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031/05

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UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No.	
First Inventor	FRANCIS daCOSTA
Title	MULTIPLE CRITICAL RADIO ~~COMM~~ MISSION WIRELESS MESH NETWORKS
Express	: ED808021958US

11/084330
031/05

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [X] **Fee Transmittal Form** (e.g., PTO/SB/17) *(Submit an original and a duplicate for fee processing)*
2. [X] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [X] **Specification** [*Total Pages* 72] Both the claims and abstract must start on a new page *(For information on the preferred arrangement, see MPEP 608.01(a))*
4. [X] **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 21]
5. **Oath or Declaration** [*Total Sheets* 2]
   a. [X] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name 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. [X] **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 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 [X] Continuation-in-part (CIP) of prior application No.: 10/434,948

Prior application information: *Examiner* _____ *Art Unit:* 2661

19. CORRESPONDENCE ADDRESS

[ ] The address associated with Customer Number: [ ] OR [X] Correspondence address below

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Signature	X [signature]	Date	3-17-05
Name (Print/Type)	FRANCIS daCOSTA	Registration No. (Attorney/Agent)	

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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17114 US PTO
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PTO/SB/17 (12-04v2)
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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 ($) 900

Complete if Known	
Application Number	
Filing Date	3-17-05
First Named Inventor	FRANCIS daCosta
Examiner Name	
Art Unit	
Attorney Docket No.	

METHOD OF PAYMENT (check all that apply)

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

☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

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

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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 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims	Fee ($)		Fee Paid ($)
9	- 20 or HP =		x	=	0

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

Indep. Claims		Extra Claims	Fee ($)		Fee Paid ($)
7	- 3 or HP =	4	x 100	=	400

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 ($)	Fee Paid ($)
93	- 100 =	0	/ 50 =	_____ (round up to a whole number) x	_____	= 0

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	0
Other (e.g., late filing surcharge): _____	

SUBMITTED BY

Signature	X [signature]	Registration No. (Attorney/Agent)	Telephone 408-373-7700
Name (Print/Type)	FRANCIS daCOSTA		Date 3-17-05

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.**

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In the United States Patent and Trademark Office

Disclosure Document Number:	548966
Title:	Multi-Radio Mesh Networks
Document Filed:	3-16-2004
Applicants:	Francis daCosta, Sriram Dyanandan

DISCLOSURE DOCUMENT -- RETENTION REQUEST

Francis daCosta
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408-373-7700 (tel)
March 17, 2005

Commissioner of Patents and Trademarks
Washington, DC

Sir:

Applicant requests that the above referenced document filed previously under the USPTO Disclosure Document Program be retained for future reference. It has been referred to in the attached Utility Patent Application.

Respectfully,



Francis daCosta

Mailing: This document was deposited with Express Mail on 3-17-05.

MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS

Inventors: Francis daCosta and Sriram Dayanandan

CROSS-REFERENCE

This application is a continuation-in-part of application of U.S. Application No. 10/434,948, filed May 8, 2003, which is herein incorporated by reference.

This application also incorporates by reference U.S. Provisional Application No. 60/554,246, filed March 17, 2004.

Also incorporated by reference are Disclosure Documents numbers 548927, 548966, and 548734 which were all filed on March 16, 2004 under the USPTO Disclosure Document program. Separate letters have been attached to this application requesting that the referenced Disclosure Documents be retained for future reference.

FIELD OF THE INVENTION

The present application builds on the disclosures or the referenced previous applications. In the referenced patent applications, a method to change the network topology by employing multiple radios is described in U.S. Application No. 10/434,948, filed May 8, 2003 in Figures 1,2,3,4,5,6,7,8.

Figure 18 in that same application depicts a two-radio mesh network, with one radio for the backhaul and another servicing clients and providing the backhaul to other nodes of the network. Extensions of the logical two-radio approach include 3 and 4 radios.

The logical two-radio approach depicted in Figure 18 in that application shows two types of radio interfaces – one to the backhaul above the node and the other servicing the backhaul below it. The invention described in this document relates to how the two-radio approach is extensible to other radio configurations required to support mission critical mesh networks.

BACKGROUND OF THE INVENTION

There is increasing interest in employing one network to support video, voice and data traffic. Currently, the video, voice and data networks are distinct since each addresses differing latency and bandwidth requirements. The challenge lies in providing - within the same network - the ability to address potentially conflicting latency and throughput needs of diverse applications.

For example, voice needs to be transmitted with low delay (latency). Occasionally lost voice packets, while undesirable, is not fatal for voice transmissions. Conversely, data transmissions mandate delivery of all packets and while low latency is desirable it is not

essential. In essence transmission across the wireless network should (ideally) be driven by the needs of the application.

Building a reliable wireless network comes with other constraints specific to wireless. Some routing paths may be best for voice, others for data. In Wired LAN applications separate routing paths is more easily accomplished since each port on the LAN is connected to one client machine. Each node may be configured to provide the performance characteristics required by that application. If all computing devices were wired, each could have different Quality of Service (QoS) settings.

This level of granularity is not possible in wireless networks. Radio is a shared medium. It is prone to interference from other radio transmissions in the vicinity. A direct repercussion of radio interference is that a separate Access Point (AP) for each client machine is not practical. An AP can interfere with other APs and there are not enough non-interfering channels to go around. Further, while each additional radio may increase bandwidth capacity, it may also cause more interference between radios – perhaps even reducing the overall capacity of the network

Controlling Network Topology. The challenge lies in enabling each Access Point node to support differing application requirements and ensuring that the aggregate demand of each Access Point be addressed without an appreciable loss in performance for individual clients. Additionally, if the network configuration needs to change then changes to network topology must occur in a stable and scalable manner.

Aggregate demand may be expressed as a range of acceptable latency and throughput values. Note that latency and throughput are often conflicting objectives. Low latency (least number of hops) may cause low throughput. High throughput may require increased latency.

In the patent application No. 10/434,948, filed May 8, 2003, a method to change the network topology by employing multiple radios is described and the changes in mesh topology is illustrated by Figures 1,2,3,4,5,6,7,8. in that application. FIG. 1 in this application briefly shows how the latency/throughput gradually changesing with network topology.

FIG. 1 is made up of four individual sections, labeled 1 through 4. In each of these sections, the main area shows a number of radio devices configured in a specific mesh topology. The radio devices are part of the backhaul – each of them is therefore both an Access Point (AP) and a bridge to the backhaul, through other APs. Each node in the figure represents a 2-radio system where one interface is " down" providing connectivity to client stations and other APs connecting to the backhaul through it. The second radio provides the backhaul path "up" to the wired backbone

The AP/bridge connected to the wired backbone is labeled, the "Root". (There is only one root in this topology, though that is not a requirement. All that is required is that the number of root be greater than or equal to one.) The other nodes must transmit their packets to the root in order to have them placed onto the wire. The solid lines between nodes and the root represent the mesh topology.

Each of the four sections also is labeled with the "Backhaul throughput" – which for the simulation is measured as a inverse relationship to proximity. The relationship between throughput and proximity is modeled as in inverse square law based on experimental data. The curve is shown in the lower left hand corner of section 4 in figure 2. The simulation environment includes the ability to change the throughput-distance relationship for differing radios and wireless cards.

Each section is also labeled with the "backhaul number of hops", which represents the average number of hops that a packet in that network will have to make in order to reach the root. The sections should be examined beginning in the upper left, and proceeding clockwise. The important results are:

- In section 1, the network is configured in order to optimize latency, that is, in order to minimize the total number of hops that packets will need to make. All nodes transmit their packets directly to the root. However, of all the possible configurations this has the lowest total throughput, because some of this one-hop links will be of low data rate due to physical separation between the nodes.

- In section 2, a tradeoff is starting to be made between latency (hops) and throughput. As the network is directed to emphasize throughput, it begins to make changes to the topology such that a larger number of hops is used in order to make sure that each mesh connection is at a higher data rate. A single change has been made in this case, as shown by the solid red line. Data from this node must now pass through an intervening node before reaching the root.

- Section 3 shows even more of an emphasis on throughput, with an additional node now using a two hop path to the root, and the throughput rate increasing from 55 to 59.

- Section 4 shows a mesh topology with a high emphasis on throughput, less on latency. Five of the nodes are now using two hop paths to reach the route, increasing the throughput to 64, but increasing to latency as well, since the average number of hops is now 1.6

Logical 2-Radio Mesh Backhauls The network topology control system described in U.S. Application No. 10/434,948, filed May 8, 2003 is based on a 2-Radio system shown in Figure 18 in that application and included as FIG 4 in this application. There are two radios in each mesh node, for the uplink and downlink support. Radio 010 is upward facing and connects to the downlink (labeled 020) of its parent radio. Thus, a chain of connectivity is formed as shown by labels 040-050-060. In addition to providing a chain of connectivity, the downward facing radios (020) also provide connectivity to clients (such as laptops) shown as triangles. One such client is labeled 030.

There is a cloud surrounding each mesh node. This is the coverage area of the radio signal for the downward facing radio. They are colored differently to depict that each is operating on a

different channel than other radios in its vicinity. Thus each radio belongs to a different Basic Service Set (BSS) or sub domain of the network. As such the system resembles a wired network switch stack. A wired network switch stack also has a similar tree structure with similar uplinks, and downlink connections. See FIG 4. Labels 040-050-060 form a functionally identical chain of connectivity. Also, each switch in a network switch stack operates on a separate sub –domain of the network.

Why Logical 2-Radio Mesh Backhauls are Needed. There are serious bandwidth degradation effects related to single radio mesh networks. The LHS diagram on FIG 2 depicts a typical 2 radio mesh network. One radio (010) provides services to clients while another radio (020) is part of an Ad Hoc Mesh – where all radios are operating on the same channel as depicted by the same color clouds (030)

In contrast FIG 2 RHS depicts a logical 2-Radio where each mesh radio (025) is part of a distinct sub domain of the network, depicted by different color clouds (035).

Returning to the LHS of FIG 2, all the backhaul radios (020) are on the same channel and thus are all part of the same network. In essence they form the wireless equivalent of a hub.

Hubs are not scalable because there is too much interference between all the members of the hub as the hub becomes larger. Exactly the same problem exists with conventional mesh networks. After 1-2 hops the co-channel interference between the mesh nodes (020) no longer allow high bandwidth transmissions.

There is another issue with single radio mesh backhauls are not scalable. There is bandwidth degradation with each hop - typically 50% per hop with single radio mesh backhauls. Refer to Figure 3. On the left hand side is a single radio backhaul. If it is part of a relay path then every packet it receives must be re-transmitted on the same radio: Label 010. This with each hop the effective throughput reduces by 50% from the previous hop. This makes bandwidth available at the end of the 3rd hop 1/8 of the available bandwidth. This is unacceptable for high performance requirements in either enterprise infrastructure networks or mission critical application requirements e.g. emergency response systems.

On the RHS FIG 3, Labeled 020, there are two radios – one to receive data and another to re-transmit. Now, the effective throughput is not compromised because there are two radio, operating on non-interfering channels. Simultaneous send and receive is now possible.

Single radio mesh backhauls do not present a scalable solution to addressing high bandwidth requirements for a mission critical mesh network.

SUMMARY OF THE INVENTION

Accordingly, there exists a need to support the performance requirements of mission critical mesh networks in multihop situations. Fig. 4 shows the infrastructure mesh in a topology with -a 2-radio unit in a multiple hop wireless network. The rectangular icons in this figure represent the APs, which have formed a mesh in order to support clients. The triangular

icons represent these clients. At the top of the figure are the root Access Points or APs (two, in this example) that have a direct connection to the wired backbone. Each of these APs creates a separate BSS using a separate RF channel.

The BSSs (Basic Service Sets) are labeled as BSS [hops], [index], so BSS 1,1 indicates that this is the first BSS for which one hop is needed to reach the wired backbone. For the non-root APs, ~~O~~one radio serves as an AP to its clients; the other radio acts as a backhaul.

The radio interface colored green - labeled 010 - acts as a connection to the " Parent" - the backhaul. It operates in station mode: it appears as a client, no different from other clients shown as triangles. The backhaul and AP radio, colored gray - labeled 020 - operates in AP mode: it services clients, including other Access Points accessing it as clients, through their second radio operating in station mode. In the lower layers, a description such as BSS 2,3 means that this is the third AP for which two hops are required to reach the wire. Triangles denote client radios (see Label 030).

~~R~~Radio is a shared medium where only one device ~~person~~ can be "talking" at a time. As networks grow, performance degrades rapidly as the same AP services more clients. The AP's ~~Basic Service Set (~~BSS~~)~~ becomes unmanageable. The need to split up the network into smaller groups becomes essential to the health of a network.

A classic ~~Our~~ solution is to split up the wireless network into smaller groups (BSS), each of which is operating on a non-interfering channel with other groups (BSS). Simultaneous "conversations" are now possible in each BSS. This solution, however, is not available in an ad-hoc (peer-to-peer) mesh solution, because such a solution must, by definition, create a single, large, BSS.

Each BSS shown in the infrastructure mesh of Fig. 4, however, is not interfering with other transmission channels allocated to neighboring BSSs. Channel Interference is contained and spatial re-use is possible. ~~2~~Two-radio solutions are therefore more impervious to noise than their 1-radio counterparts. Channels can automatically be re-allocated to avoid unpredictable sources of interference such as radar or unauthorized transmissions that may be present in emergency or military situations.

The Logical 2-Radio Concept is distinct from conventional Mesh. The Logical 2-Radio concept must not be confused with other mesh approaches that may also use 2 (or more) physical radios. This is referred to as a "Dual-radio" mesh and shown on the LHS of FIG 2.

FIG 2, LHS shows that one radio services client while the other forms an ad hoc mesh. Separating the service from the backhaul improves performance when compared with conventional ad hoc mesh networks. But a single radio ad hoc mesh is still servicing the backhaul - since only one radio communicates as part of the mesh. Packets traveling toward the Internet share bandwidth at each hop along the backhaul path with other interfering mesh backhauls - all-operating on the same channel.

Such systems are not scalable since the backhaul is still as single radio and suffers from the bandwidth degradation with each hop, endemic to single radio backhauls, see FIG 2 label 010. In contrast, the Logical 2-Radio concept described in this document focuses on a multiple radio backhaul as shown in FIG 3, Label 020..

It should also be noted that regardless of the number of radios allocated to the backhaul and those allocated in service of clients, the system resembles a wired switch stack from a logical perspective. Other mesh architectures resemble a hub.

Adding more Physical Radio: The logical 2 radio approach forms a tree like network as shown in Figure 4. One radio provides the uplink to a parent radio and another the downlink to child nodes. Thus the 2-Radio mesh node labeled 040 is a parent to mesh Node labeled 050. The mesh Node labeled 050 is a parent to mesh node labeled 060.

Mesh node labeled 050 also has two client radios, shown as triangles, one of which is labeled 030. Lack of a separate radio to service clients limits the effective backhaul bandwidth for the network, since clients are sharing bandwidth on the backhaul. It also prevents the use of proprietary but more efficient transmission protocols on the radios, since those radios also have to "talk" with client radios, that demand a non-proprietary and less efficient protocol.

An extension of the logical 2-radio functionality is to use three radios with two separate radios for the (high speed) backhaul and one more radio for separate (slower) service to clients. Refer to Figure 6. Again we see the familiar tree like structure. But this time the two backhauls are dedicated radios (labels 010, 020) and there is a separate radio (025) to service clients (030) only. The chain of connectivity (040-050-060) has not changed.

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Note that while more (physical) radios have been employed, Figures 5 and 6 are functionally identical. In both cases, one the functionality of uplink and downlink are separate. In Figure 5, the downlink supports both client and mesh nodes. In Figure 6, the radio (020) providing downlink connectivity is now dedicated to backhaul services while another radio (025) services clients (0300. There is performance improvement of shifting the slower traffic from clients to another radio so the backhaul can operate in the "fast lane" but beyond this implementation improvement FIG 6 and FIG 4 are functionally identical.

This invention addresses multiple embodiments of the logical 2 radio approach depicted in FIG 4 provides solutions that address a variety of mesh networking applications. These embodiments are shown in FIGS 5,6,7,8,9. Extensions to support voice and video in mission critical public safety networks are described in Figures 10, 11, 12. Lastly, this invention addresses how combining the logical radio embodiments may be dynamically reconfigured – in the field and on the fly - to support both infrastructure style mesh networks and conventional ad hoc mesh networks. Hybrid mesh networks for military & public safety applications are discussed and shown in Fig. 13,14,15

BRIEF DESCRIPTION OF DRAWINGS

In order to more fully describe embodiments of the present invention, reference is made to the accompanying drawings. These drawings are not to be considered limitations in the scope of the invention, but are merely illustrative.

FIG. 1 illustrates how the network topology is changed by selecting a different backhaul in a 2 radio system, with one link to the backhaul AP and the other link servicing the child AP. It depicts four network topologies. Each of the four network topologies provide a different set of performance in terms of latency and throughput. The mesh control software adjusts the latency and throughput parameters to meet voice/video or data performance requirements in terms of latency and bandwidth.

FIG. 2 contrasts the conventional "Dual Radio" mesh with the Logical 2-Radio Mesh. On the LHS of FIG 2, 2 radios labeled 010 and 020 provide client connectivity and ad hoc mesh backhaul functionality, respectively. All the mesh backhaul radios (020) are on the same channel depicted by the clouds of coverage of the same color (030). There are all part of the same sub-network. In contrast, on the RHS of FIG 2, the same radio (025) provides service to clients and also backhaul functionality but operates in different sub domains depicted by different color clouds of coverage (035). The LHS resembles a "hub", the RHS a "switch". Hubs are not scalable.

FIG. 3 compares the 2 step process of a single radio relay to a 2-radio relay. On the left side, (010) a single radio relay is shown. Every packet received has to be re-transmitted on the same radio. Thus the bandwidth with every hop in a single radio mesh network is reduced by approximately 50%. After 3 hops, the Bandwidth would be 1/8 of what is available at the Ethernet backhaul. On the RHS (020) a 2-radio backhaul is shown, where packets received on one radio are re-transmitted on another radio operating on a non-interfering channel. Now there is no bandwidth reduction with every hop and bandwidth is preserved with every hop. Two radio mesh backhauls are thus scalable while single radio backhauls are not. .

FIG. 4 shows how the structure of 2-radio multiple hop mesh network where each 2 radio unit services a Basic Service Set (BSS) by configuring one of the two radios to serve as an AP to its clients. Clients may include the second radio of another 2 radio system, with this radio configured to run in station mode, providing the backhaul path back to the Ethernet link. In the insert, the uplink radio (labeled 010) connects to the parent mesh node while the downlink radio (labeled 020) acts like an Access Point to client radios, including other mesh nodes that connect to it through their uplink radio. Note that all service radios (020) operate on different non-interfering channels, depicted by different color ovals.

FIG. 5 shows the similarities between FIG 4 and a wired switch stack with the same chain of connectivity 040-050-060. Both have the same tree-like structure and up link and down link connections. In both cases the units (040,050,060) operate on a distinct sub domain.

FIG. 6 illustrates one embodiment of the two logical radio approach with 3 physical radios. Two radios constitute logically one radio of the two logical radio concept, while the third physical radio serves clients as the second radio of the two logical radio concept. By

eliminating the sharing of physical radios for both backhaul and client services, the backhaul bandwidth has improved and also reduced the dependency to use the same type of radios for the backhaul and the client. In the insert, the uplink radio (labeled 010) connects to the parent mesh node while the downlink radio (labeled 020) connects to the uplink radio of child mesh nodes. The service radio (labeled 030) act as Access Points to client radios shown as triangles. One such is labeled 040. Note that all service radios (030) operate on different non-interfering channels, depicted by different color ovals.

FIG. 7 illustrates another embodiment of the two logical radio approach but with 5 physical radios. The uplink and downlink radios (shown as one radio figure 6) is now split into two radios, each responsible for one direction of traffic. Bandwidth is doubled and latency halved, since traffic in the opposing direction now has its own "lane". Thus, the radio labeled 010 in Figure 6 is now radios 012 and 010. Similarly, the radio marked 020 in Figure 6 is now split into radios labeled 022 and 020. The radio pairs 012-010 and 022-020 provide the same functionality as the radios labeled 010 and 020 in Figure 6 but with twice the bandwidth and approx half the latency.

FIG. 8 is an extension of the 5-radio embodiment shown in Figure 7. In Figure 7, there is one service radio to service both voice and data customers. However voice and data traffic has different performance requirements. Data requires higher bandwidth and is relatively indifferent to latency. Conversely, voice requires low bandwidth but is latency sensitive. By having different Access Point radios service the voice and data clients), the contention between voice and data packets attempting to gain access to the same medium is reduced. Also, with different radios servicing the data and voice clients, the voice and data packets can now be treated differently. The Access Point radios servicing the voice clients could therefore be operating in TDMA (time division multiple access) mode while the AP radio servicing the data clients operates in CSMA (Collision Sense Multiple Access) mode. The two radios (032) and (034) thus provide different functionality. Phones connect to the former, laptops to the latter.

FIG 9 is a 5-Radio extension of the 3-Radio configuration shown in Figure 6 but with more dedicated service radios operating on different frequencies for different types of client radios.

FIG 10 shows the maximum VOIP bandwidth available per client, using 802.11 radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, a 802.11b radio can support around 25 clients.

FIG 11 shows the maximum VOIP bandwidth available per client, using 802.11a radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, an 802.11a radio can support around 55 clients

FIG. 12 shows extensions developed and implemented in the mesh network stack to provide an efficient backhaul for voice. The small voice packets are concatenated into larger packets and sent (as one packet) at regular intervals to the backhaul radios. At each mesh node voice packets intended for that destination are removed and the rest sent back (as one large packet).

Salient portions include the Packet classifier (labeled 010) that recognizes voice packets based on size and regularity of transmissions, the VOIP concatenation engine (labeled 020) that "container-izes" small voice packets into a larger "container" packet for more efficient transportation, Real time extensions (labeled 030) to the Linux kernel enable the system to provide near real time performance regarding sending and receiving the latency sensitive VOIP container packets through the network – regardless of what the Operating System is doing at the time.

FIG. 13 shows the concept of a "Hybrid Mesh network" where 2 radio systems provide two types of service. In one case, they are part of an infrastructure mesh as shown by the 2-radio mesh node labeled 010. In another case, the same node may be dynamically reconfigured to support ad hoc peer-to-peer connectivity. The node labeled 020 (marked as E8) has two radios. One is intended for client radio connection to infrastructure mesh nodes – see the radio labeled 030 on the unit marked E9. The other provides a peer-to-peer mesh capability, as shown by radio labeled 040. Depending on the needs of the network, the 2-radio units are dynamically re-configured to support either need, infrastructure mesh (010) or backhaul support to ad hoc mesh (020). Labels 050 and 060 mark connected and broken ad hoc mesh links.

FIG. 14 is an application of the Hybrid Mesh concept to Public Safety. The node labeled 010 is a Stationary node on top of a light pole. A mobile version shown as labeled 020 is entering the building (arrow). These mobile units are also called "breadcrumb" routers. The Mobile Mesh nodes provide connectivity to 2-Radio portable units worn by the firemen in this picture. All Firemen are thus connected to themselves through a peer-to-peer mesh network shown as a thin red line. They are also connected to the Infrastructure mesh backhaul through one or more connect points. This ensures redundancy in network connectivity. The broken link (labeled 060, Figure 13) is avoided.

FIG. 15 is an application of the Hybrid Mesh concept related to Battle Force Protection.

FIG., 18 shows how the installation software is tagged to both the radios and board characteristics. It shows a serial line connected to load the boot loader program, after which the Ethernet port is used to complete the software installation and branding process. Compiling the install program on the board it is intended to run on does this, thus creating a unique software image.

FIG. 19 is a screen dump of the Flash Deployment software developed and implemented to ensure that software generated for the install of this board cannot be used by another mesh node. When the software installation process begins, the software is compiled on the board it is intended for and the compilation process is unique since it is based on a number of unique factors. The software is generated on the board – that it is intended to run on - to ensure that

the software image cannot be used to run on another board, thus preventing both software privacy and dissuading theft of the mesh nodes.

FIG. 20 shows that the Mesh Control Software sits above the Media Access Control (MAC) of the radio. As such it is Radio and Protocol agnostic.

FIG. 21 shows how channel interference is dynamically managed in the logical 2-Radio system.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

The description above and below and the drawings of the present document focus on one or more currently preferred embodiments of the present invention and also describe some exemplary optional features and/or alternative embodiments. The description and drawings are for the purpose of illustration and not limitation. Those of ordinary skill in the art would recognize variations, modifications, and alternatives. Such variations, modifications, and alternatives are also within the scope of the present invention. Section titles are terse and are for convenience only.

Radio is a shared medium where only one person can be "talking" at a time. As networks grow, performance degrades rapidly as more clients are services by the same AP. The AP's Basic Service Set (BSS) becomes unmanageable. The need to split up the network into smaller groups is essential to the health of a network.

The problem is exacerbated in multi-hop topologies using one-radio systems. With one-radio units everyone is on the same BSS - bandwidth is reduced to half with each successive hop in the network. The reason is that radio is a shared medium -every one has to stay silent when a re-transmission from one hop to another hop (within the same BSS) occurs. One radio networking solutions cannot meet are the high performance requirements of enterprise infrastructure networks.

Our solution is to split up the wireless network into smaller groups (BSS), each of which is operating on a non-interfering channel with other groups (BSS). Simultaneous "conversations" are now possible. Each BSS shown above is not interfering with other transmission channels allocated to neighboring BSSs. But to do this and provide bridging across the individual sub networks, requires 2 radios as shown in Figure 4 (label 020)

FIG. 3 compares the performance of a single radio relay (or backhaul) to that of a 2-radio relay (or backhaul) On the LHS, (010) a single radio relay is shown. Every packet received has to be re-transmitted on the same radio. Thus the bandwidth with every hop in a single radio mesh network is reduced by approximately 50%. After 3 hops, the Bandwidth would be 1/8 of what is available at the Ethernet backhaul. In contrast On the RHS (020) a 2-radio backhaul is shown, where packets received on one radio are re-transmitted on another radio operating on a non-interfering channel. This is depicted as the different color for the dashed lines emanating from the radios. (030)

Since the radios operate on different channels, they are now part of separate sub-networks. Transmissions from one do not affect the other and both can transmit/receive freely. With the radios operating on different non-interfering channels, there is now no bandwidth reduction with every hop. Bandwidth is preserved with every hop. Two radio mesh backhauls are thus scalable while single radio backhauls are not. This is in essence the power of the 2-Radio concept: separating the uplink and down link radios in a mesh network.

Fig. 4 shows the infrastructure mesh in a topology with -a 2-radio unit in a multiple hop wireless network. The rectangular icons in this figure represent the APs, which have formed a mesh in order to support clients. The triangular icons represent these clients. At the top of the figure are the root Access Points or APs (two, in this example) that have a direct connection to the wired backbone. Each of these APs creates a separate BSS using a separate RF channel.

The BSSs (Basic Service Sets) are labeled as BSS [hops], [index], so BSS 1,1 indicates that this is the first BSS for which one hop is needed to reach the wired backbone. For the non-root APs, ~~O~~one radio serves as an AP to its clients; the other radio acts as a backhaul.

The radio interface colored green - labeled 010 - acts as a connection to the " Parent" - the backhaul. It operates in station mode: it appears as a client, no different from other clients shown as triangles. The backhaul and AP radio, colored gray - labeled 020 - operates in AP mode: it services clients, including other Access Points accessing it as clients, through their second radio operating in station mode. In the lower layers, a description such as BSS 2,3 means that this is the third AP for which two hops are required to reach the wire. Triangles denote client radios (see Label 030).

~~R~~Radio is a shared medium where only one device ~~person~~ can be "talking" at a time. As networks grow, performance degrades rapidly as the same AP services more clients. The AP's ~~Basic Service Set (~~BSS~~)~~ becomes unmanageable. The need to split up the network into smaller groups becomes essential to the health of a network.

A classic ~~Our~~ solution is to split up the wireless network into smaller groups (BSS), each of which is operating on a non-interfering channel with other groups (BSS). Simultaneous "conversations" are now possible in each BSS. This solution, however, is not available in an ad-hoc (peer-to-peer) mesh solution, because such a solution must, by definition, create a single, large, BSS.

Each BSS shown in the infrastructure mesh of Fig. 4, however, is not interfering with other transmission channels allocated to neighboring BSSs. Channel Interference is contained and spatial re-use is possible. ~~2~~Two-radio solutions are therefore more impervious to noise than their 1-radio counterparts. Channels can automatically be re-allocated to avoid unpredictable sources of interference such as radar or unauthorized transmissions that may be present in emergency or military situations.

The Logical 2-Radio Concept is distinct from conventional Mesh. The Logical 2-Radio

concept must not be confused with other mesh approaches that may also use 2 (or more) physical radios. This is referred to as a "Dual-radio" mesh and shown on the LHS of FIG 2.

FIG 2, LHS shows that one radio services client while the other forms an ad hoc mesh. Separating the service from the backhaul improves performance when compared with conventional ad hoc mesh networks. But a single radio ad hoc mesh is still servicing the backhaul - since only one radio communicates as part of the mesh. Packets traveling toward the Internet share bandwidth at each hop along the backhaul path with other interfering mesh backhauls - all-operating on the same channel.

Such systems are not scalable since the backhaul is still as single radio and suffers from the bandwidth degradation with each hop, endemic to single radio backhauls, see FIG 2 label 010. In contrast, the Logical 2-Radio concept described in this document focuses on a multiple radio backhaul as shown in FIG 3, Label 020..

It should also be noted that regardless of the number of radios allocated to the backhaul and those allocated in service of clients, the system resembles a wired switch stack from a logical perspective. Other mesh architectures resemble a hub.

Adding more Physical Radio: The logical 2 radio approach forms a tree like network as shown in Figure 4. One radio provides the uplink to a parent radio and another the downlink to child nodes. Thus the 2-Radio mesh node labeled 040 is a parent to mesh Node labeled 050. The mesh Node labeled 050 is a parent to mesh node labeled 060.

Mesh node labeled 050 also has two client radios, shown as triangles, one of which is labeled 030. Lack of a separate radio to service clients limits the effective backhaul bandwidth for the network, since clients are sharing bandwidth on the backhaul. It also prevents the use of proprietary but more efficient transmission protocols on the radios, since those radios also have to "talk" with client radios, that demand a non-proprietary and less efficient protocol.

An extension of the logical 2-radio functionality is to use three radios with two separate radios for the (high speed) backhaul and one more radio for separate (slower) service to clients. Refer to Figure 6. Again we see the familiar tree like structure. But this time the two backhauls are dedicated radios (labels 010, 020) and there is a separate radio (025) to service clients (030) only. The chain of connectivity (040-050-060) has not changed.

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Note that while more (physical) radios have been employed, Figures 5 and 6 are functionally identical. In both cases, one the functionality of uplink and downlink are separate. In Figure 5, the downlink supports both client and mesh nodes. In Figure 6, the radio (020) providing downlink connectivity is now dedicated to backhaul services while another radio (025) services clients (0300. There is performance improvement of shifting the slower traffic from clients to another radio so the backhaul can operate in the "fast lane" but beyond this implementation improvement FIG 6 and FIG 4 are functionally identical.

Adding more Physical Radios to the Backhaul. In FIG 6 the logical service radio was split into 2 Physical radios to achieve greater performance. The logical backhaul radio can also be split into multiple backhaul radios to provide better backhaul. More backhaul radios provides more alternate routing paths and the ability to tune individual routing paths to support required application settings. Thus it is possible to have multiple backhauls, one that provides low latency (with fewer hops) and another that provides more throughput but using a more circuitous route with more hops and more latency.

The system would then route packets such that Voice packets traveled along the low latency backhaul and data packets would travel on the other – high throughput – backhaul. Adding more backhauls thus increases flexibility in supporting diverse performance requirements and also improves redundancy and fault tolerance. Note however, that from a logical perspective, this is still a 2-Radio system depicted in FIG. 5 and the software control layer that manages the multiple backhaul system is functionally the same as that for the 2-Radio units.

Full Duplex Backhauls A variation of this concept of adding more physical radios in support of better backhaul functionality is to split the incoming and outgoing traffic to two separate backhaul radios. This doubles the bandwidth and effectively reduces latency also.

In FIG. 7 the uplink and downlink radios (shown as one radio FIG 6) is now split into two radios, each responsible for one direction of traffic. Bandwidth is doubled and latency halved, since traffic in the opposing direction now has its own "lane". Thus, the radio labeled 010 in FIG 6 is now radios 012 and 010. Similarly, the radio marked 020 in FIG 6 is now split into radios labeled 022 and 020. The radio pairs 012-010 and 022-020 provide the same functionality as the radios labeled 010 and 020 in FIG 6 but with twice the bandwidth and approx half the latency.

Multiple Service Radios A single radio must service all local clients, regardless of the application requirements. Consider an Access Point servicing both Voice over IP (VOIP) and data clients If a number of data devices are requesting simultaneous transfers, they will interfere with voice traffic, thereby adding significant latency and jitter. Latency and jitter are enemies of VoIP, and this situation rapidly results in deteriorated call quality. Since radio is a shared medium, the only way to prevent this interference is at the source of the problem – the shared spectrum at the radio. By the time the data and voice traffic get to a wireless backhaul it's too late. The damage has already been done.

FIG. 8 is an extension of the 5-radio configuration shown in Figure 7 to separate voice and data traffic. In Figure 7, there is one service radio to service both voice and data customers. However voice and data traffic has different performance requirements. Data requires higher bandwidth and is relatively indifferent to latency. Conversely, voice requires low bandwidth but is latency sensitive. By having different Access Point radios service the voice and data clients), the contention between voice and data packets attempting to gain access to the same medium is reduced. Also, with different radios servicing the data and voice clients, the voice and data packets can now be treated differently. For example, the radio servicing voice clients could therefore be operating in a different mode such as PCF (Point Control Function)

or TDMA (time division multiple access) mode while the AP radio servicing the data clients operates in DCF (Distributed Control Function) mode.

Along the lines of multiple service radios, FIG 9 is a 5-Radio extension of the 3-Radio configuration shown in Figure 6 but with more dedicated service radios operating on different frequencies for different types of client radios. The backhaul is WiMAX and it supports WIFI, WIMAX and public safety (4.9GHZ) service radios.

The logical 2-radio concept must not be confused with "dual radio" mesh. In all the configurations outlined above, it should be noted that - regardless of the number of radios allocated to the backhaul and those allocated in servicing clients - the system is functionally identical to the logical two-radio shown in FIG 4.

