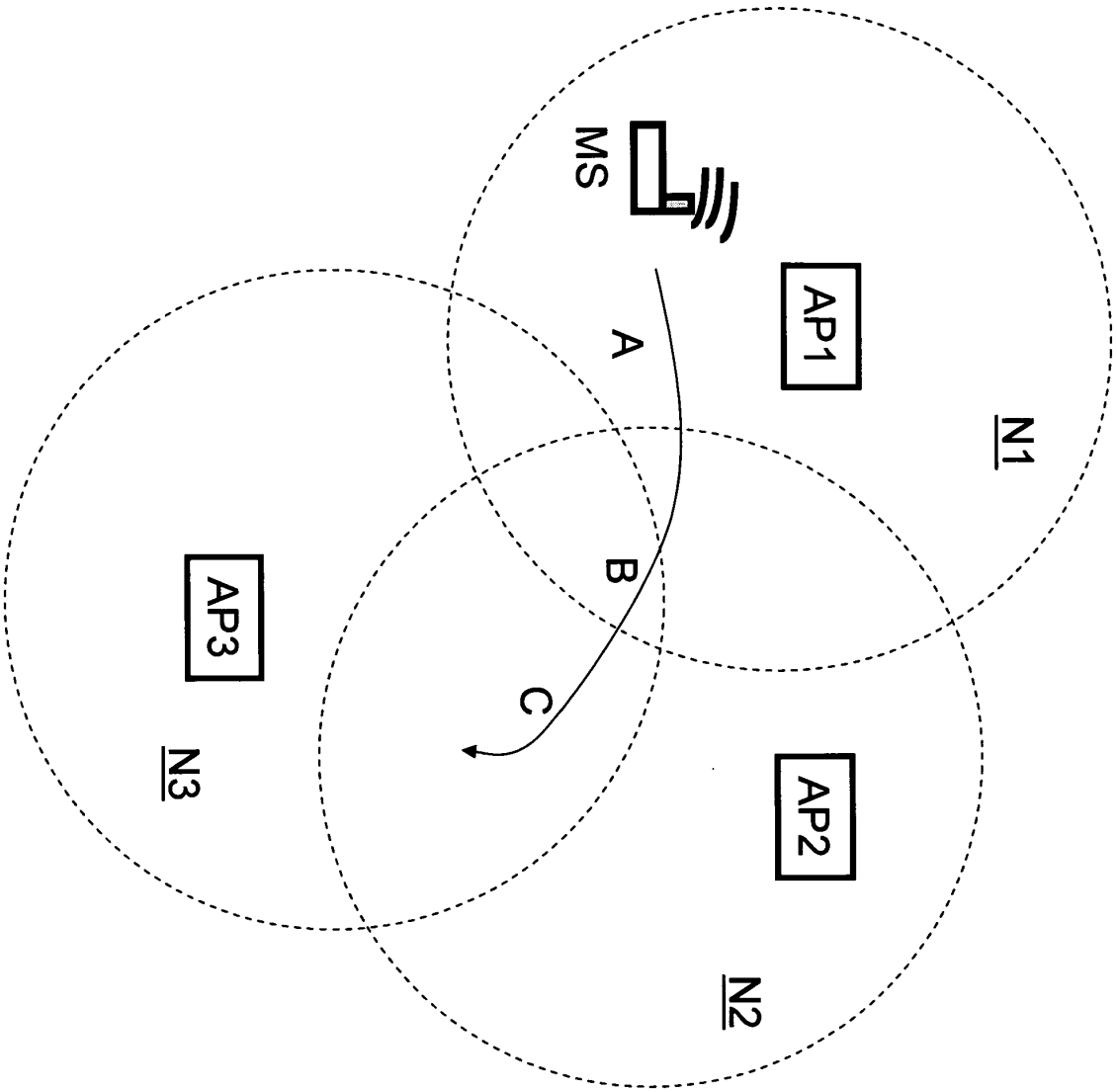


FIG. 5

APPLICATION DATA SHEET

Electronic Version v14
Stylesheet Version v14.1

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Attorney Docket Number:	3119-113

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52190 *52190*

as our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

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Fax:	
E-mail:	

PATENT APPLICATION FEE DETERMINATION RECORD
Effective December 8, 2004

Application or Docket Number: 11096721

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	21	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	21 minus 20=	* 1
INDEPENDENT CLAIMS	2 minus 3 =	* 0
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐ OR OTHER THAN SMALL ENTITY

RATE	FEE	OR	RATE	FEE
BASIC FEE		OR	BASIC FEE	
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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.

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 NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/096,721	04/01/2005	Tao Zhang	3119-113

CONFIRMATION NO. 2651

52190
WATCHSTONE P + D
1300 EYE STREET, NW
SUITE 400 EAST
WASHINGTON, DC 20005

FORMALITIES LETTER

OC000000015872233

Date Mailed: 04/26/2005

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  Applicant must submit $ **300** *to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).*
- The oath or declaration is missing. *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(f) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **$50** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$1180** for a Large Entity

- **$300** Statutory basic filing fee.
- **$130** Late oath or declaration Surcharge.

- The application search fee has not been paid. Applicant must submit **$500** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **$200** to complete the examination fee for a large entity

- Total additional claim fee(s) for this application is **$50**

  - **$50** for **1** total claims over 20.

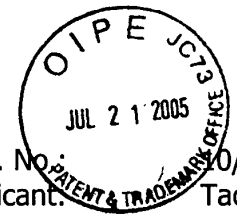
Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

TQUIBELA

Office of Initial Patent Examination (703) 308-1202

PART 3 - OFFICE COPY



Appl. No.: 10/096,721 Confirmation No. 2651
Applicant: Tao ZHANG et al.
Filed: April 1, 2005
TC/A.U.: To be assigned
Examiner: To be assigned

Title: **SILENT PROACTIVE HANDOFF**

Docket No. : 3119-113

RESPONSE TO NOTICE TO FILE MISSING PARTS

Mail Stop Missing Parts
Director of the United States Patent
and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

In response to a Notice to File Missing Parts of Application under 37 CFR 1.53(b), response copy attached, a Declaration and Power of Attorney identifying the above-referenced application by Serial Number and Filing Date is being herewith submitted. Also attached is a Credit Card Payment Form for the following fees:

$ 130.00 (fees under 37 C.F.R. 1.16(e))
$ 120.00 (extension)
$ 50.00 CLAIM FEES TO BE INSERTED
$ 40.00 Recordation Fees
$ 1,000.00 (basic filing fee, search fee, examination fee, etc.)
$ 1,340.00 **TOTAL**

Please charge or credit any other fees that may be due or payable to our deposit account number **14-1437**. An additional copy of this letter is enclosed for that purpose.

Respectfully submitted,

By _____

Stephen B. Parker
Attorney for Applicants
Registration No. 36,631
Watchstone P+D *(an affiliate of Novak Druce, LLP)*
1300 Eye Street, N.W.
Suite 400 East Tower
Washington, D.C. 20005
Tel. 202.785.5111

OIPE JC73
JUL 21 2005
PATENT & TRADEMARK OFFICE

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
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/096,721	04/01/2005	Tao Zhang	3119-113

RECEIVED
APR 27 2005

CONFIRMATION NO. 2651

FORMALITIES LETTER

OC000000015872233

52190
WATCHSTONE P + D
1300 EYE STREET, NW
SUITE 400 EAST
WASHINGTON, DC 20005

Date Mailed: 04/26/2005

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

07/22/2005 JADD01 00000082 10096721

01 FC:1011 300.00 OP
02 FC:1111 500.00 OP
03 FC:1311 200.00 OP
04 FC:1051 130.00 OP
05 FC:1202 50.00 OP

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

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  Applicant must submit $ **300** *to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).*
- The oath or declaration is missing. *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
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- Total additional claim fee(s) for this application is **$50**
  - **$50** for **1** total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

TOUSCH

Office of Initial Patent Examination (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

OIPE JC73 JUL 21 2005 PATENT & TRADEMARK OFFICE

DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

Declaration Submitted with Initial Filing | Declaration Submitted after Initial Filing

Attorney Docket No.	3119-113
First Named Inventor	Tao Zhang
COMPLETE IF KNOWN	
Application Number	~~UNKNOWN~~ 10/096,721
Filing Date	April 1, 2005
Group Art Unit	UNKNOWN
Examiner Name	To Be Assigned

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: SILENT PROACTIVE HANDOFF the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 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.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Numbers	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Claimed	Certified Copy Attached? YES NO
NONE				

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

I or we hereby appoint Stephen B. Parker, Reg. No. 36,631 as primary power of attorney and the registered practitioner(s) associated with Customer No. **52190** as associate power of attorney, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. Direct all correspondence to Customer Number **52190, attention Stephen B. Parker.**

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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF FIRST INVENTOR:			
Given Name **Tao** (first and middle [if any])		Family Name or Surname **ZHANG**	
Inventor's Signature		**Date**	
Residence: City _____	State **N.J.**	Country **USA**	**Citizenship** ___
Mailing Address _____			
City _____	State **N.J.**	**Zip**	Country **USA**
NAME OF SECOND INVENTOR:			
Given Name **Raziq** (first and middle [if any])		Family Name or Surname **YAQUB**	
Inventor's Signature		**Date** April 5th. '05	
Residence: City **Stewartsville**	State **N.J.**	Country **USA**	Citizenship **Pakistan**
Mailing Address **15 Cook Court, Stewartsville, N.J., 08886**			
City **Stewartsville**	State **N.J.**	Zip **08886**	Country **USA**

OIPE JC73
JUL 21 2005
PATENT & TRADEMARK OFFICE

PTO/SB/22 (10-00)
Approved for use through 10/31/2002. 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 if displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): 3119-113

In re Application of	Tao ZHANG et al.
Application Number	11/096,721
Filed	4/1/05
For	SILENT PROACTIVE HANDOFF
Group Art Unit	To be assigned
Examiner	To be assgined

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and appropriate non-small-entity fee are as follows (check time period desired):

- [x] One month (37 CFR 1.17(a)(1)) — $ 120.00
- [ ] Two months (37 CFR 1.17(a)(2)) — $
- [ ] Three months (37 CFR 1.17(a)(3)) — $
- [ ] Four months (37 CFR 1.17(a)(4)) — $
- [ ] Five months (37 CFR 1.17(a)(5)) — $

- [ ] Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount shown above is reduced by one-half, and the resulting fee is: $_____.
- [ ] A check in the amount of the fee is enclosed.
- [x] Payment by credit card. Form PTO-2038 is attached.
- [ ] The Commissioner has already been authorized to charge fees in this application to a Deposit Account.
- [ ] The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.
  I have enclosed a duplicate copy of this sheet.

I am the
- [ ] applicant/inventor
- [ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).
- [ ] attorney or agent of record.
- [x] attorney or agent under 37 CFR 1.34(a). Registration number if acting under 37 CFR 1.34(a) 36,631.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

July 8, 2005
Date

Signature

07/22/2005 JADD01 00000082 10096721
06 FC:1251 120.00 OP

Stephen B. Parker
Typed or printed name

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

- [ ] Total of _____ forms are submitted.

