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UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No.	025717-000110US
First Inventor	Ganesan, Vasudevan
Title	Telephone With Automatic Switching Between Cellular And VoIP Networks
Express Mail Label No.	EV 323 383 108 US

12898 U.S. PTO
11/031498
010605

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria, VA 22313-1450

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* 15]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ **Drawing(s)** *(35 U.S.C.113)* [*Total Sheets* 2]
5. **Oath or Declaration** [*Total Sheets* _____]
   a. ☒ Newly executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63 (d))
   (for a continuation/divisional with Box 18 completed)
      i. ☐ DELETION OF INVENTOR(S)
      Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☒ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM** or **CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   (if applicable, items a. - c. are required)
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee _____
10. ☒ **37 CFR 3.73(b) Statement** *(when there is an assignee)* ☒ **Power of Attorney**
11. ☐ **English Translation Document** *(if applicable)*
12. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
13. ☐ **Preliminary Amendment**
14. ☒ **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. ☐ **Nonpublication Request** under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. ☐ Other: _____

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: _____

Prior application information: *Examiner* _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

☒ The address associated with Customer Number: **20350** *OR* ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Fax	

Signature		Date	January 6, 2005
Name (Print/Type)	Ardeshir Tabibi	Registration No. (Attorney/Agent)	48,750

60392396 v1

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 ($) 500

Complete if Known	
Application Number	Unassigned
Filing Date	Herewith
First Named Inventor	Ganesan, Vasudevan
Examiner Name	Unassigned
Art Unit	Unassigned
Attorney Docket No.	025717-000110US

METHOD OF PAYMENT (check all that apply)

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

☒ Deposit Account Deposit Account Number: 20-1430 Deposit Account Name: Townsend and Townsend and Crew LLP

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

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	500
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 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims		Fee ($)		Fee Paid ($)
16	-20 or HP =	0	x	$25	=	$0

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

Indep. Claims		Extra Claims		Fee ($)		Fee Paid ($)
2	-3 or HP =	0	x	$100	=	$0

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, 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: _____ _____

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 48,750	Telephone 650-326-2400
Name (Print/Type)	Ardeshir Tabibi		Date January 6, 2005

60392424 v1

Attorney Docket No.: 025717-000110US

PATENT APPLICATION

TELEPHONE WITH AUTOMATIC SWITCHING BETWEEN CELLULAR AND VOIP NETWORKS

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TELEPHONE WITH AUTOMATIC SWITCHING BETWEEN CELLULAR AND VOIP NETWORKS

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] The present application claims benefit under 35 USC 119(e) of the filing date of U.S. provisional application number 60/534,466, filed on January 6, 2004, entitled "Radiotelephone With Automatic Switching Between Cellular And Wi Fi Networks Using Wi-Fi Signal Strength Values", the content of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] A small portion of the radio frequency (RF) spectrum is assigned to each communications carrier. The assigned spectrum, therefore, must be used efficiently in order to allow the maximum number of frequency users to have access to this spectrum. Multiple access modulation techniques have been developed to provide optimum utilizing of the RF spectrum. Examples of such modulation techniques include time division multiple access (TDMA), frequency division multiple access (FDMA), and code division multiple access (CDMA).

[0003] There is a wide variance in the performance of wireless networks. A conventional wireless cellular network, covers a relatively large geographical area but provides a relatively low bandwidth. Such wireless networks use regulated portions of the radio spectrum and are shared by many users. The infrastructure costs of wireless networks are relatively high due to the size and complexity of the cellular network equipment.

[0004] Other wireless networks, such as CDMA2000-EV-DO/DV networks, offer higher bandwidth and enhanced data services, such as web browsing. However, these networks also pack many users into a relatively small portion of the regulated spectrum. Other types of radio networks are adapted to improve spectral efficiency with increased and smaller coverage areas. For example, an IEEE 802.11x (or Wi-Fi) network may transmit at speeds up to 11 Mbps using a Direct Sequence Spread Spectrum (DSSS) mode or at speeds up to 54 Mbps using an Orthogonal Frequency Division Multiplexing (OFDM) mode.

[0005] An access point conforming to an IEEE 802.11x (e.g., IEEE 802.11b) network may cover an area of a few hundred feet in diameter. Each such access point is connected to a larger network (e.g., Internet). In order to cover larger geographical areas, a relatively large number of IEEE 802.11x network access points and a relatively large wire-line back haul networks are required. In part, due to the back haul costs, the resulting IEEE 802.11x based network may thus be more expensive to set up and operate than a similarly based wireless network. In other words, many tradeoffs often exist between and among the coverage areas, the maximum bit-rates, and the costs associated with different types of wireless networks.

[0006] Demand for high bandwidth and quality of service (QoS) associated with mobile communication devices with full roaming capability is on the rise. One known communication device includes a cellular communication module adapted to enable communication using wireless cellular networks as well as a Wi-Fi communication module adapted to enable communication using a Voice over IP (VoIP) protocol. In such devices, to change the communication mode from cellular to VoIP or vice versa, the user has to manually change the device's setting by, e.g., pressing one ore more keys.

[0007] In yet other communication devices known to be under development, to switch the communication mode from, for example, cellular to VoIP, the cellular network first detects the position of the mobile communication device to determine whether the mobile communication device is in a Wi-Fi area. If it so detects, the cellular network sends a switching signal to the mobile communication device to enable the communication to continue the communication using the VoIP protocol. However, obtaining and maintaining accurate position of many mobile communication devices concurrently poses a challenging task. Consequently, in such systems, the switching of the call from cellular to VoIP or vice versa may result in the loss of the call.