It must also be noted that the logical 2-Radio concept contrasts with what is referred to as "Dual radio" or "1+1" mesh. For example some mesh companies use what is referred to in the industry as a "1+1" mesh or "dual-radio" mesh. See FIG 2 LHS. Here one radio services client while the other forms an ad hoc mesh. Separating the service from the backhaul improves performance when compared with conventional ad hoc mesh networks. But a single radio ad hoc mesh is still servicing the backhaul - since only one radio communicates as part of the mesh. Packets traveling toward the Internet share bandwidth at each hop along the backhaul path with other interfering mesh backhauls - all-operating on the same channel.

Such systems are not scalable since the backhaul is still as single radio and suffers from the bandwidth degradation with each hop, endemic to single radio backhauls, see FIG 4 label 010. In contrast, the Logical 2-Radio concept described in this document focuses on a multiple radio backhaul as shown in FIG 2 RHS.

Other distinctive benefits of the Logical 2-Radio approach (vs.other approaches) include:

- **Layer 2 routing is radio and protocol agnostic.** The mesh control layer operates just above the MAC layer of the radio. It functions as a layer 2 bridge between backhaul and service radios. L3 functionality is thus unaffected. Thus Network/Security functionality is unaffected by our Layer 2 software. FIG. 20 shows that the Mesh Control Software sits above the Media Access Control (MAC) of the radio. As such it is Radio and Protocol agnostic.

- **Faster Routing Updates.** The tree like structure (See FIG 5,6,7) engenders a faster routing mechanism than conventional ad hoc mesh. Hence enterprise class wired network switch stacks use an efficient tree structure for routing. Ad hoc Mesh manages a large routing table, generally Order(n^2). In contrast, the tree like structure is Order (n) and both system overhead and reaction time are lower..

- **Manages Channel Interference**: In 1-radio systems, all radios on the backhaul share the same channel. They are easily affected by interference - possibly malicious- on their operating channel. With Logical 2-Radio mesh, nodes can switch to other channels to

avoid channel interference from near by nodes operating in another segment of the network. See FIG 21.

- **Dynamic Re-configurability**: The logical 2-radio approach requires a minimum of 2 physical radios (See FIG 4) but there are no upper bounds. Thus is a radio "dies", the system automatically shifts down to a more appropriate configuration. This may affect performance but functionally the system architecture has not changed. This level of redundancy is impossible in conventional mesh architectures. See FIG 2, LHS. The radios 010 and 020 are serving distinct purposes and are generally of different types. For example the radio servicing clients (010) is typically a 802,.11b/g radio while the radio part of the backhaul (020) is generally an 802.11a radio. If one radio dies, the other cannot be easily re-configured to support the dead radio functionality without compromising its original purpose. Such is NOT the case with the Logical 2-Radio approach because both radios are of the same time in order to form the chain link 040-050-060 shown in FIG 4, 5, 6.

VOIP Extension For Mesh Backhauls. FIG 10 shows the maximum VOIP bandwidth available per client, using 802.11 radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, a 802.11b radio can support around 25 clients.

FIG 11 shows the maximum VOIP bandwidth available per client, using 802.11a radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, an 802.11a radio can support around 55 clients

The point is that regardless of the type of service radio selected, the maximum clients that can be supported per radio is around 50. That implies that in the case of the chain 040-050-060 shown in FIG 6, the total number of VOIP clients to be supported by the backhaul would be around 150. Since the radio cannot support more than 50, other steps must be taken so that the relay /backhaul radios are not the bottleneck.

The inefficiencies of transmitting voice packets are largely due to their small size and frequency of transmission.. The Radio protocol commonly employed is CSMA/CA based (Collision Sense Multiple Access/ Collision Avoidance) and it becomes increasingly inefficient as the size of the packet reduces. The challenge, therefore, is to container-ize the packets so voice packets become part of large container (for more efficient transportation) but at the same time not delay sending the packets in order to "fill" the container.

As an analogy, the bus can wait a little while longer at a bus station to pick up more passengers but if it waits too long, it will miss its scheduled arrival that the next stop – to the chagrin of passengers expects to disembark there.

FIG. 12 shows extensions developed and implemented in the mesh network stack to provide an efficient – yet time sensitive - backhaul for voice. The small voice packets are concatenated into larger packets and sent (as one packet) at regular intervals to the backhaul radios. At each mesh node voice packets intended for that destination are removed and the rest sent back (as one large packet). The real time extensions (030) ensure that the delivery is made according to regular intervals – regardless of what else the operating system is doing at the time. Salient portions include the Packet classifier (labeled 010) that recognizes voice packets based on size and regularity of transmissions, the VOIP concatenation engine (labeled 020) that "container-izes" small voice packets into a larger "container" packet for more efficient transportation, Real time extensions (labeled 030) to the Linux kernel enable the system to provide near real time performance regarding sending and receiving the latency sensitive VOIP container packets through the network – regardless of what the Operating System is doing at the time.

Hybrid Mesh Networks. One-radio mesh networking solutions are inferior to multiple radio solutions in multihop situations. In the case of 1 radio systems available bandwidth is reduced by 50% with each hop: ~~T~~the bandwidth available at the 3rd hop is 1/8 of the available capacity. Conversely, 2-radio infrastructure mesh solutions are ideal for multihop situations - with no restrictions on the number of hops. They are also more reliable since the AP is intended to be stationary and therefore provide dependable service in its coverage area. But they are not intended for peer-to-peer connectivity in standard 802.11 modes of operation. In standard 802.11, radios are either configured to act as an AP, a STA or in ad hoc mode.

Mission critical applications (e.g. emergency response) need high bandwidth - regardless of how many hops you are away from the backbone- to be able to download maps or upload video. They must also be assured of connectivity at all times – every node must be able ~~to be able~~ to route traffic to all other nodes in the network.

Infrastructure backhaul addresses robust connectivity. Infrastructure backhaul is also needed to support ad-hoc mesh networking. In ~~the f~~FIG 13, the ad hoc wireless link between E2 and E3 has been lost due, say, to excessive distance or an intervening obstruction – typical of dynamic, uncertain or hostile environments. With no 2-radio backhaul support, Nodes E1 and E2 are stranded, that is, they have no way of communicating with the other mobile radio units, at least in ad-hoc mode. The backhaul link now becomes their lifeline. Two-radio portable backhauls are thus essential in emergency response systems where the team may be scattered over large areas, and yet not made up of a very high number of actual devices.

A single radio ~~A~~ad hoc mesh is not sufficient, since all E nodes are intended to be mobile, their movement cannot be restricted to operate within coverage from another E unit. Further, redundant routing configurations (E7-E8-E9) cannot be assured, and the string of pearls pattern (E3-E4-E5-E6-E7) is too tenuous a connectivity chain for mission critical applications.

Hybrid mesh topologies are for situations where one radio mobile ad hoc network connectivity (for peer-to-peer connectivity) combined with two radio infrastructure backhaul

support provides the best of both worlds: ubiquitous connectivity with multiple levels of redundancy. To simplify production issues, the 2-radio Portable backhaul and mobile units can be the same hardware but dynamically configured to operate differently.

The backhaul radios can be dynamically configured to have one radio in AP mode and the other is STA mode. The 2 radio mobile units are configured to have one radio in STA mode (to talk to the backhaul) with another radio in ad hoc mode to talk with peers. Either unit can fill in for the other – changes are software based and dynamically configurable. This favors economies of scale - the same hardware services both peer-to-peer and infrastructure requirements. Also, in the general case, most nodes would be of the 2-Radio configuration shown in FIG 4. In the event the node reaches the edge of a network and has to support ad hoc mesh (E1-E2-E3-E4) it will dynamically reconfigure itself to become a Hybrid node. Thus Node E1 could have been a 2-Radio unit but it would dynamically reconfigure itself to support the connectivity requirements of E2 thar has been stranded because of a broken link with E3 (label 060, FIG 13).

FIG. 14 is an application of the Hybrid Mesh concept to Public Safety. The node labeled 010 is a Stationary node on top of a light pole. A mobile version shown as labeled 020 is entering the building (arrow). These mobile units are also called "breadcrumb" routers. The Mobile Mesh nodes provide connectivity to 2-Radio portable units worn by the firemen in this picture. All Firemen are thus connected to themselves through a peer-to-peer mesh network shown as a thin red line. They are also connected to the Infrastructure mesh backhaul through one or more connect points. This ensures redundancy in network connectivity. The broken link (labeled 060, Figure 13) is avoided. FIG. 15 is a similar application of the Hybrid Mesh concept but related to Battle Force Protection.

Mobility Extensions for moving mesh nodes. An enhancement to the 3-Radio module is to add a 4th radio as a scanning radio. The scanning radio monitors the environment and the other radios on the mesh node to ensure that the radio-antenna subsystems are functioning correctly. They also monitor the performance of neighboring mesh nodes and when a node malfunctions, scanning radios provide diagnostic information to the Network Management System (NMS).

Recall that in the 2-Logical Radio concept, all radios are operating on non-interfering frequencies to preserve bandwidth (see FIG 2,3) and thus cannot monitor each other. An external scanning radio is also needed to gauge the signal strength of a prospective parent node before the backhaul / relay path can decide that that node could provide better service. In lightly loaded situations, the radios can perform this scanning themselves with no loss in performance. In heavily loaded situations or in the event of a disaster, scanning would result in loss in performance.

Without a separate scanning, radio the NMS and adjoining nodes still know when a node goes down because control system heartbeats (sent on one channel and re-transmitted on another by a parent node) are not received. However only an external sensing radio can determine if there has been a mechanical failure - as a break in the cable. In the event of such malfunctions, scanning radios can dynamically reconfigure themselves to assume the

functionality of the damaged unit. In short, scanning radios mesh form "buddy" relationships (as in police teams) to monitor and "cover" each other. Scanning radios are critical in dynamic environments - where mesh nodes are mounted on cars and the mesh topology is rapidly changing. These include public safety and battlefield scenarios.

Additionally scanning radios can provide information on client movement. If two mesh nodes are both in the vicinity of a moving client radio, then scanning radios on both nodes will pick up signals from the moving client radio. Now, as the client moves, its signal strength as received by one scanning radio will differ from that received by another. Based on the vector of motion, one mesh node will be better suited to servicing the client and a hand off from one mesh node to another may now be initiated in a proactive manner. Without the scanning radio, the hand off will still occur – but it will be because the client has lost connectivity and has to scan to find another mesh node to connect to. With some software on the client this break in connectivity may be avoided by informing the client when to switch to the next node. For a short while packets for the client will be sent to both nodes. Once the client shifts to the new node, the old node is informed. It then ceases to send packets and updates its routing table to delete the entry of the client as one of its clients.

Field Upgradeable Modular Design. A key advantage of the radio and protocol agnostic approach is that additional radios can be added to the system easily. The mesh control software emulates multiple port bridges and supports multiple input and output interfaces. There are no software limitations on the number of service radios or the number of backhaul radios supported. This ensures a cost effective long-term migration strategy supporting needs for more performance later.

FIG. 16 shows a production version of the 2-Logical radio system with support for up to 4 physical radios that can support a variety of configurations in a modular fashion. One radio is mounted (Label 010). There are a total of 4 such slots, two on top, two on the bottom. There are also two Ethernet ports (Label 020) with Power over Ethernet on one. Radios connect to one of 4 N-Female antenna connections (labeled 030).

FIG. 17 depicts some of the configurations possible with a 4 physical radio unit such as shown in Fig 16. Based on the number of radio slots occupied, the system automatically configures itself to be a 2-Radio (Figure 5), 3-Radio (Figure 6) or a Full Duplex Backhaul (Figure 7). The system is extensible. Through the Ethernet port, another 4 radio modular units may be added. Label 010 refers to the 2-radio configuration shown in Fig 5. The label 020 refers to the 3-radio shown in Fig 6. Label 030 refers to an extension of the 3-Radio system and discussed in more detail in this application. Label 040 refers to the Full Duplex 4 Radio system also shown in Figure 7.

Theft protection of Mesh Nodes Mesh nodes are mounted in public spaces and open air locations, there must be means to dissuade theft. Theft is effectively controlled if the software on the mesh node cannot be copied and used on another mesh node. For that, the software running on the mesh node needs to have some unique, (copy proof) feature.

FIG.18 shows the process developed and implemented for generating software tagged to the current radios and board characteristics. It shows a serial line connected to load the boot loader program, after which the Ethernet port is used to complete the software installation and branding process. Compiling the install program on the board it is intended to run on does this, thus creating a unique software image.

FIG. 19 is a screen dump of the Flash Deployment software developed and implemented to ensure that software generated for the install of this board cannot be used by another mesh node. When the software installation process begins, the software is compiled on the board it is intended for and the compilation process is unique since it is based on a number of unique factors. The software is generated on the board – that it is intended to run on - to ensure that the software image cannot be used to run on another board, thus preventing both software privacy and dissuading theft of the mesh nodes.

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Throughout the description and drawings, example embodiments are given with reference to specific configurations. It will be appreciated by those of ordinary skill in the art that the present invention can be embodied in other specific forms. Those of ordinary skill in the art would be able to practice such other embodiments without undue experimentation. The scope of the present invention, for the purpose of the present patent document, is not limited merely to the specific example embodiments of the foregoing description, but rather is indicated by the appended claims. All changes that come within the meaning and range of equivalents within the claims are intended to be considered as being embraced within the spirit and scope of the claims which follow:

CLAIMS

What is being claimed is:

1. A wireless mesh network node containing at least two relay radios for performing a packet relay function, wherein;
   a first relay radio can receive packets while a second relay radio simultaneously sends packets, and
   wherein frequency channels for each relay radio are chosen automatically by a distributed software control layer that resides on each such mesh node in a mesh network, and which communicates with control layer software on other nodes in the mesh network.

2. The mesh network node of claim 1 also including one or more separate service radios which are connected to the relay radios via a software bridge.

3. The mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation.

4. A full duplex wireless mesh network node containing at least four relay radios for performing a packet relay function, wherein the following operations can occur simultaneously;
   a first relay radio receives packets from a parent mesh node, and
   a second relay radio sends packets to a parent mesh node, and
   a third relay radio receives packets from a daughter mesh node, and
   a second relay radio sends packets to a parent mesh node.

5. A wireless mesh network node containing at least two relay radios, and at least two service radios wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic.

6. A hybrid mesh network where some mesh nodes in the network have at least two relay radios and other mesh nodes have only one relay radio.

7. A wireless mesh network node containing at least two relay radios and at least three similar radios, where upon the failure of one relay radio, another relay radio can operate in place of the failed radio.

8. A wireless mesh network node optimized for VoIP traffic containing at least two relay radios including software that concatenates smaller voice packets into larger packets in order to increase the overall throughput of the mesh.

9. A wireless mesh network node containing at least two relay radios and a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio, and wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that

packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes.

ABSTRACT

An approach using 2 logical radios to achieve high performance in multihop mesh networks is introduced. The advantages of frequency re-use, reduced channel interference over 1 radio approaches is discussed. An approach is developed to extend the logical 2-radio system to (physical) 3-radio and 4-radio systems are explained as extensions of the logical 2-radio methodology. The ability need to support both multiple radio systems and 1-radio ad hoc mesh systems in one framework is described in the context of emergency response systems. Some unique benefits of the logical 2-Radio concept related to other mesh architectures are highlighted.

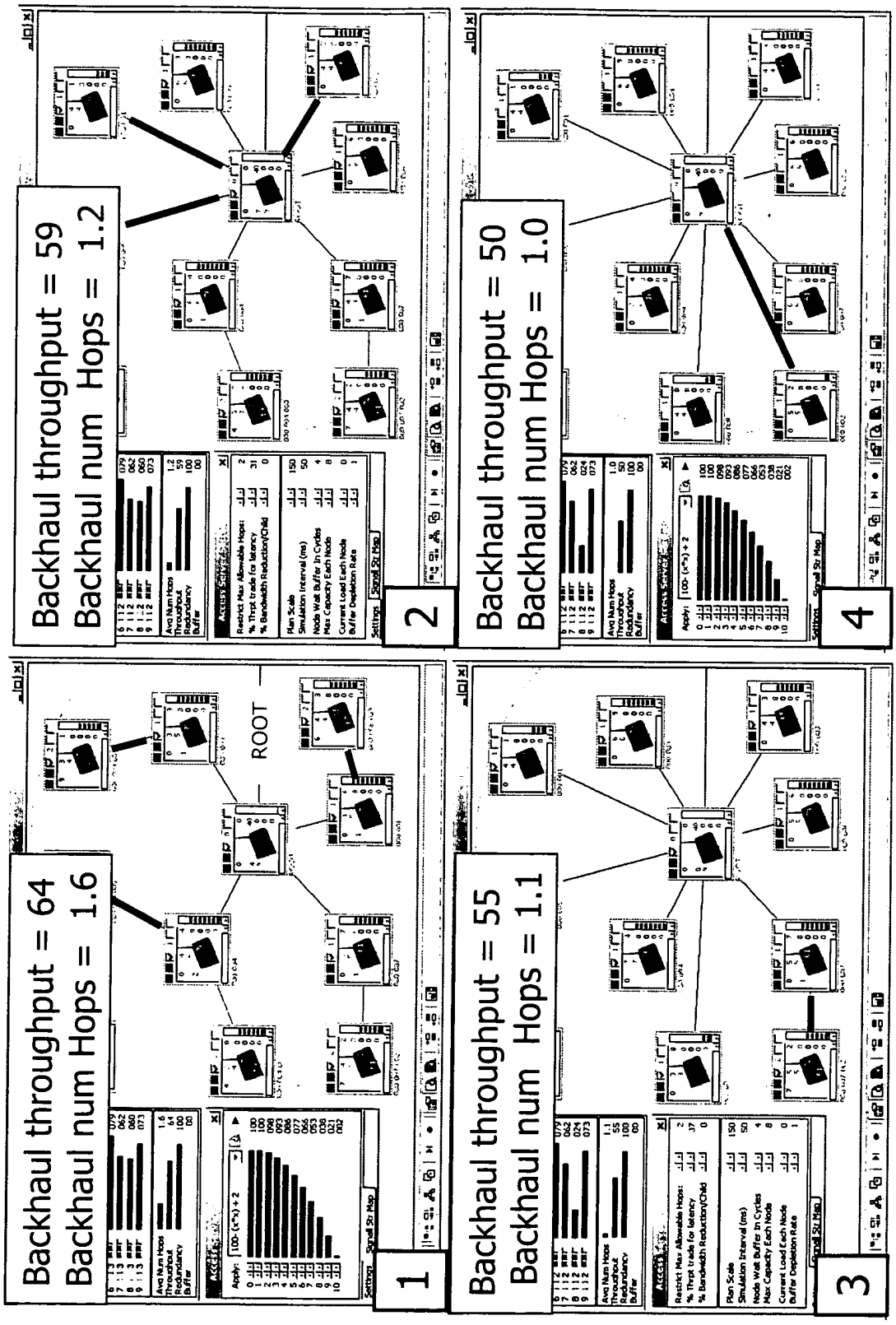


FIGURE 1

BEST AVAILABLE COPY

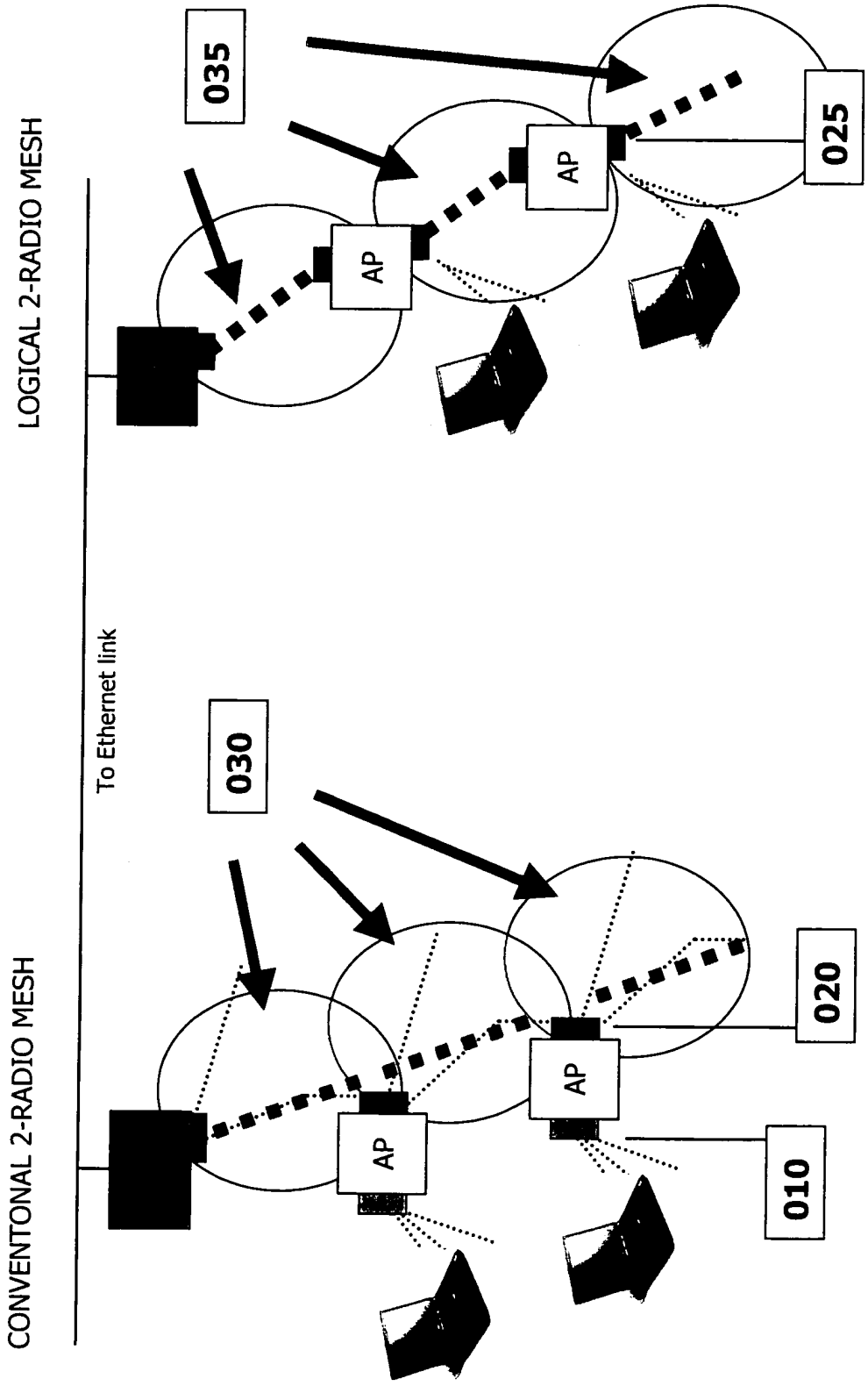

LOGICAL 2-RADIO MESH
035
AP
AP
025
To Ethernet link
CONVENTONAL 2-RADIO MESH
030
AP
AP
020
010

FIGURE 2

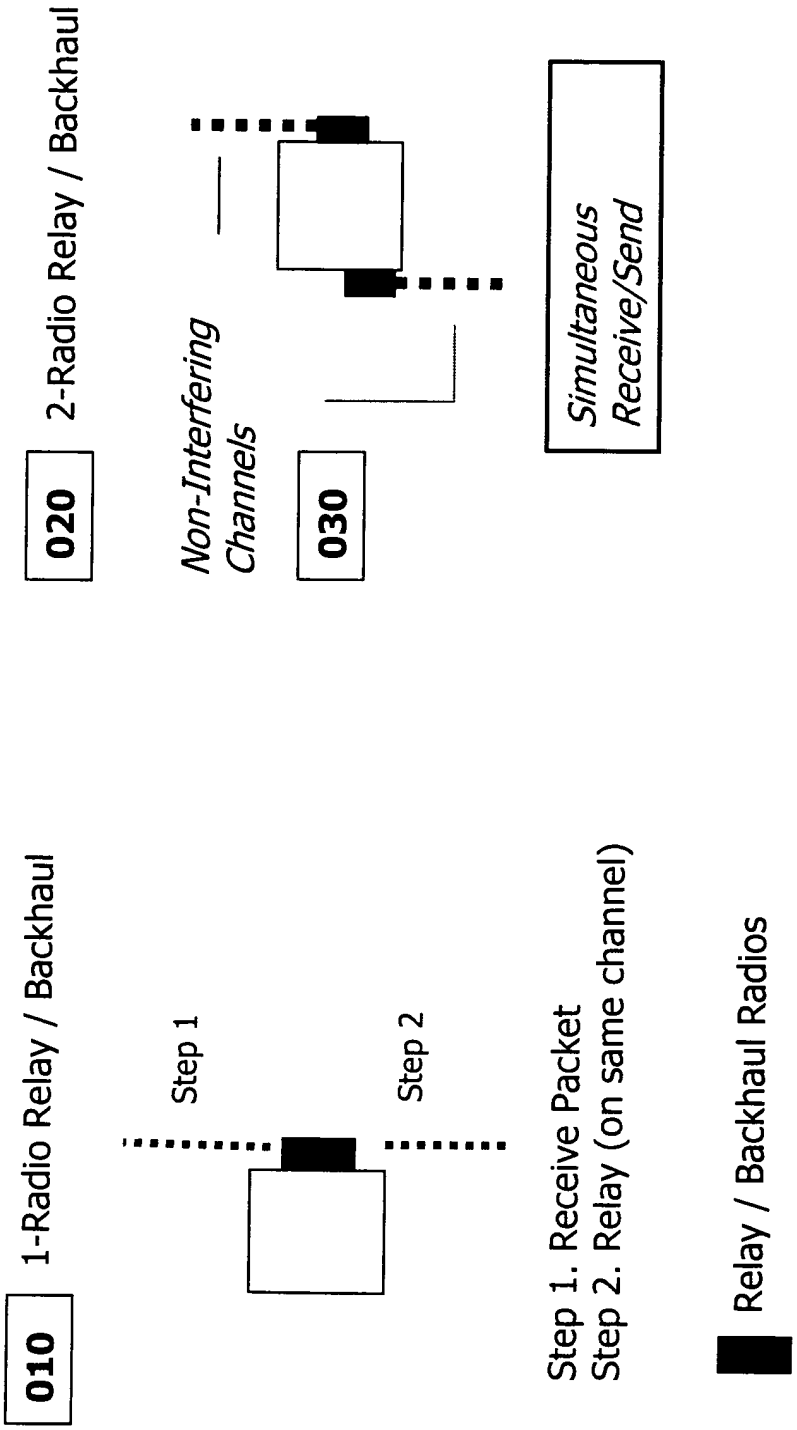

010
1-Radio Relay / Backhaul
Step 1
Step 2
020
2-Radio Relay / Backhaul
Non-Interfering Channels
030
Simultaneous Receive/Send
Step 1. Receive Packet
Step 2. Relay (on same channel)
Relay / Backhaul Radios

FIGURE 3

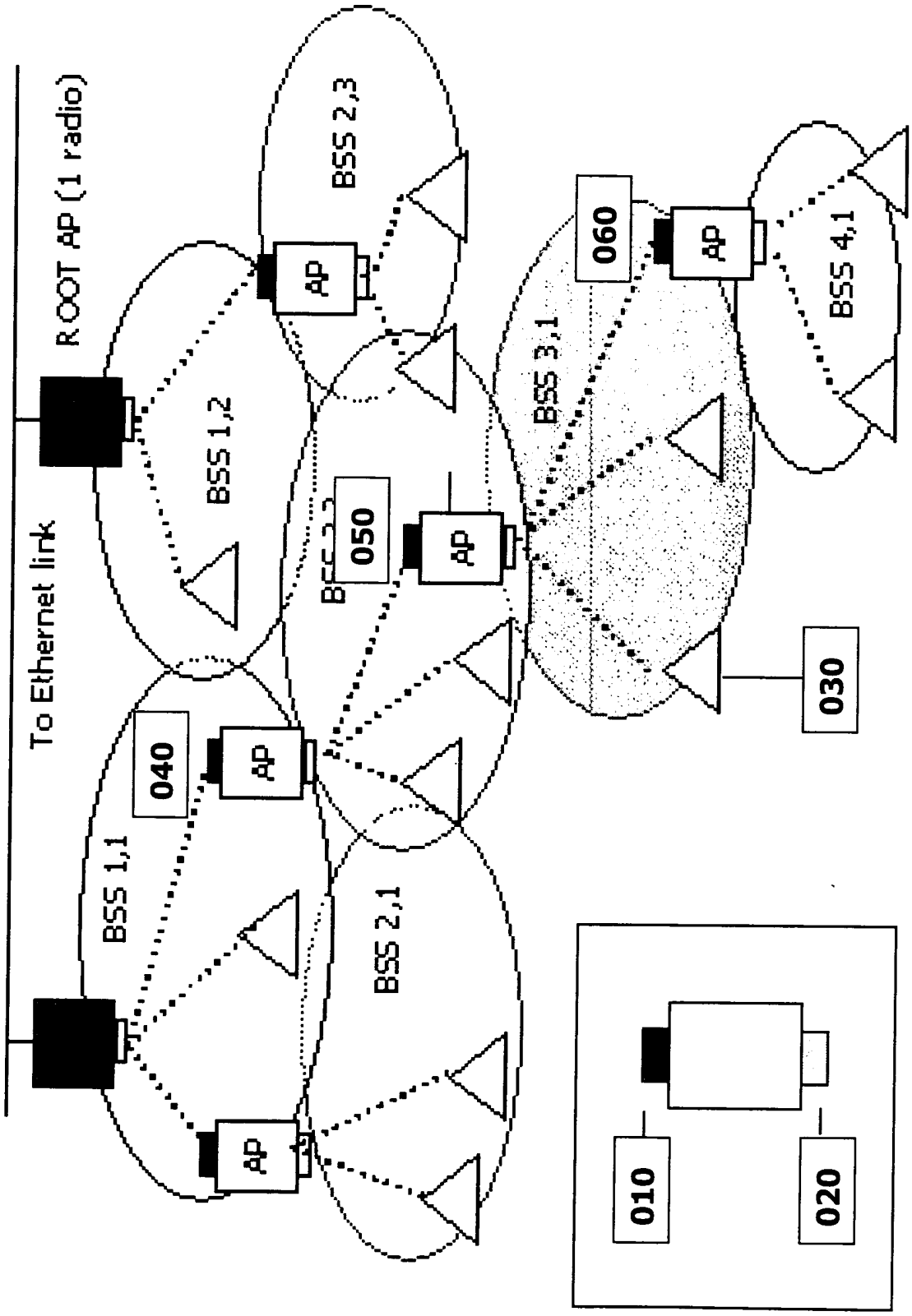

ROOT AP (1 radio)
To Ethernet link
BSS 1,2
BSS 2,3
BSS 3,1
BSS 4,1
BSS 1,1
BSS 2,1
AP
AP
AP
AP
AP
040
050
060
030
010
020

FIGURE 4

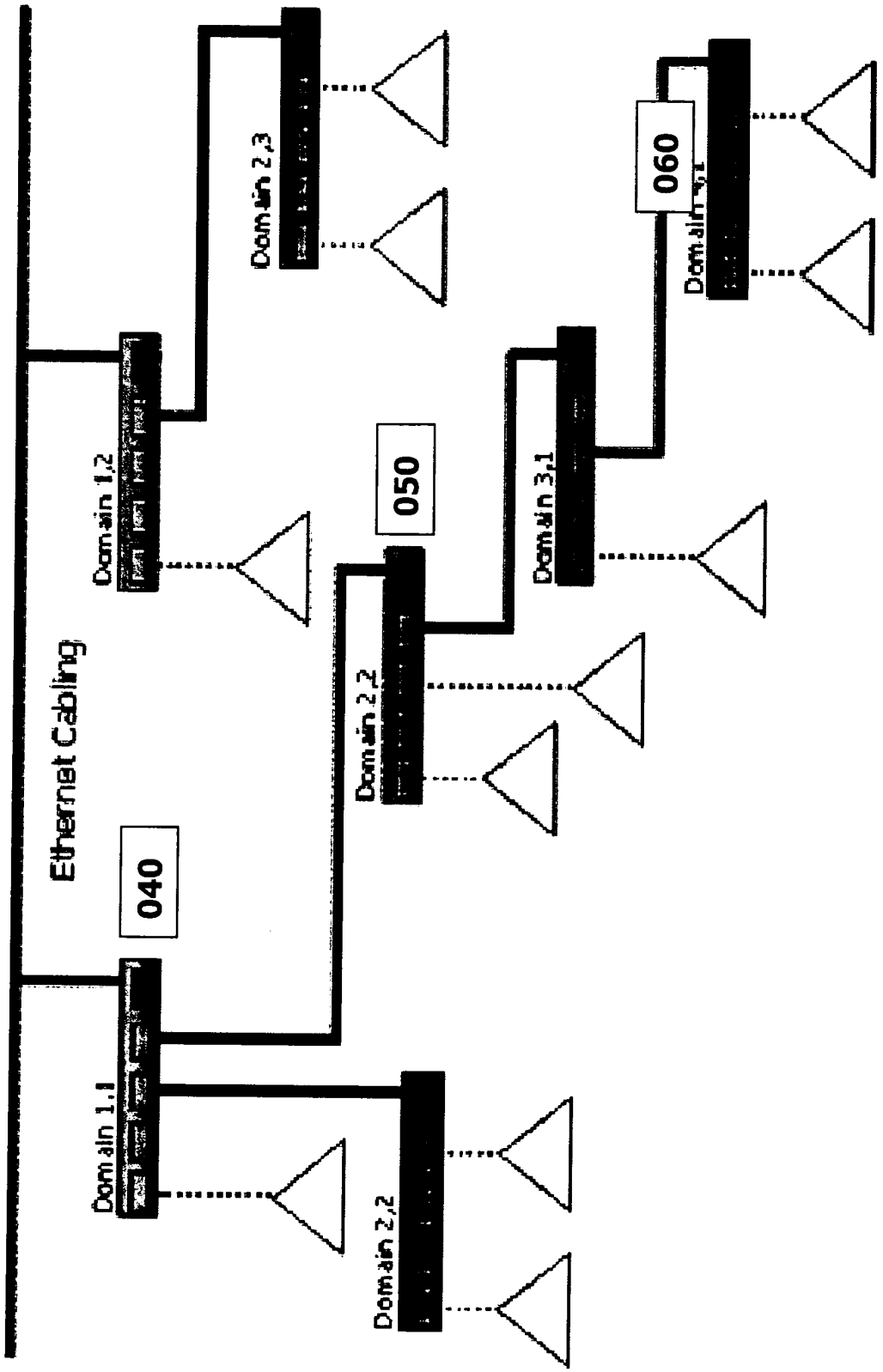

Ethernet Cabling
040
050
060
Domain 1,1
Domain 1,2
Domain 2,2
Domain 2,3
Domain 3,1
Domain 2,2