Burden Hour Statement: This form is estimated to take 0.1 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

OIPE JC73
JUL 21 2005
PATENT & TRADEMARK OFFICE

PTO/SB/21 (09-04)
Approved for use through 07/31/2006. 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 displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	13

Application Number	10/096,721
Filing Date	April 1, 2005
First Named Inventor	Tao ZHANG et al.
Art Unit	To be assigned
Examiner Name	To be assgined
Attorney Docket Number	3119-113

ENCLOSURES *(Check all that apply)*

- [✓] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [✓] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [✓] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [✓] Other Enclosure(s) (please Identify below):

  Declaration; Assignment; Recordation Cover Sheet; and Credit Card Payment Form

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Watchstone P+D		
Signature			
Printed name	Stephen B. Parker		
Date		Reg. No.	36,631

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours 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.

OIPE JC73 JUL 21 2005 PATENT & TRADEMARK OFFICE

PTO/SB/17 (12-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
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.

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	$1,340.00

Complete if Known	
Application Number	11/096,721
Filing Date	April 1, 2005
First Named Inventor	Toao ZHANG et al.
Examiner Name	To be assigned
Art Unit	To be assgined
Attorney Docket No.	3119-113

METHOD OF PAYMENT (check all that apply)

☐ Check ☑ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 141437 Deposit Account Name: Novak Druce LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	$1,000.00
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
21 - 20 or HP =	1.200.00	x 50	= 50

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 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).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____	/ 50 = _____ (round up to a whole number)	x _____	= _____

4. OTHER FEE(S)

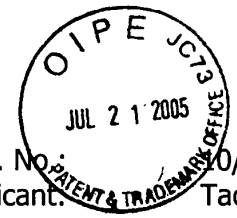
	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): ASSIGNMENT;DECLARATION;ONE (1) MONTH EXTENSION	290.00

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 36,631	Telephone 202-204-4733
Name (Print/Type)	Stephen B. Parker		Date 7/21/05

This collection of information is required by 37 CFR 1.136. 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 30 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.



Appl. No.: 10/096,721 Confirmation No. 2651
Applicant: Tao ZHANG et al.
Filed: April 1, 2005
TC/A.U.: To be assigned
Examiner: To be assigned

Title: **SILENT PROACTIVE HANDOFF**

Docket No. : 3119-113

RESPONSE TO NOTICE TO FILE MISSING PARTS

Mail Stop Missing Parts
Director of the United States Patent
and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

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$ 40.00 Recordation Fees
$ 1,000.00 (basic filing fee, search fee, examination fee, etc.)
$ 1,340.00 **TOTAL**

Please charge or credit any other fees that may be due or payable to our deposit account number **14-1437**. An additional copy of this letter is enclosed for that purpose.

Respectfully submitted,

By _____

Stephen B. Parker
Attorney for Applicants
Registration No. 36,631
Watchstone P+D *(an affiliate of Novak Druce, LLP)*
1300 Eye Street, N.W.
Suite 400 East Tower
Washington, D.C. 20005
Tel. 202.785.5111

OIPE JC73
JUL 21 2005
PATENT & TRADEMARK OFFICE

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 NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/096,721	04/01/2005	Tao Zhang	3119-113

RECEIVED
APR 27 2005

CONFIRMATION NO. 2651

FORMALITIES LETTER

OC000000015872233

52190
WATCHSTONE P + D
1300 EYE STREET, NW
SUITE 400 EAST
WASHINGTON, DC 20005

Date Mailed: 04/26/2005

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

07/22/2005 JADD01 00000082 10096721

01 FC:1011 300.00 OP
02 FC:1111 500.00 OP
03 FC:1311 200.00 OP
04 FC:1051 130.00 OP
05 FC:1202 50.00 OP

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  Applicant must submit $ **300** *to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).*
- The oath or declaration is missing. *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(f) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **$50** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$1180** for a Large Entity

- **$300** Statutory basic filing fee.
- **$130** Late oath or declaration Surcharge.

- The application search fee has not been paid. Applicant must submit **$500** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **$200** to complete the examination fee for a large entity

- Total additional claim fee(s) for this application is **$50**
  - **$50** for **1** total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

TOUSCH

Office of Initial Patent Examination (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

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 NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/096,721		2618	

Correspondence Address / Fee Address Change

The following fields have been set to Customer Number 66458 on 11/01/2006

- Correspondence Address
- Maintenance Fee Address

The address of record for Customer Number 66458 is:
WATCHSTONE P+D, PLC
1250 CONNECTICUT AVENUE, N.W.
WASHINGTON,DC 20036

PLUS Search Results for S/N 11096721, Searched Wed Jan 10 08:36:05 EST 2007

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

20060221900 99
5371780 87
5828661 87
20050036459 87
5426641 81
5987013 81
5181200 81
5448569 81
5617102 81
5633888 81
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7058033 81
7068624 81

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1883	370/331.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 07:34
L2	861	370/332.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 07:34
L3	3295	370/335.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 07:34
L4	3655	370/338.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:18
L5	2125	370/235.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:18
L6	2481	455/436.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:18
L7	1074	455/432.1.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:18
L8	793	455/437.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:18
L9	365	455/438.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:18
L10	570	455/439.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:19
L11	410	455/440.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:19
L12	791	455/442.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:19
L13	259	455/443.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:19
L14	244	455/444.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:20
L16	517	455/525.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:21
L17	1305	375/219.ccls.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:32

EAST Search History

L18	50	("20060221900" "5371780" "5828661" "20050036459" "5426641" "5987013" "5181200" "5448569" "5617102" "5633888" "5697053" "5732359" "5867785" "5873036" "5883888" "5995830" "6094579" "6108549" "6130892" "6148206" "6163701" "6188900" "6205339" "6240291" "6377556" "6404754" "6430414" "6463034" "6473411" "6492897" "6587689" "6633761" "6651105" "6654359" "6691227" "6741862" "6763007" "6831903" "6851050" "6856800" "6876747" "6973308" "6975864" "6980808" "6982949" "6993337" "7016328" "7046647" "7058033" "7068624").pn.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:32
L19	1	((handoff or hand-off or hand-over or (hand near over) or soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over) and (silen$5) and (mobile or device or cellular or terminal) and network$5 and traffic$5 and (period$5 or time$4) and (target$4 or destination)).clm.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:33
L20	1	((handoff or hand-off or hand-over or (hand near over) or soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over or handoff or roam$5) and (silen$5) and (mobile or device or cellular or terminal) and network$5 and traffic$5 and (period$5 or time$4) and (target$4 or destination)).clm.	US-PGPUB; USPAT	OR	ON	2007/05/31 08:33
L21	57	((soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over) same (silen$5))	US-PGPUB; USPAT	OR	ON	2007/05/31 08:38
L24	87	((soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over or roam$5) same (silen$5))	US-PGPUB; USPAT	OR	ON	2007/05/31 08:38

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	04/01/2005	Tao Zhang	3119-113	2651

66458 7590 06/08/2007

WATCHSTONE P+D, PLC
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SUITE 700
WASHINGTON, DC 20036-2657

EXAMINER	
AMINZAY, SHAIMA Q	
ART UNIT	PAPER NUMBER
2618	

MAIL DATE	DELIVERY MODE
06/08/2007	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.	Applicant(s)	
	11/096,721	ZHANG ET AL.	
	Examiner	Art Unit	
	Shaima Q. Aminzay	2618	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *01 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2005* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action

> (a) Patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made

1. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacs (Kovacs, U.S. Patent 7,215,958) in view of Sillasto (Sillasto et al., U.S. Publication 2005/0036,462).

Regarding claim 1, Kovacs discloses a method for performing *[silent]* proactive handoff of a mobile device to a target network while the mobile device is using a current network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 6-8, 12-19, 40-56, column 3, lines 24-31, column 5, lines 40-43, the predetermined controlled handover (proactive handoff) of a mobile unit (30) to target (22) using the serving (current) network)*, comprising: while the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53, the mobile unit (30) to target (22) using the serving (current) network for transporting application*

traffic and the serving network fulfilling mobile's demands), having the mobile device use at least one *[silent]* period to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31, 50-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 61-65, column 5, lines 40-43, 50-56 column 6, lines 43-53, column 7, lines 1-2, the mobile unit (30) using the drift (temporary) connection handover as a one time temporary connection for later connection to the target (22) handover).*

Kovacs does not specifically teach silent, however, Kovacs teaches the IP soft handover (handoff) that is an intra-frequency handover which the relocation takes place during a very short timing period that could be idle (silent or waiting) period and that is well known in the art (*Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31, 40-56).*

In a related art dealing handoff *(Figures 1-4, paragraph [10], lines 1-21, [11], lines 1-22),* Sillasto teaches the silent *(Figures 1-4, paragraph [10], lines 1-21, [11], lines 1-22, [25], lines 1-5, [41], lines 1-6, [56], lines 3-5, the silence handover (handoff)).*

It would have been obvious to one of ordinary skill in the art at the time invention was made to have included Sillasto's silent time with Kovacs's communication system to provide a network handover from the source to destination with lower time delay and minimized risk of errors (Sillasto, *paragraph [26], lines 1-4).*

Regarding claim 20, Kovacs discloses a mobile device having silent proactive handoff capability *(Figures 1-4, Abstract, lines 1-19, column 1, lines 6-8, 12-19, 40-56, column 3,*

lines 24-31, column 5, lines 40-43, the predetermined controlled handover (proactive handoff) of a mobile unit (30) to target (22) using the serving (current) network), comprising: a) a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53, controlling the mobile unit (30) to target (22) using the serving (current) network for transporting application traffic and the serving network)*; b) a target network selector component configured to select a target network to which the mobile device may potentially switch to *(Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31, 50-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 61-65, column 5, lines 40-43, 50-56 column 6, lines 43-53, column 7, lines 1-2, the target (22) is being selected for the mobile unit (30) handover)*; c) a *[silence]* predictor component configured to predict an actionable *[silence]* period *(Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31, 50-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 61-65, column 5, lines 40-43, 50-56 column 6, lines 43-53, column 7, lines 1-2, the transmission is being determined prior to the handover)*; and d) a *[silent]* handoff controller configured to control a *[silent]* proactive handoff to a target network during the actionable *[silent]* period *(Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31, 50-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 61-65, column 5, lines 40-43, 50-56 column 6, lines 43-53, column 7, lines 1-2, the mobile unit (30) handover is being controlled and predetermined)*.

Kovacs does not specifically teach silent, however, Kovacs teaches the IP soft handover (handoff) that is an intra-frequency handover which the relocation takes place during a very short timing period that could be idle (silent or waiting) period and that is well known in the art (*Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31, 40-56).*

In a related art dealing handoff *(Figures 1-4, paragraph [10], lines 1-21, [11], lines 1-22),* Sillasto teaches the silent *(Figures 1-4, paragraph [10], lines 1-21, [11], lines 1-22, [25], lines 1-5, [41], lines 1-6, [56], lines 3-5, the silence handover (handoff)).*

It would have been obvious to one of ordinary skill in the art at the time invention was made to have included Sillasto's silent time with Kovacs's communication system to provide a network handover from the source to destination with lower time delay and minimized risk of errors (Sillasto, *paragraph [26], lines 1-4).*

Regarding claim 2, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches wherein said mobile device sends or receives substantially no traffic over the current access network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 6, lines 19-25)*, and further, Sillasto teaches during the at least one silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 3, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having the mobile device use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network *(Abstract, lines 1-19, column 1, lines 12-19, column 3, lines 35-*

44, 55-59, column 6, lines 43-67, column 7, lines 1-5), and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 4, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having the mobile device use the at least one silent period to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network *(column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 64-67, column 7, lines 1-5, the higher layers such as network layer and media layers),* and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 5, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having the mobile device use the at least one silent period to perform layer-2, layer-3 or application layer authentication with the target network *(column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 64-67, column 7, lines 1-5, the higher layers such as network layer and media layers),* and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 6, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having the mobile device perform the following handoff actions during the at least one silent period: a) discovering neighboring network information; b)

obtaining a local IP address from the target network; and c) performing authentication with the target network *(Figures 1-4, column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 64-67, column 7, lines 1-5)*, and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8)*.