BRIEF SUMMARY OF THE INVENTION

[0008] In accordance with the present invention, a mobile communication device is configured so as to automatically switch a communication that is already in progress using a wireless cellular network (hereinafter alternatively referred to as cellular network) to a wireless Voice over IP (VoIP) network or vice versa. The mobile communication devices is adapted to include, in part, a cellular communication module, a first antenna adapted to receive and transmit data between the mobile communication module and a cellular network,

a Wireless Fidelity (Wi-Fi) communication module, a second antenna adapted to receive and transmit data between the Wi-Fi communication module and a VoIP network, a signal monitoring circuit, and a switching circuit adapted to switch an existing in-progress communication between the cellular communication module and the Wi-Fi communication module. The second antenna and associated circuitry are maintained in on-states continuously to monitor and detect Wi-Fi signals.

[0009] If the mobile communication device is in an in-progress (i.e., pre-established) communication via its cellular communication module and through a cellular network, and the Wi-Fi antenna system detects a Wi-Fi signal having a first predefined level (strength), a timer disposed in the mobile communication device is activated to establish a first time window of a first predefined size. If the Wi-Fi signal level detected during the first time window remains equal to or greater than the first predefined level, at the expiration of the first time window, the switching circuit causes the in-progress communication to be switched from its cellular communication module to its Wi-Fi communication module and through a VoIP network without losing the in-progress communication.

[0010] In some embodiments, upon activating the timer, the Wi-Fi communication module is caused to change state from a sleep mode, during which the Wi-Fi communication module consumes relatively small amount of power, to a stand-by mode during which the Wi-Fi communication module consumes an intermediate amount of power. Subsequently, before the communication is switched to the Wi-Fi communication module, the Wi-Fi communication module is caused to be placed in a full active mode, during which the Wi-Fi communication module consumes an amount of power larger than the intermediate amount of power.

[0011] If the mobile communication device is in a pre-established communication via its Wi-Fi communication module and through a VoIP network, and the Wi-Fi antenna system detects that the level of the received Wi-Fi signal is below a second predefined value, the timer is activated to establish a second time window of a second predefine size. If the Wi-Fi signal level detected during the second time window is equal to or greater than a third predefined value, the pre-established communication via the Wi-Fi communication module is maintained without any change. If the Wi-Fi signal level detected during the second time window is less than the third predefined value, the timer is reset and reactivated to establish a third time window of a third size. If the Wi-Fi signal level detected during the third time window is less than the third predefined value, at the expiration of the third time window, the

switching circuit causes the in-progress communication to be switched from its Wi-Fi communication module to its cellular communication module and through a cellular network without losing the in-progress communication.

[0012] In some embodiments, upon activating the timer to establish the second time window, the cellular communication module is caused to change state from a sleep mode, during which the cellular communication module consumes relatively small amount of power, to a stand-by mode during which the cellular communication module consumes an intermediate amount of power. Subsequently, before the communication is switched to the Wi-Fi communication module, the cellular communication module is caused to be placed in a full active mode, during which the cellular communication module consumes an amount of power larger than the intermediate amount of power.

[0013] In some embodiments, the Wi-Fi communication module is adapted to communicate with an access point of a Wi-Fi local are network using an 802.11x wireless protocol, and the cellular communication module is adapted to communicate with a base station of a wireless cellular network using any one of GSM, CDMA, or CDMA2000 protocols.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Figure 1 is a simplified high-level block diagram of a mobile communication device, in accordance with one embodiment of the present invention.

[0015] Figure 2 shows Wi-Fi signal threshold level and timing window used to determine whether to switch a communication from the cellular communication module to the Wi-Fi communication module of the communication device of Figure 1, in accordance with one embodiment.

[0016] Figure 3 shows Wi-Fi signal threshold levels and timing windows used to determine whether to switch a communication from the Wi-Fi communication module to the cellular communication module of the communication device of Figure 1, in accordance with one embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0017] In accordance with the present invention, a mobile communication device is configured so as to automatically switch an existing communication from a wireless cellular network (hereinafter alternatively referred to as cellular network) to a wireless Voice over IP (VoIP) network, or to switch an existing communication from a VoIP network to a cellular network. It is understood that the Wireless Fidelity (Wi-Fi) signals, as defined, for example, in IEEE 802.11x standards or other equivalent standards may be used to communicate with a Voice over IP (VoIP) network. The mobile communication device is adapted to include, in part, a cellular communication module, a first antenna adapted to receive and transmit data between the mobile communication module and a cellular network, a Wi-Fi communication module, a second antenna adapted to receive and transmit data between the Wi-Fi communication module and a VoIP network, a signal monitoring circuit, and a switching circuit adapted to switch an existing in-progress communication between the cellular communication module and the Wi-Fi communication module. The second antenna and associated circuitry are maintained in on-states continuously to monitor and detect Wi-Fi signals.

[0018] It is understood the wireless cellular network includes, in part, a multitude of base stations. Each such base station is adapted to communicate with the mobile communication device when the mobile communication device is located within the coverage area of the base station via RF signals carried over cellular network. It is also understood that each such coverage area is defined by an area centered at the base station and having a radius of, e.g., several miles. It is further understood that a Wi-Fi network may include, in part, a multitude of access points. Each such access point is adapted to communicate with the mobile communication device, when the mobile communication device is located within the coverage area of the access point, via VoIP packets. It is also understood that the mobile communication device may also include blocks adapted for computation and thus be a communication/computation device.