FIGURE 5

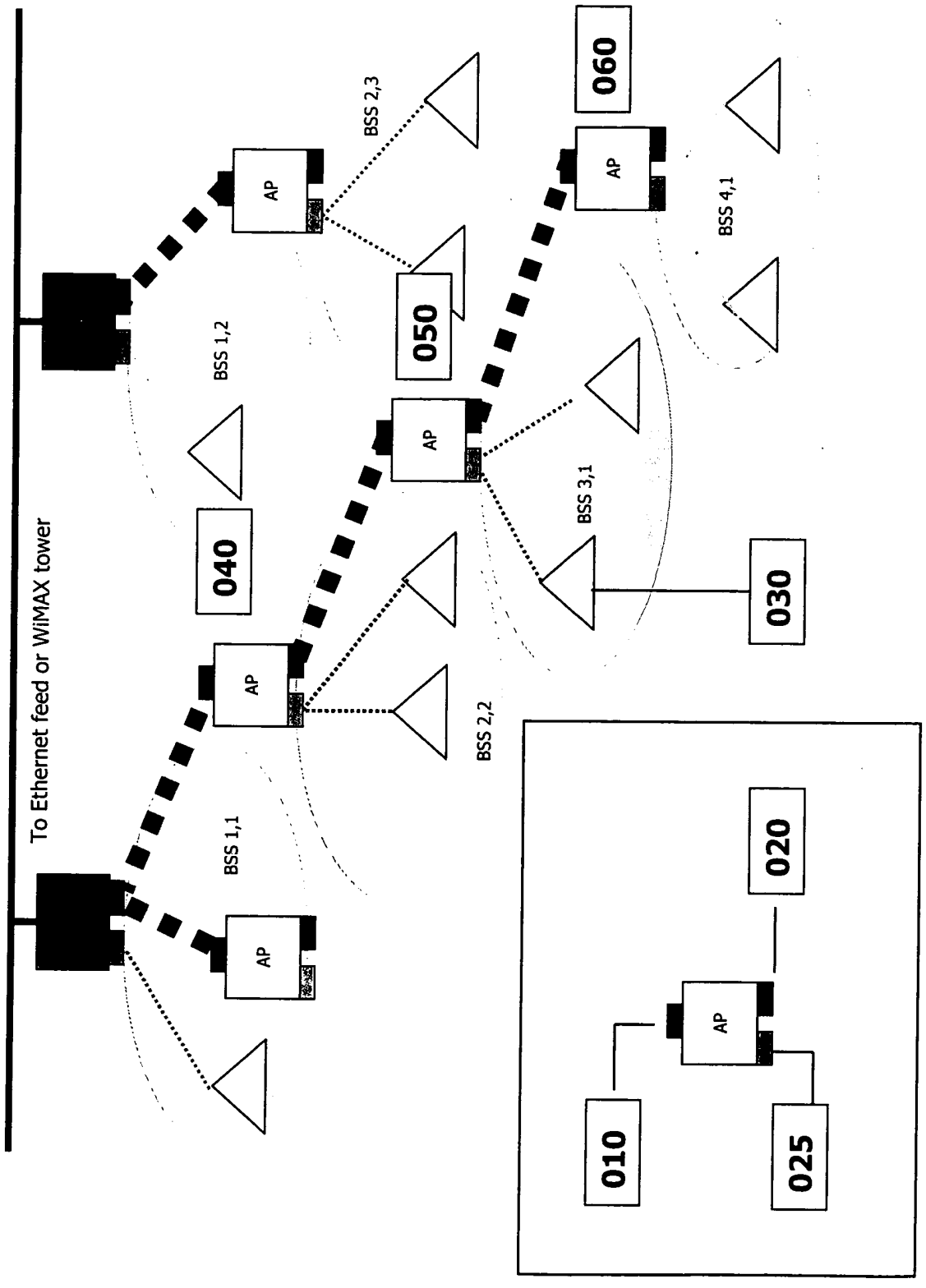

To Ethernet feed or WiMAX tower
AP
AP
AP
AP
AP
AP
BSS 1,1
BSS 1,2
BSS 2,2
BSS 2,3
BSS 3,1
BSS 4,1
010
020
025
030
040
050
060

FIGURE 6

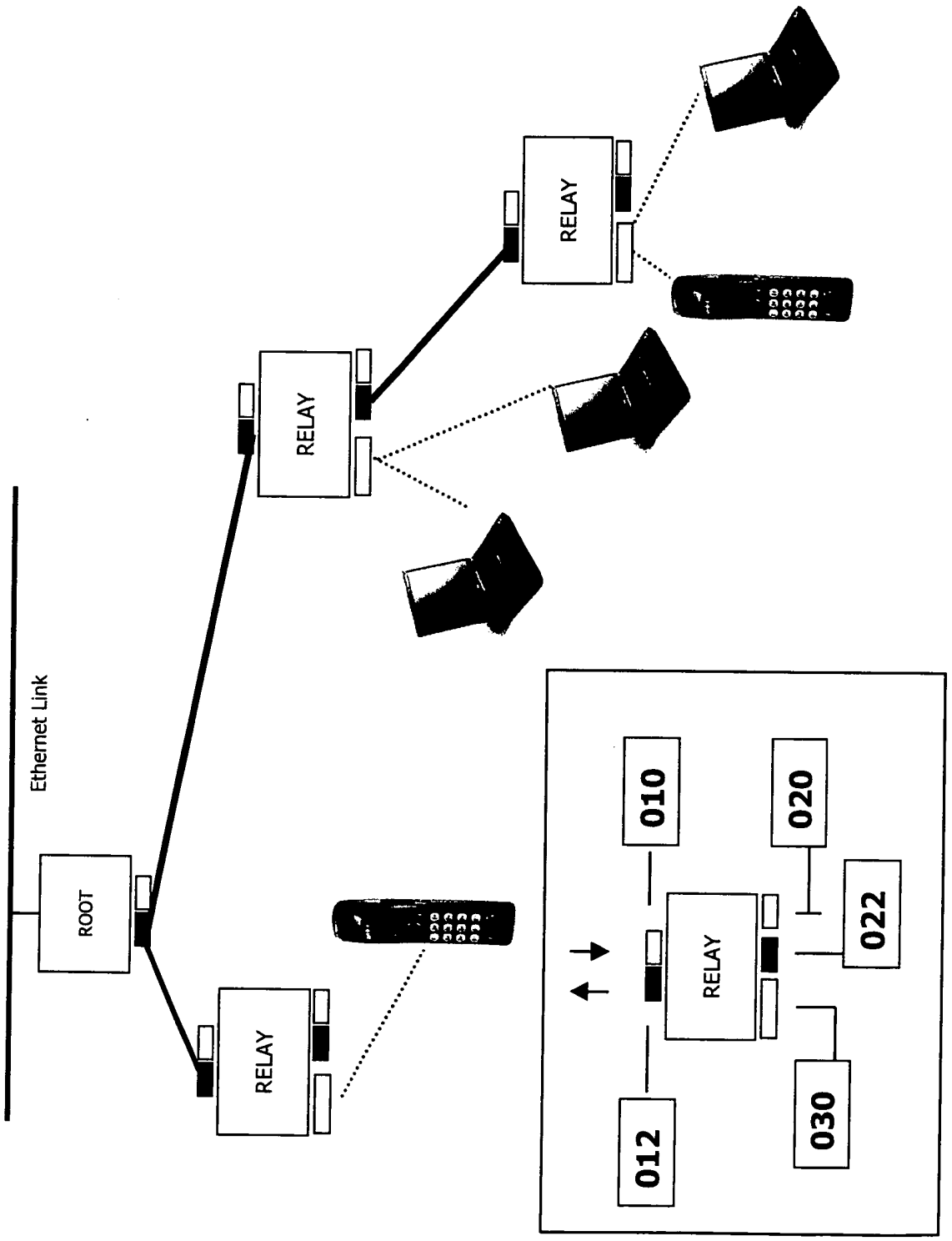


FIGURE 7

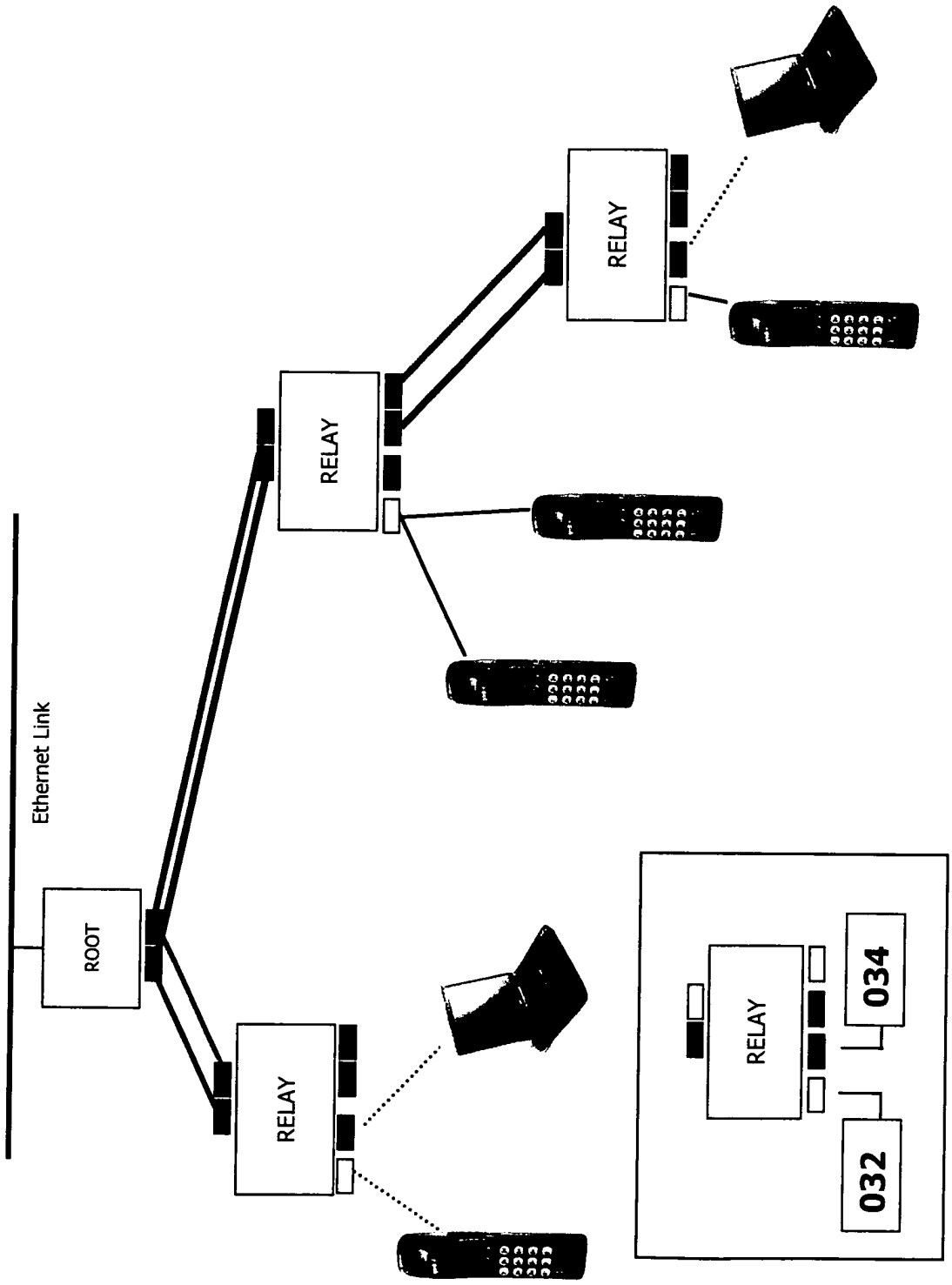


FIGURE 8

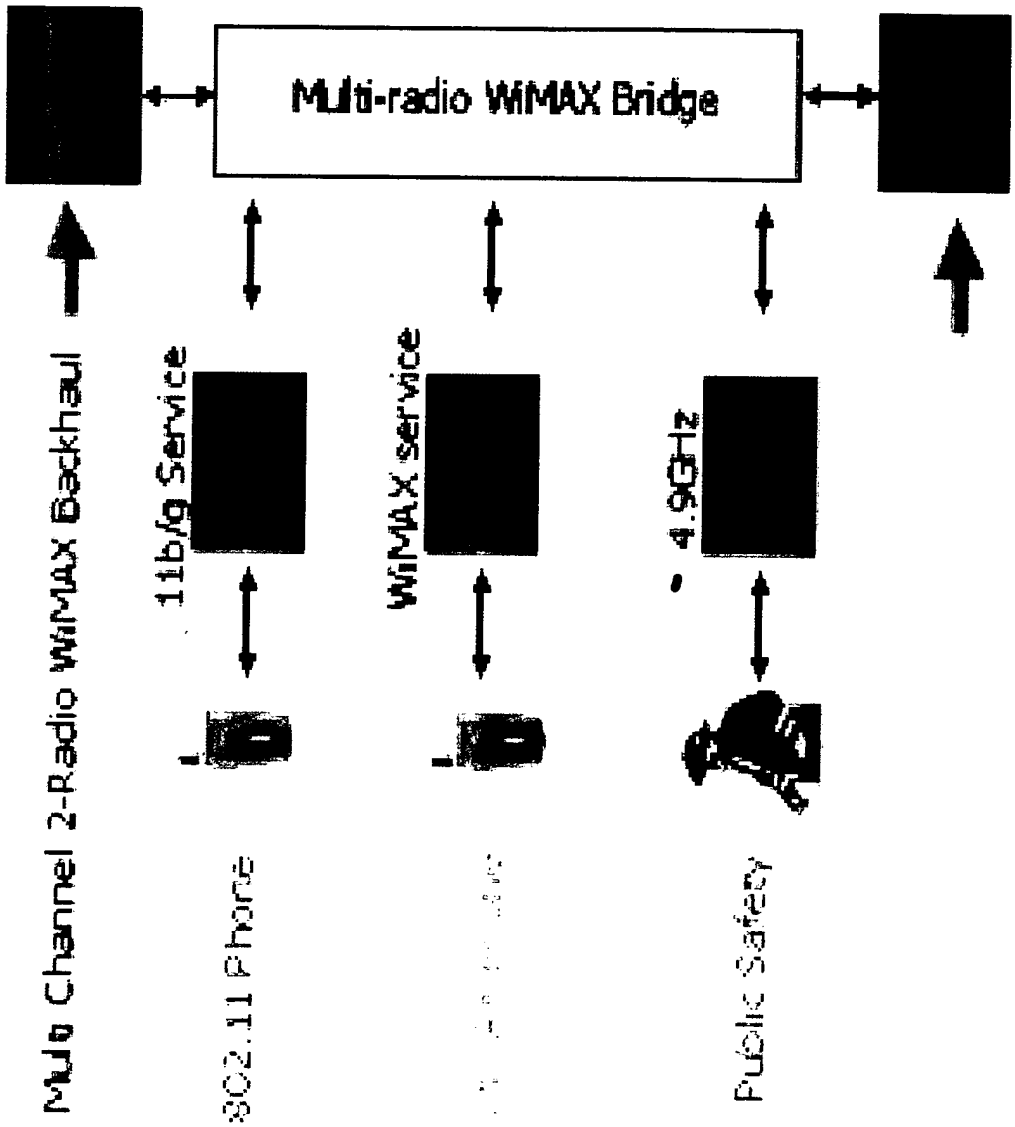

Multi-radio WiMAX Bridge
Multi Channel 2-Radio WiMAX Backhaul
11b/g Service
WiMAX service
4.9GHz
802.11 Phone
Public Safety

FIGURE 9

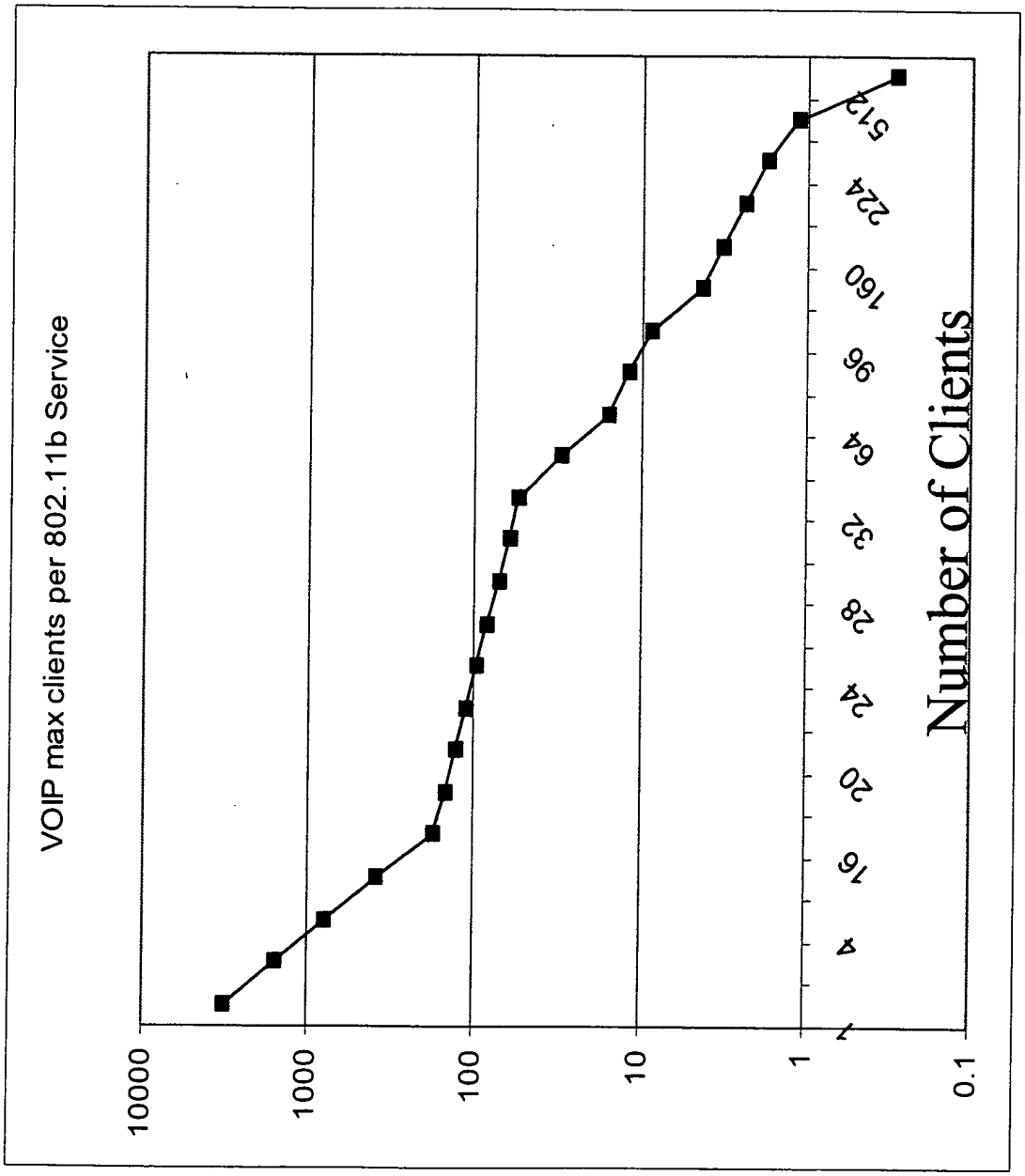

VOIP max clients per 802.11b Service
10000
1000
100
10
1
0.1
Number of Clients
1
4
16
20
24
28
32
64
96
160
224
512

FIGURE 10

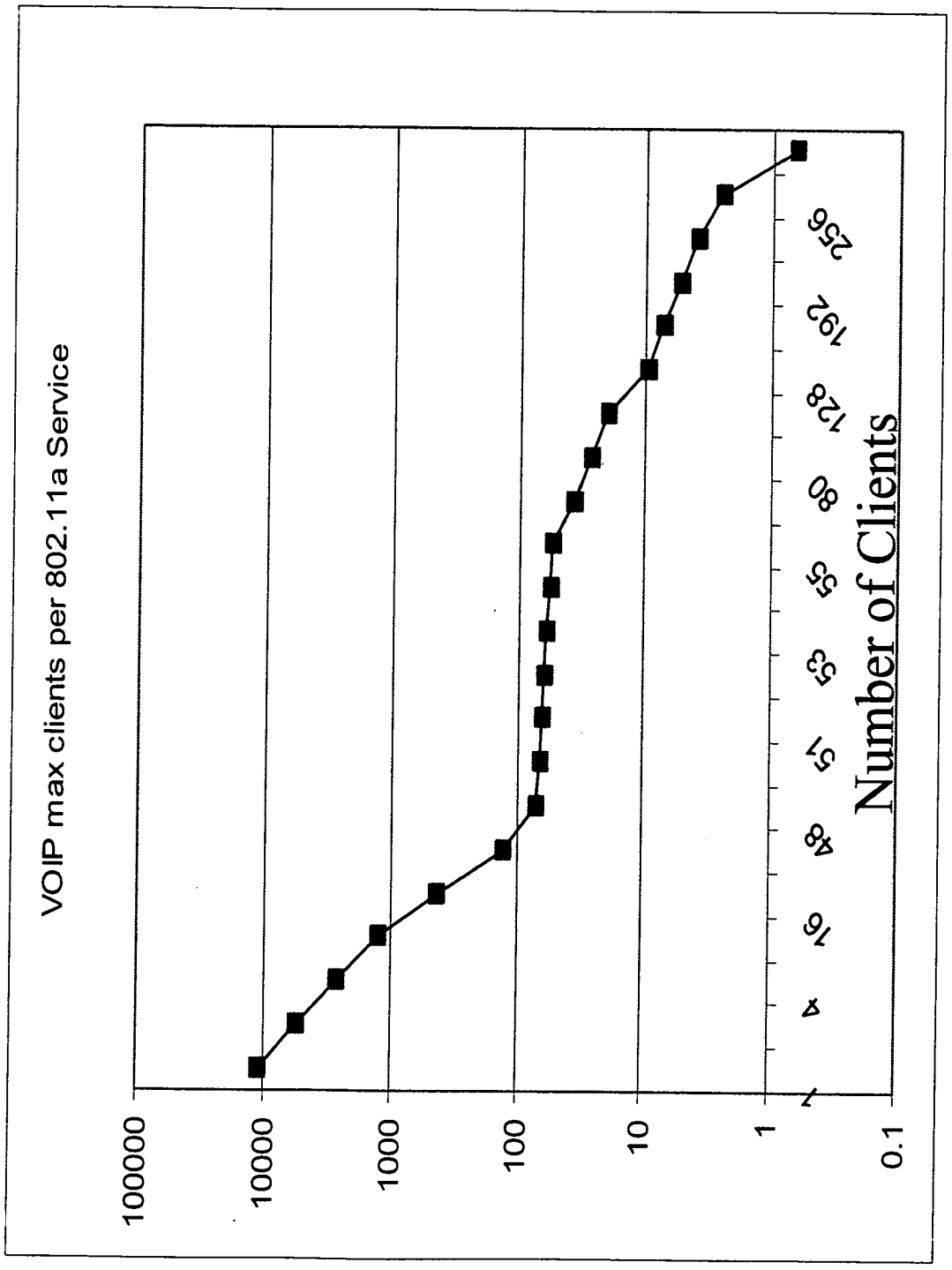

VOIP max clients per 802.11a Service
100000
10000
1000
100
10
1
0.1
1
4
16
48
57
53
55
80
128
192
256
Number of Clients

FIGURE 11

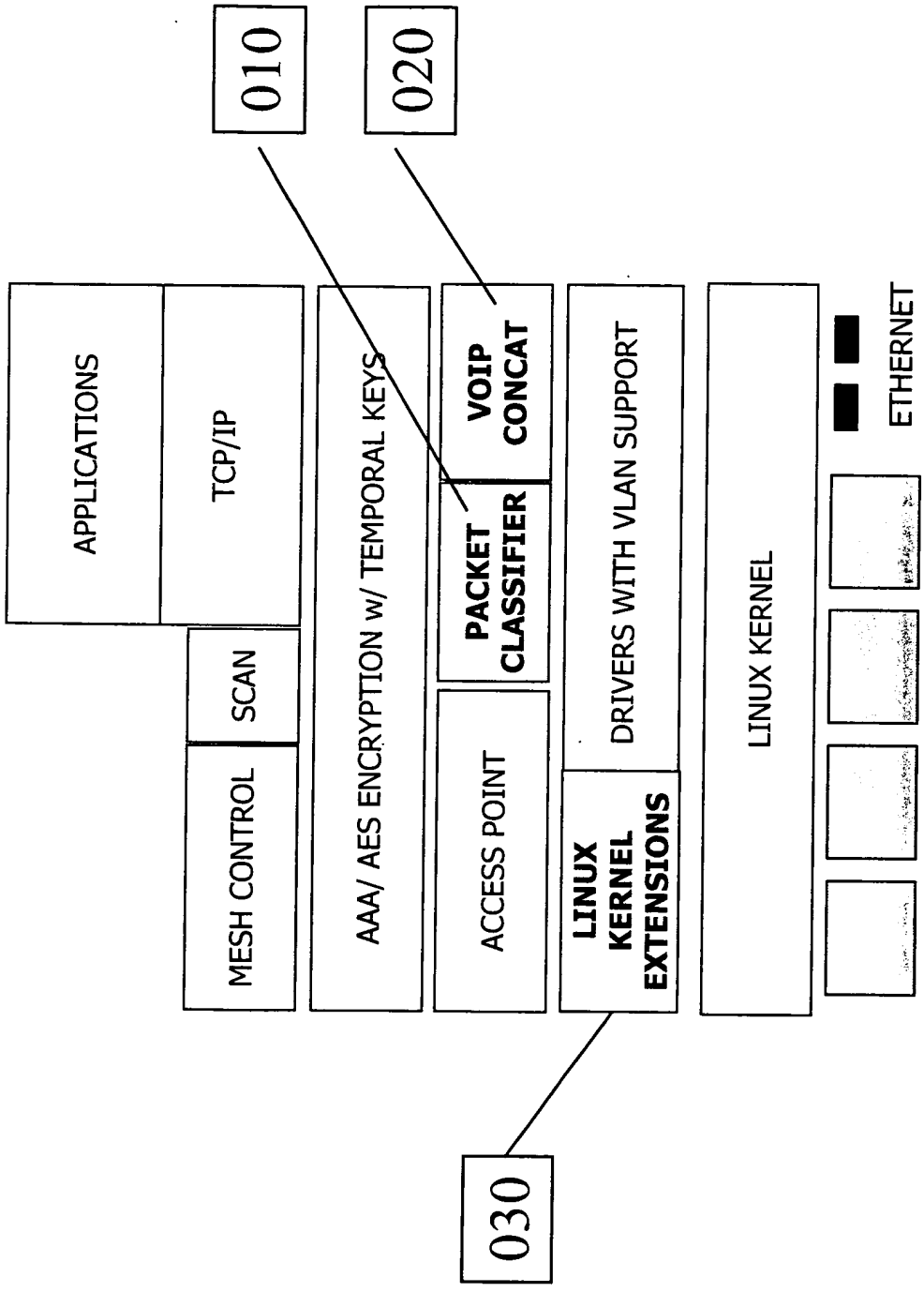

010
020
030
APPLICATIONS
TCP/IP
SCAN
MESH CONTROL
AAA/ AES ENCRYPTION w/ TEMPORAL KEYS
PACKET CLASSIFIER
VOIP CONCAT
ACCESS POINT
LINUX KERNEL EXTENSIONS
DRIVERS WITH VLAN SUPPORT
LINUX KERNEL
ETHERNET
802.11 RADIOS

FIGURE 12

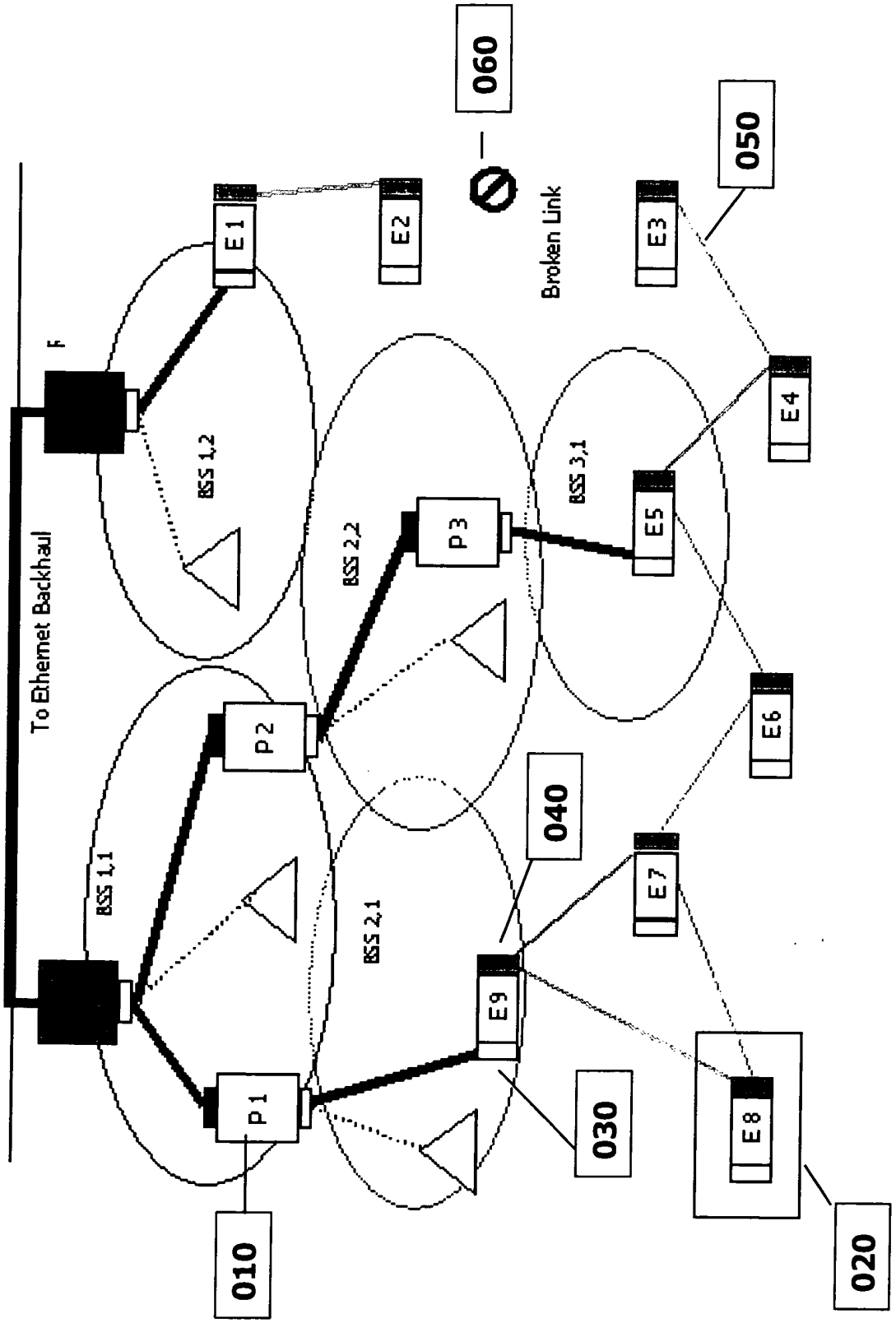

060
Broken Link
050
E1
E2
E3
E4
E5
E6
E7
E8
E9
P1
P2
P3
F
To Ethernet Backhaul
BSS 1,1
BSS 1,2
BSS 2,1
BSS 2,2
BSS 3,1
040
030
010
020