Regarding claim 7, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action *(Figures 1-4, column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 64-67, column 7, lines 1-5, the higher layers such as network layer and media layers)*, and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8)*.

Regarding claim 8, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold *(Figures 1-4, column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 64-67, column 7, lines 1-5, the higher layers such as network layer and media layers)*, and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8)*.

Regarding claim 9, Kovacs in view of Sillasto teach all the limitations of claim 8, further, Katz teaches comparing different threshold values for different handoff actions

(column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 37-56, column 6, lines 46-67).

Regarding claim 10, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches the mobile device monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic *(Figures 1-4, column 1, lines 12-19, 27-31, 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 43-67, column 7, lines 1-5).*

Regarding claim 11, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches the mobile device predict an actionable silence period based on said monitoring of time periods and a prediction model *(Figures 1-4, column 1, lines 12-19, 27-31, 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 43-67, column 7, lines 1-5),* and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 12, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches dynamically estimating at least one actionable silence period threshold for at least one handoff action based on previous times the mobile device took to perform handoff actions *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5,*

lines 40-43, column 6, lines 43-53), using the at least one threshold and inter-packet times determined from a traffic monitor to detect a next silent period, to predict if this next silent period will be an actionable silent period, and to predict a length of the next actionable silent period *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53),* and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 13, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches having said mobile device select a target network to which the mobile may switch to *(column 1, lines 12-32, 40-56, column 3, lines 25-34, column 4, lines 41-50).*

Regarding claim 14, Kovacs in view of Sillasto teach all the limitations of claim 13, further, Katz teaches when a target network is selected and an actionable silent period is detected, switching the mobile device's layer-2 connection to the target network *(column 1, lines 12-19, 27-31, 40-56, column 4, lines 41-50, 61-65, column 5, lines 29-43, column 6, lines 64-67, column 7, lines 1-5, the higher layers such as network layer and media layers),* and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 15, Kovacs in view of Sillasto teach all the limitations of claim 1,

further, Katz teaches mobile device connect successfully to the target network and before a current actionable silent period expires *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53)*, having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network, and if the current actionable silent period has not expired after the information discovery phase *(Abstract, lines 1-19, column 1, lines 12-19, column 3, lines 35-44, 55-59, column 6, lines 43-67, column 7, lines 1-5)*, having the mobile device start at least one handoff action *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53),* and further, Sillasto teaches silent period *(Figures 1-4, paragraph [16], lines 3-8).*

Regarding claim 16, Kovacs in view of Sillasto teach all the limitations of claim 15, further, Katz teaches after having the mobile device start said at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53)*, having the mobile device switch its network connection back to the current network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-*

53).

Regarding claim 17, Kovacs in view of Sillasto teach all the limitations of claim 15, further, Katz teaches after having the mobile device start said at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53)*, having the mobile device perform the remaining handoff steps to finish a handoff *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53).*

Regarding claim 18, Kovacs in view of Sillasto teach all the limitations of claim 1, further, Katz teaches mobile device make a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 41-50, 61-65, column 5, lines 40-43, column 6, lines 43-53).*

Regarding claim 19, Kovacs in view of Sillasto teach all the limitations of claim 18, further, Katz teaches mobile device make said determination based on one or more of the following parameters: types of user applications; relative speed at which the mobile

device is moving; and a predicted size of a candidate network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-63, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 54-67, column 6, lines 19-25, 43-53).*

Regarding claim 21, Kovacs in view of Sillasto teach all the limitations of claim 20, further, Katz teaches silent handoff controller is configured to establish connections to a target network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-63, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 54-67, column 6, lines 19-25, 43-53)*, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network *(Figures 1-4, Abstract, lines 1-19, column 1, lines 40-63, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 54-67, column 5, lines 21-24, column 6, lines 43-53, 61-67, column 7, lines1-16)..*

Conclusion

The prior art made of record considered pertinent to applicant's disclosure, see PTO-892 form.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shaima Q. Aminzay whose telephone number is 571-272-7874. The examiner can normally be reached on 7:00 AM -4:00 PM.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew D. Anderson can be reached on 571-272-4177. The fax 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).

Shaima Q. Aminzay
(Examiner)
June 2, 2007

MATTHEW ANDERSON
SUPERVISORY PATENT EXAMINER

Notice of References Cited	Application/Control No. 11/096,721	Applicant(s)/Patent Under Reexamination ZHANG ET AL.	
	Examiner Shaima Q. Aminzay	Art Unit 2618	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,215,958 B2	05-2007	Kovacs et al.	455/436
*	B	US-2005/0036462 A1	02-2005	Sillasto et al.	370/331
*	C	US-5,870,675 A	02-1999	Tuutijarvi et al.	455/436
*	D	US-2002/0141360 A1	10-2002	Baba et al.	370/331
*	E	US-2004/0028009 A1	02-2004	Dorenbosch et al.	370/329
*	F	US-2006/0099950 A1	05-2006	Klein et al.	455/439
*	G	US-2004/0224711 A1	11-2004	Panchal et al.	455/518
	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	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
11/096,721	ZHANG ET AL.
Examiner	**Art Unit**
Shaima Q. Aminzay	2618

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	5/31/07
	1	√
	2	√
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination	
11/096,721	ZHANG ET AL.	
Examiner	**Art Unit**	
Shaima Q. Aminzay	2618	

SEARCHED			
Class	Subclass	Date	Examiner
370	331	5/31/2007	S.A.
	235	5/31/2007	S.A.
	332	5/31/2007	S.A.
	335	5/31/2007	S.A.
	338	5/31/2007	S.A.
455	436	5/31/2007	S.A.
	432.1	5/31/2007	S.A.
	437	5/31/2007	S.A.
	438	5/31/2007	S.A.
	439	5/31/2007	S.A.
	440	5/31/2007	S.A.
	442, 443	5/31/2007	S.A.
	444, 525	5/31/2007	S.A.
375	219	5/31/2007	S.A.

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
370	**338**	**5/31/2007**	**S.A.**
455	436	5/31/2007	S.A.
455	432.1	5/31/2007	S.A.
See Search History printout EAST (US Patent, Pub.)		5/31/2007	S.A.

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
PLUS search and EAST search results enclosed.	5/31/2007	S.A.
Gregory B. Sefcheck (Class 370 Primary)	5/31/2007	S.A.

UNITED STATES PATENT AND TRADEMARK OFFICE

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Bib Data Sheet

CONFIRMATION NO. 2651

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/096,721	04/01/2005 RULE	370	2618	3119-113

APPLICANTS

Tao Zhang, Fort Lee, NJ;
Raziq Yaqub, Stewartsville, NJ;

** CONTINUING DATA ********** S.A.

** FOREIGN APPLICATIONS ********** S.A.

IF REQUIRED, FOREIGN FILING LICENSE GRANTED **
04/26/2005

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ yes ☒ no 35 USC 119 (a-d) conditions met ☐ yes ☒ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature S.A. Initials		NJ	5	21	2

ADDRESS
66458

TITLE
Silent proactive handoff

FILING FEE RECEIVED		
1180	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	04/01/2005	Tao Zhang	3119-113	2651

66458 7590 01/02/2008

WATCHSTONE P+D, PLC
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SUITE 700
WASHINGTON, DC 20036-2657

EXAMINER	
AMINZAY, SHAIMA Q	

ART UNIT	PAPER NUMBER
2618	

MAIL DATE	DELIVERY MODE
01/02/2008	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.

Notice of Abandonment	Application No.	Applicant(s)	
	11/096,721	ZHANG ET AL.	
	Examiner	Art Unit	
	Shaima Q. Aminzay	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on *08 June 2007*.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection.
   (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
   (d) ☒ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $_____ is insufficient. A balance of $_____ is due.
   The issue fee required by 37 CFR 1.18 is $_____. The publication fee, if required by 37 CFR 1.18(d), is $_____.
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.

6. ☐ The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☒ The reason(s) below:

Called applicant's representative Stephen Parker (Reg.# 36631, Telephone: 202-419-1518) on December 22, 2007 and notified that no response to the last office action that was mailed over 6 months ago has been filed

Shaima Q. Aminzay
Tel. 571-272-7874
12/26/2007

NAY MAUNG
SUPERVISORY PATENT EXAMINER

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

Application Number	11/096,721
Filing Date	April 1, 2005
Inventor	Tao Zhang
Art Unit	2618
Examiner's Name	Aminzay, Shaima Q
Docket Number	3119.113

Attention: Office of Petitions
Commissioner for Patents
Alexandria, VA 22313-1450
FAX (571) 273-8300

PETITION UNDER 37 CFR 1.137(b)

The undersigned respectfully petitions for revival of this application under 37 CFR 1.137(b). The reply and/or fee to the above-noted Office action in the form a response is enclosed herewith. Since this utility application was filed on or after June 8, 1995, no terminal disclaimer is required.

The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(b) was unintentional. In addition, the Office Action was issued without a copy of a cited reference, and the Office Action should have been reissued.

In the event that any fees are due in connection with this filing, please charge our Deposit Account **No. 50-4080.**

Signature: */Stephen B. Parker Reg. 36631/*
Date: February 20, 2008
Stephen B. Parker
Reg. 36631

Watchstone P&D, pllc

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

Application Number	11/096,721
Filing Date	April 1, 2005
Inventor	Tao Zhang
Art Unit	2618
Examiner's Name	Aminzay, Shaima Q
Docket Number	3119.113

RESPONSE

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the abandonment due to unintentional non-response to the non-final Office Action dated June 8, 2007, please enter the following:

Remarks begin on page 2.

REMARKS

Careful reconsideration and allowance are respectfully requested.

1. Reissuance of Non-Final Office Action.

It is respectfully noted that the present Office Action cites a reference by only the name Katz, and does not provide any other means to identify the reference. An effort was made to obtain a copy of the reference from the Patent Office, but the reference has been provided. It is respectfully submitted that any delay in filing of the response should come at no charge to applicant because the Patent Office should have reissued the Office Action and provided a copy of the reference.

2. Rejections Based On References.

Claims 1-21 are currently pending in the application. Claims 1-21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacs (Kovacs, U.S. Patent 7,215,958) in view of Sillasto (Sillasto et al., U.S. Publication 2005/0036,462).

The Examiner states that with respect to Claim 1, Kovacs disclose a method for performing proactive handoff of a mobile device to a target network while the current network is being used by the device. As stated by the Examiner Kovacs does not specifically teach silent but that Kovacs does teach that relocation takes place during a very short timing period.

It is respectfully submitted that it can not be seen that the Examiner's reference to Figures 1-4, Abstract, lines 1-19, column 1, lines 27-31,50-56, column 2, lines 25-34, column 3, lines 24-31, column 4, lines 61-65, column 5, lines 40-43, 50-56 column 6, lines 43-53, and column 7, lines 1-2, constitutes a disclosure of the mobile unit making a one time temporary connection to at least one target network to proactively perform at least one handoff action.