[0019] If the mobile communication device is in an in-progress (i.e., pre-established) communication via its cellular communication module and through a cellular network, and the Wi-Fi antenna system detects a Wi-Fi signal having a first predefined level (strength), a timer disposed in the mobile communication device is activated to establish a first time window of a first predefined size. If the Wi-Fi signal level detected during the first time window remains equal to or greater than the first predefined level, at the expiration of the

first time window, the switching circuit causes the in-progress communication to be switched from its cellular communication module to its Wi-Fi communication module and through a VoIP network without losing the in-progress communication.

[0020] In some embodiments, upon activating the timer, the Wi-Fi communication module is caused to change state from a sleep mode, during which the Wi-Fi communication module consumes relatively small amount of power, to a stand-by mode during which the Wi-Fi communication module consumes an intermediate amount of power. Subsequently, before the communication is switched to the Wi-Fi communication module, the Wi-Fi communication module is caused to be placed in a full active mode, during which the Wi-Fi communication module consumes an amount of power larger than the intermediate amount of power.

[0021] If the mobile communication device is in a pre-established communication via its Wi-Fi communication module and through a VoIP network, and the Wi-Fi antenna system detects that the level of the received Wi-Fi signal is below a second predefined value, the timer is activated to establish a second time window of a second predefine size. If the Wi-Fi signal level detected during the second time window is equal to or greater than a third predefined value, the pre-established communication via the Wi-Fi communication module is maintained without any change. If the Wi-Fi signal level detected during the second time window is less than the third predefined value, the timer is reset and reactivated to establish a third time window of a third size. If the Wi-Fi signal level detected during the third time window is less than the third predefined value, at the expiration of the third time window, the switching circuit causes the in-progress communication to be switched from its Wi-Fi communication module to its cellular communication module and through a cellular network without losing the in-progress communication.

[0022] In some embodiments, upon activating the timer to establish the second time window, the cellular communication module is caused to change state from a sleep mode, during which the cellular communication module consumes relatively small amount of power, to a stand-by mode during which the cellular communication module consumes an intermediate amount of power. Subsequently, before the communication is switched to the Wi-Fi communication module, the cellular communication module is caused to be placed in a full active mode, during which the cellular communication module consumes an amount of power larger than the intermediate amount of power.

[0023] FIG. 1 is a simplified high-level block diagram of a mobile communication device 100, in accordance with one embodiment of the present invention. Mobile communication device 100, which is adapted to automatically switch communication between cellular and VoIP networks, is shown as including, in part, a cellular communication module (hereinafter alternatively referred to as cellular module) 3 coupled to a cellular antenna 1, a Wi-Fi communication module (hereinafter alternatively referred to as Wi-Fi module) 4 coupled to a Wi-Fi antenna 2, an audio/video amplifier 5, a network switch unit 6, a timer unit 7, a Wi-Fi signal level monitor 8, a microphone 20, a speaker 21, and a display monitor 22. Mobile communication device 100 is adapted to establish and maintain communication via either a cellular module 3, through a wireless network (not shown), and/or via Wi-Fi module 4, through a VoIP network (not shown). Cellular module 3 further includes a transceiver 30 adapted to transmit signal to and receive signal from a cellular network. Wi-Fi module 4 further includes a transceiver 32 adapted to transmit signal to and receive signal from a VoIP network. Depending on the level of detected Wi-Fi signal emitted from a Wi-Fi access point, a call initially established via cellular module 3 may be switched to be handle by Wi-Fi module 4, or a call initially established via Wi-Fi module 4 may be switched to be handled by cellular module 3.

[0024] Assume that mobile communication device 100 is in communications with a cellular network and is entering the coverage area of a Wi-Fi access point adapted to transmit and receive Wi-Fi signals. As is known, a Wi-Fi access point may be used to gain access to a VoIP network. Wi-Fi antenna 2 together with Wi-Fi module 4 and Wi-Fi signal monitor 8 continuously monitor for to detect Wi-Fi signals. If a detected Wi-Fi signal level is greater than a predefined threshold value V_{th1}, Wi-Fi signal level monitor 8 activates timer 7 via signal line 10 and sends a wake-up signal to network switch unit 6 via signal line 12, thereby to change the state of network switch unit 6 from a sleep mode, during which network switch unit consumes relatively small power, to a stand-by mode, during which network switch unit consumes an intermediate amount of power. Network switch unit 6, in turn, supplies wake-up switching signals to cellular module 3 via signal line 15 and to Wi-Fi module 4 via signal line 13. This causes phone cellular module 3 and Wi-Fi module 4 to activate their respective switching modules. The detected Wi-Fi signal level may be determined, for example, by taking multiple samples of the incoming Wi-Fi signal(s) and computing a signal level from these samples. In one embodiment, an average of the amplitudes/phases of the sampled signals may be used to detect the Wi-Fi signal level.

[0025] If the detected Wi-Fi signal level is greater than V_{th1}, timer unit 7 is activated to establish a first time window of a first predefined size T_1, as shown in Figure 2. During time window T_1, Wi-Fi antenna 2 together with Wi-Fi module 4 and Wi-Fi signal monitor 8 continue to monitor and detect the level of received Wi-Fi signal. If the Wi-Fi signal level detected during time window T_1 remains equal to or greater than V_{th1}, at the expiration of time window T_1, timer unit 7 sends a cellular tear-down signal and a Wi-Fi link-up signal to the network switch unit 6 via signal line 11. In response, network switch unit 6 sends the tear-down signal to cellular module 3 via signal line 15, and sends the link-up signal to Wi-Fi module 4 via signal line 13. Network switch unit 6 also instructs audio/video amplifier 5, via signal line 14, to generate an audio/video alert signal. The generated audio alter signal is subsequently reproduced by speaker 21 via signal line 18, and the generated video alert signal is subsequently reproduced by display monitor 22 via signal line 23. The audio/video alert tones are adapted to notify the mobile communication device user of a network switch from cellular to Wi-Fi.