FIGURE 13

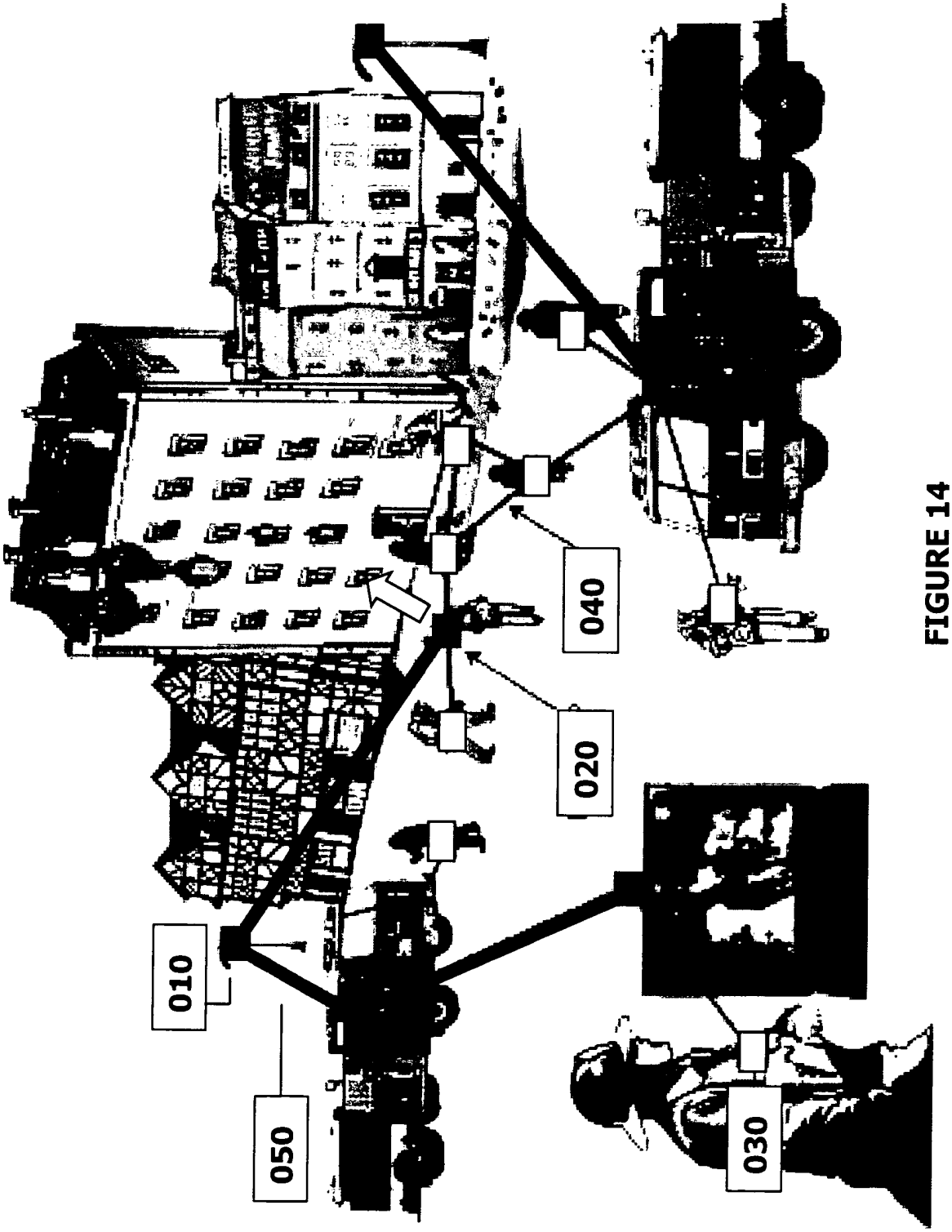


FIGURE 14

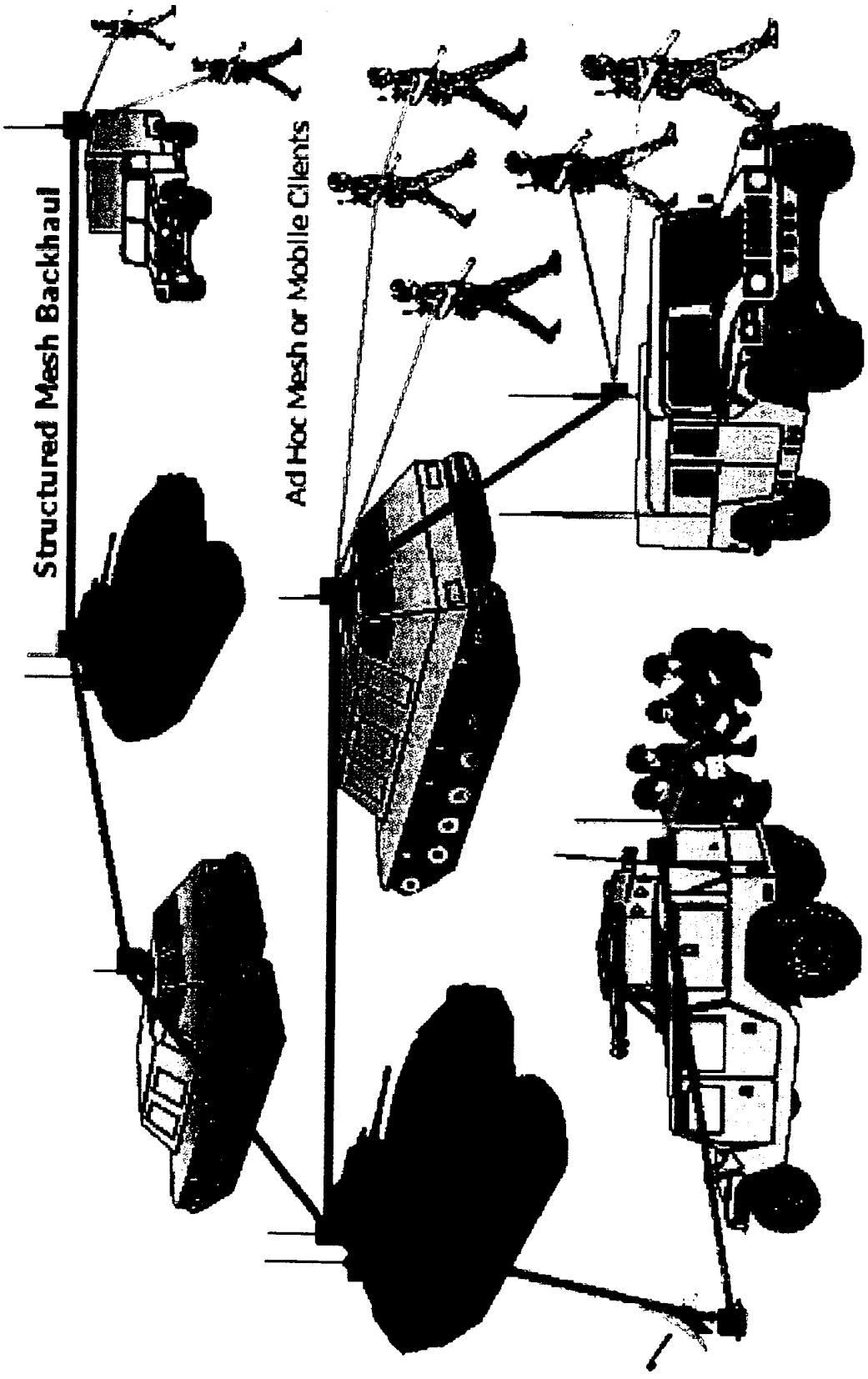


FIGURE 15

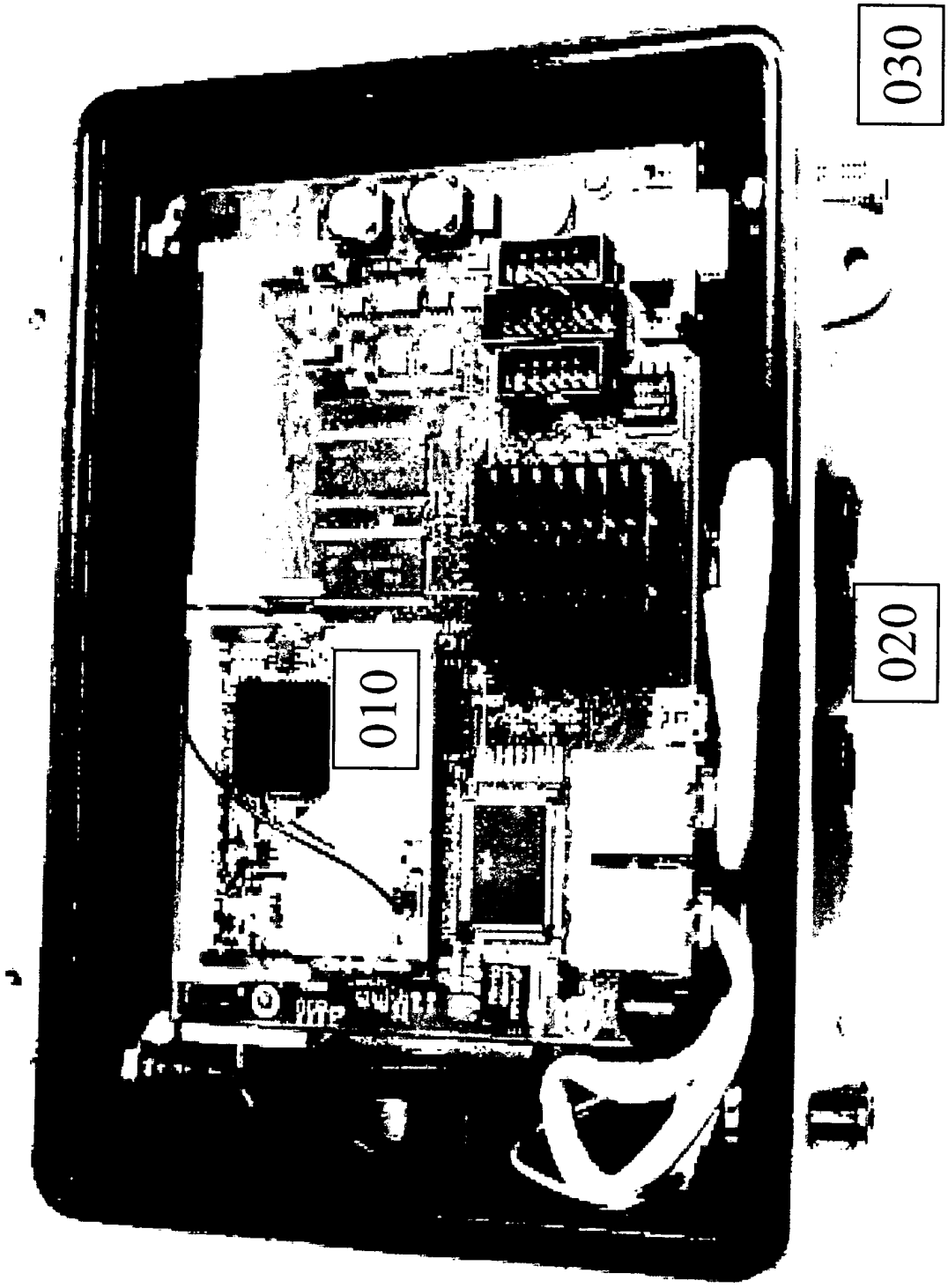


FIGURE 16

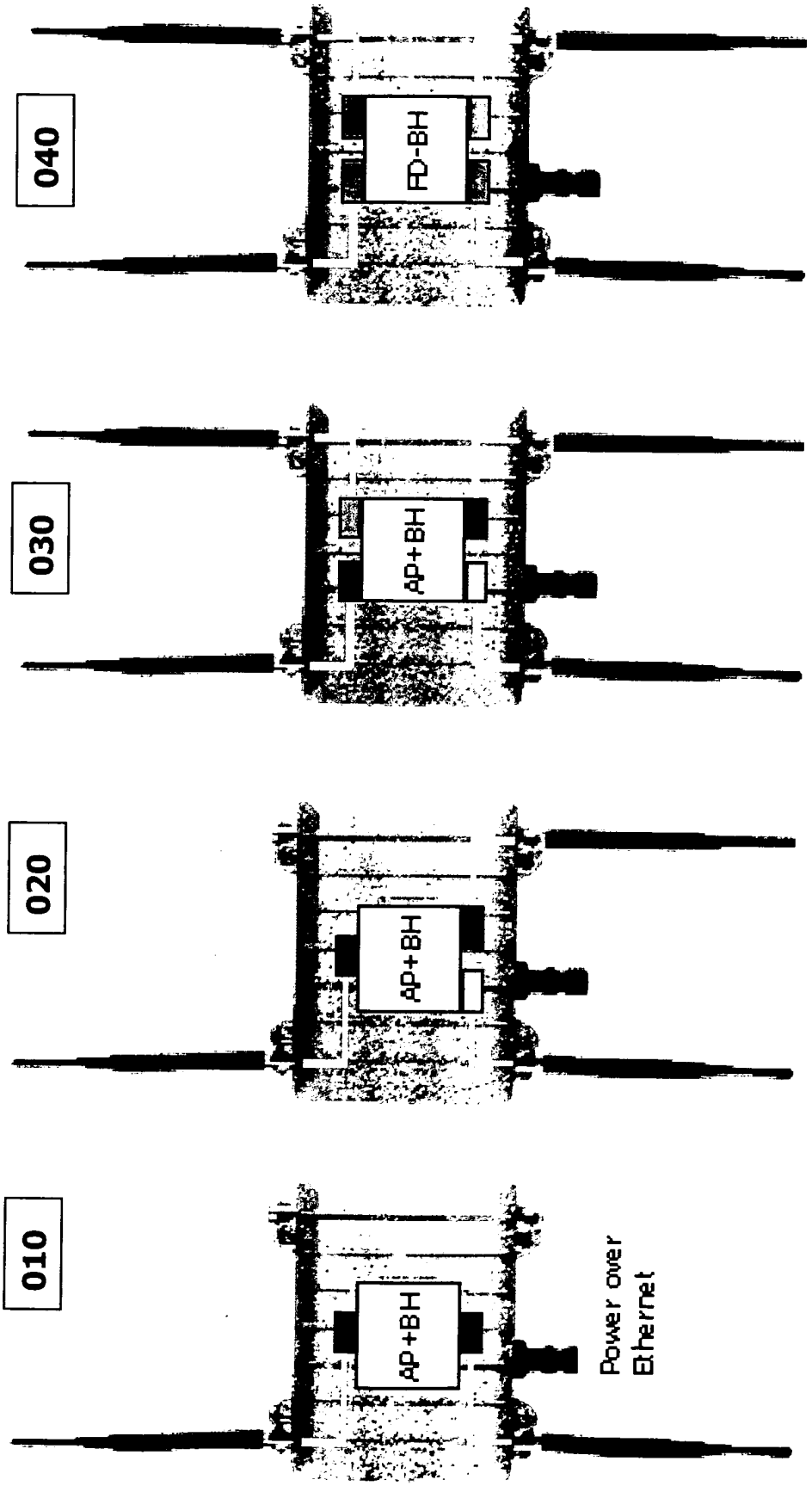


FIGURE 17

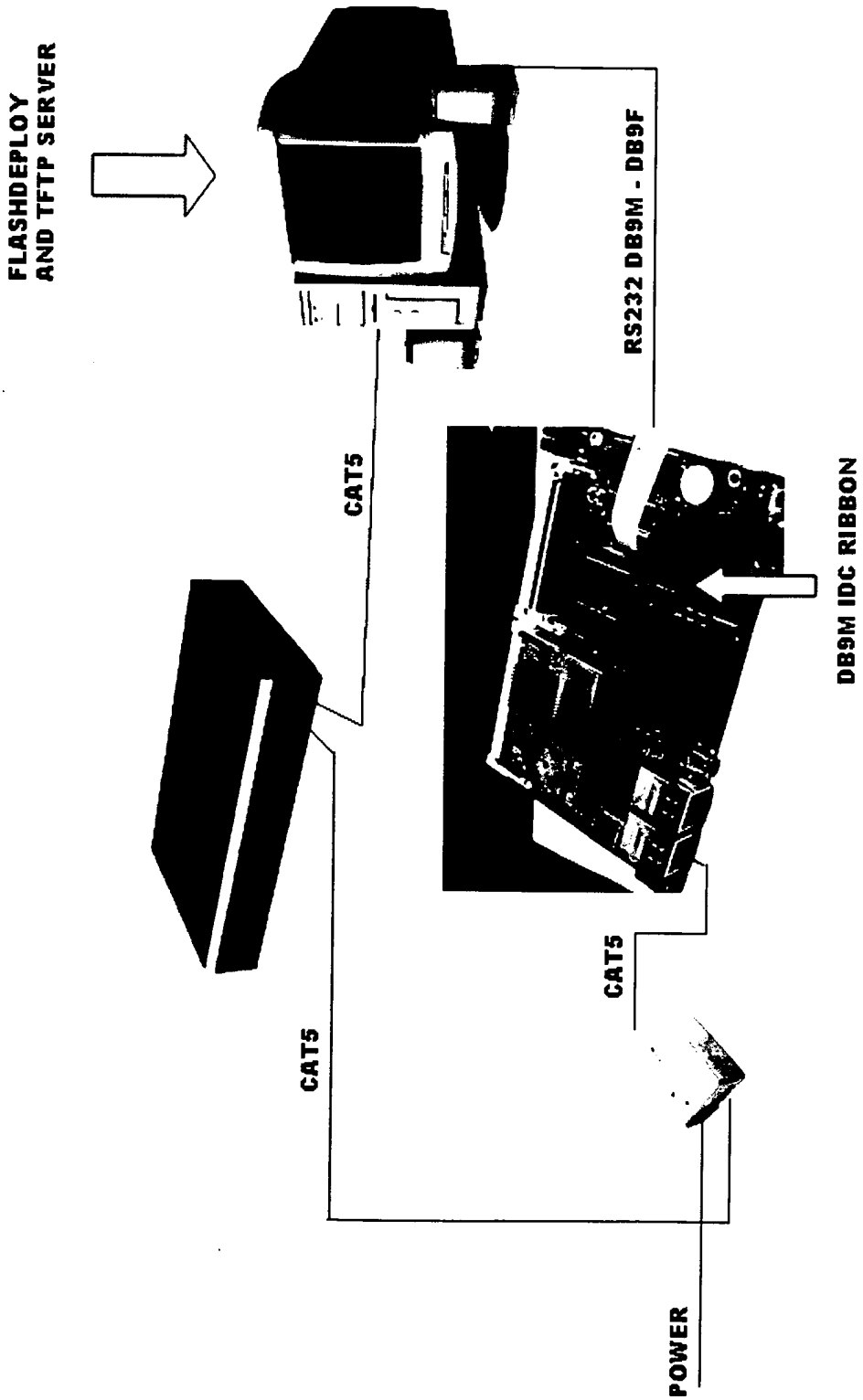

FLASHDEPLOY
AND TFTP SERVER
RS232 DB9M - DB9F
CAT5
DB9M IDC RIBBON
WITH DB9F-DB9F
GENDER
CHANGER TO
COM2
CAT5
CAT5
POWER

FIGURE 18

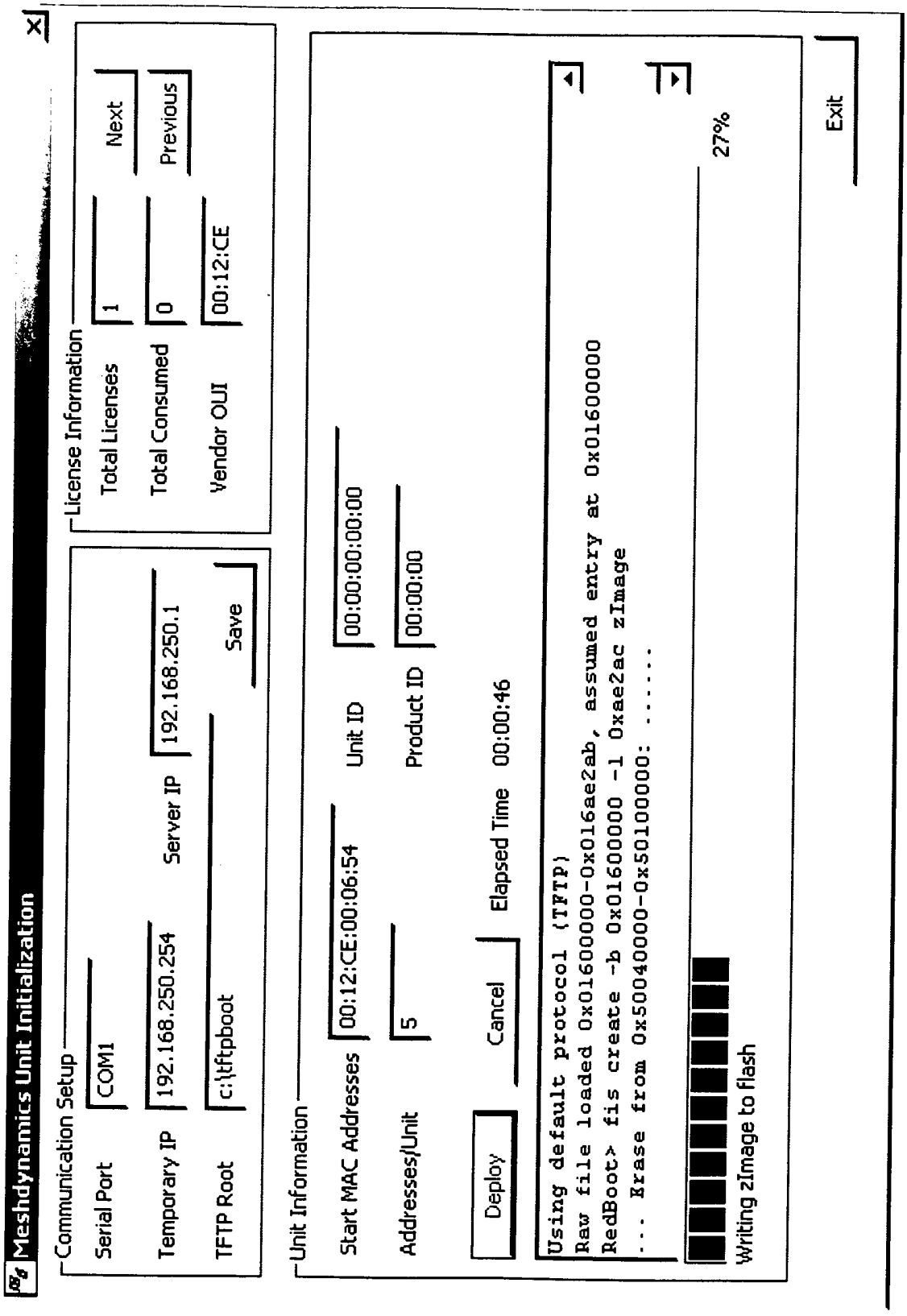

Meshdynamics Unit Initialization
Communication Setup
Serial Port
COM1
Temporary IP
192.168.250.254
Server IP
192.168.250.1
TFTP Root
c:\tftpboot
Save
License Information
Total Licenses
1
Next
Total Consumed
0
Previous
Vendor OUI
00:12:CE
Unit Information
Start MAC Addresses
00:12:CE:00:06:54
Unit ID
00:00:00:00:00:00
Addresses/Unit
5
Product ID
00:00:00
Deploy
Cancel
Elapsed Time 00:00:46
Using default protocol (TFTP)
Raw file loaded 0x01600000-0x016ae2ab, assumed entry at 0x01600000
RedBoot> fis create -b 0x01600000 -l 0xae2ac zImage
... Erase from 0x50040000-0x50100000: ......
27%
Writing zImage to flash
Exit

FIGURE 19

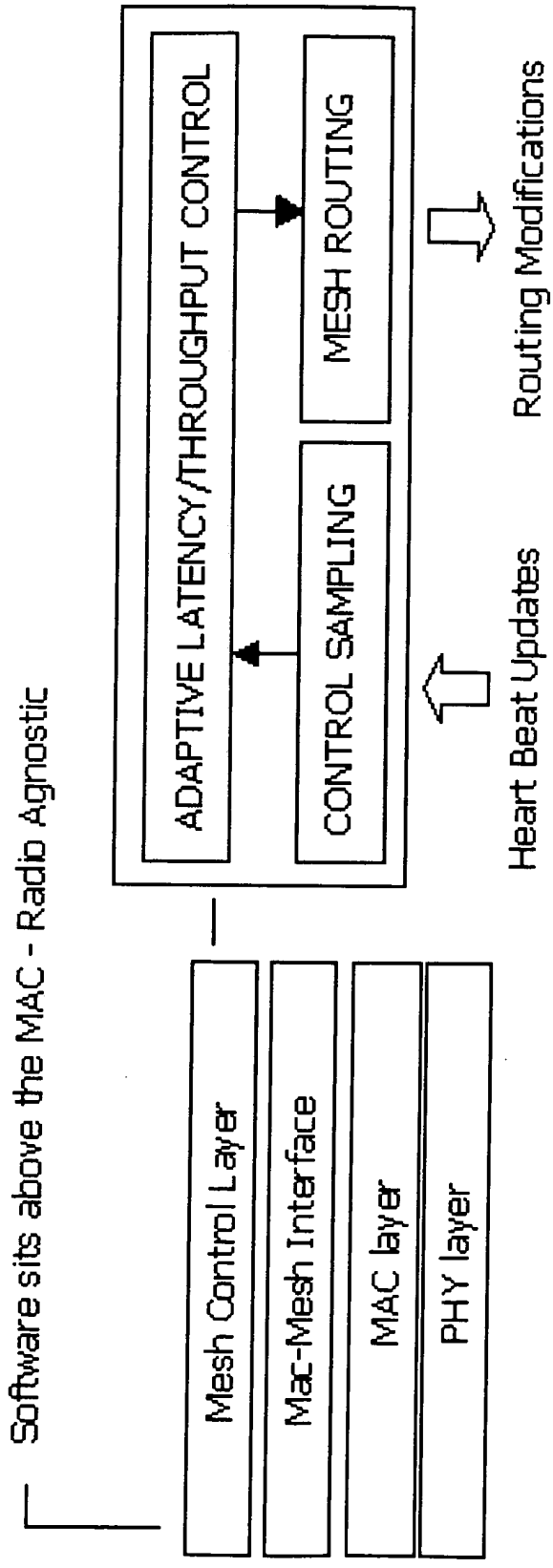

Software sits above the MAC - Radio Agnostic
Mesh Control Layer
Mac-Mesh Interface
MAC layer
PHY layer
ADAPTIVE LATENCY/THROUGHPUT CONTROL
MESH ROUTING
CONTROL SAMPLING
Routing Modifications
Heart Beat Updates

FIGURE 20

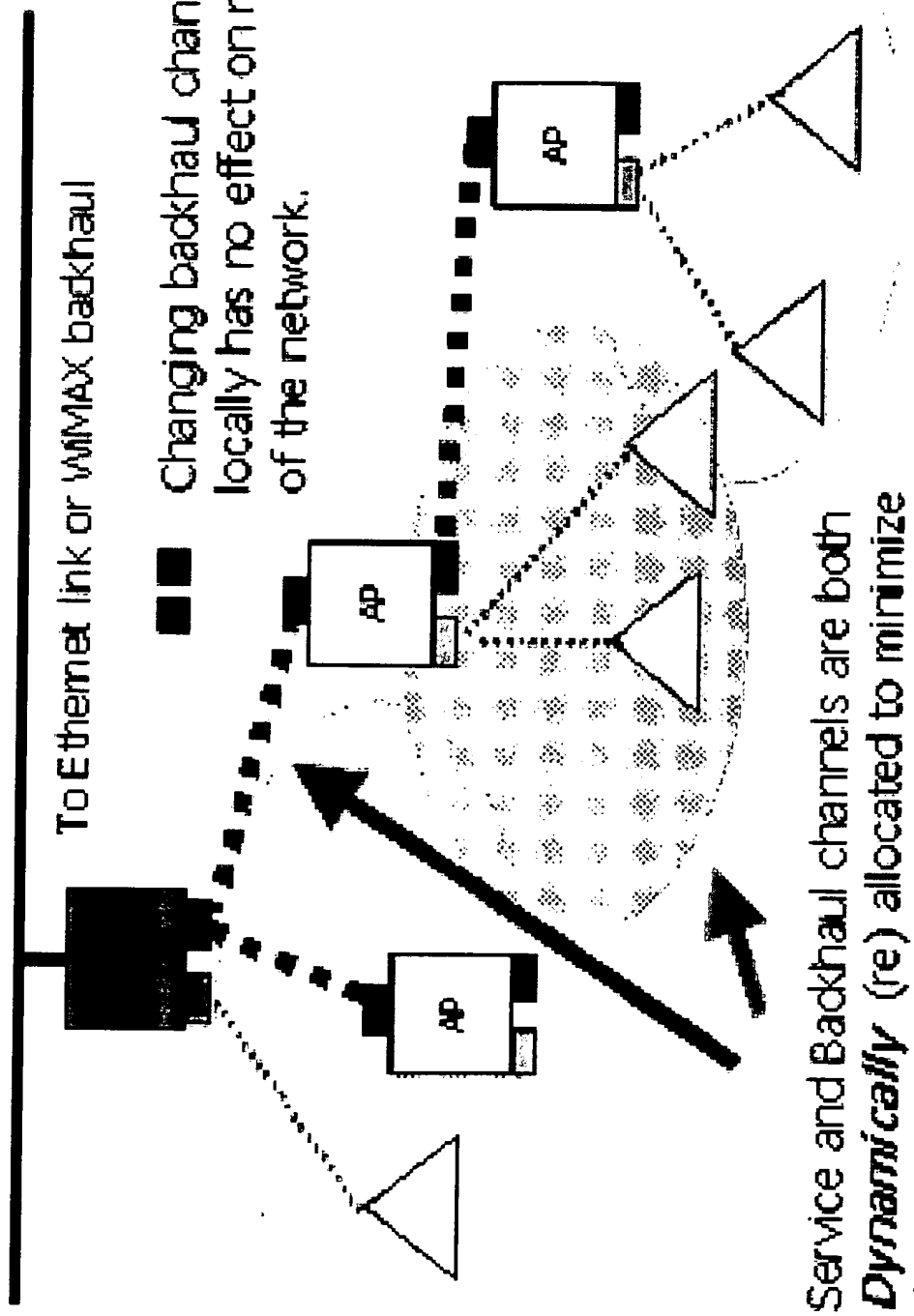

To Ethernet link or WiMAX backhaul
Changing backhaul channels locally has no effect on rest of the network.
AP
AP
AP
Service and Backhaul channels are both *Dynamically* (re) allocated to minimize channel interference effects.

FIGURE 21

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☒ Declaration Submitted With Initial Filing **OR** ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	
First Named Inventor	Francis da Costa
COMPLETE IF KNOWN	
Application Number	
Filing Date	3-17-05
Art Unit	
Examiner Name	

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MULTIPLE RADIO MISSION CRITICAL WIRELESS MESH NETWORKS

(Title of the Invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) ☐ as United States Application Number or PCT International Application Number ☐ and was amended on (MM/DD/YYYY) ☐ (if applicable).

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 (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), 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, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Direct all correspondence to: ☐ The address associated with Customer Number: _____ OR ☒ Correspondence address below

Name: FRANCIS da COSTA c/o MESH DYNAMICS

Address: 2953 BUNKER HILL LA, SUITE 400

City: SANTA CLARA | State: CA | ZIP: 95054

Country: USA | Telephone: 408-373-7700 | Fax: 408-516-8987

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 SOLE OR FIRST INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): FRANCIS | Family Name or Surname: da COSTA

Inventor's Signature: X [signature] | Date: 3-17-05

Residence: City: SAN JOSE | State: CA | Country: USA | Citizenship: USA

Mailing Address: c/o MESH DYNAMICS
2953 BUNKER HILL LA, SUITE 400

City: SANTA CLARA | State: CA | Zip: 95054 | Country: USA

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): SRIRAM | Family Name or Surname: DYANANDAN

Inventor's Signature: _____ | Date: _____

Residence: City: SAN JOSE | State: CA | Country: USA | Citizenship: INDIA

Mailing Address: c/o MESH DYNAMICS
2953 BUNKER HILL LA, SUITE 400

City: SANTA CLARA | State: CA | Zip: 95054 | Country: USA

☐ Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.

PATENT APPLICATION SERIAL NO. _____

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FEE RECORD SHEET

03/23/2005 DTESSEM1 00000072 11084330

01 FC:2011	150.00	OP
02 FC:2111	250.00	OP
03 FC:2311	100.00	OP
04 FC:2201	400.00	OP

PTO-1556
(5/87)

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

1, 4, 5, 6, 7, 8, 9

PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 8, 2004

11084330

CLAIMS AS FILED - PART I

	(Column 1)		(Column 2)
TOTAL CLAIMS	9		
FOR	NUMBER FILED		NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	9	minus 20=	* 0
INDEPENDENT CLAIMS	2	minus 3 =	* 4
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=	400		OR	X200=	
+180=			OR	+360=	
TOTAL	550		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			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."
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The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc..
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11084330_CA

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

☐ CD(s) containing:
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Doc Code: Computer Artifact Type Code: P

pages of specification and/or sequence listing and/or table ☐
Doc Code: Artifact Artifact Type Code: S

content unspecified or combined ☐
Doc Code: Artifact Artifact Type Code: U

☐ 21 docs Stapled Set(s) Color Documents or B/W Photographs
Doc Code: Artifact Artifact Type Code: C

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Doc Code: Artifact Artifact Type Code: F

☐ Video tape(s)
Doc Code: Artifact Artifact Type Code: V

☐ Model(s)
Doc Code: Artifact Artifact Type Code: M

☐ Bound Document(s)
Doc Code: Artifact Artifact Type Code: B

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Doc Code: Artifact Artifact Type Code X

☐ Other, description: _____
Doc Code: Artifact Artifact Type Code: Z

March 8, 2004

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Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

11,084330 - ZA.

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Doc Code: Computer Artifact Type Code: P

pages of specification and/or sequence listing and/or table ☐
Doc Code: Artifact Artifact Type Code: S

content unspecified or combined ☐
Doc Code: Artifact Artifact Type Code: U

☐ Stapled Set(s) Color Documents or B/W Photographs
Doc Code: Artifact Artifact Type Code: C

☐ Microfilm(s)
Doc Code: Artifact Artifact Type Code: F

☐ Video tape(s)
Doc Code: Artifact Artifact Type Code: V

☐ Model(s)
Doc Code: Artifact Artifact Type Code: M

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/084,330	03/17/2005	Francis daCosta	

CONFIRMATION NO. 3657

FRANCIS daCOSTA
c/o MESHDYNAMICS
SUITE 400
2953 BUNKER HILL LANE
SANTA CLARA, CA 95054

FORMALITIES LETTER

OC000000015849602

Date Mailed: 04/25/2005

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 signature of the following inventor(s) is missing from the oath or declaration:
  Sriram Dyanandan
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(f) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

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

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be accompanied by a marked up copy as set forth in 37 CFR 1.125(c) and a statement that the specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
  - The line spacing on the specification, claims, or abstract is not 1½ or double spaced (see 37 CFR 1.52(b)).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$65** for a Small Entity

- **$65** Late oath or declaration Surcharge.

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.

Donna Williams

Office of Initial Patent Examination (703) 308-1202

PART 3 - OFFICE COPY

OIPE JG37
JUN 25 2005
PATENT & TRADEMARK OFFICE

In the United States Patent and Trademark Office

Appn. Number:	11/084,330
Appn Filed:	March 17, 2005
Applicant:	Francis daCosta
Title:	Multiple-radio mission critical wireless mesh networks
Examiner/GAU:	na / 2661

June 25, 2005

Response to Notice to File Missing Parts

Mail Stop Missing Parts
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

As requested in the attached "Notice to File Missing Parts of Nonprovisional Application", applicant has herewith enclosed an original signed declaration signature page. Application has also submitted a substitute specification with the proper line spacing as also required by the attached notice. Please note that this specification is identical to the original specification as filed on 3-17-05, except for the altered line spacing. A check for $190 is attached to cover the fees for the Late Declaration as well as an Application Size Fee since the new line spacing caused the application to exceed 100 pages.

Respectfully submitted,

Francis daCosta

EV841795934US

c/o MeshDynamics, 2953 Bunker Hill La, Suite 400, Santa Clara, CA 95054
408-373-7700

Mailing: This document was deposited with Express Mail along with the appropriate fees for extension of time and IDS on June 25, 2005.

Fee computation:	Late oath or declaration surcharge	$ 65 (small entity)
	Application size fee	$125 (small entity)
	Total Due	$190

6-27-05

IFW

OIPE JC37 JUN 25 2005 PATENT & TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/084,330	03/17/2005	Francis daCosta	

CONFIRMATION NO. 3657

FRANCIS daCOSTA
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FORMALITIES LETTER

OC000000015849602

Date Mailed: 04/25/2005

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

06/28/2005 YPOLITE1 00000074 11084330

01 FC:2051 65.00 OP
02 FC:2081 125.00 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 signature of the following inventor(s) is missing from the oath or declaration:
  Sriram Dyanandan
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(f) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

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

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be accompanied by a marked up copy as set forth in 37 CFR 1.125(c) and a statement that the specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
  - The line spacing on the specification, claims, or abstract is not 1½ or double spaced (see 37 CFR 1.52(b)).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$65** for a Small Entity

- **$65** Late oath or declaration Surcharge.