Moreover, Kovacs, in the Abstract, lines 9-13 states, "[b]ased on the relocation-specific information, the target network element (22) establishes a link

to the drift network element (21), **such that the drift network element (21) can receive user traffic from both the serving network element (20) and the target network element (20).”** Emphasis added. Accordingly, the examiner's statement, “Kovacs teaches the IP soft handover (handoff) that is an intra-frequency handover which the relocation takes place during a very short timing period that could be idle (silent or waiting) period”, is inconsistent with Kovacs disclosure in the Abstract, lines 9-13, quoted above.

Since Kovacs teaches away from the use of a silent period for a temporary handoff, it would not be obvious to one of ordinary skill in the art at the time invention was made to have included Sillasto's silent time with Kovacs's communication system to provide a network handover from the source to destination with lower time delay and minimized risk of errors.

With regard to claim 2, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 and notes that, “Katz teaches wherein said mobile device sends or receives substantially no traffic over the current access network” citing Figures 1-4 and lines from columns, 1, 2, and 6. It is noted that no reference to Katz has been cited by the Examiner, no patent number has been provided and it does not appear that the Examiner is referring to Kovacs, since the columns and lines in Kovacs do not appear to be relevant. It is noted that this error was brought to the attention of the examiner, but corrective information has not been provided. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

The Examiner again referred to Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz in the rejection of Claim 3. Neither Kovacs nor Sillasto teaches the use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network. As stated heretofore, Katz has not been cited. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office***

Action.

With regarding to claim 4, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There is no reference to Katz that has been cited by the Examiner and none of the cited references teaches having the mobile device use the at least one silent period to establish a layer-Z connection or association with the target network for receiving IP layer or high layer advertisements from the target network. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 5, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the use of at least one silent period to perform authentication with the target network. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 6, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. It is noted that there has not been a citing of any Katz reference and the cited prior art does not teach the use of at least one silent period to perform the handoff steps (a), (b), and/or (c) as set forth in the pending application. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 7, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach a determination of whether the at least one silent period is sufficient to complete one or more handoff action. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 8, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach a determination of whether the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 9, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the step comparing different threshold values for different handoff actions. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 10, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the mobile device monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 11, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the mobile device predicting an actionable silence period based on the monitoring of time periods and a prediction model. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 12, the Examiner states that Kovacs in view of

Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach dynamically estimating at least one actionable silence period threshold for at least one handoff action based on the previous times the mobile device took to perform hand off actions. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 13, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the mobile device selecting a target network to which the mobile may switch. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 14, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 13 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the mobile device selecting a target network to which the mobile may, during the detection of an actionable silent period, switch its layer-2 connection once a target network is selected. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 15, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach mobile device connect successfully to the target network and before a current actionable silent period expires. Further the cited prior art does not teach having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network, and if the current

actionable silent period has not expired after the information discovery phase and having the mobile device start at least one handoff action. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 16, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 15 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach after having the mobile device start said at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements and having the mobile device switch its network connection back to the current network. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 17, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 15 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the step of after having the mobile device start said at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements, having the mobile device perform the remaining handoff steps to finish a handoff. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 18, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 1 with further reference to Katz. It is noted that there has not been a citing of any Katz reference and the cited prior art does not teach the step of the mobile device making a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

With regard to claim 19, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 18 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach the step of the mobile device making a determination based on one or more of the following parameters: types of user applications; relative speed at which the mobile device is moving; and a predicted size of a candidate network. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

Regarding claim 20, the Examiner states that Kovacs discloses a mobile device having silent proactive handoff capability, however, neither Kovacs nor Sillasto the use a silent handoff controller to make use of this capability to control a silent proactive handoff to a target network during the silent period.

The comments supra, in regard to claim 1, are applicable with respect to claim 20. Additionally, it is noted that Kovacs, as acknowledged by the Examiner, does not specifically teach a silent period, and accordingly, does not disclosure a silence predictor component and certainly does not disclose that such a controller would have any utility in the Kovacs system.

For the reason set forth in regard to claim 1, It is dramatically evident that Kovacs does not teach that such a device could or should be configured to control a silent proactive handoff to a target network during an actionable silent period.

With regard to claim 21, the Examiner states that Kovacs in view of Sillasto teach all the limitations of claim 20 with further reference to Katz. There has not been a citing of any Katz reference and the cited prior art does not teach a device wherein a silent handoff controller is configured to establish connections to a target network, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network. ***Once again, because this reference to Katz has not been provided, it is submitted that the Patent Office needs to issue a new Non-Final Office Action.***

Concluding Remarks:

In view of the foregoing, it is respectfully submitted that the pending application is in condition for allowance and an early Notice of Allowance is requested. In the event that any fees are due, please charge our Deposit Account No. 50-4080.

Respectfully submitted,

/Stephen B Parker Reg. No. 36631/

Stephen B. Parker
Reg. No. 36631

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Electronic Acknowledgement Receipt

EFS ID:	2885263
Application Number:	11096721
International Application Number:	
Confirmation Number:	2651
Title of Invention:	Silent proactive handoff
First Named Inventor/Applicant Name:	Tao Zhang
Customer Number:	66458
Filer:	Stephen B. Parker
Filer Authorized By:	
Attorney Docket Number:	3119-113
Receipt Date:	20-FEB-2008
Filing Date:	01-APR-2005
Time Stamp:	14:33:58
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	Petition for review by the Office of Petitions.	3119x113xPET.pdf	99621 e9f9af7de15fd1d09a1ca6b1ad6491be7ef115ce	no	1

Warnings:	
Information:	

2	Amendment - After Non-Final Rejection	3119x113xRES.pdf	134975 7d3a17c3089bed4e7fe6d7b6038e9997629b06c9	no	9
Warnings:					
Information:					
			Total Files Size (in bytes):	234596	

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

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WASHINGTON DC 20036-2657

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MAY 30 2008

OFFICE OF PETITIONS

In re Application of	:	
Tao **Zhang** et al.	:	
Application No. 11/096,721	:	DECISION ON PETITION
Filed: April 01, 2005	:	
Attorney Docket No. 3119-113	:	

This is a decision on the petition under the unintentional provisions of 37 CFR 1.137(b), filed February 20, 2008, to revive the above-identified application.

The petition is **GRANTED**.

This application became abandoned for failure to reply in a timely manner to the Non-final Office action mailed June 08, 2007, which set a shortened statutory period for reply of three (3) months. No extension of time under the provisions of 37 CFR 1.136(a) was obtained. Accordingly, the above-identified application became abandoned on September 09, 2007.

The petition satisfies the requirements of 37 CFR 1.137(b) in that petitioner has supplied (1) the reply in the form of an amendment; (2) the petition fee of $1,540.00 and (3) a statement of unintentional delay. Accordingly, the reply to the Non-final Office action of February 20, 2008 is accepted as having been unintentionally delayed.

37 CFR 1.137(b)(3) requires a statement that "the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to 37 CFR 1.137(b) was unintentional." Since the statement appearing in the petition varies from the language required by 37 CFR 1.137(b)(3), the statement is being construed as the required statement. Petitioner must notify the Office if this is **not** a correct reading of the statement appearing in the petition.

Telephone inquiries concerning this decision should be directed to Thuy Pardo at (571) 272-6052 or in her absence, the undersigned at (571)272-7099.

This application is being referred to Technology Center AU 2618 for appropriate action by the Examiner in the normal course of business on the reply received.

David A. Bucci
Petitions Examiner
Office of Petitions

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

Application Number	11/096,721
Filing Date	April 1, 2005
Inventor	Tao Zhang
Art Unit	2618
Examiner's Name	Aminzay, Shaima Q
Docket Number	3119.113

Attention: Office of Petitions
Commissioner for Patents
Alexandria, VA 22313-1450
FAX (571) 273-8300

PETITION UNDER 37 CFR 1.137(b)

The undersigned respectfully petitions for revival of this application under 37 CFR 1.137(b). The reply and/or fee to the above-noted Office action in the form a response is enclosed herewith. Since this utility application was filed on or after June 8, 1995, no terminal disclaimer is required.

The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(b) was unintentional. In addition, the Office Action was issued without a copy of a cited reference, and the Office Action should have been reissued.

In the event that any fees are due in connection with this filing, please charge our Deposit Account **No. 50-4080.**

Signature: ***/Stephen B. Parker Reg. 36631/***
Date: February 20, 2008
Stephen B. Parker
Reg. 36631

Watchstone P&D, pllc

05/30/2008 CKHLOK 00000023 504080 11096721
01 FC:1453 1540.00 DA

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	04/01/2005	Tao Zhang	3119-113	2651

66458 7590 07/03/2008

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EXAMINER	
AMINZAY, SHAIMA Q	
ART UNIT	PAPER NUMBER
2618	
MAIL DATE	DELIVERY MODE
07/03/2008	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.	Applicant(s)	
	11/096,721	ZHANG ET AL.	
	Examiner	Art Unit	
	SHAIMA Q. AMINZAY	2618	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *2/20/2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2005* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This office action is in view of the PETITION TO REVIVE APPLICATION filed on February 20, 2008 that is GRANTED on May 30, 2008.

Response to Arguments

1. Response to arguments with respect to rejected claims 1-21 under Claim Rejections - 35 USC 103(a) is **moot** based on new ground of rejection, therefore, Claim Rejections - 35 USC 103(a) with respect to claims 1-21 withdrawn.

Claim Rejections – 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacs (Kovacs, U.S. Patent No. 7,215,958) in view of Sollenberger (Sollenberger et al., U.S. Publication No. 2006/0085,552).

Regarding claim 1, Kovacs discloses a method for performing *[silent]* proactive handoff of a mobile device to a target network while the mobile device is using a current network *(e.g., Fig1-4, 1:6-8, 12-19, 40-56, 3: 24-31, 5: 40-43, the predetermined controlled handover (proactive handoff) of a mobile unit (30) to target (22) using the serving (current) network)*, comprising: while the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53, the mobile unit (30) to target (22) using the serving (current) network for transporting application traffic and the serving network fulfilling mobile's demands)*, having the mobile device use at least one *[silent]* period to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network *(e.g., Fig1-4, 1: 27-31, 50-56, 2: 25-34, 3: 24-31, 4: 61-65, 5: 40-43, 50-56, 6: 43-53,, 7: 1-2, the mobile unit (30) using the drift (temporary) connection handover as a one time temporary connection for later connection to the target (22) handover).*

Kovacs does not specifically teach silent, however, Kovacs teaches the IP soft handover (handoff) that is an intra-frequency handover which the relocation takes place during a very short timing period that could be idle (silent or waiting) period and that is well known in the art (e.g., *Fig1-4, 1: 27-31, 40-56).*

In a related art dealing with wireless network handoff *(e.g., 2:1-3, 4:1-2, 5:1-5, 9:15-21),* Sollenberger teaches the mobile device (wireless terminal) use silent (sleep) period for temporary connection to target *(e.g., 9:15-21, 11:14-25, 33:3-11, the mobile device*

uses the sleep period to gather measurements from neighboring network for later handoff, for example, mobile assistance hand-off "MAHO" that is well known in the art).