[0026] Cellular module 3 is adapted to terminate connection to the cellular network and to switch off connection to audio/video amplifier 5 after receiving the tear-down signal. Wi-Fi module 4 is adapted to activate connection to VoIP network and to switch on connection to audio/video amplifier 5--for passing voice signal to audio amplifier 5 and video signal to display monitor 22-- after receiving a Wi-Fi link-up signal. The previously established communication link is thus continued uninterrupted via the VoIP network and through loudspeaker 21, microphone 20 and display monitor 23.

[0027] Assume that mobile communication device 100 is in communications with a VoIP network and may be leaving the coverage area of the Wi-Fi access point. Wi-Fi antenna 2 together with Wi-Fi module 4 and Wi-Fi signal monitor 8 continuously monitor for to detect Wi-Fi signals. If the detected Wi-Fi signal level falls below a second predefined threshold value V_{th2}, Wi-Fi signal level monitor 8 activates timer 7 and sends a wake-up signal to network switch unit 6 to change the state of network switch unit 6 from the sleep mode to stand-by mode. Network switch unit 6, in turn, supplies wake-up switching signals to cellular module 3 and to Wi-Fi module 4 to enable these modules to activate their respective switching procedures.

[0028] Once activated, timer unit 7 establishes a second time window of a second predefined size T_2, as shown in Figure 3. During time window T_2, Wi-Fi antenna 2 together

with Wi-Fi module 4 and Wi-Fi signal monitor 8 continue to monitor and detect the level of received Wi-Fi signal. If the Wi-Fi signal level detected during time window T_2 is equal to or greater than a third predefined threshold value V_{th3}, where V_{th3} is smaller than V_{th2}, the previously established VoIP communication continues without switching.

[0029] If the Wi-Fi signal level detected during time window T_2 is smaller than V_{th3}, at the expiration of time window T_2, timer unit 7 is reset and activated to establishes a third time window of a third predefined size T_3, where T_3 is smaller than T_2. If the Wi-Fi signal level detected during time window T_3 is equal to or greater than V_{th3}, the previously established VoIP communication continues without switching.

[0030] If the Wi-Fi signal level detected during time window T_3 is less than V_{th3}, at the expiration of time window T_3, timer unit 7 sends a Wi-Fi tear-down signal and a cellular link-up signal to network switch unit 6. In response, network switch unit 6 sends the tear-down signal to Wi-Fi module 3, and sends the link-up signal to cellular module 4. Network switch unit 6 also instructs audio/video amplifier 5 to generate an audio/video alert signals. The generated audio alter signals is subsequently reproduced by speaker 21, and the generated video alert signal is subsequently reproduced by display monitor 22. The audio/video alert tones are adapted to notify the mobile communication device user of a network switch from Wi-Fi to cellular

[0031] Wi-Fi module 4 is adapted to terminate connection to the VoIP network and to switch off connection to audio/video amplifier 5 after receiving the tear-down signal. Cellular module 4 is adapted to activate connection to the cellular network and to switch on connection to audio/video amplifier 5 after receiving a Wi-Fi link-up signal. The previously established communication link is thus continued uninterrupted and through loudspeaker 21, microphone 20 and display monitor 23.

[0032] In accordance with some embodiments, if the mobile communication device detects both an Wi-Fi signal from an access point and a cellular signal from a mobile cellular base station before establishing a communication link, the mobile communication device first attempts to establish communication with the Wi-Fi access point using Wi-Fi module 4.

[0033] The above embodiments of the present invention are illustrative and not limiting. Various alternatives and equivalents are possible. It is understood that the functionality associated with any blocks described above may be centralized or distributed, whether locally or remotely. It is also understood that one or more blocks of each mobile communication

device may be performed by hardware, firmware or software, or some combinations thereof. The invention is not limited by the type of cellular network, e.g., CDMA, GSM, otherwise used to carry communication. Nor is the invention limited by the VoIP network. The invention is not limited by the Wi-Fi signals, such as those defined by IEEE 802.11x, where x may be a, b, g, or WiMAX used to carry VoIP communication. The invention is not limited by the type of integrated circuit(s) in which the present invention may be disposed. Nor is the invention limited to any specific type of process technology, e.g., CMOS, Bipolar, or BICMOS that may be used to manufacture the present invention. Other additions, subtractions or modifications are obvious in view of the present invention and are intended to fall within the scope of the appended claims.

WHAT IS CLAIMED IS:

1. A mobile communication device comprising:

a cellular communication module adapted to communicate with a wireless cellular network;

a Wi-Fi communication module adapted to communicate with an access point associated with a Wi-Fi network using a VoIP protocol; and

a switching circuit adapted to automatically switch operation between the cellular communication module and the Wi-Fi communication module.

2. The mobile communication device of claim 1 wherein said wireless cellular network is selected from a group consisting of GSM, CDMA, and CDMA2000 wireless cellular networks.

3. The mobile communication device of claim 2 wherein said Wi-Fi network is selected from a group consisting of an IEEE 802.11x, Wi-Fi, and WiMAX networks.