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

Norma Williams

Office of Initial Patent Examination (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

OIPE JC37 JUN 25 2005 PATENT & TRADEMARK OFFICE

PTO/SB/01 (09-04)
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DECLARATION — Utility or Design Patent Application

Direct all correspondence to: ☐ The address associated with Customer Number: _____ OR ☒ Correspondence address below

Name: FRANCIS da COSTA c/o MESH DYNAMICS

Address: 2953 BUNKER HILL LA, SUITE 400

City: SANTA CLARA | State: CA | ZIP: 95054

Country: USA | Telephone: 408-373-7700 | Fax: 408-516-8987

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 SOLE OR FIRST INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): FRANCIS | Family Name or Surname: da COSTA

Inventor's Signature: X [signature] | Date: 3-17-05

Residence: City: SAN JOSE | State: CA | Country: USA | Citizenship: USA

Mailing Address: c/o MESH DYNAMICS
2953 BUNKER HILL LA, SUITE 400

City: SANTA CLARA | State: CA | Zip: 95054 | Country: USA

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): SRIRAM | Family Name or Surname: DYANANDAN

Inventor's Signature: [signature] | Date:

Residence: City: SAN JOSE | State: CA | Country: USA | Citizenship: INDIA

Mailing Address: c/o MESH DYNAMICS
2953 BUNKER HILL LA, SUITE 400

City: SANTA CLARA | State: CA | Zip: 95054 | Country: USA

☐ Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.



MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS

Inventors: Francis daCosta and Sriram Dayanandan

CROSS-REFERENCE

This application is a continuation-in-part of application of U.S. Application No. 10/434,948, filed May 8, 2003, which is herein incorporated by reference.

This application also incorporates by reference U.S. Provisional Application No. 60/554,246, filed March 17, 2004.

Also incorporated by reference are Disclosure Documents numbers 548927, 548966, and 548734 which were all filed on March 16, 2004 under the USPTO Disclosure Document program. Separate letters have been attached to this application requesting that the referenced Disclosure Documents be retained for future reference.

FIELD OF THE INVENTION

The present application builds on the disclosures or the referenced previous applications. In the referenced patent applications, a method to change the network topology by employing multiple radios is described in U.S. Application No. 10/434,948, filed May 8, 2003 in Figures 1,2,3,4,5,6,7,8.

Figure 18 in that same application depicts a two-radio mesh network, with one radio for the backhaul and another servicing clients and providing the backhaul to other nodes of the network. Extensions of the logical two-radio approach include 3 and 4 radios.

The logical two-radio approach depicted in Figure 18 in that application shows two types of radio interfaces – one to the backhaul above the node and the other servicing the backhaul

below it. The invention described in this document relates to how the two-radio approach is extensible to other radio configurations required to support mission critical mesh networks.

BACKGROUND OF THE INVENTION

There is increasing interest in employing one network to support video, voice and data traffic. Currently, the video, voice and data networks are distinct since each addresses differing latency and bandwidth requirements. The challenge lies in providing - within the same network - the ability to address potentially conflicting latency and throughput needs of diverse applications.

For example, voice needs to be transmitted with low delay (latency). Occasionally lost voice packets, while undesirable, is not fatal for voice transmissions. Conversely, data transmissions mandate delivery of all packets and while low latency is desirable it is not essential. In essence transmission across the wireless network should (ideally) be driven by the needs of the application.

Building a reliable wireless network comes with other constraints specific to wireless. Some routing paths may be best for voice, others for data. In Wired LAN applications separate routing paths is more easily accomplished since each port on the LAN is connected to one client machine. Each node may be configured to provide the performance characteristics required by that application. If all computing devices were wired, each could have different Quality of Service (QoS) settings.

This level of granularity is not possible in wireless networks. Radio is a shared medium. It is prone to interference from other radio transmissions in the vicinity. A direct repercussion of radio interference is that a separate Access Point (AP) for each client machine is not practical. An AP can interfere with other APs and there are not enough non-interfering channels to go around. Further, while each additional radio may increase bandwidth capacity, it may also cause more interference between radios – perhaps even reducing the overall capacity of the network

Controlling Network Topology. The challenge lies in enabling each Access Point node to support differing application requirements and ensuring that the aggregate demand of each Access Point be addressed without an appreciable loss in performance for individual clients. Additionally, if the network configuration needs to change then changes to network topology must occur in a stable and scalable manner.

Aggregate demand may be expressed as a range of acceptable latency and throughput values. Note that latency and throughput are often conflicting objectives. Low latency (least number of hops) may cause low throughput. High throughput may require increased latency.

In the patent application No. 10/434,948, filed May 8, 2003, a method to change the network topology by employing multiple radios is described and the changes in mesh topology is illustrated by Figures 1,2,3,4,5,6,7,8. in that application. FIG. 1 in this application briefly shows how the latency/throughput gradually changes with network topology.

FIG. 1 is made up of four individual sections, labeled 1 through 4. In each of these sections, the main area shows a number of radio devices configured in a specific mesh topology. The radio devices are part of the backhaul – each of them is therefore both an Access Point (AP) and a bridge to the backhaul, through other APs. Each node in the figure represents a 2-radio system where one interface is " down" providing connectivity to client stations and other APs connecting to the backhaul through it. The second radio provides the backhaul path "up" to the wired backbone.

The AP/bridge connected to the wired backbone is labeled, the "Root". (There is only one root in this topology, though that is not a requirement. All that is required is that the number of root be greater than or equal to one.) The other nodes must transmit their packets to the root in order to have them placed onto the wire. The solid lines between nodes and the root represent the mesh topology.

Each of the four sections also is labeled with the "Backhaul throughput" – which for the

simulation is measured as a inverse relationship to proximity. The relationship between throughput and proximity is modeled as in inverse square law based on experimental data. The curve is shown in the lower left hand corner of section 4 in figure 2. The simulation environment includes the ability to change the throughput-distance relationship for differing radios and wireless cards.

Each section is also labeled with the "backhaul number of hops", which represents the average number of hops that a packet in that network will have to make in order to reach the root. The sections should be examined beginning in the upper left, and proceeding clockwise. The important results are:

- In section 1, the network is configured in order to optimize latency, that is, in order to minimize the total number of hops that packets will need to make. All nodes transmit their packets directly to the root. However, of all the possible configurations this has the lowest total throughput, because some of this one-hop links will be of low data rate due to physical separation between the nodes.

- In section 2, a tradeoff is starting to be made between latency (hops) and throughput. As the network is directed to emphasize throughput, it begins to make changes to the topology such that a larger number of hops is used in order to make sure that each mesh connection is at a higher data rate. A single change has been made in this case, as shown by the solid red line. Data from this node must now pass through an intervening node before reaching the root.

- Section 3 shows even more of an emphasis on throughput, with an additional node now using a two hop path to the root, and the throughput rate increasing from 55 to 59.

- Section 4 shows a mesh topology with a high emphasis on throughput, less on latency. Five of the nodes are now using two hop paths to reach the route, increasing the throughput to 64, but increasing to latency as well, since the average number of hops is now 1.6

Logical 2-Radio Mesh Backhauls The network topology control system described in U.S. Application No. 10/434,948, filed May 8, 2003 is based on a 2-Radio system shown in Figure 18 in that application and included as FIG 4 in this application. There are two radios in each mesh node, for the uplink and downlink support. Radio 010 is upward facing and connects to the downlink (labeled 020) of its parent radio. Thus, a chain of connectivity is formed as shown by labels 040-050-060. In addition to providing a chain of connectivity, the downward facing radios (020) also provide connectivity to clients (such as laptops) shown as triangles. One such client is labeled 030.

There is a cloud surrounding each mesh node. This is the coverage area of the radio signal for the downward facing radio. They are colored differently to depict that each is operating on a different channel than other radios in its vicinity. Thus each radio belongs to a different Basic Service Set (BSS) or sub domain of the network. As such the system resembles a wired network switch stack. A wired network switch stack also has a similar tree structure with similar uplinks, and downlink connections. See FIG 4. Labels 040-050-060 form a functionally identical chain of connectivity. Also, each switch in a network switch stack operates on a separate sub –domain of the network.

Why Logical 2-Radio Mesh Backhauls are Needed. There are serious bandwidth degradation effects related to single radio mesh networks. The LHS diagram on FIG 2 depicts a typical 2 radio mesh network. One radio (010) provides services to clients while another radio (020) is part of an Ad Hoc Mesh – where all radios are operating on the same channel as depicted by the same color clouds (030)

In contrast FIG 2 RHS depicts a logical 2-Radio where each mesh radio (025) is part of a distinct sub domain of the network, depicted by different color clouds (035).

Returning to the LHS of FIG 2, all the backhaul radios (020) are on the same channel and thus are all part of the same network. In essence they form the wireless equivalent of a hub.

Hubs are not scalable because there is too much interference between all the members of the hub as the hub becomes larger. Exactly the same problem exists with conventional mesh networks. After 1-2 hops the co-channel interference between the mesh nodes (020) no longer allow high bandwidth transmissions.

There is another issue with single radio mesh backhauls are not scalable. There is bandwidth degradation with each hop - typically 50% per hop with single radio mesh backhauls. Refer to Figure 3. On the left hand side is a single radio backhaul. If it is part of a relay path then every packet it receives must be re-transmitted on the same radio: Label 010. This with each hop the effective throughput reduces by 50% from the previous hop. This makes bandwidth available at the end of the 3rd hop 1/8 of the available bandwidth. This is unacceptable for high performance requirements in either enterprise infrastructure networks or mission critical application requirements e.g. emergency response systems.

On the RHS FIG 3, Labeled 020, there are two radios – one to receive data and another to re-transmit. Now, the effective throughput is not compromised because there are two radio, operating on non-interfering channels. Simultaneous send and receive is now possible.

Single radio mesh backhauls do not present a scalable solution to addressing high bandwidth requirements for a mission critical mesh network.

SUMMARY OF THE INVENTION

Accordingly, there exists a need to support the performance requirements of mission critical mesh networks in multihop situations. Fig. 4 shows the infrastructure mesh in a topology with a 2-radio unit in a multiple hop wireless network. The rectangular icons in this figure represent the APs, which have formed a mesh in order to support clients. The triangular icons represent these clients. At the top of the figure are the root Access Points or APs (two,

in this example) that have a direct connection to the wired backbone. Each of these APs creates a separate BSS using a separate RF channel.

The BSSs (Basic Service Sets) are labeled as BSS [hops], [index], so BSS 1,1 indicates that this is the first BSS for which one hop is needed to reach the wired backbone. For the non-root APs, one radio serves as an AP to its clients; the other radio acts as a backhaul.

The radio interface colored green - labeled 010 - acts as a connection to the " Parent" - the backhaul. It operates in station mode: it appears as a client, no different from other clients shown as triangles. The backhaul and AP radio, colored gray - labeled 020 - operates in AP mode: it services clients, including other Access Points accessing it as clients, through their second radio operating in station mode. In the lower layers, a description such as BSS 2,3 means that this is the third AP for which two hops are required to reach the wire. Triangles denote client radios (see Label 030).

Radio is a shared medium where only one device can be "talking" at a time. As networks grow, performance degrades rapidly as the same AP services more clients. The AP's BSS becomes unmanageable. The need to split up the network into smaller groups becomes essential to the health of a network.

A classic solution is to split up the wireless network into smaller groups (BSS), each of which is operating on a non-interfering channel with other groups (BSS). Simultaneous "conversations" are now possible in each BSS. This solution, however, is not available in an ad-hoc (peer-to-peer) mesh solution, because such a solution must, by definition, create a single, large, BSS.

Each BSS shown in the infrastructure mesh of Fig. 4, however, is not interfering with other transmission channels allocated to neighboring BSSs. Channel Interference is contained and spatial re-use is possible. Two-radio solutions are therefore more impervious to noise than their 1-radio counterparts. Channels can automatically be re-allocated to avoid unpredictable

sources of interference such as radar or unauthorized transmissions that may be present in emergency or military situations.

The Logical 2-Radio Concept is distinct from conventional Mesh. The Logical 2-Radio concept must not be confused with other mesh approaches that may also use 2 (or more) physical radios. This is referred to as a "Dual-radio" mesh and shown on the LHS of FIG 2.

FIG 2, LHS shows that one radio services client while the other forms an ad hoc mesh. Separating the service from the backhaul improves performance when compared with conventional ad hoc mesh networks. But a single radio ad hoc mesh is still servicing the backhaul - since only one radio communicates as part of the mesh. Packets traveling toward the Internet share bandwidth at each hop along the backhaul path with other interfering mesh backhauls - all-operating on the same channel.

Such systems are not scalable since the backhaul is still as single radio and suffers from the bandwidth degradation with each hop, endemic to single radio backhauls, see FIG 2 label 010. In contrast, the Logical 2-Radio concept described in this document focuses on a multiple radio backhaul as shown in FIG 3, Label 020..

It should also be noted that regardless of the number of radios allocated to the backhaul and those allocated in service of clients, the system resembles a wired switch stack from a logical perspective. Other mesh architectures resemble a hub.

Adding more Physical Radio: The logical 2 radio approach forms a tree like network as shown in Figure 4. One radio provides the uplink to a parent radio and another the downlink to child nodes. Thus the 2-Radio mesh node labeled 040 is a parent to mesh Node labeled 050. The mesh Node labeled 050 is a parent to mesh node labeled 060.

Mesh node labeled 050 also has two client radios, shown as triangles, one of which is labeled 030. Lack of a separate radio to service clients limits the effective backhaul bandwidth for the network, since clients are sharing bandwidth on the backhaul. It also prevents the use of

proprietary but more efficient transmission protocols on the radios, since those radios also have to "talk" with client radios, that demand a non-proprietary and less efficient protocol.

An extension of the logical 2-radio functionality is to use three radios with two separate radios for the (high speed) backhaul and one more radio for separate (slower) service to clients. Refer to Figure 6. Again we see the familiar tree like structure. But this time the two backhauls are dedicated radios (labels 010, 020) and there is a separate radio (025) to service clients (030) only. The chain of connectivity (040-050-060) has not changed.

.

Note that while more (physical) radios have been employed, Figures 5 and 6 are functionally identical. In both cases, one the functionality of uplink and downlink are separate. In Figure 5, the downlink supports both client and mesh nodes. In Figure 6, the radio (020) providing downlink connectivity is now dedicated to backhaul services while another radio (025) services clients (0300. There is performance improvement of shifting the slower traffic from clients to another radio so the backhaul can operate in the "fast lane" but beyond this implementation improvement FIG 6 and FIG 4 are functionally identical.

This invention addresses multiple embodiments of the logical 2 radio approach depicted in FIG 4 provides solutions that address a variety of mesh networking applications. These embodiments are shown in FIGS 5,6,7,8,9. Extensions to support voice and video in mission critical public safety networks are described in Figures 10, 11, 12. Lastly, this invention addresses how combining the logical radio embodiments may be dynamically reconfigured – in the field and on the fly - to support both infrastructure style mesh networks and conventional ad hoc mesh networks. Hybrid mesh networks for military & public safety applications are discussed and shown in Fig. 13,14,15

BRIEF DESCRIPTION OF DRAWINGS

In order to more fully describe embodiments of the present invention, reference is made to

the accompanying drawings. These drawings are not to be considered limitations in the scope of the invention, but are merely illustrative.

FIG. 1 illustrates how the network topology is changed by selecting a different backhaul in a 2 radio system, with one link to the backhaul AP and the other link servicing the child AP. It depicts four network topologies. Each of the four network topologies provide a different set of performance in terms of latency and throughput. The mesh control software adjusts the latency and throughput parameters to meet voice/video or data performance requirements in terms of latency and bandwidth.

FIG. 2 contrasts the conventional "Dual Radio" mesh with the Logical 2-Radio Mesh. On the LHS of FIG 2, 2 radios labeled 010 and 020 provide client connectivity and ad hoc mesh backhaul functionality, respectively. All the mesh backhaul radios (020) are on the same channel depicted by the clouds of coverage of the same color (030). There are all part of the same sub-network. In contrast, on the RHS of FIG 2, the same radio (025) provides service to clients and also backhaul functionality but operates in different sub domains depicted by different color clouds of coverage (035). The LHS resembles a "hub", the RHS a "switch". Hubs are not scalable.

FIG. 3 compares the 2 step process of a single radio relay to a 2-radio relay. On the left side, (010) a single radio relay is shown. Every packet received has to be re-transmitted on the same radio. Thus the bandwidth with every hop in a single radio mesh network is reduced by approximately 50%. After 3 hops, the Bandwidth would be 1/8 of what is available at the Ethernet backhaul. On the RHS (020) a 2-radio backhaul is shown, where packets received on one radio are re-transmitted on another radio operating on a non-interfering channel. Now there is no bandwidth reduction with every hop and bandwidth is preserved with every hop. Two radio mesh backhauls are thus scalable while single radio backhauls are not. .

FIG. 4 shows how the structure of 2-radio multiple hop mesh network where each 2 radio unit services a Basic Service Set (BSS) by configuring one of the two radios to serve as an AP to its clients. Clients may include the second radio of another 2 radio system, with this

radio configured to run in station mode, providing the backhaul path back to the Ethernet link. In the insert, the uplink radio (labeled 010) connects to the parent mesh node while the downlink radio (labeled 020) acts like an Access Point to client radios, including other mesh nodes that connect to it through their uplink radio. Note that all service radios (020) operate on different non-interfering channels, depicted by different color ovals.

FIG. 5 shows the similarities between FIG 4 and a wired switch stack with the same chain of connectivity 040-050-060. Both have the same tree-like structure and up link and down link connections. In both cases the units (040,050,060) operate on a distinct sub domain.

FIG. 6 illustrates one embodiment of the two logical radio approach with 3 physical radios. Two radios constitute logically one radio of the two logical radio concept, while the third physical radio serves clients as the second radio of the two logical radio concept. By eliminating the sharing of physical radios for both backhaul and client services, the backhaul bandwidth has improved and also reduced the dependency to use the same type of radios for the backhaul and the client. In the insert, the uplink radio (labeled 010) connects to the parent mesh node while the downlink radio (labeled 020) connects to the uplink radio of child mesh nodes. The service radio (labeled 030) act as Access Points to client radios shown as triangles. One such is labeled 040. Note that all service radios (030) operate on different non-interfering channels, depicted by different color ovals.

FIG. 7 illustrates another embodiment of the two logical radio approach but with 5 physical radios. The uplink and downlink radios (shown as one radio figure 6) is now split into two radios, each responsible for one direction of traffic. Bandwidth is doubled and latency halved, since traffic in the opposing direction now has its own "lane". Thus, the radio labeled 010 in Figure 6 is now radios 012 and 010. Similarly, the radio marked 020 in Figure 6 is now split into radios labeled 022 and 020. The radio pairs 012-010 and 022-020 provide the same functionality as the radios labeled 010 and 020 in Figure 6 but with twice the bandwidth and approx half the latency.

FIG. 8 is an extension of the 5-radio embodiment shown in Figure 7. In Figure 7, there is one service radio to service both voice and data customers. However voice and data traffic has different performance requirements. Data requires higher bandwidth and is relatively indifferent to latency. Conversely, voice requires low bandwidth but is latency sensitive. By having different Access Point radios service the voice and data clients), the contention between voice and data packets attempting to gain access to the same medium is reduced. Also, with different radios servicing the data and voice clients, the voice and data packets can now be treated differently. The Access Point radios servicing the voice clients could therefore be operating in TDMA (time division multiple access) mode while the AP radio servicing the data clients operates in CSMA (Collision Sense Multiple Access) mode. The two radios (032) and (034) thus provide different functionality. Phones connect to the former, laptops to the latter.

FIG 9 is a 5-Radio extension of the 3-Radio configuration shown in Figure 6 but with more dedicated service radios operating on different frequencies for different types of client radios.

FIG 10 shows the maximum VOIP bandwidth available per client, using 802.11 radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, a 802.11b radio can support around 25 clients.

FIG 11 shows the maximum VOIP bandwidth available per client, using 802.11a radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, an 802.11a radio can support around 55 clients

FIG. 12 shows extensions developed and implemented in the mesh network stack to provide an efficient backhaul for voice. The small voice packets are concatenated into larger packets

and sent (as one packet) at regular intervals to the backhaul radios. At each mesh node voice packets intended for that destination are removed and the rest sent back (as one large packet).

Salient portions include the Packet classifier (labeled 010) that recognizes voice packets based on size and regularity of transmissions, the VOIP concatenation engine (labeled 020) that "container-izes" small voice packets into a larger "container" packet for more efficient transportation, Real time extensions (labeled 030) to the Linux kernel enable the system to provide near real time performance regarding sending and receiving the latency sensitive VOIP container packets through the network – regardless of what the Operating System is doing at the time.

FIG. 13 shows the concept of a "Hybrid Mesh network" where 2 radio systems provide two types of service. In one case, they are part of an infrastructure mesh as shown by the 2-radio mesh node labeled 010. In another case, the same node may be dynamically reconfigured to support ad hoc peer-to-peer connectivity. The node labeled 020 (marked as E8) has two radios. One is intended for client radio connection to infrastructure mesh nodes – see the radio labeled 030 on the unit marked E9. The other provides a peer-to-peer mesh capability, as shown by radio labeled 040. Depending on the needs of the network, the 2-radio units are dynamically re-configured to support either need, infrastructure mesh (010) or backhaul support to ad hoc mesh (020). Labels 050 and 060 mark connected and broken ad hoc mesh links.

FIG. 14 is an application of the Hybrid Mesh concept to Public Safety. The node labeled 010 is a Stationary node on top of a light pole. A mobile version shown as labeled 020 is entering the building (arrow). These mobile units are also called "breadcrumb" routers. The Mobile Mesh nodes provide connectivity to 2-Radio portable units worn by the firemen in this picture. All Firemen are thus connected to themselves through a peer-to-peer mesh network shown as a thin red line. They are also connected to the Infrastructure mesh backhaul through one or more connect points. This ensures redundancy in network connectivity. The broken link (labeled 060, Figure 13) is avoided.

FIG. 15 is an application of the Hybrid Mesh concept related to Battle Force Protection.

FIG., 18 shows how the installation software is tagged to both the radios and board characteristics. It shows a serial line connected to load the boot loader program, after which the Ethernet port is used to complete the software installation and branding process. Compiling the install program on the board it is intended to run on does this, thus creating a unique software image.

FIG. 19 is a screen dump of the Flash Deployment software developed and implemented to ensure that software generated for the install of this board cannot be used by another mesh node. When the software installation process begins, the software is compiled on the board it is intended for and the compilation process is unique since it is based on a number of unique factors. The software is generated on the board – that it is intended to run on - to ensure that the software image cannot be used to run on another board, thus preventing both software privacy and dissuading theft of the mesh nodes.

FIG. 20 shows that the Mesh Control Software sits above the Media Access Control (MAC) of the radio. As such it is Radio and Protocol agnostic.

FIG. 21 shows how channel interference is dynamically managed in the logical 2-Radio system.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

The description above and below and the drawings of the present document focus on one or more currently preferred embodiments of the present invention and also describe some exemplary optional features and/or alternative embodiments. The description and drawings are for the purpose of illustration and not limitation. Those of ordinary skill in the art would recognize variations, modifications, and alternatives. Such variations, modifications, and alternatives are also within the scope of the present invention. Section titles are terse and are for convenience only.

Radio is a shared medium where only one person can be "talking" at a time. As networks grow, performance degrades rapidly as more clients are services by the same AP. The AP's Basic Service Set (BSS) becomes unmanageable. The need to split up the network into smaller groups is essential to the health of a network.

The problem is exacerbated in multi-hop topologies using one-radio systems. With one-radio units everyone is on the same BSS - bandwidth is reduced to half with each successive hop in the network. The reason is that radio is a shared medium -every one has to stay silent when a re-transmission from one hop to another hop (within the same BSS) occurs. One radio networking solutions cannot meet are the high performance requirements of enterprise infrastructure networks.

Our solution is to split up the wireless network into smaller groups (BSS), each of which is operating on a non-interfering channel with other groups (BSS). Simultaneous "conversations" are now possible. Each BSS shown above is not interfering with other transmission channels allocated to neighboring BSSs. But to do this and provide bridging across the individual sub networks, requires 2 radios as shown in Figure 4 (label 020)

FIG. 3 compares the performance of a single radio relay (or backhaul) to that of a 2-radio relay (or backhaul) On the LHS, (010) a single radio relay is shown. Every packet received has to be re-transmitted on the same radio. Thus the bandwidth with every hop in a single radio mesh network is reduced by approximately 50%. After 3 hops, the Bandwidth would be 1/8 of what is available at the Ethernet backhaul. In contrast On the RHS (020) a 2-radio backhaul is shown, where packets received on one radio are re-transmitted on another radio operating on a non-interfering channel. This is depicted as the different color for the dashed lines emanating from the radios. (030)

Since the radios operate on different channels, they are now part of separate sub-networks. Transmissions from one do not affect the other and both can transmit/receive freely. With the radios operating on different non-interfering channels, there is now no bandwidth reduction

with every hop. Bandwidth is preserved with every hop. Two radio mesh backhauls are thus scalable while single radio backhauls are not. This is in essence the power of the 2-Radio concept: separating the uplink and down link radios in a mesh network.

Fig. 4 shows the infrastructure mesh in a topology with a 2-radio unit in a multiple hop wireless network. The rectangular icons in this figure represent the APs, which have formed a mesh in order to support clients. The triangular icons represent these clients. At the top of the figure are the root Access Points or APs (two, in this example) that have a direct connection to the wired backbone. Each of these APs creates a separate BSS using a separate RF channel.

The BSSs (Basic Service Sets) are labeled as BSS [hops], [index], so BSS 1,1 indicates that this is the first BSS for which one hop is needed to reach the wired backbone. For the non-root APs, one radio serves as an AP to its clients; the other radio acts as a backhaul.

The radio interface colored green - labeled 010 - acts as a connection to the " Parent" - the backhaul. It operates in station mode: it appears as a client, no different from other clients shown as triangles. The backhaul and AP radio, colored gray - labeled 020 - operates in AP mode: it services clients, including other Access Points accessing it as clients, through their second radio operating in station mode. In the lower layers, a description such as BSS 2,3 means that this is the third AP for which two hops are required to reach the wire. Triangles denote client radios (see Label 030).

Radio is a shared medium where only one device can be "talking" at a time. As networks grow, performance degrades rapidly as the same AP services more clients. The AP's BSS becomes unmanageable. The need to split up the network into smaller groups becomes essential to the health of a network.

A classic solution is to split up the wireless network into smaller groups (BSS), each of which is operating on a non-interfering channel with other groups (BSS). Simultaneous "conversations" are now possible in each BSS. This solution, however, is not available in an

ad-hoc (peer-to-peer) mesh solution, because such a solution must, by definition, create a single, large, BSS.

Each BSS shown in the infrastructure mesh of Fig. 4, however, is not interfering with other transmission channels allocated to neighboring BSSs. Channel Interference is contained and spatial re-use is possible. Two-radio solutions are therefore more impervious to noise than their 1-radio counterparts. Channels can automatically be re-allocated to avoid unpredictable sources of interference such as radar or unauthorized transmissions that may be present in emergency or military situations.

The Logical 2-Radio Concept is distinct from conventional Mesh. The Logical 2-Radio concept must not be confused with other mesh approaches that may also use 2 (or more) physical radios. This is referred to as a "Dual-radio" mesh and shown on the LHS of FIG 2.

FIG 2, LHS shows that one radio services client while the other forms an ad hoc mesh. Separating the service from the backhaul improves performance when compared with conventional ad hoc mesh networks. But a single radio ad hoc mesh is still servicing the backhaul - since only one radio communicates as part of the mesh. Packets traveling toward the Internet share bandwidth at each hop along the backhaul path with other interfering mesh backhauls - all-operating on the same channel.

Such systems are not scalable since the backhaul is still as single radio and suffers from the bandwidth degradation with each hop, endemic to single radio backhauls, see FIG 2 label 010. In contrast, the Logical 2-Radio concept described in this document focuses on a multiple radio backhaul as shown in FIG 3, Label 020..

It should also be noted that regardless of the number of radios allocated to the backhaul and those allocated in service of clients, the system resembles a wired switch stack from a logical perspective. Other mesh architectures resemble a hub.

Adding more Physical Radio: The logical 2 radio approach forms a tree like network as shown in Figure 4. One radio provides the uplink to a parent radio and another the downlink to child nodes. Thus the 2-Radio mesh node labeled 040 is a parent to mesh Node labeled 050. The mesh Node labeled 050 is a parent to mesh node labeled 060.

Mesh node labeled 050 also has two client radios, shown as triangles, one of which is labeled 030. Lack of a separate radio to service clients limits the effective backhaul bandwidth for the network, since clients are sharing bandwidth on the backhaul. It also prevents the use of proprietary but more efficient transmission protocols on the radios, since those radios also have to "talk" with client radios, that demand a non-proprietary and less efficient protocol.

An extension of the logical 2-radio functionality is to use three radios with two separate radios for the (high speed) backhaul and one more radio for separate (slower) service to clients. Refer to Figure 6. Again we see the familiar tree like structure. But this time the two backhauls are dedicated radios (labels 010, 020) and there is a separate radio (025) to service clients (030) only. The chain of connectivity (040-050-060) has not changed.

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Note that while more (physical) radios have been employed, Figures 5 and 6 are functionally identical. In both cases, one the functionality of uplink and downlink are separate. In Figure 5, the downlink supports both client and mesh nodes. In Figure 6, the radio (020) providing downlink connectivity is now dedicated to backhaul services while another radio (025) services clients (0300. There is performance improvement of shifting the slower traffic from clients to another radio so the backhaul can operate in the "fast lane" but beyond this implementation improvement FIG 6 and FIG 4 are functionally identical.

Adding more Physical Radios to the Backhaul. In FIG 6 the logical service radio was split into 2 Physical radios to achieve greater performance. The logical backhaul radio can also be split into multiple backhaul radios to provide better backhaul. More backhaul radios provides more alternate routing paths and the ability to tune individual routing paths to support required application settings. Thus it is possible to have multiple backhauls, one that provides

low latency (with fewer hops) and another that provides more throughput but using a more circuitous route with more hops and more latency.

The system would then route packets such that Voice packets traveled along the low latency backhaul and data packets would travel on the other – high throughput – backhaul. Adding more backhauls thus increases flexibility in supporting diverse performance requirements and also improves redundancy and fault tolerance. Note however, that from a logical perspective, this is still a 2-Radio system depicted in FIG. 5 and the software control layer that manages the multiple backhaul system is functionally the same as that for the 2-Radio units.

Full Duplex Backhauls A variation of this concept of adding more physical radios in support of better backhaul functionality is to split the incoming and outgoing traffic to two separate backhaul radios. This doubles the bandwidth and effectively reduces latency also.

In FIG. 7 the uplink and downlink radios (shown as one radio FIG 6) is now split into two radios, each responsible for one direction of traffic. Bandwidth is doubled and latency halved, since traffic in the opposing direction now has its own "lane". Thus, the radio labeled 010 in FIG 6 is now radios 012 and 010. Similarly, the radio marked 020 in FIG 6 is now split into radios labeled 022 and 020. The radio pairs 012-010 and 022-020 provide the same functionality as the radios labeled 010 and 020 in FIG 6 but with twice the bandwidth and approx half the latency.

Multiple Service Radios A single radio must service all local clients, regardless of the application requirements. Consider an Access Point servicing both Voice over IP (VOIP) and data clients If a number of data devices are requesting simultaneous transfers, they will interfere with voice traffic, thereby adding significant latency and jitter. Latency and jitter are enemies of VoIP, and this situation rapidly results in deteriorated call quality. Since radio is a shared medium, the only way to prevent this interference is at the source of the problem – the shared spectrum at the radio. By the time the data and voice traffic get to a wireless backhaul it's too late. The damage has already been done.

FIG. 8 is an extension of the 5-radio configuration shown in Figure 7 to separate voice and data traffic. In Figure 7, there is one service radio to service both voice and data customers. However voice and data traffic has different performance requirements. Data requires higher bandwidth and is relatively indifferent to latency. Conversely, voice requires low bandwidth but is latency sensitive. By having different Access Point radios service the voice and data clients), the contention between voice and data packets attempting to gain access to the same medium is reduced. Also, with different radios servicing the data and voice clients, the voice and data packets can now be treated differently. For example, the radio servicing voice clients could therefore be operating in a different mode such as PCF (Point Control Function) or TDMA (time division multiple access) mode while the AP radio servicing the data clients operates in DCF (Distributed Control Function) mode.

Along the lines of multiple service radios, FIG 9 is a 5-Radio extension of the 3-Radio configuration shown in Figure 6 but with more dedicated service radios operating on different frequencies for different types of client radios. The backhaul is WiMAX and it supports WIFI, WIMAX and public safety (4.9GHZ) service radios.

The logical 2-radio concept must not be confused with "dual radio" mesh. In all the configurations outlined above, it should be noted that - regardless of the number of radios allocated to the backhaul and those allocated in servicing clients - the system is functionally identical to the logical two-radio shown in FIG 4.

It must also be noted that the logical 2-Radio concept contrasts with what is referred to as "Dual radio" or "1+1" mesh. For example some mesh companies use what is referred to in the industry as a "1+1" mesh or "dual-radio" mesh. See FIG 2 LHS. Here one radio services client while the other forms an ad hoc mesh. Separating the service from the backhaul improves performance when compared with conventional ad hoc mesh networks. But a single radio ad hoc mesh is still servicing the backhaul - since only one radio communicates as part of the mesh. Packets traveling toward the Internet share bandwidth at each hop along the backhaul path with other interfering mesh backhauls - all-operating on the same channel.

Such systems are not scalable since the backhaul is still as single radio and suffers from the bandwidth degradation with each hop, endemic to single radio backhauls, see FIG 4 label 010. In contrast, the Logical 2-Radio concept described in this document focuses on a multiple radio backhaul as shown in FIG 2 RHS.

Other distinctive benefits of the Logical 2-Radio approach (vs.other approaches) include:

- **Layer 2 routing is radio and protocol agnostic.** The mesh control layer operates just above the MAC layer of the radio. It functions as a layer 2 bridge between backhaul and service radios. L3 functionality is thus unaffected. Thus Network/Security functionality is unaffected by our Layer 2 software. FIG. 20 shows that the Mesh Control Software sits above the Media Access Control (MAC) of the radio. As such it is Radio and Protocol agnostic.

- **Faster Routing Updates.** The tree like structure (See FIG 5,6,7) engenders a faster routing mechanism than conventional ad hoc mesh. Hence enterprise class wired network switch stacks use an efficient tree structure for routing. Ad hoc Mesh manages a large routing table, generally Order(n^2). In contrast, the tree like structure is Order (n) and both system overhead and reaction time are lower..