It would have been obvious to one of ordinary skill in the art at the time invention was made to have included Sollenberger's wireless network handoff sleep (silent) mode time with Kovacs's wireless network handoff to provide the wireless network with sleep (silent) period "*gathering and evaluating of neighbor cell measurements which are used to help determine when to conduct a hand off*" and to conserve power consumption *(Sollenberger, e.g., 8:1-3, 9:15:21).*

Regarding claim 20, Kovacs discloses a mobile device having silent proactive handoff capability *(e.g., Fig1-4, 1:6-8, 12-19, 40-56, 3: 24-31, 5: 40-43, the predetermined controlled handover (proactive handoff) of a mobile unit (30) to target (22) using the serving (current) network)*, comprising: a) a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53, controlling the mobile unit (30) to target (22) using the serving (current) network for transporting application traffic and the serving network)*; b) a target network selector component configured to select a target network to which the mobile device may potentially switch to *(e.g., Fig1-4, 1: 27-31, 50-56, 2: 25-34, 3: 24-31, 4: 61-65, 5: 40-43, 50-56, 6: 43-53,, 7: 1-2, the target (22) is being selected for the mobile unit (30) handover)*; c) a *[silence]* predictor component configured to predict an actionable

[silence] period *(e.g., Fig1-4, 1: 27-31, 50-56, 2: 25-34, 3: 24-31, 4: 61-65, 5: 40-43, 50-56, 6: 43-53,, 7: 1-2, the transmission is being determined prior to the handover)*; and d) a *[silent]* handoff controller configured to control a *[silent]* proactive handoff to a target network during the actionable *[silent]* period *(e.g., Fig1-4, 1: 27-31, 50-56, 2: 25-34, 3: 24-31, 4: 61-65, 5: 40-43, 50-56, 6: 43-53,, 7: 1-2, the mobile unit (30) handover is being controlled and predetermined).*

Kovacs does not specifically teach silent, however, Kovacs teaches the IP soft handover (handoff) that is an intra-frequency handover which the relocation takes place during a very short timing period that could be idle (silent or waiting) period and that is well known in the art (e.g., *Fig1-4, 1: 27-31, 40-56).*

In a related art dealing with wireless network handoff *(e.g., 2:1-3, 4:1-2, 5:1-5, 9:15-21),* Sollenberger teaches the mobile device (wireless terminal) use silent (sleep) period for temporary connection to target *(e.g., 9:15-21, 11:14-25, 33:3-11, the mobile device uses the sleep period to gather measurements from neighboring network for later handoff, for example, mobile assistance hand-off "MAHO" that is well known in the art).*

It would have been obvious to one of ordinary skill in the art at the time invention was made to have included Sollenberger's wireless network handoff sleep (silent) mode time with Kovacs's wireless network handoff to provide the wireless network with sleep (silent) period "*gathering and evaluating of neighbor cell measurements which are used to help determine when to conduct a hand off*" and to conserve power consumption *(Sollenberger, e.g., 8:1-3, 9:15:21).*

Regarding claim 2, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches wherein said mobile device sends or receives substantially no traffic over the current access network *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 6: 19-25)*.

Regarding claim 3, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having the mobile device use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network *(e.g., 1: 12-19, 3: 35-44, 55-59, 6: 43-67,, 7: 1-5)*.

Regarding claim 4, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having the mobile device use the at least one silent period to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network *(e.g., 1:12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 29-43, 6: 64-67,, 7: 1-5, the higher layers such as network layer and media layers)*.

Regarding claim 5, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having the mobile device use the at least one silent period to perform layer-2, layer-3 or application layer authentication with the target network *(e.g., 1:12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 29-43, 6: 64-67,, 7: 1-5, the higher layers such as network layer and media layers)*.

Regarding claim 6, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having the mobile device perform the following handoff actions during the at least one silent period: a) discovering neighboring network information; b) obtaining a local IP address from the target network; and c) performing authentication with the target network *(e.g., Fig1-4, 1: 12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 29-43, 6: 64-67,, 7: 1-5).*

Regarding claim 7, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action *(e.g., Fig1-4, 1: 12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 29-43, 6: 64-67,, 7: 1-5, the higher layers such as network layer and media layers).*

Regarding claim 8, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold *(e.g., Fig1-4, 1: 12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 29-43, 6: 64-67,, 7: 1-5, the higher layers such as network layer and media layers).*

Regarding claim 9, Kovacs in view of Sollenberger teach all the limitations of claim 8, further, Kovacs teaches comparing different threshold values for different handoff actions

(e.g., 1:12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 37-56, 6: 46-67).

Regarding claim 10, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches the mobile device monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic *(e.g., Fig1-4, 1: 12-19, 27-31, 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 29-43, 6: 43-67,, 7: 1-5).*

Regarding claim 11, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches the mobile device predict an actionable silence period based on said monitoring of time periods and a prediction model *(e.g., Fig1-4, 1: 12-19, 27-31, 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 29-43, 6: 43-67,, 7: 1-5).*

Regarding claim 12, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches dynamically estimating at least one actionable silence period threshold for at least one handoff action based on previous times the mobile device took to perform handoff actions *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53)*, using the at least one threshold and inter-packet times determined from a traffic monitor to detect a next silent period, to predict if this next silent period will be an actionable silent period, and to predict a length of the next actionable silent period *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53).*

Regarding claim 13, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches having said mobile device select a target network to which the mobile may switch to *(e.g., 1:12-32, 40-56, 3: 25-34, 4: 41-50).*

Regarding claim 14, Kovacs in view of Sollenberger teach all the limitations of claim 13, further, Kovacs teaches when a target network is selected and an actionable silent period is detected, switching the mobile device's layer-2 connection to the target network *(e.g., 1:12-19, 27-31, 40-56, 4: 41-50, 61-65, 5: 29-43, 6: 64-67,, 7: 1-5, the higher layers such as network layer and media layers).*

Regarding claim 15, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches mobile device connect successfully to the target network and before a current actionable silent period expires *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53)*, having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network, and if the current actionable silent period has not expired after the information discovery phase *(e.g., 1: 12-19, 3: 35-44, 55-59, 6: 43-67,, 7: 1-5)*, having the mobile device start at least one handoff action *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53).*

Regarding claim 16, Kovacs in view of Sollenberger teach all the limitations of claim

15, further, Kovacs teaches after having the mobile device start said at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53)*, having the mobile device switch its network connection back to the current network *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53).*

Regarding claim 17, Kovacs in view of Sollenberger teach all the limitations of claim 15, further, Kovacs teaches after having the mobile device start said at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53)*, having the mobile device perform the remaining handoff steps to finish a handoff *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53)*.

Regarding claim 18, Kovacs in view of Sollenberger teach all the limitations of claim 1, further, Kovacs teaches mobile device make a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network *(e.g., Fig1-4, 1: 40-56, 2: 25-34, 3: 24-31, 4: 41-50, 61-65, 5: 40-43, 6: 43-53)*.

Regarding claim 19, Kovacs in view of Sollenberger teach all the limitations of claim 18, further, Kovacs teaches mobile device make said determination based on one or more of the following parameters: types of user applications; relative speed at which the

mobile device is moving; and a predicted size of a candidate network *(e.g., Fig1-4, 1: 40-63, 2: 25-34, 3: 24-31, 4: 54-67, 6: 19-25, 43-53)*.

Regarding claim 21, Kovacs in view of Sollenberger teach all the limitations of claim 20, further, Kovacs teaches silent handoff controller is configured to establish connections to a target network *(e.g., Fig1-4, 1: 40-63, 2: 25-34, 3: 24-31, 4: 54-67, 6: 19-25, 43-53)*, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network *(e.g., Fig1-4, 1: 40-63, 2: 25-34, 3: 24-31, 4: 54-67, 5: 21-24, 6: 43-53, 61-67, 7:1-16)*.

Conclusion

The prior art made of record considered pertinent to applicant's disclosure, see PTO-892 form.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shaima Q. Aminzay whose telephone number is 571-272-7874. The examiner can normally be reached on 7:00 AM -4:00 PM.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew D. Anderson can be reached on 571-272-4177. The fax 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).

/SHAIMA Q. AMINZAY/
Primary Examiner, Art Unit 2618

June 30, 2008

Notice of References Cited	Application/Control No. 11/096,721	Applicant(s)/Patent Under Reexamination ZHANG ET AL.	
	Examiner SHAIMA Q. AMINZAY	Art Unit 2618	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,215,958 B2	05-2007	Kovacs et al.	455/436
*	B	US-6,438,376 B1	08-2002	Elliott et al.	455/437
*	C	US-6,112,082 A	08-2000	Almgren et al.	455/425
*	D	US-6,018,661 A	01-2000	Raith et al.	455/437
*	E	US-2006/0085552 A1	04-2006	Sollenberger et al.	709/232
	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	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
	11096721	ZHANG ET AL.
	Examiner	Art Unit
	SHAIMA Q AMINZAY	2618

✓	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	06/30/2008								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
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	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11096721	ZHANG ET AL.
	Examiner	**Art Unit**
	SHAIMA Q AMINZAY	2618

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
370	331, 235, 332, 335, 338, 341	6/30/2008	S.A.
455	436, 432.1, 437, 439, 442, 443, 525	6/30/2008	S.A.
375	219	6/30/2008	S.A.

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
PLUS search and EAST search results enclosed	6/30/2008	S.A.
Consulted John Pezzlo (Class 370 Primary Examiner)	6/30/2008	S.A.
Consulted B. Sefcheck (Class 370 Primary Examiner)	5/31/2007	S.A.

INTERFERENCE SEARCH			
Class	**Subclass**	**Date**	**Examiner**
370	338, 335	6/30/2008	S.A.
455	436, 432.1	6/30/2008	S.A.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L22	14312	370/331,235,332,335,338,341.ccls.	US-PGPUB; USPAT	OR	ON	2008/06/30 15:00
L23	5754	455/436,432.1,437,439,442,443,525.ccls.	US-PGPUB; USPAT	OR	ON	2008/06/30 15:05
L24	1490	375/219.ccls.	US-PGPUB; USPAT	OR	ON	2008/06/30 15:05
L25	50	(20060221900|5371780|5828661|20050036459| 5426641|5987013|5181200|5448569|5617102| 5633888|5697053|5732359|5867785|5873036| 5883888|5995830|6094579|6108549|6130892| 6148206|6163701|6188900|6205339|6240291| 6377556|6404754|6430414|6463034|6473411| 6492897|6587689|6633761|6651105|6654359| 6691227|6741862|6763007|6831903|6851050| 6856800|6876747|6973308|6975864|6980808| 6982949|6993337|7016328|7046647|7058033| 7068624).pn.	US-PGPUB; USPAT	OR	ON	2008/06/30 15:06
L26	3	((handoff or hand-off or hand-over or (hand near over) or soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over) and (quiet or mute or muted or silent or silence or dormant or sleep$3) and (mobile or device or cellular or terminal) and traffic$5 and (period$5 or tim$4) and (network$4 near5 (target$4 or destination or other or next)) and (proactiv$4 or control$4)).clm.	US-PGPUB; USPAT	OR	ON	2008/06/30 15:07
L27	479	(((Mobile near Assistan$4 near (handoff or hand-off or handover or hand-over)) or MAHO) with (handoff or hand-off or hand-over or (hand near over) or soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over))	US-PGPUB; USPAT	OR	ON	2008/06/30 15:09
L28	463	27 And (@ad<="20050401" or @rlad<="20050401")	US-PGPUB; USPAT	OR	ON	2008/06/30 15:09
L29	27	28 and ((quiet or mute or muted or silent or silence or dormant or sleep$3) with (time or period))	US-PGPUB; USPAT	OR	ON	2008/06/30 15:09

6/ 30/ 2008 3:14:13 PM
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	04/01/2005	Tao Zhang	3119-113	2651

66458 7590 07/03/2008

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WASHINGTON, DC 20036-2657

EXAMINER	
AMINZAY, SHAIMA Q	

ART UNIT	PAPER NUMBER
2618	

MAIL DATE	DELIVERY MODE
07/03/2008	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.