4. The mobile communication device of claim 3 further comprising:

a timer; and

a Wi-Fi signal monitor; wherein if the Wi-Fi signal monitor detects that a first Wi-Fi signal level is greater than a first predefined threshold value V_{th1}, the timer is activated to establish a first time window of a first predefined size T_1, wherein if during T_1 the Wi-Fi signal monitor detects that a second Wi-Fi signal level is equal to or greater than V_{th1}, at the expiration of the first time window, the switching circuit sends a tear-down signal to the cellular communication module and a link-up signal to the Wi-Fi communication module, wherein said tear-down signal causes the cellular communication module to discontinue handling a previously established cellular communication and wherein said link-up signal causes the Wi-Fi communication module to handle the previously established cellular communication via a VoIP network.

5. The mobile communication device of claim 4 wherein said tear-down signal causes the cellular communication module to go into a sleep mode.

6. The mobile communication device of claim 4 wherein upon activation of the timer, the network switching circuit causes the Wi-Fi communication module to change state from a sleep mode to an active mode.

7. The mobile communication device of claim 4 wherein each of said first and second Wi-Fi signal levels is defined by a respective plurality of samples of received Wi-Fi signal.

8. The mobile communication device of claim 4 wherein if the Wi-Fi signal monitor detects that the Wi-Fi signal level is below a second predefined threshold value V_{th2}, the timer is activated to establish a second time window of a second predefined size T_2, wherein if during time window T_2, the Wi-Fi signal monitor detects that the Wi-Fi signal level is equal to or greater than a third predefined threshold value V_{th3}, a previously established VoIP communication continues without switching, wherein V_{th3} is smaller than V_{th2}.

9. The mobile communication device of claim 8 wherein if during time window T_2, the Wi-Fi signal monitor detects that the Wi-Fi signal level is smaller than V_{th3}, upon expiration of time window T_2, the timer unit is activated to establish a third time window of a third predefined size T_3, where T_3 is smaller than T_2, wherein if during time window T_3 the Wi-Fi signal monitor detects that the Wi-Fi signal level is smaller than V_{th3}, the switching circuit sends a tear-down signal to the Wi-Fi communication module and a link-up signal to the cellular communication module, wherein said tear-down signal causes the Wi-Fi communication module to discontinue handling a previously established VoIP communication and wherein said link-up signal causes the cellular communication module to handle the previously established VoIP communication via a cellular network.

10. The mobile communication device of claim 9 wherein at the expiration of the predefine time period T_2, the network switching circuit causes the cellular communication module to change state from a sleep mode to an active mode.

11. A method comprising:

detecting a first Wi-Fi signal level;

establish a first time window of a first predefined size T_1 if the detected first Wi-Fi signal level is greater than a first predefined threshold value V_{th1};

detecting a second Wi-Fi signal level during the first time window;

automatically switching a communication in progress via a cellular wireless network to a communication via a VoIP network if the second detected Wi-Fi signal level is greater than V_{th1}.

12. The method of claim 11 wherein said wireless cellular network is selected from a group consisting of GSM, CDMA, and CDMA2000 wireless cellular networks.

13. The method of claim 11 wherein said VoIP network is in communication with a network selected from a group consisting of an IEEE 802.11x, Wi-Fi and WiMAX networks.

14. The method of claim 11 wherein each of said first and second Wi-Fi signal levels is defined by a respective plurality of samples of received Wi-Fi signal.

15. The method of claim 11 further comprising:

detecting a third Wi-Fi signal level;

establishing a second time window of a second predefined size T_2 if the third detected Wi-Fi signal level falls below a second predefined threshold value V_{th2};

detecting a fourth Wi-Fi signal level during the second time window; and

continuing a VoIP communication without change if the fourth detected Wi-Fi signal level is equal to or greater than a third predefined threshold value V_{th3}, wherein V_{th3} is smaller than V_{th2}.

16. The method of claim 15 further comprising:

establishing a third time window of a third predefined size T_3 if the fourth detected Wi-Fi signal level is less than V_{th3};

detecting a fifth Wi-Fi signal level during the third time window;

automatically switching a communication in progress via a VoIP wireless network to a communication via a cellular network if the fifth detected Wi-Fi signal level is less than V_{th3}.

TELEPHONE WITH AUTOMATIC SWITCHING BETWEEN CELLULAR AND VOIP NETWORKS

ABSTRACT OF THE DISCLOSURE

[0034] A mobile communication device includes, in part, a cellular communication module, a first antenna adapted to receive and transmit data between the mobile communication module and a cellular network, a Wireless Fidelity (Wi-Fi) communication module, a second antenna adapted to receive and transmit data between the Wi-Fi communication module and a VoIP network, a signal monitoring circuit, and a switching circuit adapted to switch an existing communication from the cellular communication module to the Wi-Fi communication module or vice versa.