- **Manages Channel Interference**: In 1-radio systems, all radios on the backhaul share the same channel. They are easily affected by interference - possibly malicious- on their operating channel. With Logical 2-Radio mesh, nodes can switch to other channels to avoid channel interference from near by nodes operating in another segment of the network. See FIG 21.

- **Dynamic Re-configurability**: The logical 2-radio approach requires a minimum of 2 physical radios (See FIG 4) but there are no upper bounds. Thus is a radio "dies", the system automatically shifts down to a more appropriate configuration. This may affect performance but functionally the system architecture has not changed. This level of redundancy is impossible in conventional mesh architectures. See FIG 2, LHS. The

radios 010 and 020 are serving distinct purposes and are generally of different types. For example the radio servicing clients (010) is typically a 802,.11b/g radio while the radio part of the backhaul (020) is generally an 802.11a radio. If one radio dies, the other cannot be easily re-configured to support the dead radio functionality without compromising its original purpose. Such is NOT the case with the Logical 2-Radio approach because both radios are of the same time in order to form the chain link 040-050-060 shown in FIG 4, 5, 6.

VOIP Extension For Mesh Backhauls. FIG 10 shows the maximum VOIP bandwidth available per client, using 802.11 radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, a 802.11b radio can support around 25 clients.

FIG 11 shows the maximum VOIP bandwidth available per client, using 802.11a radios, as the number of clients increase. This is the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet – and the associated voice quality – drops dramatically. For a 64 Kbps voice quality, an 802.11a radio can support around 55 clients

The point is that regardless of the type of service radio selected, the maximum clients that can be supported per radio is around 50. That implies that in the case of the chain 040-050-060 shown in FIG 6, the total number of VOIP clients to be supported by the backhaul would be around 150. Since the radio cannot support more than 50, other steps must be taken so that the relay /backhaul radios are not the bottleneck.

The inefficiencies of transmitting voice packets are largely due to their small size and frequency of transmission.. The Radio protocol commonly employed is CSMA/CA based (Collision Sense Multiple Access/ Collision Avoidance) and it becomes increasingly inefficient as the size of the packet reduces. The challenge, therefore, is to container-ize the

packets so voice packets become part of large container (for more efficient transportation) but at the same time not delay sending the packets in order to "fill" the container.

As an analogy, the bus can wait a little while longer at a bus station to pick up more passengers but if it waits too long, it will miss its scheduled arrival that the next stop – to the chagrin of passengers expects to disembark there.

FIG. 12 shows extensions developed and implemented in the mesh network stack to provide an efficient – yet time sensitive - backhaul for voice. The small voice packets are concatenated into larger packets and sent (as one packet) at regular intervals to the backhaul radios. At each mesh node voice packets intended for that destination are removed and the rest sent back (as one large packet). The real time extensions (030) ensure that the delivery is made according to regular intervals – regardless of what else the operating system is doing at the time. Salient portions include the Packet classifier (labeled 010) that recognizes voice packets based on size and regularity of transmissions, the VOIP concatenation engine (labeled 020) that "container-izes" small voice packets into a larger "container" packet for more efficient transportation, Real time extensions (labeled 030) to the Linux kernel enable the system to provide near real time performance regarding sending and receiving the latency sensitive VOIP container packets through the network – regardless of what the Operating System is doing at the time.

Hybrid Mesh Networks. One-radio mesh networking solutions are inferior to multiple radio solutions in multihop situations. In the case of 1 radio systems available bandwidth is reduced by 50% with each hop: the bandwidth available at the 3rd hop is 1/8 of the available capacity. Conversely, 2-radio infrastructure mesh solutions are ideal for multihop situations - with no restrictions on the number of hops. They are also more reliable since the AP is intended to be stationary and therefore provide dependable service in its coverage area. But they are not intended for peer-to-peer connectivity in standard 802.11 modes of operation. In standard 802.11, radios are either configured to act as an AP, a STA or in ad hoc mode.

Mission critical applications (e.g. emergency response) need high bandwidth - regardless of

how many hops you are away from the backbone- to be able to download maps or upload video. They must also be assured of connectivity at all times – every node must be able to route traffic to all other nodes in the network.

Infrastructure backhaul addresses robust connectivity. Infrastructure backhaul is also needed to support ad-hoc mesh networking. In FIG 13, the ad hoc wireless link between E2 and E3 has been lost due, say, to excessive distance or an intervening obstruction – typical of dynamic, uncertain or hostile environments. With no 2-radio backhaul support, Nodes E1 and E2 are stranded, that is, they have no way of communicating with the other mobile radio units, at least in ad-hoc mode. The backhaul link now becomes their lifeline. Two-radio portable backhauls are thus essential in emergency response systems where the team may be scattered over large areas, and yet not made up of a very high number of actual devices.

A single radio ad hoc mesh is not sufficient, since all E nodes are intended to be mobile, their movement cannot be restricted to operate within coverage from another E unit. Further, redundant routing configurations (E7-E8-E9) cannot be assured, and the string of pearls pattern (E3-E4-E5-E6-E7) is too tenuous a connectivity chain for mission critical applications.

Hybrid mesh topologies are for situations where one radio mobile ad hoc network connectivity (for peer-to-peer connectivity) combined with two radio infrastructure backhaul support provides the best of both worlds: ubiquitous connectivity with multiple levels of redundancy. To simplify production issues, the 2-radio Portable backhaul and mobile units can be the same hardware but dynamically configured to operate differently.

The backhaul radios can be dynamically configured to have one radio in AP mode and the other is STA mode. The 2 radio mobile units are configured to have one radio in STA mode (to talk to the backhaul) with another radio in ad hoc mode to talk with peers. Either unit can fill in for the other – changes are software based and dynamically configurable. This favors economies of scale - the same hardware services both peer-to-peer and infrastructure requirements. Also, in the general case, most nodes would be of the 2-Radio configuration

shown in FIG 4. In the event the node reaches the edge of a network and has to support ad hoc mesh (E1-E2-E3-E4) it will dynamically reconfigure itself to become a Hybrid node. Thus Node E1 could have been a 2-Radio unit but it would dynamically reconfigure itself to support the connectivity requirements of E2 thar has been stranded because of a broken link with E3 (label 060, FIG 13).

FIG. 14 is an application of the Hybrid Mesh concept to Public Safety. The node labeled 010 is a Stationary node on top of a light pole. A mobile version shown as labeled 020 is entering the building (arrow). These mobile units are also called "breadcrumb" routers. The Mobile Mesh nodes provide connectivity to 2-Radio portable units worn by the firemen in this picture. All Firemen are thus connected to themselves through a peer-to-peer mesh network shown as a thin red line. They are also connected to the Infrastructure mesh backhaul through one or more connect points. This ensures redundancy in network connectivity. The broken link (labeled 060, Figure 13) is avoided. FIG. 15 is a similar application of the Hybrid Mesh concept but related to Battle Force Protection.

Mobility Extensions for moving mesh nodes. An enhancement to the 3-Radio module is to add a 4th radio as a scanning radio. The scanning radio monitors the environment and the other radios on the mesh node to ensure that the radio-antenna subsystems are functioning correctly. They also monitor the performance of neighboring mesh nodes and when a node malfunctions, scanning radios provide diagnostic information to the Network Management System (NMS).

Recall that in the 2-Logical Radio concept, all radios are operating on non-interfering frequencies to preserve bandwidth (see FIG 2,3) and thus cannot monitor each other. An external scanning radio is also needed to gauge the signal strength of a prospective parent node before the backhaul / relay path can decide that that node could provide better service. In lightly loaded situations, the radios can perform this scanning themselves with no loss in performance. In heavily loaded situations or in the event of a disaster, scanning would result in loss in performance.

Without a separate scanning, radio the NMS and adjoining nodes still know when a node goes down because control system heartbeats (sent on one channel and re-transmitted on another by a parent node) are not received. However only an external sensing radio can determine if there has been a mechanical failure - as a break in the cable. In the event of such malfunctions, scanning radios can dynamically reconfigure themselves to assume the functionality of the damaged unit. In short, scanning radios mesh form "buddy" relationships (as in police teams) to monitor and "cover" each other. Scanning radios are critical in dynamic environments - where mesh nodes are mounted on cars and the mesh topology is rapidly changing. These include public safety and battlefield scenarios.

Additionally scanning radios can provide information on client movement. If two mesh nodes are both in the vicinity of a moving client radio, then scanning radios on both nodes will pick up signals from the moving client radio. Now, as the client moves, its signal strength as received by one scanning radio will differ from that received by another. Based on the vector of motion, one mesh node will be better suited to servicing the client and a hand off from one mesh node to another may now be initiated in a proactive manner. Without the scanning radio, the hand off will still occur – but it will be because the client has lost connectivity and has to scan to find another mesh node to connect to. With some software on the client this break in connectivity may be avoided by informing the client when to switch to the next node. For a short while packets for the client will be sent to both nodes. Once the client shifts to the new node, the old node is informed. It then ceases to send packets and updates its routing table to delete the entry of the client as one of its clients.

Field Upgradeable Modular Design. A key advantage of the radio and protocol agnostic approach is that additional radios can be added to the system easily. The mesh control software emulates multiple port bridges and supports multiple input and output interfaces. There are no software limitations on the number of service radios or the number of backhaul radios supported. This ensures a cost effective long-term migration strategy supporting needs for more performance later.

FIG. 16 shows a production version of the 2-Logical radio system with support for up to 4 physical radios that can support a variety of configurations in a modular fashion. One radio is mounted (Label 010). There are a total of 4 such slots, two on top, two on the bottom. There are also two Ethernet ports (Label 020) with Power over Ethernet on one. Radios connect to one of 4 N-Female antenna connections (labeled 030).

FIG. 17 depicts some of the configurations possible with a 4 physical radio unit such as shown in Fig 16. Based on the number of radio slots occupied, the system automatically configures itself to be a 2-Radio (Figure 5), 3-Radio (Figure 6) or a Full Duplex Backhaul (Figure 7). The system is extensible. Through the Ethernet port, another 4 radio modular units may be added. Label 010 refers to the 2-radio configuration shown in Fig 5. The label 020 refers to the 3-radio shown in Fig 6. Label 030 refers to an extension of the 3-Radio system and discussed in more detail in this application. Label 040 refers to the Full Duplex 4 Radio system also shown in Figure 7.

Theft protection of Mesh Nodes Mesh nodes are mounted in public spaces and open air locations, there must be means to dissuade theft. Theft is effectively controlled if the software on the mesh node cannot be copied and used on another mesh node. For that, the software running on the mesh node needs to have some unique, (copy proof) feature.

FIG.18 shows the process developed and implemented for generating software tagged to the current radios and board characteristics. It shows a serial line connected to load the boot loader program, after which the Ethernet port is used to complete the software installation and branding process. Compiling the install program on the board it is intended to run on does this, thus creating a unique software image.

FIG. 19 is a screen dump of the Flash Deployment software developed and implemented to ensure that software generated for the install of this board cannot be used by another mesh node. When the software installation process begins, the software is compiled on the board it is intended for and the compilation process is unique since it is based on a number of unique factors. The software is generated on the board – that it is intended to run on - to ensure that

the software image cannot be used to run on another board, thus preventing both software privacy and dissuading theft of the mesh nodes.

***

Throughout the description and drawings, example embodiments are given with reference to specific configurations. It will be appreciated by those of ordinary skill in the art that the present invention can be embodied in other specific forms. Those of ordinary skill in the art would be able to practice such other embodiments without undue experimentation. The scope of the present invention, for the purpose of the present patent document, is not limited merely to the specific example embodiments of the foregoing description, but rather is indicated by the appended claims. All changes that come within the meaning and range of equivalents within the claims are intended to be considered as being embraced within the spirit and scope of the claims which follow:

CLAIMS

What is being claimed is:

1. A wireless mesh network node containing at least two relay radios for performing a packet relay function, wherein;

a first relay radio can receive packets while a second relay radio simultaneously sends packets, and

wherein frequency channels for each relay radio are chosen automatically by a distributed software control layer that resides on each such mesh node in a mesh network, and which communicates with control layer software on other nodes in the mesh network.

2. The mesh network node of claim 1 also including one or more separate service radios which are connected to the relay radios via a software bridge.

3. The mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation.

4. A full duplex wireless mesh network node containing at least four relay radios for performing a packet relay function, wherein the following operations can occur simultaneously;

a first relay radio receives packets from a parent mesh node, and

a second relay radio sends packets to a parent mesh node, and

a third relay radio receives packets from a daughter mesh node, and

a second relay radio sends packets to a parent mesh node.

5. A wireless mesh network node containing at least two relay radios, and at least two service radios wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic.

6. A hybrid mesh network where some mesh nodes in the network have at least two relay radios and other mesh nodes have only one relay radio.

7. A wireless mesh network node containing at least two relay radios and at least three similar radios, where upon the failure of one relay radio, another relay radio can operate in place of the failed radio.

8. A wireless mesh network node optimized for VoIP traffic containing at least two relay radios including software that concatenates smaller voice packets into larger packets in order to increase the overall throughput of the mesh.

9. A wireless mesh network node containing at least two relay radios and a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio, and wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes.

ABSTRACT

An approach using 2 logical radios to achieve high performance in multihop mesh networks is introduced. The advantages of frequency re-use, reduced channel interference over 1 radio approaches is discussed. An approach is developed to extend the logical 2-radio system to (physical) 3-radio and 4-radio systems are explained as extensions of the logical 2-radio methodology. The ability need to support both multiple radio systems and 1-radio ad hoc mesh systems in one framework is described in the context of emergency response systems. Some unique benefits of the logical 2-Radio concept related to other mesh architectures are highlighted.

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APPENDIX 0001 – 0010 ATTACHMENTS FOLLOW

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In the United States Patent and Trademark Office

Appn. Number:	11/084,330
Appn Filed:	March 17, 2005
Applicant:	Francis daCosta
Title:	Multiple-radio mission critical wireless mesh networks
Examiner/GAU:	na / 2661

September 23, 2005

Amendment A

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Please amend the Cross Reference section of the specification per the following. Note that applicant's utility application as timely filed did include a reference to the previously filed provisional application as required by 35 U.S.C. 119(e)(1), however it was mentioned in the second sentence of the application - not in the first sentence as specifically required by paragraph (a)(5)(iii) of 37 CFR § 1.78 .

Applicant is uncertain if the changes made per this amendment actually constitute an "Unintentionally Delayed Claim for Priority under 35 U.S.C. 119", since the reference to the previously filed provisional application did in fact exist in the Cross Reference section at the beginning of the application as originally filed. If an "Unintentionally Delayed Claim for Priority" is appropriate, please refer to applicant's attached "Statement of Unintentional Delay" and process the attached check for $1,370 which is the Petition Fee per 37 CFR § 1.17 (t) for the acceptance of an unintentionally delayed claim for priority under 35 U.S.C. 119, 120, 121, or 365(a) or (c). If such a petition and fee is not appropriate, please notify applicant as such and return the attached check. In any case, please process the amendment which follows.

Respectfully submitted,

Francis daCosta

Francis daCosta
c/o MeshDynamics, 2953 Bunker Hill La, Suite 400, Santa Clara, CA 95054, 408-373-7700

09/28/2005 CNGUYEN 00000007 11084330 1370.00 OP
01 FC:1454

EV808021887US
EXPRESS MAIL 9-26-05

Specification:

Please amend the Cross Reference section of the specification per the following:

CROSS-REFERENCE

This application is a continuation-in-part ~~of application~~ of U.S. Application No. 10/434,948, filed May 8, 2003, which is herein incorporated by reference[[.]], and claims priority to ~~This application also incorporates by reference~~ U.S. Provisional Application No. 60/554,246, filed March 17, 2004[[.]], which is herein incorporated by reference.

Also incorporated by reference are Disclosure Documents numbers 548927, 548966, and 548734 which were all filed on March 16, 2004 under the USPTO Disclosure Document program. Separate letters have been attached to this application requesting that the referenced Disclosure Documents be retained for future reference.

In the United States Patent and Trademark Office

Appn. Number:	11/084,330
Appn Filed:	March 17, 2005
Applicant:	Francis daCosta
Title:	Multiple-radio mission critical wireless mesh networks
Examiner/GAU:	na / 2661

September 23, 2005

Statement of Unintentionally Delayed Claim for Priority

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant would like to state that the entire delay between the date the priority claim was due under paragraph (a)(5)(ii) of 37 CFR § 1.78 and the date the claim has now been filed, was unintentional. Applicant had until now believed that the reference made to the previously filed provisional application was correct since it was mentioned in the Cross Reference section at the beginning of the application.

Respectfully submitted,

Francis daCosta
c/o MeshDynamics, 2953 Bunker Hill La, Suite 400, Santa Clara, CA 95054
408-373-7700

10-17-05

IFW

OIPE IAP80 OCT 14 2005 PATENT & TRADEMARK OFFICE

In the United States Patent and Trademark Office

Appn. Number:	11/084,330
Appn Filed:	March 17, 2005
Applicant:	Francis daCosta
Title:	Multiple-radio mission critical wireless mesh networks
Examiner/GAU:	na / 2661

October 13, 2005

Amendment B

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Please amend the Cross Reference section of the specification per the following. Note that a first preliminary amendment (Amendment A) was filed on September 23 to clarify the reference to a previously filed provisional application (No. 60/554,246, filed March 17, 2004).

This amendment further amends the Cross Reference section of Utility Patent Application No 11/084,330 to add a reference to another previously filed provisional application (No. 60/618,751 , filed October 14, 2004). Applicant neglected to add this reference when filing Amendment A referenced above. The marked-up text shown on the next page is a modification of the changed version of the Specification resulting from previous Amendment A.

Respectfully submitted,

Francis daCosta

Francis daCosta
c/o MeshDynamics, 2953 Bunker Hill La, Suite 400, Santa Clara, CA 95054, 408-373-7700

EXPRESS MAIL
10-14-05
(EV841795965US)

Specification:

Please amend the Cross Reference section of the specification per the following:

CROSS-REFERENCE

This application is a continuation-in-part of U.S. Application No. 10/434,948, filed May 8, 2003, which is herein incorporated by reference, and claims priority to U.S. Provisional Application No. 60/554,246, filed March 17, 2004, and to U.S Provisional Application No. 60/618,751, which ~~is~~ are herein incorporated by reference.

Also incorporated by reference are Disclosure Documents numbers 548927, 548966, and 548734 which were all filed on March 16, 2004 under the USPTO Disclosure Document program. Separate letters have been attached to this application requesting that the referenced Disclosure Documents be retained for future reference.

1, 4, 5, 6, 7, 8, 9

PATENT APPLICATION FEE DETERMINATION RECORD
Effective December 8, 2004

11084330

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	9	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	29 minus 20=	* 8
INDEPENDENT CLAIMS	7 minus 3 =	* 4
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=	400	OR	X200=	
+180=		OR	+360=	
TOTAL	550	OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A — 10/14/05

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 9	Minus	** 20	=
Independent	* 7	Minus	*** 3	= 4
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		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		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		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.

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FEB 27 2006

SAN DIEGO
Emerald Plaza Center
402 West Broadway, Suite 400
San Diego, California 92101

SEATTLE
Two Union Square Center
601 Union Street, 42nd Floor
Seattle, Washington 98101

INTELLECTUAL PROPERTY LAW GROUP LLP
· PATENT · TRADEMARK · COPYRIGHT ·
Old Bank of America Building
12 South First Street, 12th Floor
San Jose, California 95113
TEL: 408.286.8933
FAX: 408.286.8932
URL:www.iplg.com

LOS ANGELES
2600 Mission Street
Suite 100
San Marino, California 91108

WASHINGTON D.C.
601 Pennsylvania Avenue Center
South Building Suite 900
Washington, D.C. 20004

February 27, 2006

Via Facsimile 571-273-8300

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

Re: POWER OF ATTORNEY AND STATEMENT UNDER 37 CFR 3.73(b)
Title: "*Multiple-Radio Mission Critical Wireless Mesh Networks*"
Inventors: Francis DaCosta and Sriram Dayanandan
Application No.: 11/084,330
Filing Date: 03/17/2005
Our File No.: DACOSTAF.CIP3

Dear Sir:

Please find enclosed the following documents to be filed for the above-identified application:

1. Power of Attorney by the Assignee (Form PTO/SB/80); and
2. Statement Under 37 CFR 3.73(b) (Form PTO/SB/96).

If you have any questions, please do not hesitate to contact us.

Sincerely,
INTELLECTUAL PROPERTY LAW GROUP LLP

Juneko Jackson (Reg. No. 48,870)
Enclosures

Certificate Of Transmission

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office, Fax No. (571) 273 - 8300 on 2/27/2006.

VINCENT CHEN
Typed or printed name of person signing this certificate

Signature

PAGE 1/3 * RCVD AT 2/27/2006 5:56:20 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-2/9 * DNIS:2738300 * CSID:4082868932 * DURATION (mm-ss):01-32

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FEB 27 2006

PTO/SB/80 (01-06)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

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

I hereby appoint:

[X] Practitioners associated with the Customer Number: 24943

OR

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

Name	Registration Number	Name	Registration Number

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

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

[X] The address associated with Customer Number: 24943

OR

[ ] Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

ADVANCED CYBERNETICS GROUP, INC.
2953 Bunker Hill Lane, #400
Santa Clara, CA 95054

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

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

Signature	Francis DaCosta	Date	2-16-2006
Name	Francis daCosta	Telephone	408-373-7700
Title	Founder		

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

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

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Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(b)

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FEB 27 2006

Applicant/Patent Owner: Francis Dacosta, Sriram Dayanandan

Application No./Patent No.: 11/084,330 Filed/Issue Date: 03/17/2005

Entitled: Multiple-Radio Mission Critical Wireless Mesh Networks

Advanced Cybernetics Group, Inc., 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 013656, Frame 0328, 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 302.08]

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

Signature	02/27/2006 Date
Juneko Jackson	408-286-8933
Printed or Typed Name	Telephone Number
Patent Attorney	
Title	

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

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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE CA 92614

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OFFICE OF PETITIONS

In re Application of :
DaCosta et al. : DECISION ON PETITION
Application No. 11/084,330 : UNDER 37 CFR 1.78(a)(6)
Filed: 17 March, 2005 :
For: MULTIPLE-RADIO MISSION :
CRITICAL WIRELESS MESH NETWORKS :

This is a decision on the petition under 37 CFR § 1.78(a)(6), filed on 26 September, 2005, to accept an unintentionally delayed claim under 35 U.S.C. § 119(e) for the benefit of prior-filed provisional Application No. 60/618,751, as set forth in the amendment filed on 14 October, 2005.

The petition is **DISMISSED**.

A petition under 37 CFR 1.78(a)(6) is only applicable to those applications filed on or after November 29, 2000. Further, the petition is appropriate only after expiration of the period specified in 37 CFR 1.78(a)(5)(ii) and must be filed during the pendency of the nonprovisional application. In addition, the petition must be accompanied by:

(1) the reference required by 35 U.S.C. § 119(e) and 37 CFR 1.78(a)(5)(i) to the prior-filed application, unless previously submitted;
(2) the surcharge set forth in § 1.17(t); and
(3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(5)(ii) and the date the claim was filed was unintentional. The Commissioner may require additional information where there is a question whether the delay was unintentional.

This pending nonprovisional application was filed on 17 March, 2005, within twelve months of the filing date of the prior-filed provisional application, Application No. 60/618,751, which was

filed on 17 March, 2004, and for which priority is claimed. A reference to the prior-filed provisional application has been included in an amendment to the first sentence of the specification following the title.

However, the amendment is not acceptable as drafted since it improperly incorporates by reference the prior-filed application. An incorporation by reference statement added after an application's filing date is not effective because no new matter can be added to an application after its filing date (*see* 35 U.S.C. § 132(a)). If an incorporation by reference statement is included in an amendment to the specification to add a benefit claim under 35 U.S.C. § 120 after the filing date of the application, the amendment would not be proper. When a benefit claim under 35 U.S.C. § 120 is submitted after the filing of an application, the reference to the prior application cannot include an incorporation by reference statement of the prior application. *See* Dart Industries v. Banner, 636 F.2d 684, 207 USPQ 273 (C.A.D.C. 1980). *Note* MPEP §§ 201.06(c) and 608.04(b).

Accordingly, before the petition under 37 CFR 1.78(a)(6) can be granted, a renewed petition under 37 CFR 1.78(a)(6) and either an Application Data Sheet or a proper amendment (complying with 37 CFR 1.121 or 37 CFR 1.76(b)(5)) deleting the incorporation by reference statement, are required.

Additionally, the amendment and the present petition are objected to because they have not been signed in accordance with 37 CFR 1.33(b). 37 CFR 1.33(b) requires that amendments and other papers filed in an application must be signed by a registered patent attorney or agent, an assignee in accordance with 37 CFR 3.71(b), or all of the applicants. The amendment and petition, however, are signed by only one of the joint inventors, Francis DeCosta. A properly signed amendment and petition in compliance with the above paragraph should be filed to correct the deficiencies.

Lastly, the revocation and power of attorney by assignee filed on 27 February, 2006, cannot be accepted because the showing of record does not indicate that the above-identified application claims benefit of the application under which the assignment is recorded. Petitioners should verify, in any renewed petition, that the power of attorney references the correct assignment document. As the papers have been signed by a registered patent attorney, however, a copy of this decision will be forwarded to

the address listed therein. All future correspondence will be mailed solely to the address of record.

Further correspondence with respect to this matter should be addressed as follows:

By mail: Mail Stop PETITIONS
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Post Office Box 1450
Alexandria, VA 22313-1450

By hand: Customer Service Window
Mail Stop Petitions
Randolph Building
401 Dulany Street
Alexandria, VA 22314

By fax: (571) 273-8300
ATTN: Office of Petitions

Any questions concerning this decision on petition may be directed to Senior Petitions Attorney Douglas I. Wood at (571) 272-3231. All other inquiries concerning either the examination procedures or status of the application should be directed to the Technology Center.

Frances Hicks
Lead Paralegal
Office of Petitions

cc: Intellectual Property Law Group LLP
Old Bank of America Bldg.
12 South First Street, 12th floor
San Jose CA 95113

OIPE
MAY 26 2006
PATENT & TRADEMARK OFFICE

Knobbe Martens Olson & Bear LLP
Intellectual Property Law

2040 Main Street
Fourteenth Floor
Irvine, CA 92614
Tel 949-760-0404
Fax 949-760-9502
www.kmob.com

IFW
DAC

May 22, 2006

U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

To Whom It May Concern,

Enclosed please find documents listed below that were mailed to our firm; these documents do not appear to belong to us.

11/084,330	Decision on Petition Under 37 CFR 1.78 (a) (6)
60/793,626	Filing Receipt

Thank You,

Brandon Hamada
U.S. Docketing Clerk
(949) 721-5251

OIPE
MAY 25 2006
PATENT & TRADEMARK OFFICE

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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IRVINE CA 92614

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OFFICE OF PETITIONS

In re Application of	:	
DaCosta et al.	:	DECISION ON PETITION
Application No. 11/084,330	:	UNDER 37 CFR 1.78(a)(6)
Filed: 17 March, 2005	:	
For: MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS	:	

This is a decision on the petition under 37 CFR § 1.78(a)(6), filed on 26 September, 2005, to accept an unintentionally delayed claim under 35 U.S.C. § 119(e) for the benefit of prior-filed provisional Application No. 60/618,751, as set forth in the amendment filed on 14 October, 2005.

The petition is **DISMISSED**.

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> **(1)** the reference required by 35 U.S.C. § 119(e) and 37 CFR 1.78(a)(5)(i) to the prior-filed application, unless previously submitted;
> **(2)** the surcharge set forth in § 1.17(t); and
> **(3)** a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(5)(ii) and the date the claim was filed was unintentional. The Commissioner may require additional information where there is a question whether the delay was unintentional.

This pending nonprovisional application was filed on 17 March, 2005, within twelve months of the filing date of the prior-filed provisional application, Application No. 60/618,751, which was

filed on 17 March, 2004, and for which priority is claimed. A reference to the prior-filed provisional application has been included in an amendment to the first sentence of the specification following the title.

However, the amendment is not acceptable as drafted since it improperly incorporates by reference the prior-filed application. An incorporation by reference statement added after an application's filing date is not effective because no new matter can be added to an application after its filing date (*see* 35 U.S.C. § 132(a)). If an incorporation by reference statement is included in an amendment to the specification to add a benefit claim under 35 U.S.C. § 120 after the filing date of the application, the amendment would not be proper. When a benefit claim under 35 U.S.C. § 120 is submitted after the filing of an application, the reference to the prior application cannot include an incorporation by reference statement of the prior application. *See* Dart Industries v. Banner, 636 F.2d 684, 207 USPQ 273 (C.A.D.C. 1980). *Note* MPEP §§ 201.06(c) and 608.04(b).

Accordingly, before the petition under 37 CFR 1.78(a)(6) can be granted, a renewed petition under 37 CFR 1.78(a)(6) and either an Application Data Sheet or a proper amendment (complying with 37 CFR 1.121 or 37 CFR 1.76(b)(5)) deleting the incorporation by reference statement, are required.

Additionally, the amendment and the present petition are objected to because they have not been signed in accordance with 37 CFR 1.33(b). 37 CFR 1.33(b) requires that amendments and other papers filed in an application must be signed by a registered patent attorney or agent, an assignee in accordance with 37 CFR 3.71(b), or all of the applicants. The amendment and petition, however, are signed by only one of the joint inventors, Francis DeCosta. A properly signed amendment and petition in compliance with the above paragraph should be filed to correct the deficiencies.

Lastly, the revocation and power of attorney by assignee filed on 27 February, 2006, cannot be accepted because the showing of record does not indicate that the above-identified application claims benefit of the application under which the assignment is recorded. Petitioners should verify, in any renewed petition, that the power of attorney references the correct assignment document. As the papers have been signed by a registered patent attorney, however, a copy of this decision will be forwarded to

the address listed therein. All future correspondence will be mailed solely to the address of record.

Further correspondence with respect to this matter should be addressed as follows:

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Post Office Box 1450
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By hand: Customer Service Window
Mail Stop Petitions
Randolph Building
401 Dulany Street
Alexandria, VA 22314

By fax: (571) 273-8300
ATTN: Office of Petitions

Any questions concerning this decision on petition may be directed to Senior Petitions Attorney Douglas I. Wood at (571) 272-3231. All other inquiries concerning either the examination procedures or status of the application should be directed to the Technology Center.

Frances Hicks
Lead Paralegal
Office of Petitions

cc: Intellectual Property Law Group LLP
Old Bank of America Bldg.
12 South First Street, 12th floor
San Jose CA 95113

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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
www.uspto.gov

APPL NO.	FILING OR 371 (c) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
60/793,626	04/21/2006		100	2006.04.21.02CTS			

CONFIRMATION NO. 9354

Najib Babul
146 Medinah Drive
Blue Bell, PA 19422-3212

FILING RECEIPT

OC000000018659062

Date Mailed: 05/02/2006

Receipt is acknowledged of this provisional Patent Application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Najib Babul, Blue Bell, PA;

Power of Attorney: None

If Required, Foreign Filing License Granted: 05/01/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US60/793,626

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: Not applicable

Early-Publication Request: Not applicable

**** SMALL ENTITY ****

Title

Methods of treating carpal tunnel syndrome and compositions for use therefor

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no

effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

DAC
DW



Certificate Of Mailing

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage affixed in an envelope addressed to: "Mail Stop Petitions, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on the date below.

Date of deposit: 7/27/06

Kathleen Mak
Name of Person Mailing Paper or Fee

Signature

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Francis DaCosta et al.	Senior Petitions Attorney:	WOOD, Douglas I.
Application No.:	11/084,330	Art Unit:	2616
Filing Date:	March 17, 2005	**RENEWED PETITION TO ACCEPT AN UNINTENTIONALLY DELAYED CLAIM FOR PRIORITY**	
For:	*Multiple-Radio Mission Critical Wireless Mesh Networks*	Customer No.:	24943
Atty. Docket no.:	DACOSTAF.CIP3		

RENEWED PETITION TO ACCEPT AN UNINTENTIONALLY DELAYED CLAIM FOR PRIORITY - 37 CFR § 1.78

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

Dear Sir:

Applicant respectfully submits this renewed petition for the acceptance of an unintentionally delayed claim for priority under 35 U.S.C. §119(e) for the benefit of a prior-filed provisional application. The above-identified application has received a Decision on

the originally filed Petition dated May 4, 2006 requiring that before the petition can be granted, a renewed petition and a proper amendment must be submitted. This renewed petition is being submitted along with a preliminary amendment under 37 CFR §1.121 to amend the specification to contain a proper reference to the prior-filed application and remove the improper incorporation by reference statement. The surcharge required under 37 CFR §1.17(t) has been paid on September 26, 2005. The entire delay between the date the claim was due and date the claim was filed was unintentional. It is respectfully requested that this petition be granted.

Respectfully submitted,

Date: 07/27/2006

Otto O. Lee (Reg. No.: 37,871)
Juneko Jackson (Reg. No.: 48,870)
Intellectual Property Law Group LLP
Attorney for Applicant(s)

12 So. First St., Suite 1205
San Jose, CA 95131
Telephone: (408) 286-8933
Facsimile: (408) 286-8932

SAN DIEGO
Emerald Plaza Center
402 West Broadway, Suite 400
San Diego, California 92101

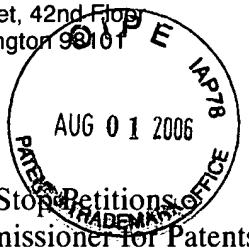
SEATTLE
Two Union Square Center
601 Union Street, 42nd Floor
Seattle, Washington 98101



INTELLECTUAL PROPERTY LAW GROUP LLP
· PATENT · TRADEMARK · COPYRIGHT ·
Old Bank of America Building
12 South First Street, 12th Floor
San Jose, California 95113
TEL: 408.286.8933
FAX: 408.286.8932
URL:www.iplg.com

LOS ANGELES
2600 Mission Street
Suite 100
San Marino, California 91108

WASHINGTON D.C.
601 Pennsylvania Avenue Center
South Building Suite 900
Washington, D.C. 20004



July 27, 2006

Via U.S. First Class Mail

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

Re: RENEWED PETITION TO ACCEPT AN UNINTENTIONALLY DELAYED CLAIM FOR PRIORITY UNDER 37 CFR § 1.78 AND PRELIMINARY AMENDMENT

Title:	*"Multiple-Radio Mission Critical Wireless Mesh Networks"*		
Inventors:	Francis DaCosta and Sriram Dayanandan		
Application No.:	11/084,330		
Filing Date:	03/17/2005	Senior Petitions Attorney:	Douglas I. Wood
Our File No.:	DACOSTAF.CIP3	Customer No.:	24943

Dear Sir:

Please find enclosed the following documents for the above-identified application:

1. A renewed Petition To Accept An Unintentionally Delayed Claim For Priority Under 37 CFR § 1.78 (2 pages);
2. a Preliminary Amendment (4 pages);
3. Power of Attorney by the Assignee (Form PTO/SB/80);
4. Statement Under 37 CFR 3.73(b) (Form PTO/SB/96);
5. copies of the new Assignment filed (3 pages); and
6. a return receipt request postcard.