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

This application has been withdraw from abandoned.

Thank you,

JOHN EPPS
SUPERVISORY LEGAL INSTRUMENTS EXMR.
TECHNOLOGY CENTER 2600

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

Application Number	11/096,721
Filing Date	April 1, 2005
Inventor	Tao Zhang
Art Unit	2618
Examiner's Name	Aminzay, Shaima Q
Docket Number	3119.113

RESPONSE

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the non-final Office Action dated July 3, 2008, please enter the following amendments and remarks:

1. A complete listing of claims showing all present amendments to the claims begins on page 2, with deletions shown in strike-through and additions in underline.

2. Remarks begin on page 7.

Listing of Claims:

1. (Currently Amended) A method for performing silent proactive handoff of a mobile device to a target network while the mobile device is using a current network, comprising:

while the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements, having the mobile device use at least one silent period of an application to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network.

2. (Original) The method of claim 1, wherein said mobile device sends or receives substantially no traffic over the current access network during the at least one silent period.

3. (Original) The method of claim 1, further including having the mobile device use the at least one silent period to connect to the target network so that the mobile device receives advertisement messages from the target network.

4. (Original) The method of claim 1, further including having the mobile device use the at least one silent period to establish a layer-2 connection or association with the target network for receiving IP-layer or high layer advertisements from the target network.

5. (Original) The method of claim 1, further including having the mobile device use the at least one silent period to perform layer-2, layer-3 or application layer authentication with the target network.

6. (Original) The method of claim 1, further including having the mobile device perform the following handoff actions during the at least one silent period: a) discovering neighboring network information; b) obtaining a local IP address from the target network; and c) performing authentication with the target network.

7. (Original) The method of claim 1, further including having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action.

8. (Original) The method of claim 1, further including having the mobile device determine if the at least one silent period is sufficient to complete one or more handoff action by comparison to a pre-set or a dynamically determined threshold.

9. (Original) The method of claim 8, further including comparing different threshold values for different handoff actions.

10. (Original) The method of claim 1, further including the mobile device monitoring time periods between packets entering and/or leaving the mobile device over the current access network that the mobile device currently uses to transport its application traffic.

11. (Original) The method of claim 1, further including having the mobile device predict an actionable silence period based on said monitoring of time periods and a prediction model.

12. (Original) The method of claim 1, further including dynamically estimating at least one actionable silence period threshold for at least one handoff action based on previous times the mobile device took to perform handoff actions, using the at least one threshold and inter-packet times determined from a traffic monitor to detect a next silent period, to predict if this next silent period will be an actionable silent period, and to predict a length of the next actionable silent period.

13. (Original) The method of claim 1, further including having said mobile device select a target network to which the mobile may switch to.

14. (Original) The method of claim 13, further including when a target network is selected and an actionable silent period is detected, switching the mobile device's layer-2 connection to the target network.

15. (Original) The method of claim 1, further including having the mobile device connect successfully to the target network and before a current actionable silent period expires, having the mobile device enter an information discovery phase to listen to the target network's advertisement messages to learn information needed to perform handoffs at different protocol layers to the target network, and if the current actionable silent period has not expired after the information discovery phase, having the mobile device start at least one handoff action.

16. (Original) The method of claim 15, further including after having the mobile device start said at least one handoff action, in the event that the current network continues to satisfy the mobile device's requirements, having the mobile device switch its network connection

back to the current network.

17. (Original) The method of claim 15, further including after having the mobile device start said at least one handoff action, in the event that the current network does not continue to satisfy the mobile device's requirements, having the mobile device perform the remaining handoff steps to finish a handoff.

18. (Original) The method of claim 1, further including having said mobile device make a determination as to whether to utilize a silent proactive handoff based on an estimation of the time that the mobile device will be within a candidate network.

19. (Original) The method of claim 18, further including having said mobile device make said determination based on one or more of the following parameters: types of user applications; relative speed at which the mobile device is moving; and a predicted size of a candidate network.

20. (Currently Amended) A mobile device having silent proactive handoff capability, comprising:

a) a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network;

b) a target network selector component configured to select a target network to which the mobile device may potentially switch to <u>when an actionable silence period is detected</u>;

c) a silence predictor component configured to predict [[an]] <u>the</u> actionable silence period <u>of an application</u>; and

d) a silent handoff controller configured to control a silent proactive handoff to a target network during the actionable silent period.

21. (Original) The mobile device of claim 20, wherein said silent handoff controller is configured to establish connections to a target network, to discover network information about a target network, to obtain a local IP address for the mobile device from the target network, and to perform authentication with the target network.

REMARKS

The Office Action dated July 3, 2008, has been received and carefully noted. The foregoing amendments and the following remarks serve as a full and complete response to the issues raised by the Office Action.

Claims 1 and 20 are amended to more particularly point out and distinctly claim the subject matter of the invention. The amendments do not add new matter. Thus, claims 1-21 are pending in the present application and are respectfully submitted for reconsideration.

Rejections Based On References:

Claims 1-21 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 7,215,958 (Kovacs) in view of U.S. Patent Publication No. 2006/0085552 (Sollenberger et al.). Applicants respectfully traverse the rejections of claims 1-21.

Claim 1 recites a method for performing silent proactive handoff of a mobile device to a target network while the mobile device is using a current network. While the mobile device is using the current network to transport application traffic and the current network satisfies the mobile device's requirements, the mobile device uses at least one silent period of an application to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network.

Claim 20 recites a mobile device having silent proactive handoff capability. The mobile device includes a traffic monitor component configured to monitor time periods between packets transmitted to or from the mobile device over a current access network. The mobile device also includes a target network selector component configured to select a target network to which the mobile device may potentially switch to when an actionable silence period is detected. The mobile device also includes

a silence predictor component configured to predict the actionable silence period of an application. The mobile device also includes a silent handoff controller configured to control a silent proactive handoff to a target network during the actionable silent period.

The claimed embodiments disclose how to use the silent periods of the applications to perform some or all of the tasks needed to realize a handoff from one radio access network to another. A silent period is the time period during which the applications running on a mobile device naturally do not have messages to send and receive.

Kovacs relates to a method at the radio resource control layer for relocating a radio connection from one serving network to another. Kovacs does not show any consideration about detecting or using silent periods, as recited in the claims, of applications that run several protocol layers above the radio link control layer. Thus, Kovacs fails to disclose or suggest the mobile device using at least one silent period of an application to temporarily connect to at least one target network to proactively perform at least one handoff action for potential later handoff to the target network.

Sollenberger relates to how a mobile device responds to received paging message bursts. When a mobile receives paging bursts, the mobiles WAKES UP to perform the actions needed to respond to the paging burst. The mobile WAKES UP by getting out of SLEEP mode by powering up its radio circuits and processing units to re-establish certain radio layer connectivity. In addition, the mobile device of Sollenberger also performs other scheduled "processing operations" or re-schedule previously scheduled "processing operations" while the mobile device is in the WAKE UP state. After completing these processing operations in WAKE UP mode, the mobile device goes back into SLEEP mode. Sollenberger describes these aspects in Figure 5, and column 9, lines 15-21, column 11, lines 14-25, and column 33, lines 3-11.

Sollenberger fails to disclose or suggest any indication about how a mobile device uses a silent period of an application to perform any processing. According to Sollenberger, all of the processing is done when the mobile device wakes up upon receiving paging bursts. In contrast, the claimed embodiments disclose how to predict the future silent period of the applications running on a mobile device and then use these silent periods to perform handoff processing. Therefore, this feature of the claims is distinguishable from the teachings of Sollenberger, which describes waking up to perform processing and not doing any processing while in a silent period.

Further, applicants submit that the sleep period described by Sollenberger differs greatly from the feature of a silent period, recited in the claims. According to the claimed embodiments, a silent period is a time period during which the applications running on a mobile device do not have any packets to send or receive. Moreover, radio connectivity may or may not be OFF. Thus, the claimed embodiments may use such silent periods to perform handoff tasks. In Sollenberger, a sleep period is a time period during which the radio is mostly turned OFF, leaving only a signaling channel for receiving paging messages. No processing operations are performed during the sleep period of Sollenberger. Thus, this sleep period of Sollenberger is distinguishable from the silent period recited in the claims. Applicants submit that Sollenberger fails to disclose or suggest at least these features of claim 1, and cannot be used to cure the deficiencies found in Kovacs.

As for claim 20, applicants again submit that Kovacs fails to disclose or suggest a mobile device having silent proactive handoff. Kovacs, for example, simply fails to mention anything to do with the use of a silence predictor component configured to predict an actionable silence period of an application. Sollenberger fails to disclose or suggest those features of claim 20 missing from Kovacs.

Applicants note that the Office Action alleges that Kovacs teaches a traffic monitor component configured to monitor time periods between packets transmitted to and from a mobile device. Applicants submit that Kovacs fails to disclose or suggest this feature of claim 20 as the sections cited by the Office Action do not teach any monitoring of traffic to and from a mobile device. Instead, Kovacs controls a mobile unit. Applicants submit monitoring, as claimed, is distinguishable from controlling, as described in Kovacs. Thus, Kovacs fails to disclose or suggest this feature of claim 20.

Further, Kovacs fails to disclose or suggest an actionable silent period as used by the target network selector, the silence predictor component, and the silent handoff controller recited in claim 20. The Office Action acknowledges that Kovacs fails to teach an actionable silent period, but alleges that a soft handoff could be performed during a silent or waiting period. Applicants respectfully submit that a soft handoff is distinguishable from the features recited in claim 20. A soft handoff, as described by Kovacs, refers to techniques at the radio layers, or the physical and link control layers, to perform handoff in a way to reduce bit loss rate, for example, by combining signals from multiple base stations. Thus, Kovacs addresses handoff at the radio connection layer, and does not address handoff at higher layers, such as the IP layer or the application layers. The claimed embodiments address handoff at all these different protocol layers, and can be used together with soft handoff techniques or any other radio layer handoff techniques. Thus, Kovacs fails to disclose or suggest at least these features of claim 20.

The Office Action alleges Sollenberger teaches the mobile device uses a silent, or sleep, period for temporary connection to target. Applicants submit that the Office Action misinterprets the teachings of Sollenberger. Sollenberger describes carrying out processing operations

when the mobile device WAKES UP upon receiving paging bursts, and does not perform any operations during sleep periods.

Moreover, as discussed above, the sleep period described in Sollenberger is a completely different concept than the silent period recited in the claims. In Sollenberger, a sleep period is a time period during which the radio is mostly turned OFF, thereby leaving only a signaling channel for receiving paging messages. In the claimed embodiments, a silent period refers to a time period during which the APPLICATIONS running on a mobile device do not have any packets to send or receive. The mobile device can use such silent periods to perform some handoff tasks. Sollenberger fails to disclose or suggest the use of silent periods to do any tasks. Thus, Sollenberger also fails to disclose or suggest at least these features of claim 20.