60388221 v1/Fig. 1/AT

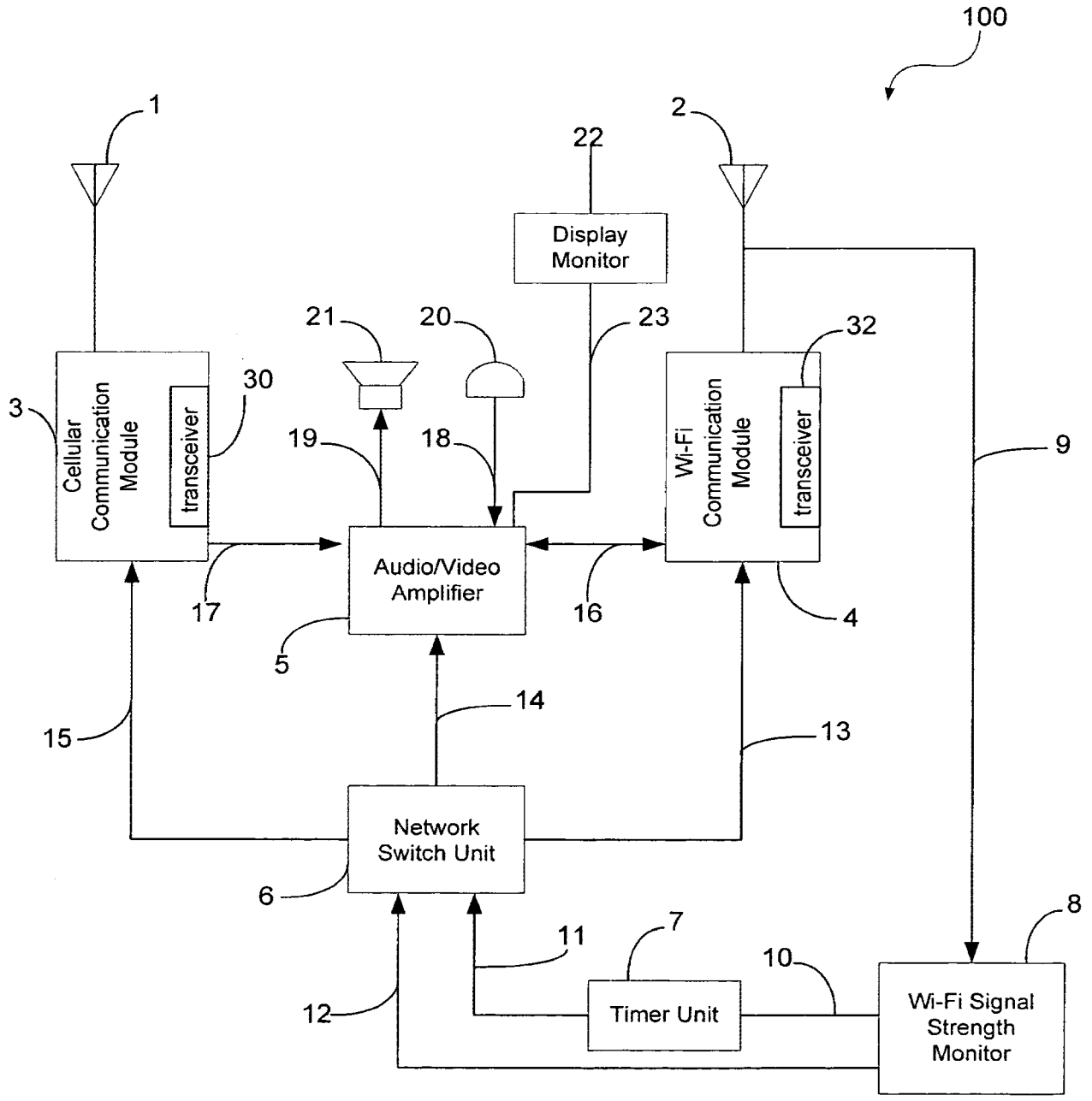
100
1
2
22
Display Monitor
21
20
23
32
3
Cellular Communication Module
transceiver
30
19
18
Wi-Fi Communication Module
transceiver
9
Audio/Video Amplifier
17
16
4
5
14
15
13
Network Switch Unit
6
8
11
7
10
12
Timer Unit
Wi-Fi Signal Strength Monitor