If you have any questions, please do not hesitate to contact us.

Sincerely,
INTELLECTUAL PROPERTY LAW GROUP LLP

Juneko Jackson (Reg. No. 48,870)
Enclosures

Certificate Of Mailing

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage affixed in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on the date below.

Date of deposit: 7/27/2006

Kathleen Mok
Name of Person Mailing Paper or Fee

Signature



Certificate Of Mailing

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage affixed in an envelope addressed to: "Mail Stop Petitions, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on the date below.

Date of deposit: 7/27/06

Kathleen Mok
Name of Person Mailing Paper or Fee

Signature

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Francis DaCosta et al.	Senior Petitions Attorney: WOOD, Douglas I.
Application No: 11/084,330	Art Unit: 2616
Filing Date: March 17, 2005	**PRELIMINARY AMENDMENT**
For: *Multiple-Radio Mission Critical Wireless Mesh Networks*	Customer No.: 24943
Atty. Docket no.: DACOSTAF.CIP3	

PRELIMINARY AMENDMENT

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

Dear Sir:

This amendment is being submitted under 37 C.F.R. § 1.121 after the receipt of the Decision on the Petition dated May 4, 2006, hereinafter, "the Decision." The present amendment is being filed in order to correct a previously filed amendment which improperly included an incorporation by reference statement. The present amendment is being submitted with a renewed petition under 37 CFR 1.78(a)(6) to request the unintentionally delayed claim for priority along with a newly signed power of attorney by the assignee.

AMENDMENT TO THE SPECIFICATIONS

Please amend the specifications in the Cross-Reference Section, on page 1, line 7 with the following sentence:

-- This application is a continuation-in-part of U.S. Application No. 10/434,948, filed May 8, 2003, which is herein incorporated by reference, and claims priority to U.S. Provisional Application No. 60/554,246, filed March 17, 2004, and to U.S. Provisional Application No. 60/618,751, filed on March 17, 2004~~which are herein incorporated by reference~~. --

REMARKS

This Application is believed by Applicant to be in proper condition for allowance. Accordingly, allowance of all claims are respectfully requested.

I. PRIORITY

A renewed petition to accept an unintentionally delayed claim under 35 USC § 119(e) for the benefit of the prior-filed provisional application has been further submitted with this amendment and it is respectfully requested that the specification be amended as shown above, to include a reference to the prior-filed provisional Application no. 60/618,751, filed on March 17, 2004, in accordance with 37 C.F.R. §1.78(a)(6).

Further, as required by the Decision, the prior filed incorporation by reference statement has been deleted from the present amendment to the specification.

II. REVOCATION AND POWER OF ATTORNEY

A newly signed power of attorney by assignee has been filed with this amendment along with copies of an assignment of the applications to which the present application claims benefit. The assignment has concurrently been submitted to the Assignments Division for recordation under separate cover.

III. CONCLUSION

Applicant respectfully requests the present amendment be accepted and the accompanying renewed petition be granted. Should the Senior Petition Attorney or

Examiner have any questions regarding the above amendment, they are requested to teiephone Applicant's representative at the number listed below.

Respectfully submitted,

Date: 07/27/2006

Otto O. Lee (Reg. No.: 37,871)
Juneko Jackson (Reg. No.: 48,870)
Intellectual Property Law Group LLP
Attorney for Applicant(s)

12 So. First St., Suite 1205
San Jose, CA 95131
Telephone: (408) 286-8933
Facsimile: (408) 286-8932

OIPE IAP78
AUG 0 1 2006
PATENT & TRADEMARK OFFICE

PTO/SB/80 (01-06)
Approved for use through 12/31/2008. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

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

I hereby appoint:

[X] Practitioners associated with the Customer Number: 24943

OR

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

Name	Registration Number	Name	Registration Number

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

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

[X] The address associated with Customer Number: 24943

OR

[ ] Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
ADVANCED CYBERNETICS GROUP, INC.
2953 Bunker Hill Lane, #400
Santa Clara, CA 95054

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

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

Signature	Francis daCosta	Date	6/19/2006
Name	Francis daCosta	Telephone	408-373-7700
Title	Founder		

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

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

OIPE IAP78
AUG 01 2006
PATENT & TRADEMARK OFFICE

PTO/SB/96 (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.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Francis Dacosta, Sriram Dayanandan

Application No./Patent No.: 11/084,330 Filed/Issue Date: 03/17/2005

Entitled: Multiple-Radio Mission Critical Wireless Mesh Networks

Advanced Cybernetics Group, Inc., 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 302.08]

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

Signature	7/27/2006 Date
Juneko Jackson	408-286-8933
Printed or Typed Name	Telephone Number
Patent Attorney	
Title	

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

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

ASSIGNMENT

WHEREAS, I, Francis daCosta, (hereinafter referred to as "ASSIGNOR"), is the owner of applications for United States Letters Patent listed on the attached Schedule I which form part of this assignment; and is the owner of all rights, title and interest in and to the inventions illustrated, described and claimed in said applications for Letters Patent.

WHEREAS, ADVANCED CYBERNETICS GROUP, INC., a corporation organized and existing under the laws of the State of California, having its principal place of business at 2943 Bunker Hill Lane, #400, Santa Clara, CA 95054 (hereinafter referred to as "ASSIGNEE"), is desirous of acquiring my entire right, title and interest in and to the inventions and said applications for Letters Patent;

NOW THEREFORE, for and in consideration of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said **ASSIGNOR**, has sold, assigned and set over, and by these presents does hereby sell, assign and set over unto the said **ASSIGNEE**, its legal representatives, successors and assigns, its entire rights, title and interest in and to said applications to United States Letters Patent, and the inventions disclosed, described or claimed in said applications to Letters Patent, together with all divisions, reissues, continuations and extensions thereof, and any and all rights of recovery for past infringement of said applications to Letters Patent.

I also hereby sell and assign to said ASSIGNEE, its successors, assigns and legal representatives the full and exclusive rights, title and interest to the inventions disclosed in said applications for patent and any applications throughout the world, including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in its own name throughout the world including all rights of priority, all rights to publish cautionary notices reserving ownership of said inventions and all rights to register said inventions in appropriate registries; and

I further agree to execute any and all powers of attorney, applications, assignments, declarations, affidavits, and any other papers in connection therewith necessary to perfect such rights, title and interest in ASSIGNEE, its successors, assigns and legal representatives.

I hereby further agree that I will communicate to said ASSIGNEE, or its successors, assigns and legal representatives, any facts known to me respecting any improvements; and, at the expense of said ASSIGNEE, to testify in any legal proceedings, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and substitute applications, make all lawful oaths, and generally do everything possible to vest title in said ASSIGNEE and to aid said ASSIGNEE, its successors, assigns and legal representatives to obtain and enforce proper protection for said inventions in all countries.

6/19/2006
Date

Name: Francis daCosta

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 2006, before me, _____ a Notary Public in and for the State and County aforesaid, personally appeared _____, known by me to be the person of the above name who signed and sealed the foregoing instrument, and acknowledged the same to be his own free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this _____ day of _____, 2006.

(seal)

Notary Public

ASSIGNMENT

WHEREAS, I, Sriram Dayanandan, (hereinafter referred to as "ASSIGNOR"), is the owner of applications for United States Letters Patent listed on the attached Schedule I which form part of this assignment; and is the owner of all rights, title and interest in and to the inventions illustrated, described and claimed in said applications for Letters Patent.

WHEREAS, ADVANCED CYBENETICS GROUP, INC., a corporation organized and existing under the laws of the State of California, having its principal place of business at 2943 Bunker Hill Lane, #400, Santa Clara, CA 95054 (hereinafter referred to as "ASSIGNEE"), is desirous of acquiring my entire right, title and interest in and to the inventions and said applications for Letters Patent;

NOW THEREFORE, for and in consideration of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said **ASSIGNOR**, has sold, assigned and set over, and by these presents does hereby sell, assign and set over unto the said **ASSIGNEE**, its legal representatives, successors and assigns, its entire rights, title and interest in and to said applications to United States Letters Patent, and the inventions disclosed, described or claimed in said applications to Letters Patent, together with all divisions, reissues, continuations and extensions thereof, and any and all rights of recovery for past infringement of said applications to Letters Patent.

I also hereby sell and assign to said ASSIGNEE, its successors, assigns and legal representatives the full and exclusive rights, title and interest to the inventions disclosed in said applications for patent and any applications throughout the world, including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in its own name throughout the world including all rights of priority, all rights to publish cautionary notices reserving ownership of said inventions and all rights to register said inventions in appropriate registries; and

I further agree to execute any and all powers of attorney, applications, assignments, declarations, affidavits, and any other papers in connection therewith necessary to perfect such rights, title and interest in ASSIGNEE, its successors, assigns and legal representatives.

I hereby further agree that I will communicate to said ASSIGNEE, or its successors, assigns and legal representatives, any facts known to me respecting any improvements; and, at the expense of said ASSIGNEE, to testify in any legal proceedings, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and substitute applications, make all lawful oaths, and generally do everything possible to vest title in said ASSIGNEE and to aid said ASSIGNEE, its successors, assigns and legal representatives to obtain and enforce proper protection for said inventions in all countries.

6/19/2006
Date

Name: Sriram Dayanandan

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 2006, before me, _____ a Notary Public in and for the State and County aforesaid, personally appeared _____, known by me to be the person of the above name who signed and sealed the foregoing instrument, and acknowledged the same to be his own free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this _____ day of _____, 2006.

(seal)

Notary Public

Schedule I

Application No.	Title	Filing Date
60/421,930	Adaptive application aware wireless LAN using distributed control	10/28/2002
10/434,948	High performance wireless networks using distributed control	05/08/2003
10/641,917	Low cost implementation for high performance embedded systems	08/15/2003
60/535,668	Coordination between simultaneously operating Pico-Nets in IEEE 802.15.03 wireless networks	01/09/2004
11/036,297	Coordination between simultaneously operating Pico-Nets in high mobility wireless networks	01/07/2005
60/554,246	Multiple radio solutions for wireless mesh networks	03/17/2004
60/618,751		03/17/2004
11/084,330	Multiple-radio mission critical wireless mesh networks	03/17/2005
60/696,144	Methods for managing latency and jitter on wireless LANs	06/30/2005
11/266,884	Managing latency and jitter on wireless LANs	11/04/2005
60/815,217	Mobility extensions for wireless multiple radio mesh	6/19/2006
60/543,421	Coordination between simultaneously operating pico-nets in IEEE 802.15.X wireless networks	2/09/2004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		)	Senior Petitions Attorney:
	Francis DaCosta et al.	)	WOOD, Douglas I.
Application No:	11/084,330	)	Art Unit: 2616
Filing Date:	March 17, 2005	)	**PRELIMINARY AMENDMENT**
For:	*Multiple-Radio Mission Critical Wireless Mesh Networks*	)	Customer No.: 24943
Atty. Docket no.:	DACOSTAF.CIP3	)	

PRELIMINARY AMENDMENT

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

Dear Sir:

This amendment is being submitted under 37 C.F.R. § 1.121 after the receipt of the Decision on the Petition dated May 4, 2006, hereinafter, "the Decision." The present amendment is being filed in order to correct a previously filed amendment. The present amendment is being submitted after discussion with Senior Petitions Attorney Wood to correctly indicate the date of filing of the referred to application no. 60/618,751 in the amendment to the specification.

AMENDMENT TO THE SPECIFICATIONS

Please amend the specifications in the Cross-Reference Section, on page 1, line 7 with the following sentence:

-- This application is a continuation-in-part of U.S. Application No. 10/434,948, filed May 8, 2003, which is herein incorporated by reference~~, and~~. This application also claims priority to U.S. Provisional Application No. 60/554,246, filed March 17, 2004, and to U.S. Provisional Application No. 60/618,751, filed on October 14, 2004~~which are herein incorporated by reference~~. --

REMARKS

This Application is believed by Applicant to be in proper condition for allowance. Accordingly, allowance of all claims are respectfully requested.

I. PRIORITY

A renewed petition to accept an unintentionally delayed claim under 35 USC § 119(e) for the benefit of the prior-filed provisional application has been previously submitted and it is respectfully requested that the specification be amended as shown above, to include a reference to the prior-filed provisional Application no. 60/618,751, filed on October 14, 2004, in accordance with 37 C.F.R. §1.78(a)(6).

Further, as required by the Decision, the prior filed incorporation by reference statement has been deleted from the present amendment to the specification.

II. REVOCATION AND POWER OF ATTORNEY

A newly signed power of attorney by assignee has been filed with this amendment along with copies of an assignment of the applications to which the present application claims benefit. The assignment has concurrently been submitted to the Assignments Division for recordation under separate cover.

III. CONCLUSION

Applicant respectfully requests the present amendment be accepted and the accompanying renewed petition be granted. Should the Senior Petition Attorney or

Examiner have any questions regarding the above amendment, they are requested to telephone Applicant's representative at the number listed below.

Respectfully submitted,

Date: November 20, 2006

/Juneko Jackson/

Otto O. Lee (Reg. No.: 37,871)
Juneko Jackson (Reg. No.: 48,870)
Intellectual Property Law Group LLP
Attorney for Applicant(s)

12 So. First St., Suite 1205
San Jose, CA 95131
Telephone: (408) 286-8933
Facsimile: (408) 286-8932

Electronic Acknowledgement Receipt

EFS ID:	1325715
Application Number:	11084330
International Application Number:	
Confirmation Number:	3657
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	24943
Filer:	Otto O. Lee/Juneko Jackson
Filer Authorized By:	Otto O. Lee
Attorney Docket Number:	DACOSTAF.CIP3
Receipt Date:	20-NOV-2006
Filing Date:	17-MAR-2005
Time Stamp:	21:08:41
Application Type:	Utility

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1		Revised_amendment_2.pdf	87057	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Specification	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	4
Warnings:			
Information:			
	Total Files Size (in bytes):	87057	

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.

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number: 11/084,330

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))							
SEARCH FEE (37 CFR 1.16(k), (l), or (m))							
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))							
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

11-20-06

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 9	Minus	** 20	= 0	x 25 =		OR	x 50 =	
Independent (37 CFR 1.16(h))	* 7	Minus	*** 7		x 100 =		OR	x 200 =	
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	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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.

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.

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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
11/084,330	03/17/2005	2617	1090	DACOSTAF.CIP3	21	9	7

CONFIRMATION NO. 3657

CORRECTED FILING RECEIPT

24943
INTELLECTUAL PROPERTY LAW GROUP LLP
12 SOUTH FIRST STREET
SUITE 1205
SAN JOSE, CA95113

Date Mailed: 12/05/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Francis daCosta, San Jose, CA;
Sriram Dyanandan, San Jose, CA;

Power of Attorney: The patent practitioners associated with Customer Number 24943

Domestic Priority data as claimed by applicant

This application is a CIP of 10/434,948 05/08/2003
and claims benefit of 60/554,246 03/17/2004
and claims benefit of 60/618,751 10/14/2004

Foreign Applications

If Required, Foreign Filing License Granted: 04/23/2005

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/084,330**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

** SMALL ENTITY **

Title

Multiple-radio mission critical wireless mesh networks

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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12 SOUTH FIRST STREET
SUITE 1205
SAN JOSE CA 95113

COPY MAILED
DEC 20 2006
OFFICE OF PETITIONS

In re Application of :
da Costa et al. :
Application No. 11/084,330 : DECISION ON PETITION
Filed: 17 March, 2005 : UNDER 37 CFR 1.78(a)(6)
Attorney Docket No. DACOSTAF.CIP3 :

This is a decision on the renewed petition under 37 CFR 1.78(a)(6), filed on 1 August, 2006, to accept an unintentionally delayed claim under 35 U.S.C. § 119(e) for the benefit of the prior-filed provisional application set forth in the amendment filed on 20 November, 2006.

The petition is **GRANTED**.

A petition for acceptance of a claim for late priority under 37 CFR 1.78(a)(6) is only applicable to those applications filed on or after November 29, 2000. Further, the petition is appropriate only after the expiration of the period specified in 37 CFR 1.78(a)(5)(ii) and must be filed during the pendency of the nonprovisional application. In addition, the petition must be accompanied by:

(1) the reference required by 35 U.S.C. § 119(e) and 37 CFR 1.78(a)(5)(i) of the prior-filed application, unless previously submitted;
(2) the surcharge set forth in § 1.17(t); and
(3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(5)(ii) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

Additionally, the instant nonprovisional application must be pending at the time of filing of the reference to the prior-filed provisional application as required by 37 CFR 1.78(a)(5)(ii). Further, the nonprovisional application claiming the benefit of the prior-filed provisional application must have been filed within twelve months of the filing date of the prior-filed provisional application.

All the above requirements having been satisfied, the late claim for priority under 35 U.S.C. § 119(e) is accepted as being unintentionally delayed.

The granting of the petition to accept the delayed benefit claim to the prior-filed application under 37 CFR 1.78(a)(6) should not be construed as meaning that this application is entitled to the benefit of the prior-filed application. In order for this application to be entitled to the benefit of the prior-filed application, all other requirements under 35 U.S.C. § 119(e) and 37 CFR 1.78(a)(4) and (a)(5) must be met. Similarly, the fact that the corrected Filing Receipt accompanying this decision on petition includes the prior-filed application should not be construed as meaning that applicant is entitled to the claim for benefit of priority to the prior-filed application noted thereon. Accordingly, the examiner will, in due course, consider this benefit claim and determine whether the application is entitled to the benefit of the earlier filing date.

It is noted that the preliminary amendment filed with the present petition does not correctly reference the filing date of the prior-filed provisional application. However, on 20 November, 2006, prior to the mailing of this decision, a new preliminary amendment was filed referencing the correct filing date for prior-filed provisional application No. 60/618,751.

A corrected Filing Receipt, which includes the priority claim to the prior-filed provisional application, accompanies this decision on petition.

Receipt of the power of attorney filed with the present petition is acknowledged.

Any inquiries concerning this decision may be directed to Patent Attorney Douglas I. Wood at (571) 272-3231. All other inquiries concerning either the examination procedures or status of the application should be directed to the Technology Center.

This matter is being referred to Technology Center Art Unit 2617 for appropriate action on the amendment filed on 20 November, 2006, including consideration by the examiner of applicant's entitlement to claim benefit of priority under 35 U.S.C. § 119(e) to the prior-filed provisional application.

Christina Tartera Donnell

Christina Tartera Donnell
Senior Petitions Attorney
Office of Petitions
Office of the Deputy Commissioner
for Patent Examination Policy

ATTACHMENT: Corrected Filing Receipt

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APPL NO.	FILING OR 371 (c) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
11/084,330	03/17/2005	2617	1090	DACOSTAF.CIP3	21	9	7

CONFIRMATION NO. 3657

24943
INTELLECTUAL PROPERTY LAW GROUP LLP
12 SOUTH FIRST STREET
SUITE 1205
SAN JOSE, CA 95113

CORRECTED FILING RECEIPT

OC000000021473257

Date Mailed: 12/05/2006

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Applicant(s)

Francis daCosta, San Jose, CA;
Sriram Dyanandan, San Jose, CA;

Power of Attorney: The patent practitioners associated with Customer Number **24943**.

Domestic Priority data as claimed by applicant

This application is a CIP of 10/434,948 05/08/2003
and claims benefit of 60/554,246 03/17/2004
and claims benefit of 60/618,751 10/14/2004

Foreign Applications

If Required, Foreign Filing License Granted: 04/23/2005

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US11/084,330

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Multiple-radio mission critical wireless mesh networks

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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Bib Data Sheet

CONFIRMATION NO. 3657

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/084,330	03/17/2005 RULE	370	2617	DACOSTAF.CIP3

APPLICANTS

Francis daCosta, San Jose, CA;
Sriram Dyanandan, San Jose, CA;

**** CONTINUING DATA ***************************

This application is a CIP of 10/434,948 05/08/2003
and claims benefit of 60/554,246 03/17/2004
and claims benefit of 60/618,751 10/14/2004

**** FOREIGN APPLICATIONS *********************

IF REQUIRED, FOREIGN FILING LICENSE GRANTED **
04/23/2005

** SMALL ENTITY **

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☐ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged _____ Examiner's Signature _____ Initials	CA	21	9	7

ADDRESS
24943

TITLE

Multiple-radio mission critical wireless mesh networks

FILING FEE RECEIVED	FEES: Authority has been given in Paper
1090	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

PTO/SB/83 (01-06)
Approved for use through 12/31/2008. OMB 0651-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	11/084,330
Filing Date	03/17/2005
First Named Inventor	Francis daCosta
Art Unit	2617
Examiner Name	TROST IV, WILLIAM GEORGE
Attorney Docket Number	DACOSTAF.CIP3

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

Please withdraw me as attorney or agent for the above identified patent application, and

- ☐ all the attorneys/agents of record.
- ☐ the attorneys/agents (with registration numbers) listed on the attached paper(s), or
- ☑ the attorneys/agents associated with Customer Number: 24943

NOTE: This box can only be checked when the power of attorney of record in the application is to all the practitioners associated with a customer number.

The reasons for this request are: The practitioners have been discharged by the client.

CORRESPONDENCE ADDRESS

1. ☐ The correspondence address is NOT affected by this withdrawal.
2. ☑ Change the correspondence address and direct all future correspondence to:

☐ The address associated with Customer Number:

OR

☑ Firm or Individual Name	Lee Van Pelt, Esq.				
Address	Van Pelt, Yi & James LLP 10050 N. Foothill Blvd., Suite 200				
City	Cupertino	State	CA	Zip	95014-5601
Country	USA				
Telephone	408-973-2585	Email			

Signature	/Juneko Jackson/		
Name	Juneko Jackson	Registration No.	48,870
Date	03/08/2007	Telephone No.	408-286-8933

NOTE: Withdrawal is effective when approved rather than when received. Unless there are at least 30 days between approval of withdrawal and the expiration date of a time period for response or possible extension period, the request to withdraw is normally disapproved.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	1596518
Application Number:	11084330
International Application Number:	
Confirmation Number:	3657
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	24943
Filer:	Otto O. Lee
Filer Authorized By:	
Attorney Docket Number:	DACOSTAF.CIP3
Receipt Date:	15-MAR-2007
Filing Date:	17-MAR-2005
Time Stamp:	17:51:33
Application Type:	Utility

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Request to withdraw as attorney - IA	withdrawal_CIP3.pdf	327065	no	1
Warnings:					

Information:	
Total Files Size (in bytes):	327065

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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.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1157	(backhaul backbone) with network and (full adj duplex)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:08
L2	65	(backhaul backbone) with network and (full adj duplex) and (mesh multihop multi adj hop "multi-hop") near2 network	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:09
L3	52	(backhaul backbone) with network and (full adj duplex) and (mesh multihop multi adj hop "multi-hop") near2 network and (relay repeater$)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:13
L4	23	"2-radio"	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:16
L5	0	"2003040336"	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:16
L6	1	"20030040336"	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:16
L7	212	f\ull adj duplex with (repeaters relay$)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:17
L8	212	full adj duplex with (repeaters relay$)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:17
L9	193	full adj duplex with (repeaters relay$) and network	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:17
L10	114	full adj duplex with (repeaters relay$) and network and wireless	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:25
L11	545	full adj duplex same (repeaters relay$)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:25
L12	14	full adj duplex same (repeaters relay$).ab.	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:32
L13	315823	mesh multi-hop	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:32
L14	709	(mesh multi-hop multi adj hop) and radio with node	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:33
L15	1103	(mesh multi-hop multi adj hop) and radio with (relay$ repeater$ node)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:33
L16	105	(mesh multi-hop multi adj hop) and radio with (relay$ repeater$ node) and full adj duplex	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:42
L17	9	(mesh multi-hop multi adj hop) and radio with (relay$ repeater$ node) and full adj duplex same interference	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:34
L18	43	(mesh multi-hop multi adj hop) and (multi adj radio)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:45

EAST Search History

L19	901	"370"/$.ccls. and (backbone backhaul) and (mesh multihop multi-hop)	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:46
L20	123	"370"/$.ccls. and (backbone backhaul) and (mesh multihop multi-hop).ab.	US-PGPUB; USPAT	OR	OFF	2007/07/08 10:47
L21	129	"370"/$.ccls. and (backbone backhaul) and (mesh multihop multi-hop) same (repeaters relay$)	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:00
L22	901	"370"/$.ccls. and (backbone backhaul) and (mesh multihop multi-hop)	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:02
L23	617	"370"/$.ccls. and (backbone backhaul) and (mesh multihop multi-hop) and distributed	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:02
L24	129	"370"/$.ccls. and (backbone backhaul) and (mesh multihop multi-hop) same distributed	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:13
L25	1	(backbone backhaul) and (mesh multihop multi-hop) same distributed	EPO	OR	OFF	2007/07/08 11:14
L26	6	(backbone backhaul) and (mesh multihop multi-hop)	EPO	OR	OFF	2007/07/08 11:21
L27	49	(backbone backhaul) and (mesh multihop multi-hop)	DERWENT; IBM_TDB	OR	OFF	2007/07/08 11:29
L28	42	(relay repeaters node) with radios	DERWENT; IBM_TDB	OR	OFF	2007/07/08 11:30
L29	0	(relay repeaters node) with radios and "370"/$.ccls	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/07/08 11:30
L30	0	(relay repeaters node) with radios and "370"/$.ccls	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:31
L31	0	(relay repeaters node) with radio and "370"/$.ccls	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:31
L32	2791	two near2 radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:31
L33	767	two near2 radios and wireless near2 network	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:32
L34	25	(two and three and multiple) near2 radios and wireless near2 network	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:33

EAST Search History

L35	20	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/08 11:45
L36	59	"6028857"	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:54
L37	409	repeater with (redundancy malfuncton reliability)	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:54
L38	15	repeater with (redundancy malfuncton reliability) with failure$	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:55
L39	0	repeater with tadio and (redundancy malfuncton reliability) with failure$	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:55
L40	32	repeater with radio and (redundancy malfuncton reliability) with failure$	US-PGPUB; USPAT	OR	OFF	2007/07/08 11:56
L41	39	repeater with radio and (redundancy malfunction reliability) with failure$	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:11
L42	315837	(mesh multi adj hop "multi-hop")	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:12
L43	1210	(mesh multi adj hop "multi-hop") and radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:12
L44	143	(mesh multi adj hop "multi-hop") same radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:29
L45	7	(mesh multi adj hop "multi-hop") same radios.ab.	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:12
L46	16	("5371780" | "5471469" | "5488608" | "5530693" | "5673031" | "6085076" | "6110103").PN. OR ("6298053").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/08 12:18
L47	2066	"370"/$.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:30
L48	294	"370"/$.ccls. and radios and full adj duplex	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:43
L49	42	mesh adj network and interference.ab.	US-PGPUB; USPAT	OR	OFF	2007/07/08 12:53
L50	19	mesh adj network and distributed with software with control	US-PGPUB; USPAT	OR	OFF	2007/07/08 13:26
L51	2	"20020085719"	US-PGPUB; USPAT	OR	OFF	2007/07/08 13:28

EAST Search History

L52	2791	two near2 radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 13:28
L53	781	two near2 radios and (node router ap access adj point)	US-PGPUB; USPAT	OR	OFF	2007/07/08 13:29
L54	137	two near2 radios same (node router ap access adj point)	US-PGPUB; USPAT	OR	OFF	2007/07/08 13:58
L55	198	(three multiple two) near2 radios same (node router ap access adj point)	US-PGPUB; USPAT	OR	OFF	2007/07/08 17:55
L56	10	("20020037742" | "20020183013" | "4010474" | "4723294" | "5581268" | "5628049" | "6100847" | "6298243" | "6564044" | "6759924").PN. OR ("6961596"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/08 15:25
L57	28	("6259898").URPN.	USPAT	OR	OFF	2007/07/08 15:36
L58	19	(three multiple two) near2 radios same (node router ap access adj point) and VoIP	US-PGPUB; USPAT	OR	OFF	2007/07/08 15:44
L59	2	(three multiple two) near2 radios same (node router ap access adj point) and packets with concatenat$3	US-PGPUB; USPAT	OR	OFF	2007/07/08 16:26
L60	3	(three multiple two) near2 radios same (node router ap access adj point) and service adj radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 16:37
L61	3	(three multiple two) near2 radios same (node router ap access adj point) and service adj radios	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/07/08 16:40
L62	9	(three multiple two) near2 radios and service adj radios	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/07/08 16:38
L63	18	(node router ap access adj point) and service adj radios	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/07/08 17:00
L64	1	"20050232179"	US-PGPUB; USPAT	OR	OFF	2007/07/08 17:54

EAST Search History

L65	198	(three multiple two) near2 radios same (node router ap access adj point)	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:36
L66	113	(three multiple two) near2 radios same (node router ap access adj point) and voice same data	US-PGPUB; USPAT	OR	OFF	2007/07/08 17:55
L67	8	(three multiple two) near2 radios same (node router ap access adj point) same voice same data	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:02
L68	65	radios same (node router ap access adj point) same voice same data	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:02
L69	0	("6965594").URPN.	USPAT	OR	OFF	2007/07/08 18:22
L70	0	(radios) same voice with IP and concatenate with packets	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:23
L71	1	(radios) same voice with IP and concatenate$ with packets	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:24
L72	141	voice with IP and concatenat$4 with packets	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:25
L73	1	voice with IP and concatenat$4 with packets and mesh adj networks	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:25
L74	8	voice with IP and concatenat$4 with packets and radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:35
L75	146	voice with IP same packets and radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:52
L76	46	"5546397"	US-PGPUB; USPAT	OR	OFF	2007/07/08 18:52
L77	12	"5546397" and break	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:01
L78	1	(three multiple two) near2 radios same (node router ap access adj point) and voice with data with (exclusively reserved)	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:03
L79	1	radios with exclusively with voice	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:04
L80	33	radio with exclusively with voice	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:04
L81	1648	separate with voice and data with (node router access adj point)	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:06
L82	13	separate with voice and data with (node router access adj point) same radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:11
L83	1710	separate with voice and data with radio	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:11

EAST Search History

L84	331	separate with voice with data with radio	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:11
L85	45	separate with voice with data with radio and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:25
L86	2465	voip and (packetiz$4 concatenat$4)	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:26
L87	29	voip same (packetiz$4 concatenat$4) and radios	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:29
L88	140	(node router) with (packetiz$4 concatenat$4) and voip	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:30
L89	54	radio and (node router) with (packetiz$4 concatenat$4) and voip	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:30
L90	54	(wirelss radio) and (node router) with (packetiz$4 concatenat$4) and voip	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:30
L91	103	(wireless radio) and (node router) with (packetiz$4 concatenat$4) and voip	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:31
L92	14	(wireless radio) with (node router) with (packetiz$4 concatenat$4) and voip	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:32
L93	19	(wireless radio) same (node router) with (packetiz$4 concatenat$4) and voip	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:32
L94	19	(three multiple two) near2 radios same (node router ap access adj point) and VoIP	US-PGPUB; USPAT	OR	OFF	2007/07/08 19:37
S270	2403	DCS and modulation	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:17
S271	407	DCS same modulation	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:29
S272	20	(multi dual) adj band and single adj power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:40
S273	46	("5212813" | "5930373" | "6317608").PN. OR ("6400963"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/05 12:38
S274	24	("4723306" | "5541554" | "5661434" | "5774017" | "5969582" | "5973557" | "6078794" | "6091966" | "6188877" | "6195536" | "6215359" | "6243566").PN. OR ("6317608").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/05 12:40
S275	10	(multi dual) adj band and GSM and CDMA and single adj power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:51

EAST Search History

S276	28	(multi dual) adj mode and single adj power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:01
S277	1963	(multi dual) adj mode and power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:01
S278	350	(multi dual) adj mode same power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:44
S279	27514	(multi dual) adj mode (WCDMA and DCS)	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:45
S280	27	(multi dual) adj mode same (WCDMA and DCS)	US-PGPUB; USPAT	OR	OFF	2007/07/05 14:11
S281	1	(multi dual) adj mode same (WCDMA and DCS)	EPO; JPO	OR	OFF	2007/07/05 14:13
S282	1	("dual-mode" "multi-mode") same (WCDMA and DCS)	EPO; JPO	OR	OFF	2007/07/05 14:14
S283	27	("dual-mode" "multi-mode") same (WCDMA and DCS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/07/05 15:45

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	29	logical adj spanning adj tree	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:17
L2	2	logical adj spanning adj tree.ti.	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:17
L3	12	("5740366" | "6370146" | "6385174" | "6456599" | "6791949" | "6816460" | "6836463" | "6845091").PN. OR ("6982960"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/09 08:26
L4	14843	(addition association) with nodes	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:27
L5	320	(addition association) with nodes and mesh adj network	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:27
L6	12	(addition association) with nodes and mesh adj network and multiple adj radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:27
L7	22	("5355371" | "5455569" | "5495479" | "5850592" | "5974236" | "5987011" | "6304556" | "6349091" | "6349210" | "6385174" | "6396814" | "6456599" | "6512935" | "6535498").PN. OR ("6791949").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/09 08:34
L8	64	mesh adj network and mobile adj node	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:38
L9	1	"20050232179"	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:41
L10	2	mesh adj network and (scanning adj radio)	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:42
L11	184	self adj healing and mesh adj network	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:54
L12	398	radios with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:54
L13	20	radios with voice with data and (nodes ap access adj points router) with (repeater relay)	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:57
L14	7	separate with radios with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:58
L15	240	(relay repeater) with radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 08:58
L16	43	(relay repeater) with radios same voice same data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:02