Claims 2-19 and 21 depend directly or indirectly from claims 1 and 20. Applicants submit that these claims are allowable over Kovacs and Sollenberger for at least the reasons given above. Thus, applicants respectfully maintain that Kovacs and Sollenberger, either alone or in combination, fails to disclose or suggest all the features of claims 1-21. Applicants respectfully request that the obviousness rejection be withdrawn.

Concluding Remarks:

In view of the foregoing, it is respectfully submitted that the pending application is in condition for allowance and an early Notice of Allowance is requested. In the event that any fees are due, please charge our Deposit Account No. 50-4080.

Respectfully submitted,

/Stephen B Parker Reg. No. 36631/

Stephen B. Parker
Reg. No. 36631

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Email: patents@w-pd-a.com

C92033

Electronic Acknowledgement Receipt

EFS ID:	4008644
Application Number:	11096721
International Application Number:	
Confirmation Number:	2651
Title of Invention:	Silent proactive handoff
First Named Inventor/Applicant Name:	Tao Zhang
Customer Number:	66458
Filer:	Stephen B. Parker
Filer Authorized By:	
Attorney Docket Number:	3119.113
Receipt Date:	25-SEP-2008
Filing Date:	01-APR-2005
Time Stamp:	17:51:01
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	Amendment/Req. Reconsideration-After Non-Final Reject	3119x113xResponsexAsxFiled.pdf	111159 c7c3278b212e5e6b83c11a604f46714b68132cbe	no	12

Warnings:	
Information:	

Total Files Size (in bytes):	111159

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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.

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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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/096,721	04/01/2005	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	09/25/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 21	= 0	X $ =		OR	X $50=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $210=	0
	☐ 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	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/MARQUITA D. JONES/

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.

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

66458 7590 10/20/2008

WATCHSTONE P+D, PLC
1250 CONNECTICUT AVENUE, N.W.
SUITE 700
WASHINGTON, DC 20036-2657

EXAMINER	
AMINZAY, SHAIMA Q	
ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 10/20/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	04/01/2005	Tao Zhang	3119.113	2651

TITLE OF INVENTION: SILENT PROACTIVE HANDOFF

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	01/20/2009

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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

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)

66458 7590 10/20/2008

WATCHSTONE P+D, PLC
1250 CONNECTICUT AVENUE, N.W.
SUITE 700
WASHINGTON, DC 20036-2657

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.
11/096,721	04/01/2005	Tao Zhang	3119.113	2651

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nonprovisional	NO	$1510	$300	$0	$1810	01/20/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
AMINZAY, SHAIMA Q	2618	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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information 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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
AMINZAY, SHAIMA Q	
ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 10/20/2008

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 220 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 220 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Notice of Allowability	Application No.	Applicant(s)	
	11/096,721	ZHANG ET AL.	
	Examiner	Art Unit	
	SHAIMA Q. AMINZAY	2618	

-- 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 *9/25/2008*.

2. ☒ The allowed claim(s) is/are *1-21*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   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 a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ 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. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Response to Arguments

Applicant's Arguments/Remarks filed 9/25/2008 have been fully considered.

1. Response to argument with respect to rejected claims 1-21 is **moot** as the applicant's amendment to claims overcome the rejection and puts the application in conditions for allowance, therefore, the Claim Rejections-35 USC 103(a) with respect to claims 1-21 withdrawn.

Allowable Subject Matter

2. Claims 1-21 are allowed.

Reasons for Allowance

3. The following is an examiner's statement of reason for allowance: see applicant's remarks, filed 9/25/2008, pages 7 - 11.

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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shaima Q. Aminzay whose telephone number is 571-272-7874. The examiner can normally be reached on 7:00 AM -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew D. Anderson can be reached on 571-272-4177. The fax 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).

/Shaima Q. Aminzay/

Examiner, Art Unit 2618

October 15, 2008

/Matthew D. Anderson/

Supervisory Patent Examiner, Art Unit 2618

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11096721	ZHANG ET AL.
	Examiner	Art Unit
	SHAIMA Q AMINZAY	2618

SEARCHED

Class	Subclass	Date	Examiner
370	331, 235, 332, 335, 338, 341	10/15/2008	S.A.
455	436, 432.1, 437, 439, 442, 443, 525	10/15/2008	S.A.
375	219	10/15/2008	S.A.

SEARCH NOTES

Search Notes	Date	Examiner
PLUS search and EAST search results enclosed	10/15/2008	S.A.
Inventor search and claims (*.clm.) search results for Double Patent enclosed.	10/15/2008	S.A.
Consulted John Pezzlo (Class 370 Primary Examiner)	6/30/2008	S.A.
Consulted B. Sefcheck (Class 370 Primary Examiner)	5/31/2007	S.A.

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
370	338, 335	10/15/2008	S.A.
455	436, 432.1	10/15/2008	S.A.

/SHAIMA Q AMINZAY/ Examiner.Art Unit 2618	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11096721	ZHANG ET AL.
	Examiner	Art Unit
	SHAIMA Q AMINZAY	2618

✓	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	06/30/2008	10/15/2008							
	1	✓	=							
	2	✓	=							
	3	✓	=							
	4	✓	=							
	5	✓	=							
	6	✓	=							
	7	✓	=							
	8	✓	=							
	9	✓	=							
	10	✓	=							
	11	✓	=							
	12	✓	=							
	13	✓	=							
	14	✓	=							
	15	✓	=							
	16	✓	=							
	17	✓	=							
	18	✓	=							
	19	✓	=							
	20	✓	=							
	21	✓	=							

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L8	15108	370/331,235,332,335,338,341.ccls.	US-PGPUB; USPAT	OR	ON	2008/10/15 11:49
L9	5970	455/436,432.1,437,439,442,443,525.ccls.	US-PGPUB; USPAT	OR	ON	2008/10/15 11:49
L10	1546	375/219.ccls.	US-PGPUB; USPAT	OR	ON	2008/10/15 11:49
L11	50	(20060221900|5371780|5828661|20050036459| 5426641|5987013|5181200|5448569|5617102| 5633888|5697053|5732359|5867785|5873036| 5883888|5995830|6094579|6108549|6130892| 6148206|6163701|6188900|6205339|6240291| 6377556|6404754|6430414|6463034|6473411| 6492897|6587689|6633761|6651105|6654359| 6691227|6741862|6763007|6831903|6851050| 6856800|6876747|6973308|6975864|6980808| 6982949|6993337|7016328|7046647|7058033| 7068624).pn.	US-PGPUB; USPAT	OR	ON	2008/10/15 11:50
L12	19023	(Zhang).in.	US-PGPUB; USPAT	OR	ON	2008/10/15 11:51
L13	162	12 and (Zhang with Tao)	US-PGPUB; USPAT	OR	ON	2008/10/15 11:52
L14	3	((handoff or hand-off or hand-over or (hand near over) or soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over) and (quiet or mute or muted or silent or silence or dormant or sleep$3) and (mobile or device or cellular or terminal) and traffic$5 and (period$5 or tim$4) and (network$4 near5 (target$4 or destination or other or next)) and (proactiv$4 or control$4)).clm.	US-PGPUB; USPAT	OR	ON	2008/10/15 11:52
L15	1	14 and 13	US-PGPUB; USPAT	OR	ON	2008/10/15 11:52
L16	17409	(8 or 9 or 10 or 11) And (@ad<="20050401" or @rlad<="20050401")	US-PGPUB; USPAT	OR	ON	2008/10/15 11:54
L17	207	16 and ((handoff or hand-off or hand-over or (hand near over) or soft-handover or (soft near handover) or hard-handover or hard-hand-over or hand-off or handover or hand-over) and (quiet or mute or muted or silent or silence or dormant or sleep$3) and (mobile or device or cellular or terminal) and traffic$5 and (period$5 or tim$4) and (network$4 near5 (target$4 or destination or other or next)) and (proactiv$4 or control$4))	US-PGPUB; USPAT	OR	ON	2008/10/15 11:54
L18	1	17 and ((silen$4 near3 period$4) with (network$4 near5 (target$4 or destination or other or next)))	US-PGPUB; USPAT	OR	ON	2008/10/15 11:55

10/ 15/ 2008 11:57:33 AM

C:\ Documents and Settings\ Saminzay\ My Documents\ EAST\ Workspaces\ 11096721--10-15-08.wsp

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11096721	ZHANG ET AL.
	Examiner	**Art Unit**
	SHAIMA Q AMINZAY	2618

ORIGINAL		INTERNATIONAL CLASSIFICATION									
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED				
370	331	H	0	4	Q	7 / 00 (2006.01.01)					

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
370	235	332	335	341	
455	436	432.1	525		

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

/SHAIMA Q AMINZAY/ Examiner.Art Unit 2618	10/15/2008	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	21	
/MATTHEW D ANDERSON/ Supervisory Patent Examiner.Art Unit 2618	10/15/2008	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

PART B - FEE(S) TRANSMITTAL

PTO/SB/17 (10-08) Approved for use through 08/31/2010. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

U.S.P.T.O. JAN 21 2009 PATENT & TRADEMARK OFFICE

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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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.

STEPHEN B. PARKER	(Depositor's name)
	(Signature)
01-16-2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	04/01/2005	Tao Zhang	3119.113	2651

TITLE OF INVENTION: SILENT PROACTIVE HANDOFF

01/21/2009 NNGUYEN2 00000090 11096721

01 FC:1501 1510.00 OP
02 FC:1504 300.00 OP

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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1 WATCHSTONE P+D, PLLC
2 STEPHEN B. PARKER
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE	(B) RESIDENCE: (CITY and STATE OR COUNTRY)
TOSHIBA AMERICA RESEARCH, INC.	PISCATAWAY, NJ
TELCORDIA TECHNOLOGIES, INC.	PISCATAWAY, NJ

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 any deficiency, or credit any overpayment, to Deposit Account Number 50-4080 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date 1/16/2009

Typed or printed name STEPHEN B. PARKER Registration No. 36,631

This collection of information 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.

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/096,721	03/10/2009	7502348	3119.113	2651

66458 7590 02/18/2009

WATCHSTONE P+D, PLLC
1250 CONNECTICUT AVENUE, N.W.
SUITE 700
WASHINGTON, DC 20036-2657

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 219 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 Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Tao Zhang, Fort Lee, NJ;
Raziq Yaqub, Stewartsville, NJ;

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 NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/096,721	7502348	2618	9200

OC000000037101920

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 89739 on 07/27/2009

- **Correspondence Address**
- **Maintenance Fee Address**
- **Power of Attorney Address**

The address of record for Customer Number 89739 is:

89739
WP&D unit of Westerman Hattori Daniels & Adrian
LLP
1250 Connecticut Ave., Suite 700
Washington, DC 20036

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
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.
(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,502,348 B2

APPLICATION NO. : 11/096,721

ISSUE DATE : March 10, 2009

INVENTOR(S) : Zhang, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Face Page, in Field (74), under "Attorney, Agent, or Firm", in Column 2, Line 1, delete "Watchstone P+D, PLC; " and insert - - Watchstone P+D, PLLC; - -, therefor.

In Column 14, Line 64, delete "the require" and insert - - the required - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 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: Attention Certificate of Corrections Branch, 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.

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.