FIG. 1

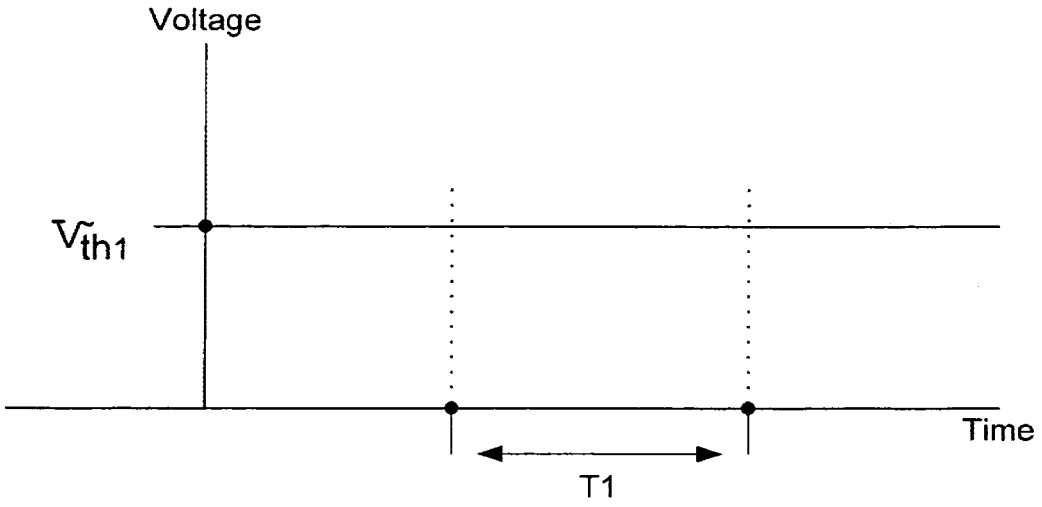

FIG. 2

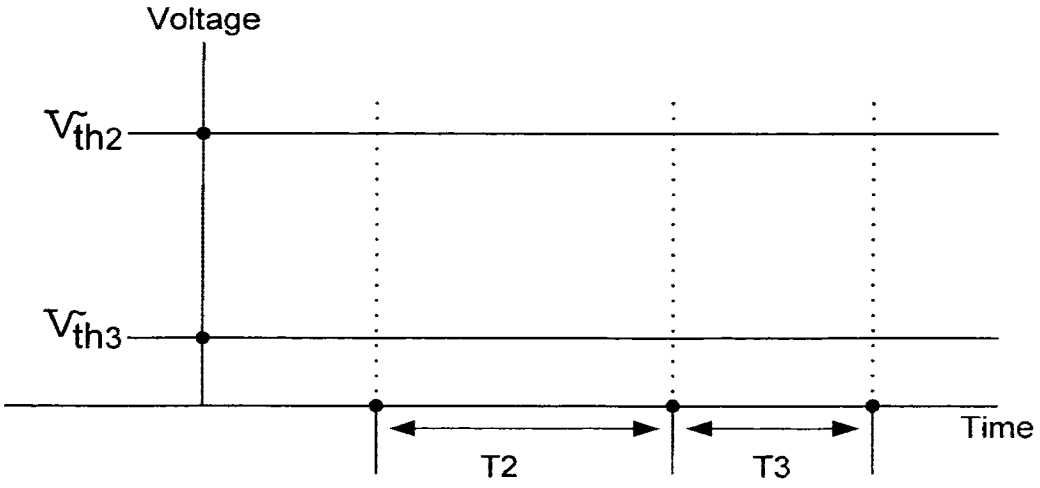

FIG. 3

Attorney Docket No.: 025717-000110US
Client Ref. No.:

PTO/SB/01A (09-04)

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	Telephone With Automatic Switching Between Cellular And VoIP Networks

As the below named inventor(s), I/we declare that:

This declaration is directed to:

☒ The attached application, or

☐ Application No. _____, filed on Herewith _____,

☐ as amended on _____ (if applicable);

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be 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.

All statements made herein of my/our own knowledge are true, all statements made herein 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 are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

FULL NAME OF INVENTOR(S)

Inventor one: Vasudevan Ganesan — Date: January 6, 2005

Signature: _____ — Citizen of: Canada

Inventor two: _____ — Date: _____

Signature: _____ — Citizen of: _____

Inventor three: _____ — Date: _____

Signature: _____ — Citizen of: _____

Inventor four: _____ — Date: _____

Signature: _____ — Citizen of: _____

☐ Additional inventors or a legal representative are being named on _____ additional form(s) attached hereto.

60392402 v1

POWER OF ATTORNEY and CORRESPONDENCE ADDRESS INDICATION FORM		
	Application Number	Unassigned
	Filing Date	January 6, 2005
	First Named Inventor	Ganesan, Vasudevan
	Title	Telephone With Automatic Switching Between Cellular And VoIP Networks
	Art Unit	Unassigned
	Examiner Name	Unassigned
	Attorney Docket Number	025717-000110US

I hereby revoke all previous powers of attorney given in the above-identified application.

I hereby appoint:

☒ Practitioners associated with the Customer Number: **20350**

OR

☐ Practitioner(s) named below:

Name	Registration Number

as my/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.

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number:

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Fax			

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).

SIGNATURE of Applicant or Assignee of Record

Signature		Date	January 6, 2005
Name	Vasudevan Ganesan	Telephone	(408) 481-1695
Title and Company	CEO		

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 1 forms are submitted.

60392437 v1

Attorney Docket No. 025717-000110US

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Ganesan, Vasudevan

Application No./Patent No.: Unassigned Filed/Issue Date: Herewith

Entitled: **TELEPHONE WITH AUTOMATIC SWITCHING BETWEEN CELLULAR AND VoIP NETWORKS**

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

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title and interest.
   The extent (by, percentage) of its ownership interest is _____%

in the patent application/patent identified above by virtue of either:

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

OR

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

1. From: _____ To :_____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To :_____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.
3. From: _____ To :_____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.

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

☒ Copies of assignments or other documents in the chain of title are attached.
[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.8]

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

Signature	January 6, 2005 Date
Vasudevan Ganesan Printed or Typed Name	(408) 481-1695 Telephone Number
CEO Title	

60392467 v1

Attorney Docket No.: 025717-000110US

ASSIGNMENT OF PATENT APPLICATION

SOLE

WHEREAS, Vasudevan Ganesan of 19500 Pruneridge Ave., #6111, Cupertino, CA 95014 hereinafter referred to as "Assignor," is the inventor of the invention described and set forth in the below-identified application for United States Letters Patent:

Title of Invention: Telephone With Automatic Switching Between Cellular And VoIP Networks

Date(s) of execution of Declaration: January 6, 2005

Filing Date: January 6, 2005

Application No.:

WHEREAS, Hava Corp., a corporation of the state of California, located at 19500 Pruneridge Ave., #6111, Cupertino, CA 95014, hereinafter referred to as "ASSIGNEE," is desirous of acquiring an interest in the invention and application and in any U.S. Letters Patent and Registrations which may be granted on the same;

For good and valuable consideration, receipt of which is hereby acknowledged by Assignor, Assignor has assigned, and by these presents does assign to Assignee all right, title and interest in and to the invention and application and to all foreign counterparts (including patent, utility model and industrial designs), and in and to any Letters Patent and Registrations which may hereafter be granted on any patent application claiming priority from the same in the United States and all countries throughout the world, and to claim the priority from the application as provided by the Paris Convention. The right, title and interest is to be held and enjoyed by Assignee and Assignee's successors and assigns as fully and exclusively as it would have been held and enjoyed by Assignor had this Assignment not been made, for the full term of any Letters Patent and Registrations which may be granted thereon, or of any division, renewal, continuation in whole or in part, substitution, conversion, reissue, prolongation or extension thereof.