Electronic Patent Application Fee Transmittal

Application Number:	11096721
Filing Date:	01-Apr-2005
Title of Invention:	SILENT PROACTIVE HANDOFF
First Named Inventor/Applicant Name:	Tao Zhang
Filer:	Steven Ware Smith/Kara Coffman
Attorney Docket Number:	3119.113

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Certificate of Correction	1811	1	100	100
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**100**

Electronic Acknowledgement Receipt

EFS ID:	20161630
Application Number:	11096721
International Application Number:	
Confirmation Number:	2651
Title of Invention:	SILENT PROACTIVE HANDOFF
First Named Inventor/Applicant Name:	Tao Zhang
Customer Number:	89739
Filer:	Steven Ware Smith/Kara Coffman
Filer Authorized By:	Steven Ware Smith
Attorney Docket Number:	3119.113
Receipt Date:	17-SEP-2014
Filing Date:	01-APR-2005
Time Stamp:	12:09:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$100
RAM confirmation Number	8299
Deposit Account	501379
Authorized User	
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 1.20 (Post Issuance fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	P52145-US1_2014-09-17_CoC_Request_Letter.pdf	109418 3745f4e8c0787e2cd7c148eb0cd84483a8884f21	no	3
Warnings:					
Information:					
2	Request for Certificate of Correction	P52145-US1_2014-09-17_CoC_PTO-1050.pdf	115001 85e24fd48043e3e805aa4106a3bc3c29083fb143	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30029 b41cf21b0f99a9cecf42a51224863ec711c3351e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	254448		

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.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: U.S. Patent No. 7,502,348

USPTO CONFIRMATION CODE: 2651

APPLICATION NO.: 11/096,721

FILED: April 1, 2005

EXAMINER: Matthew D. Anderson

GROUP ART UNIT: 2618

FOR: SILENT PROACTIVE HANDOFF

37 CFR 1.322 & 37 CFR 1.323 REQUEST FOR CERTIFICATE OF CORRECTION FOR USPTO AND/OR APPLICANT MISTAKE

HONORABLE COMMISSIONER OF PATENTS & TRADEMARKS

SIR:

The following is a request for a certificate of correction in Serial Number 11/096,721, now Patent Number 7,502,348.

A certificate of correction under 35 USC 254 is respectfully requested in the above-identified patent.

The errors were the fault of both the applicant and USPTO and, accordingly, please charge **$100.00** to our Deposit Account No. 50-1379. In the event that a further fee is required, please charge the amount to the same Deposit Account.

The exact locations where the errors appear in the patent and patent application are as follows:

On the Face Page, in Field (74), under "Attorney, Agent, or Firm", in Column 2, Line 1, delete "Watchstone P+D, PLC; " and
insert - - Watchstone P+D, PLLC; - -, therefor.
(ISSUE FEE PAYMENT (PTO-85B) DATED JANUARY 21, 2009, PAGE 1 (PAGE 3 OF FW), UNDER ATTORNEY'S NAME, LINE 1)

In Column 14, Line 64, delete "the require" and insert - - the required - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED APRIL 1, 2005, PAGE 28, LINE 12)

The requested corrections are attached on Form PTO 1050.

Respectfully Submitted

, 2014 /Ronald J. Ward,Reg#54870/

DATE

Ronald J. Ward
Registration No. 54,870
Attorney of Record

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 7,502,348 B2
APPLICATION NO.	: 11/096721
DATED	: March 10, 2009
INVENTOR(S)	: Zhang et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page, Item (74), under "Attorney, Agent, or Firm", in Column 2, Line 1, delete "Watchstone P+D, PLC;" and insert -- Watchstone P+D, PLLC; --, therefor.

In the Specification

In Column 14, Line 64, delete "the require" and insert -- the required --, therefor.

Signed and Sealed this
Eighteenth Day of November, 2014

Michelle K. Lee

Michelle K. Lee
Deputy Director of the United States Patent and Trademark Office

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6767321

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
TOSHIBA AMERICA RESEARCH, INC.	06/11/2021

RECEIVING PARTY DATA

Name:	FOUR BATONS WIRELESS, LLC
Street Address:	14 WALL STREET
Internal Address:	20TH FL
City:	NEW YORK
State/Country:	NEW YORK
Postal Code:	10005

PROPERTY NUMBERS Total: 58

Property Type	Number
Patent Number:	6999434
Patent Number:	7031278
Patent Number:	7035236
Patent Number:	7039028
Patent Number:	7072340
Patent Number:	7075910
Patent Number:	7139285
Patent Number:	7369576
Patent Number:	7463892
Patent Number:	7502348
Patent Number:	7505433
Patent Number:	7508788
Patent Number:	7576694
Patent Number:	7587598
Patent Number:	7606602
Patent Number:	7720581
Patent Number:	7729325
Patent Number:	7738882
Patent Number:	7768982

Property Type	Number
Patent Number:	7778773
Patent Number:	7826424
Patent Number:	7843867
Patent Number:	7848312
Patent Number:	7860019
Patent Number:	7860978
Patent Number:	7885185
Patent Number:	7899592
Patent Number:	7936719
Patent Number:	7948918
Patent Number:	7974602
Patent Number:	7975300
Patent Number:	8006089
Patent Number:	8036176
Patent Number:	8036192
Patent Number:	8046829
Patent Number:	8073436
Patent Number:	8107960
Patent Number:	8160021
Patent Number:	8165088
Patent Number:	8218512
Patent Number:	8239671
Patent Number:	8270948
Patent Number:	8306026
Patent Number:	8332923
Patent Number:	8385937
Patent Number:	8463308
Patent Number:	8514808
Patent Number:	8554915
Patent Number:	8565185
Patent Number:	8688834
Patent Number:	8717931
Patent Number:	8781473
Patent Number:	8798006
Patent Number:	8817990
Patent Number:	8908540
Patent Number:	8929330
Patent Number:	9046595

Property Type	Number
Patent Number:	9526040

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone:	2123237442
Email:	skolmykov@kskiplaw.com
Correspondent Name:	SERGEY KOLMYKOV
Address Line 1:	305 BROADWAY
Address Line 2:	7TH FL
Address Line 4:	NEW YORK, NEW YORK 10007

NAME OF SUBMITTER:	SERGEY KOLMYKOV
SIGNATURE:	/Sergey Kolmykov/
DATE SIGNED:	06/17/2021
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3

source=Patent Transfer Agreement -Patent Assginment (TARI) TARI sign#page1.tif

source=Patent Transfer Agreement -Patent Assginment (TARI) TARI sign#page2.tif

source=Patent Transfer Agreement -Patent Assginment (TARI) TARI sign#page3.tif

PATENT ASSIGNMENT AGREEMENT

THIS PATENT ASSIGNMENT AGREEMENT (the "Agreement"), is made and entered into this 14 day of June, 2021 (the "Effective Date"), by and between Toshiba America Research, Inc., ("Assignor"), a corporation organized under the laws of the State of Delaware, having offices at 1251 Avenue of the Americas, New York, NY 10020, United States, and Four Batons Wireless, LLC, a limited liability company organized under the laws of the State of Delaware, having offices at 14 Wall Street, 20th Floor, New York, NY 10005, United States ("Assignee") (each a "Party" and collectively the "Parties").

WHEREAS, Assignor wishes to assign the United States patents as listed on Schedule A (United States patent properties) hereto (collectively the "Patents") to Assignee;

WHEREAS, Assignor and Assignee have entered into a Patent Transfer Agreement (the "Transfer Agreement") dated June 9, 2021, wherein Assignor has agreed to sell and Assignee has agreed to purchase the Patents subject to all prior encumbrances and licenses;

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the Parties and pursuant to the Transfer Agreement, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, it is hereby agreed as follows:

"Encumbrances" means any commitments, patent licenses, immunities, releases or other rights relating to any of the Patents, whether express, implied or otherwise, that are made, entered into or granted by, or that arise from any actions taken by Assignor, any current or former Affiliate of Assignor, or any other Person, on or before the date of this agreement.

I. ASSIGNMENT

1. To all whom it may concern, be it known that for good and valuable consideration, Assignor has sold, assigned, transferred, and set over, and by these presents does sell, assign, transfer, and set over unto said Assignee, subject to all Encumbrances, its whole right, title, and interest in and to all of the Patents, said whole right, title, and interest in and to said Patents including all past, present, and future causes of action and claims for damages derived by reason of patent infringement thereof (to the extent such damages are not already paid, awarded or contractually owed to Assignor, its Affiliates or any predecessor of Assignor or Assignor's Affiliates), for said Assignee's own use and for the use of its assigns, successors, and legal representatives to the full end of the term of each of the Patents. For clarity, the foregoing assignment does not include (i) any trademarks, trade dress, trade names, or other indicia of origin; (ii) except for rights in the Patents, any inventions or discoveries, whether patentable or not, or registrations, invention disclosures, patents and applications therefor; (iii) any trade secrets, confidential information or know-how; (iv) any works of authorship, whether copyrightable or not; and (v) any other intellectual property or proprietary rights of Assignor, its Affiliates or any predecessor of Assignor or Assignor's Affiliates.

1. Assignor hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States and any official of any country or countries foreign to the United States, whose

duty is to issue patents or other evidence or forms of industrial property on applications as aforesaid, to issue the same to Assignee, it successors, assigns and legal representatives, or to such nominees as it may designate.

2. Assignor agrees that, whenever reasonably requested by Assignee and at Assignee's sole cost and expense, Assignor will execute all papers, take all rightful oaths, and do all acts which may be reasonably necessary for vesting title thereto in Assignee, its successors, assigns and legal representatives or nominees.

3. Assignor authorizes and empowers Assignee, its successors, assigns and legal representatives or nominees, to invoke and claim for any application for patent the benefit of the right of priority to the Patents provided by the Paris Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, or any other international agreement or the domestic laws of the country in which any such application is filed, as may be applicable, and to invoke and claim such right of priority without further written or oral authorization from Assignor.

4. Assignor hereby consents that a copy of this Agreement shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document that may be required in any country for any purpose and more particularly in proof of the right of Assignee or nominee to claim the aforesaid benefit of the right of priority provided by the Paris Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it.

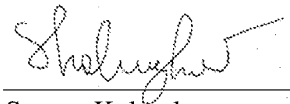
In Testimony Whereof, the Parties, by its fully authorized representatives have executed this Assignment as of the dates indicated below.

Toshiba America Research Inc.

By: 
Name: Hiroyuki Hieda
Title: President

Date: June 11th, 2021

Four Batons Wireless, LLC

By: 
Name: Sergey Kolmykov
Title: General Counsel

Date: June 12, 2021

SCHEDULE A
UNITED STATES PATENTS

US 6,999,434
US 7,031,278
US 7,035,236
US 7,039,028
US 7,072,340
US 7,075,910
US 7,139,285
US 7,369,576
US 7,463,892
US 7,502,348
US 7,505,433
US 7,508,788
US 7,576,694
US 7,587,598
US 7,606,602
US 7,720,581
US 7,729,325
US 7,738,882
US 7,768,982
US 7,778,773
US 7,826,424
US 7,843,867
US 7,848,312
US 7,860,019
US 7,860,978
US 7,885,185
US 7,899,592
US 7,936,719
US 7,948,918
US 7,974,602
US 7,975,300
US 8,006,089
US 8,036,176
US 8,036,192
US 8,046,829
US 8,073,436
US 8,107,960
US 8,160,021
US 8,165,088
US 8,218,512
US 8,239,671
US 8,270,948
US 8,306,026
US 8,332,923
US 8,385,937
US 8,463,308
US 8,514,808
US 8,554,915
US 8,565,185
US 8,688,834
US 8,717,931
US 8,781,473
US 8,798,006
US 8,817,990
US 8,908,540
US 8,929,330
US 9,046,595
US 9,526,040