Assignor further agrees that Assignor will, without charge to Assignee, but at Assignee's expense, (a) cooperate with Assignee in the prosecution of U.S. Patent applications and foreign counterparts on the invention and any improvements, (b) execute, verify, acknowledge and deliver all such further papers, including applications and instruments of transfer, and (c) perform such other acts as Assignee lawfully may request to obtain or maintain Letters Patent and Registrations for the invention and improvements in any and all countries, and to vest title thereto in Assignee, or Assignee's successors and assigns.

Assignor hereby authorizes and requests Townsend and Townsend and Crew LLP, Two Embarcadero Center, Eighth Floor, San Francisco, CA 94111-3834, to insert herein above the application number and filing date of said application when known.

IN TESTIMONY WHEREOF, Assignor has signed his/her name on the date indicated.

Dated: January 6, 2005

Vasudevan Ganesan

60392410 v1

PATENT APPLICATION FEE DETERMINATION RECORD
Effective December 8, 2004

Application or Docket Number: 11 031498

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	16	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	16 minus 20=	*
INDEPENDENT CLAIMS	2 minus 3 =	*
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		RATE	FEE
BASIC FEE	150.00	OR	BASIC FEE	300.00
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL	150	OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

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

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

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

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

1 - 11

AMENDMENT C

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

RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL 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.

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

01/12/2005 EFLORES 00000042 201430 11031498

01 FC:2011 150.00 DA
02 FC:2111 250.00 DA
03 FC:2311 100.00 DA

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

Application Data Sheet

Application Information

Application number::	
Filing Date::	
Application Type::	Regular
Subject Matter::	Utility
Suggested classification::	
Suggested Group Art Unit::	
CD-ROM or CD-R??::	
Number of CD disks::	
Number of copies of CDs::	
Sequence Submission::	
Computer Readable Form (CRF)?::	
Number of copies of CRF::	
Title::	Telephone With Automatic Switching Between Cellular And VoIP Networks
Attorney Docket Number::	025717-000110US
Request for Early Publication::	No
Request for Non-Publication::	No
Suggested Drawing Figure::	1
Total Drawing Sheets::	2
Small Entity?::	Yes
Latin name::	
Variety denomination name::	
Petition included?::	No
Petition Type::	
Licensed US Govt. Agency::	
Contract or Grant Numbers One::	
Secrecy Order in Parent Appl.::	No

Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	Canada
Status::	Full Capacity
Given Name::	Vasudevan
Middle Name::	
Family Name::	Ganesan
Name Suffix::	
City of Residence::	Cupertino
State or Province of Residence::	CA
Country of Residence::	US
Street of Mailing Address::	19500 Pruneridge Ave., #6111
City of Mailing Address::	Cupertino
State or Province of mailing address::	CA
Country of mailing address::	US
Postal or Zip Code of mailing address::	95014

Correspondence Information

Correspondence Customer Number:: 20350

Representative Information

Representative Customer Number:: 20350

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This Application	An Appn claiming benefit under 35 USC 119(e) of	60/534,466	01/06/04

18304 U.S. PTO
010605

PTO/SB/05 (09-04)

UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No.	025717-000110US
First Inventor	Ganesan, Vasudevan
Title	Telephone With Automatic Switching Between Cellular And VoIP Networks
Express Mail Label No.	EV 323 383 108 US

12898 U.S. PTO
11/031498
010605

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria, VA 22313-1450

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* 15]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ **Drawing(s)** *(35 U.S.C.113)* [*Total Sheets* 2]
5. **Oath or Declaration** [*Total Sheets* _____]
   a. ☒ Newly executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63 (d))
   (for a continuation/divisional with Box 18 completed)
      i. ☐ DELETION OF INVENTOR(S)
      Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☒ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM** or **CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   (if applicable, items a. - c. are required)
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee _____
10. ☒ **37 CFR 3.73(b) Statement** *(when there is an assignee)* ☒ **Power of Attorney**
11. ☐ **English Translation Document** *(if applicable)*
12. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
13. ☐ **Preliminary Amendment**
14. ☒ **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. ☐ **Nonpublication Request** under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. ☐ Other: _____

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: _____

Prior application information: *Examiner* _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

☒ The address associated with Customer Number: **20350** *OR* ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Fax	

Signature		Date	January 6, 2005
Name (Print/Type)	Ardeshir Tabibi	Registration No. (Attorney/Agent)	48,750

60392396 v1

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 ($) 500

Complete if Known	
Application Number	Unassigned
Filing Date	Herewith
First Named Inventor	Ganesan, Vasudevan
Examiner Name	Unassigned
Art Unit	Unassigned
Attorney Docket No.	025717-000110US

METHOD OF PAYMENT (check all that apply)

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

☒ Deposit Account Deposit Account Number: 20-1430 Deposit Account Name: Townsend and Townsend and Crew 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

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	500
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 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims		Fee ($)		Fee Paid ($)
16	-20 or HP =	0	x	$25	=	$0

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

Indep. Claims		Extra Claims		Fee ($)		Fee Paid ($)
2	-3 or HP =	0	x	$100	=	$0

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, 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: _____ _____

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 48,750	Telephone 650-326-2400
Name (Print/Type)	Ardeshir Tabibi		Date January 6, 2005

60392424 v1