EAST Search History

L17	54	(relay repeater nodes router) with radios same voice with radio$ same data with radio$	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:08
L18	10	(relay repeater nodes router) with voice near relay same data near relay	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:10
L19	110	(relay repeater nodes router) with separate with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:11
L20	0	(relay repeater nodes router) with separate with voice with data with radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:11
L21	24	(relay repeater nodes router) with separate with voice with data and radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:31
L22	0	(relay repeater nodes router) with separately with voice with data and radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:31
L23	2	(relay repeater nodes router) with separately with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:32
L24	15	(relay repeater nodes router) same separately with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:37
L25	0	(relay repeater nodes router) same separately with voice with data with radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:37
L26	0	(relay repeater nodes router) same separately with voice with data same radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:37
L27	398	radios with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:38
L28	1	service adj radios with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:38
L29	183	(router node relay) and radios with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:38
L30	197	(router node relay repeater) and radios with voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:39
L31	65	(router node relay repeater) with radios same voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 09:39
L32	0	("7187941").URPN.	USPAT	OR	OFF	2007/07/09 09:57
L33	1639	separate with data with radio	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:03
L34	428	separate with data with radio and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:03
L35	1326	separate with data with voice and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:03

EAST Search History

L36	68	separate with radio with voice and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:03
L37	46	34 and 36	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:08
L38	420	(separate exclusive) with (voice with data) with (radio$ port)	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:09
L39	537	(separate exclusive) with (voice with data) with (radio$ port dedicated)	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:09
L40	122	(separate exclusive) with (voice with data) with (dedicated)	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:24
L41	1	(separate exclusive) with (voice with data) with (dedicated) same relay	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:10
L42	304	multiple adj radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:27
L43	777	multiple adj (radios transceiver$ transmitter$ receiver$) same (node$ router$ relay$ repeater$)	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:28
L44	107	multiple adj (radios transceiver$ transmitter$ receiver$) same (node$ router$ relay$ repeater$) and (adhoc mesh ad-hoc) with network	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:31
L45	2	multiple adj (radios transceiver$ transmitter$ receiver$) same (node$ router$ relay$ repeater$) and (adhoc mesh ad-hoc) with network and (radio with voice with data)	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:29
L46	26	multiple adj (radios transceiver$ transmitter$ receiver$) same (node$ router$ relay$ repeater$) and (adhoc mesh ad-hoc) with network and voice with data	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:46
L47	0	mulitple adj radios with dedicaated \with radio with voice	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:47
L48	0	mulitple adj radios with dedicaated with radio with voice	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:48
L49	208	mesh adj networks and latency	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:48
L50	87	mesh adj networks and latency and voice and data	US-PGPUB; USPAT	OR	OFF	2007/07/09 10:48
L51	20	mesh adj networks and latency and voice and data and radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:09
L52	54	self adj healing with mesh adj network	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:10

EAST Search History

L53	0	self adj healing with mesh adj network and relay with sensors	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:10
L54	16	self adj healing with mesh adj network and relay	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:11
L55	23	self adj (healing organizing) with mesh adj network and relay	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:17
L56	6545	370/315,338,349,238,437.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:23
L57	441	370/315,338,349,238,437.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:23
L58	30	370/315,338,349,238,437.ccls. and radios and healing	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:24
L59	0	("7206294").URPN.	USPAT	OR	OFF	2007/07/09 11:30
L60	373	self adj healing with networks	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:31
L61	213	self adj healing with networks and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:34
L62	3	self adj healing with networks.ti. and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:32
L63	3	("6490244").URPN.	USPAT	OR	OFF	2007/07/09 11:33
L64	7	self adj healing with networks.ab. and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:49
L65	18	mesh adj networks with (mobile moving removal addition) with nodes	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:52
L66	0	self adj updating same mesh adj networks	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:52
L67	0	self adj updating and mesh adj networks	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:53
L68	2	lee near chung and self adj organizing adj network	US-PGPUB; USPAT	OR	OFF	2007/07/09 11:54
S270	2403	DCS and modulation	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:17
S271	407	DCS same modulation	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:29
S272	20	(multi dual) adj band and single adj power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:40
S273	46	("5212813" | "5930373" | "6317608").PN. OR ("6400963").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/05 12:38

EAST Search History

S274	24	("4723306" | "5541554" | "5661434" | "5774017" | "5969582" | "5973557" | "6078794" | "6091966" | "6188877" | "6195536" | "6215359" | "6243566").PN. OR ("6317608").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/05 12:40
S275	10	(multi dual) adj band and GSM and CDMA and single adj power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 12:51
S276	28	(multi dual) adj mode and single adj power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:01
S277	1963	(multi dual) adj mode and power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:01
S278	350	(multi dual) adj mode same power adj amplifier	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:44
S279	27514	(multi dual) adj mode (WCDMA and DCS)	US-PGPUB; USPAT	OR	OFF	2007/07/05 13:45
S280	27	(multi dual) adj mode same (WCDMA and DCS)	US-PGPUB; USPAT	OR	OFF	2007/07/05 14:11
S281	1	(multi dual) adj mode same (WCDMA and DCS)	EPO; JPO	OR	OFF	2007/07/05 14:13
S282	1	("dual-mode" "multi-mode") same (WCDMA and DCS)	EPO; JPO	OR	OFF	2007/07/05 14:14
S283	27	("dual-mode" "multi-mode") same (WCDMA and DCS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/07/05 15:45

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCosta	DACOSTAF.CIP3	3657

24943 7590 07/16/2007

INTELLECTUAL PROPERTY LAW GROUP LLP
12 SOUTH FIRST STREET
SUITE 1205
SAN JOSE, CA 95113

EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	
ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
07/16/2007	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)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	Muthuswamy G. Manoharan	2617	

-- 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 *17 March 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) *1-9* 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) *1-9* 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 _____ 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 § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1,2 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Elson et al. (hereinafter Elson) (US 2003/0012168).

Regarding **claim 1**, Elson teaches a wireless mesh network node containing at least two relay radios for performing a packet relay function, wherein a first relay radio can receive packets while a second relay radio simultaneously sends packets (Figure 10; "simultaneous transmissions through multiple channels", Paragraph [0038]), and wherein frequency channels for each relay radio are chosen automatically by a distributed software control layer that resides on each such mesh node in a mesh network, and which communicates with control layer software on other nodes in the mesh network (Paragraph [0089]).

Regarding **claim 2**, Elson teaches the mesh network node of claim 1 also including one or more separate service radios which are connected to the relay radios via a software bridge (Paragraph [0086-0087]; Figure 1).

Regarding **claim 4,** Elson teaches a full duplex wireless mesh network node containing at least four relay radios for performing a packet relay function, wherein the following operations can occur simultaneously; a first relay radio receives packets from a parent mesh node, and a second relay radio sends packets to a parent mesh node, and a third relay radio receives packets from a daughter mesh node, and a second relay radio sends packets to a parent mesh node ("simultaneous transmissions through multiple channels", Paragraph [0038]; "alternative embodiments can include any number of radios", "the base-remote master slave configuration provides for communication among the radios", Paragraph [0022]; Figure 2).

Claim 8 is rejected under 35 U.S.C. 102(e) as being anticipated by Siegel (US 2004/0095900).

Regarding **claim 8**, Siegel teaches a wireless mesh network node optimized for VoIP traffic containing at least two relay radios including software that concatenates smaller voice packets into larger packets in order to increase the overall throughput of the mesh (Paragraph [0037]).

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168).

Regarding **claim 3,** Elson teaches the mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation in an alternative embodiment ("alternative embodiments of the access network may include nodes that support various other communication protocols or wireless local area network standards", Figure 10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the alternative embodiments that teaches the mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation in order to permit multi-hopping over large geographical areas under varying conditions of mobility.

Regarding **claim 6,** Elson teaches a hybrid mesh network where some mesh nodes in the network have at least two relay radios and other mesh nodes have only one relay radio ("alternative embodiments include any number of radios", Paragraph [0022]). Therefore, it would be obvious to one of ordinary skill in the at the time of invention to have mesh nodes in the network have at least two relay radios and other mesh nodes have only one relay radio as a design choice.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Liu (US 7103371).

Regarding **claim 5**, Elson teaches a wireless mesh network node containing at least two relay radios, and at least two service radios. Elson did not teach specifically a mesh network wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic. However, Liu teaches in an analogous art wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic ("separate dedicated channels or single channel for voice and data"; Abstract). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic in order to solve the latency variations associated with voice and data.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis (US 6393261).

Regarding **claim 7**, Lewis teaches a wireless mesh network node containing at least two relay radios (item 42a and 42b in Figure 1) and at least three similar radios (there are three similar radios 42a and 42b in Figure 1). Lewis further teaches in an another embodiment where upon the failure of one relay radio, another relay radio can operate in place of the failed radio (Col. 1, lines 59-62). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use additional radio where upon the failure of one relay radio, another relay radio can operate in place of the failed radio in order to improve the reliability.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Lee et al. (hereinafter Lee) (US 6982960).

Regarding **claim 9,** Elson teaches a mesh network node containing at least two relay radios and a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio (Figure 10; "can include any number of radios", Paragraph [0022, 0087]). Elson did not teach specifically wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes. However, Lee teaches in an analogous art wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such

that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes ("self healing mechanism so that the network can recover form node failures and a self updating mechanism, so that the network can expand as more nodes enter the system", Abstract; "expansion", item 450 in Figure 14). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the mesh network node said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes, in order to build a self-organizing wireless network that provides physical and logical network construction, network routing, and network maintenance while addressing the issues associated with building a network around low-cost, low-power devices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Muthuswamy G. Manoharan whose telephone number is 571-272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GEORGE ENG
SUPERVISORY PATENT EXAMINER

Notice of References Cited	Application/Control No. 11/084,330	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner Muthuswamy G. Manoharan	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,103,371	09-2006	Liu, Yu-Jih	455/456.4
*	B	US-7,103,371	09-2006	Liu, Yu-Jih	455/456.4
*	C	US-6,393,261	05-2002	Lewis, Daniel E.	455/103
*	D	US-6,982,960	01-2006	Lee et al.	370/254
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	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
11/084,330	DACOSTA ET AL.
Examiner	**Art Unit**
Muthuswamy G. Manoharan	2617

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

Claim		Date
Final	Original	7/9/07
	1	√
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination	
11/084,330	DACOSTA ET AL.	
Examiner	**Art Unit**	
Muthuswamy G. Manoharan	2617	

SEARCHED			
Class	Subclass	Date	Examiner
370	315	7/9/2007	MGM
	338	7/9/2007	MGM
	349	7/9/2007	MGM
	238	7/9/2007	MGM
	437	7/9/2007	MGM

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Searched EAST	7/9/2007	MGM
consulted George Eng	7/9/2007	MGM

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REF. NO.: MESHP005
PATENT APPLICATION NO.: 11/084,330
NO. PAGES: 3 pages total

MESSAGE:

Dear Official Fax Filing:

Please accept the enclosed Power of Attorney to Prosecute and 37 CFR §3.73(b) Statement, for the above-referenced application.

If you have any questions please do not hesitate to contact me.

Best Regards,

Diana Y. Fu

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REVOCATION OF POWER OF ATTORNEY WITH NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	11/084,330
Filing Date	March 17, 2005
First Named Inventor	Francis daCosta
Art Unit	2617
Examiner Name	Not Assigned
Attorney Docket Number	MESHP005

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

☐ A Power of Attorney is submitted herewith.

OR

☑ I hereby appoint the practitioners associated with the Customer Number: 21912

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

☐ The address associated with Customer Number: 21912

OR

☐ Firm *or* Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

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	Francis daCosta		
Name	Francis daCosta		
Date	Aug - 03 - 2007	Telephone	408-373-7700

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.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: DACOSTA et al.

Application No./Patent No.: 11/084,330 Filed/Issue Date: March 17, 2005

Entitled: MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS

Mesh Dynamics, Inc., 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 019429, Frame 0187, 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 follows:

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

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

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

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

_____	8/7/07
Signature	Date
Diana Y. Fu	408-973-2585
Printed or Typed Name	Telephone Number
Reg. No. 52,924	
Title	

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

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

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DEC 14 2007
PATENT & TRADEMARK OFFICE

IPW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	DACOSTA et al.	Examiner:	Muthuswamy Ganapathy Manoharan
Application No.:	11/084,330	Art Unit:	2617
Filed:	March 17, 2005	Docket No.	MESHP005
Title:	MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS		

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in a prepaid envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on:

12/11, 2007. Elaine Nguyen

Elaine Nguyen

TRANSMITTAL OF AMENDMENT E

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

Sir:

Transmitted herewith is Amendment E in response to Office Action mailed July 16, 2007 in the above-identified application.

The fee has been calculated as shown below.

CLAIMS	After Amd.	HP*	Extra		Small Entity Rate	Small Entity Fee		Large Entity Rate	Large Entity Fee
Total	9	9	-0-		x $25 = $		OR	x $50 = $	
Independent	4	7	-0-		x $105 = $		OR	x $210 = $	
Multiple Dependent Claims					x $185 = $		OR	x $370 = $	
HP = Highest previously paid					TOTAL FEE $		OR	TOTAL FEE $	**-0-**

☒ Applicant(s) hereby petition for following extension of time in which to respond to the outstanding Office Action.

		SMALL ENTITY Rate	SMALL ENTITY Add'l Fee		LARGE ENTITY Rate	LARGE ENTITY Add'l Fee
☐ Extension for Response within FIRST month		x $60 = $		OR	x $120 = $	
☒ Extension for Response within SECOND month		x $230 = $		OR	x $460 = $	460.00
☐ Extension for Response within THIRD month		x $525 = $		OR	x $1050 = $	
☐ Extension for Response within FOURTH month		x $820 = $		OR	x $1640 = $	
☐ Extension for Response within FIFTH month		x $1115 = $		OR	x $2230 = $	

☐ Applicant(s) believe that no (additional) Extension of Time is required; however, if it is determined that such an extension is required, Applicant(s) hereby petition that such an extension be granted and authorize the Commissioner to charge the required fees for an Extension of Time under 37 CFR 1.136 to Deposit Account No. 50-0685. (MESHP005).

☒ Enclosed is our Check No. 3396 in the amount of $460.00 to cover the additional claim fee and/or extension of time fees.

☐ Enclosed is Applicant Initiated Interview Request Form, PTOL-413A.

☐ Enclosed are _____sheets replacement drawings.

☐ Please charge Deposit Account No. 50-0685 (MESHP005) in the amount of $_____to cover the additional claim fee and/or extension of time fees.

☒ If the required fees are missing or any additional fees are required during the pendency of the subject application, please charge such fees or credit any overpayment to Deposit Account No. 50-0685 (MESHP005).

☐ OTHER:

Respectfully submitted,
VAN PELT, YI & JAMES LLP

Diana Y. Fu
Registration No. 52,924

10050 N. Foothill Blvd., Suite 200
Cupertino, CA 95014
Telephone: 408-973-2585

OIPE
DEC 14 2007
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	DACOSTA et al.	Examiner:	Muthuswamy Ganapathy Manoharan
Application No.:	11/084,330	Art Unit:	2617
Filed:	March 17, 2005	Docket No.:	MESHP005
Title:	MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS		

CERTIFICATE OF MAILING

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12/11, 2007.

Elaine Nguyen

AMENDMENT E

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

Dear Sir:

This is in response to the Office Action mailed July 16, 2007. The following amendments and remarks are respectfully submitted.

12/14/2007 HMARZI1 00000063 11084330
01 FC:1252 460.00 OP

OIPE MP27
DEC 14 2007
PATENT & TRADEMARK OFFICE

IN THE CLAIMS

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

Listing of Claims:

1. (Currently Amended) A wireless mesh network node ~~containing~~ comprising:

at least two relay radios for performing a packet relay function, wherein[;]:

a first relay radio can receive packets while a second relay radio simultaneously sends packets, and

wherein frequency channels for each relay radio are chosen automatically by a distributed software control layer that resides on each such mesh node in a mesh network, and which communicates with control layer software on other nodes in the mesh network.

2. (Original) The mesh network node of claim 1 also including one or more separate service radios which are connected to the relay radios via a software bridge.

3. (Original) The mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation.

4. (Currently Amended) A full duplex wireless mesh network node ~~containing at least four relay radios for performing a packet relay function, wherein the following operations can occur simultaneously;~~ comprising:

a first relay radio receives packets from a parent mesh node, and

a second relay radio sends packets to [[a]] the parent mesh node, and

a third relay radio receives packets from a daughter mesh node, and

a ~~second relay radio sends packets to a parent~~ fourth relay radio receives packets from the daughter mesh node; wherein

the four relay radios are configurable to perform their operations simultaneously.

5. (Currently Amended) [[A]] The wireless mesh network node ~~containing at least two relay radios, and~~ of claim 1, further comprising at least two service radios wherein at least one service

radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic.

6. (Currently Amended) A hybrid mesh network ~~where some mesh nodes~~ comprising:

a mesh node in the network have at least two relay radios configured to operate in an infrastructure mode to relay data from a child node to a backhaul, or in an ad hoc mode to communicate with peer mesh nodes without communicating with the backhaul;

and other mesh nodes have only one relay radio.

7. (Currently Amended) [[A]] The wireless mesh network node of claim 1, further comprising ~~containing at least two relay radios and~~ at least three ~~similar~~ radios similar to the relay radios, where upon the failure of one relay radio, another relay radio ~~can operate~~ is configured to operate in place of the failed radio.

8. (Currently Amended) A wireless mesh network node optimized for VoIP traffic ~~containing~~ comprising at least two relay radios ~~including software that concatenates~~ configured to concatenate smaller voice packets into larger packets in order to increase the overall throughput of the mesh.

9. (Currently Amended) A wireless mesh network node ~~containing~~ comprising at least two relay radios and a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio, and wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes.

REMARKS

Claims 1 and 4-9 have been amended to clarify the subject matter regarded as the invention. Claims 1-9 are pending.

35 USC §102 Rejections

Claims 1, 2, and 4 stand rejected under 35 U.S.C. 102(e) as being anticipated by Elson et al.

The rejection is respectfully traversed. With respect to claim 1, Elson does not teach that frequency channels for each relay radio are chosen automatically by a distributed software control layer that resides on each mesh node in a mesh network. In the relevant paragraph, Elson describes:

> [0089] The multi-radio node hardware and software described herein and in the Related Applications provides a convenient means of implementing these access networks. The capability for local control over resources such as radio ports supports provision of differentiated quality of service and security without the need for large back-end servers in each installation. The local control over resources further enables remote upgrade of this software. The enterprise-level software provides the capabilities for multiple Internet service providers to be supported, giving economies of scale in the user population.

Thus, in so far as Elson is concerned with multi-radio node hardware and software, Elson merely teaches that such hardware and software provides capabilities such as quality of service, security, remote upgrade, and multiple Internet service providers. Elson does not, however, teach automatically choosing frequency channels for each relay radio. As such, claim 1 is believed to be allowable.

Claims 2-3, 5, and 7 depend from claim 1 and are believed to be allowable for the same reasons described above.

Regarding claim 4, support for the amended claim may be found, as an example and without limitation, at Figure 8 of the specification. Elson teaches a radio modem 402 that operates with Frequency Hopped Spread Spectrum (FHSS) signaling (FIG. 4, [0027]). Elson

further teaches that communication between base and remotes is synchronized within a time division multiple access (TDMA) cycle within each hop. Elson's FHSS-TDMA based scheme allows interleaving of transmitted and received packets at a single modem. (FIG. 4, [0027]). Thus, Elson teaches that a radio modem communicates with multiple remotes, rather than a first relay radio receives packets from a parent mesh node, and a second relay radio sends packets to the parent mesh node, and a third relay radio receives packets from a daughter mesh node, and a fourth relay radio receives packets from the daughter mesh node, wherein the four relay radios are configured to perform their operations simultaneously. As such, claim 4 is believed to be allowable.

Claim 8 stands rejected under 35 U.S.C. 102(e) as being anticipated by Siegel. Siegel, however, does not describe a wireless mesh network node optimized for VoIP traffic comprising at least two relay radios configured to concatenate smaller voice packets into larger packets in order to increase the overall throughput of the mesh. In the relevant passage, Siegel teaches:

> [0037] A speech pattern or voice message is provided to a microphone of a mobile communication unit, which is then amplified and converted into digitized voice data. The digitized voice data can be in the form of digitized voice packets, such as Voice Over Internet Protocol (VOIP) packets, Network Voice Protocol (NVP) packets or any other form of digitized voice or digitized speech data. Identification information is provided in the digitized voice packets, for example, in a header of the digitized voice packets. The header can contain data type, data source, data destinations, data security and data priority information. The packets can be transmitted in a multicast transmission such that they are addressed to multiple mobile communications units within different network addresses, subnet addresses and/or subteam addresses. The packets are then converted to an analog voice signal to be transmitted over the air via a radio frequency link. The analog voice signal can be modulated and transmitted over the air as modulated radio transmission waves or electromagnetic waves.

Thus, while Siegel teaches transmitting VoIP packets, Siegel does not teach any relay radios configured to concatenate smaller voice packets into larger packets, nor does Siegel teach that such configuration is to increase overall throughput of the mesh. As such, claim 8 is believed to be allowable.

35 USC §103 Rejections

Claims 3 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Elson.

With respect to claim 3, based on the reasons described above, claim 3 is believed to be allowable over Elson.

With respect to claim 6, support for the amended claim can be found, as an example and without limitation, at Figure 15, and paragraphs [0058] and [0111]. Since Elson does not teach a hybrid mesh network comprising a mesh node in the network have at least two relay radios configured to operate in an infrastructure mode to relay data from a child node to a backhaul, or in an ad hoc mode to communicate with peer mesh nodes without communicating with the backhaul, it is believed that claim 6 is allowable.

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Elson in view of Liu. For reasons described above, claim 5 is believed to be allowable.

Claim 7 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis. For reasons described above, claim 7 is believed to be allowable.

Claim 9 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Elson in view of Lee. Neither Elson nor Lee teaches a mesh network node comprising a sensing radio. Specifically, Lee teaches a physical topology construction process. 4:9-10. In so far as Lee teaches network expansion, manual manipulation is required: "a user adding node N(n+1) 110 to expand network 100 (block 450) is responsible for positioning node N(n+1) 110 so that it is within communication range of at least one other node connected to network 100." 4:16-20. Thus, Lee does not teach a mesh network node comprising a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio, and wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes. As such, claim 9 is believed to be allowable.

The foregoing amendments are not to be taken as an admission of unpatentability of any of the claims prior to the amendments.

Reconsideration of the application and allowance of all claims are respectfully requested based on the preceding remarks. If at any time the Examiner believes that an interview would be helpful, please contact the undersigned.

Respectfully submitted,

Dated: 12/10/2007

Diana Y. Fu
Registration No. 52,924
V 408-973-2593
F 408-973-2595

VAN PELT, YI & JAMES LLP
10050 N. Foothill Blvd., Suite 200
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PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/084,330	03/17/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			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 12/14/2007	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 9	Minus	** 20	= 0	X $25 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 5	Minus	***7	= 0	X $105 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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:
BREWER DAWN

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/084,330	03/17/2005	Francis daCosta	MESHP005

CONFIRMATION NO. 3657

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

POA ACCEPTANCE LETTER

OC000000027315547

Date Mailed: 12/17/2007

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/07/2007.

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

/amwise/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/084,330	03/17/2005	Francis daCosta	DACOSTAF.CIP3

CONFIRMATION NO. 3657

POWER OF ATTORNEY NOTICE

24943
INTELLECTUAL PROPERTY LAW GROUP LLP
12 SOUTH FIRST STREET
SUITE 1205
SAN JOSE, CA 95113

OC000000027315510

Date Mailed: 12/17/2007

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/07/2007.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/amwise/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

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INTELLECTUAL PROPERTY LAW GROUP LLP
12 SOUTH FIRST STREET
SUITE 1205
SAN JOSE, CA 95113

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DEC 18 2007

OFFICE OF PETITIONS

In re Application of :
Francis Dacosta, et al. :
Application No. 11/084,330 : DECISION ON PETITION
Filed: March 17, 2005 : TO WITHDRAW
Attorney Docket No. DACOSTAF.CIP3 : FROM RECORD
:

This is a decision on the Request to Withdraw as attorney or agent of record under 37 C.F.R. § 1.36(b) filed March 15, 2007.

The request is **DISMISSED** as moot.

A review of the file record indicates that the power of attorney to Intellectual Property Law Group, LLP has been revoked by the assignee of the patent application on August 7, 2007. Accordingly, the request to withdraw under 37 C.F.R. § 1.36(b) is moot.

All future communications from the Office will continue to be directed to the below-listed address until otherwise notified by applicant.

Telephone inquires concerning this decision should be directed to undersigned at 571-272-1642.

April M. Wise
Petitions Examiner
Office of Petitions

cc: LEE VAN PELT, ESQ.
VAN PELT, YI & JAMES, LLP
10050 N. FOOTHILL BLVD.
SUITE 200
CUPERTINO, CA 95014-5601

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/084,330	03/17/2005	Francis daCosta	DACOSTAF.CIP3

CONFIRMATION NO. 3657

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SUITE 1205
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OC000000027315510

Date Mailed: 12/17/2007

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/amwise/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/084,330	03/17/2005	Francis daCosta	MESHP005

CONFIRMATION NO. 3657

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

POA ACCEPTANCE LETTER

OC000000027315547

Date Mailed: 12/17/2007

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/07/2007.

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

/amwise/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

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Bib Data Sheet

CONFIRMATION NO. 3657

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/084,330	03/17/2005 RULE	370	2617	MESHP005

APPLICANTS

Francis daCosta, San Jose, CA;
Sriram Dyanandan, San Jose, CA;

**** CONTINUING DATA ***************************

This application is a CIP of 10/434,948 05/08/2003
and claims benefit of 60/554,246 03/17/2004
and claims benefit of 60/618,751 10/14/2004

**** FOREIGN APPLICATIONS *********************

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 04/23/2005

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed	☐ yes ☐ no	CA	21	9	7
35 USC 119 (a-d) conditions met	☐ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged	Examiner's Signature Initials				

ADDRESS
21912

TITLE

Multiple-radio mission critical wireless mesh networks

FILING FEE RECEIVED		
1090	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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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCosta	MESHP005	3657

21912 7590 03/18/2008

VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	
ART UNIT	PAPER NUMBER
2617	
MAIL DATE	DELIVERY MODE
03/18/2008	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)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	MUTHUSWAMY G. MANOHARAN	2617	

-- 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 *14 December 2007*.

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) *1-9* 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) *1-9* 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 _____ 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 § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Elson et al. (hereinafter Elson) (US 2003/0012168).

Regarding **claim 1,** Elson teaches a wireless mesh network node comprising at least two relay radios for performing a packet relay function, wherein a first relay radio can receive packets while a second relay radio simultaneously sends packets (Figure 10; "**simultaneous transmissions through multiple channels**", Paragraph [0038]), and wherein frequency channels for each relay radio are chosen automatically by a distributed software control layer that resides on each such mesh node in a mesh network, and which communicates with control layer software on other nodes in the mesh network ("within a dual radio node of an embodiment two modems operate simultaneously, each on an independent network or cluster. The dual architecture facilitates passing information between clusters and allows messages to be passed between networks", Paragraph [0036], Paragraph [0089]; "channel assignment", paragraph [0091]).

Regarding **claim 2,** Elson teaches the mesh network node of claim 1 also including one or more separate service radios which are connected to the relay radios via a software bridge (Paragraph [0086-0087]; Figure 1).

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168).

Regarding **claim 3,** Elson teaches the mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation in an alternative embodiment ("alternative embodiments of the access

network may include nodes that support various other communication protocols or wireless local area network standards", Figure 10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the alternative embodiments that teaches the mesh network node of claim 2 where the separate service radios may differ from each other according to protocol or frequencies of operation in order to permit multi-hopping over large geographical areas under varying conditions of mobility.

Claim 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Lee et al. (hereinafter Lee) (US 6982960).

Regarding **claim 4**, Elson teaches a full duplex wireless mesh network node comprising:

a first relay receives packets from a mesh node, and a second relay radio sends packets to a mesh node, and a third relay radio receives packets from a mesh node, and a fourth relay radio sends packets to a mesh node wherein the four relay radios are configurable to perform their operations simultaneously("simultaneous transmissions through multiple channels", Paragraph [0038]; "alternative embodiments can include any number of radios", "the base-remote master slave configuration provides for communication among the radios", Paragraph [0022]; Figure 2).

Elson did not teach specifically parent mesh node, daughter mesh node. However, Lee teaches in analogous art nodes including parent and child nodes (Figure 8). Therefore, it would be obvious to one of ordinary skill in the art at the time of

invention to use parent and child nodes in order to improve the self organizing capability of the network.

Regarding **claim 9,** Elson teaches a mesh network node comprising at least two relay radios and a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio (Figure 10; "can include any number of radios", Paragraph [0022, 0087]; "if a base node disappears after registering with the network, its disappearance is discovered immediately by the associated remote nodes because the base node transmits a synchronization signal each hop", Paragraph [0032]).

Elson did not teach specifically wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes. However, Lee teaches in an analogous art wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes ("self healing mechanism so that the network can recover form node failures and a self updating mechanism, so that the network can expand as more nodes enter the system", Abstract; "expansion", item 450 in Figure 14). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the mesh network node said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as

the moving node dissociates and re-associates with other mesh nodes, in order to build a self-organizing wireless network that provides physical and logical network construction, network routing, and network maintenance while addressing the issues associated with building a network around low-cost, low-power devices.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Liu (US 7103371).

Regarding **claim 5,** Elson teaches a wireless mesh network node further comprising at least two relay radios, and at least two service radios. Elson did not teach specifically a mesh network wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic. However, Liu teaches in an analogous art wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic ("separate dedicated channels or single channel for voice and data"; Abstract). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use wherein at least one service radio is used exclusively for data traffic and at least one service radio is used exclusively for voice traffic in order to solve the latency variations associated with voice and data.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Saadawi et al. (hereinafter Saadawi) (US 2005/0286464).

Regarding **claim 6,** Elson teaches a hybrid mesh network comprising: a mesh node in the network have at least two relay radios configured to operate in an adhoc

mode to communicate with peer mesh nodes without communicating with backhaul ("alternative embodiments include any number of radios", Paragraph [0022]).

Elson did not teach specifically a mesh node configured to operate in an infrastructure mode to relay data from a child node to a backhaul. However, Saadawi teaches in an analogous art wherein a mesh node configured to operate in an infrastructure mode to relay data from a child node to backhaul ("self configured and adaptive to dynamic changes", Paragraph [0003]). Therefore, it would be obvious to one of ordinary skill in the at the time of invention to use a mesh node configured to operate in an infrastructure mode to relay data from a child node to a backhaul in order to be adaptive to dynamic changes.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view of Lewis (US 6393261).

Regarding **claim 7**, Elson teaches a wireless mesh network node of claim 1, further comprising at least three radios ("the embodiments can include any number of radios', Paragraph [0022]), similar to the relay radios, where upon the failure of one relay radio, another relay radio is configured to operate in place of the failed radio.

Lewis teaches in an analogous wherein the failure of one relay radio, another relay radio can operate in place of the failed radio (Col. 1, lines 59-62). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use additional radio where upon the failure of one relay radio, another relay radio can operate in place of the failed radio in order to improve the reliability.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Siegel (US 2004/0095900) in view of Mishra et al. (SU 2005/0237992).

Regarding **claim 8,** Siegel teaches a wireless mesh network node optimized for VoIP traffic containing at least two relay radios (item 20 in figure 1; Abstract, paragraph [0037]) including software that digitize voice packets. Siegel did not teach specifically software that concatenates smaller voice packets into larger packets in order to increase the overall throughput of the mesh. However, Mishra teaches in analogous art software that concatenates smaller packets into larger packets in order to increase the throughput (Paragraph [0081]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use software that concatenates smaller packets into larger packets in order to improve the effective throughput for all packet sizes.

Response to Arguments

Applicant's arguments filed on 12/14/2007 have been fully considered but they are not persuasive.

Examiner respectfully disagrees with applicant's assertion on page 2 with the remarks, "Thus in so far Elson is concerned with multi-radio node hardware and software, Elson merely teaches that such hardware and software provides capabilities such as quality of service, security, remote upgrade, and multiple internet service providers. Elson, does not, however, teach automatically choosing frequency channels for each relay radio. As such, claim 1 is believed to be allowable".

Elson also teaches a channel assignment" (Paragraph [0091]) and also time slot assignment (Paragraph [0027]). Therefore, it is apparent that Elson teaches the limitation, "automatically choosing frequency channels for each relay radio".

Examiner respectfully disagrees with applicant's assertion on page 6 with the remarks," Lee does not teach a mesh network node comprising a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing radio, and wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node disassociates and re-associates with other mesh nodes. As such, Claim 9 is believed to be allowable".

Elson teaches (Paragraph [0032]),"Similarly any remote nodes that are powered synchronize with any existing bases on their networks. Once every 256 hops each remote node re-registers with the associated base node, so that if a remote node disappears after registering with the network it will be noticed within approximately 4 seconds. Similarly if a base node disappears after registering with the network, its disappearance is discovered immediately by the associated remote nodes because the base node transmits a synchronization signal each hop. Modems appearing and disappearing on a wireless channel of an embodiment are passed through the API as connect or disconnect packets generated by each internal modem when they are no longer synchronized with a specific base node or remote node".

Therefore, Elson teaches a mesh network node comprising a sensing radio such that the movement of another mesh node in a mesh network is observed by the sensing

radio. Lee further teaches node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node disassociates and re-associates with other mesh nodes ("self healing mechanism so that the network can recover from node failures and a self updating mechanism, so that the network can expand as more nodes enter the system", Abstract, item 450 in Figure 14). Therefore, Elson in view of Lee teaches all the limitations of the claim.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUTHUSWAMY G. MANOHARAN whose telephone number is (571)272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Eng/
Supervisory Patent Examiner, Art Unit 2617

Notice of References Cited	Application/Control No. 11/084,330	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner MUTHUSWAMY G. MANOHARAN	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2005/0286464	12-2005	Saadawi et al.	370/328
*	B	US-2005/0237992	10-2005	Mishra et al.	370/349
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	996565	(mesh sensor)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L2	7327	(mesh sensor adhoc ad-hoc) with networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L3	839	(mesh sensor adhoc ad-hoc) with networks and scalable	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L4	45	(mesh sensor adhoc ad-hoc) with networks and scalable.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L5	758	(mesh sensor adhoc ad-hoc) with networks and (tworadios dual adj radios radios)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:45
L6	758	(mesh sensor adhoc ad-hoc) with networks and (two adj radios dual adj radios radios)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:45
L7	35	(mesh sensor adhoc ad-hoc) with networks.ab. and (two adj radios dual adj radios radios)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:45
L8	0	mulit adj radio$ with mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:17
L9	8	multi adj radio$ with mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:17
L10	13	multi adj (channel radio $) with (mesh densor adhoc) adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:25
L11	477	multi adj (channel radio $) with networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:25
L12	46	multi adj (channel radio $) with networks and (mesh adhoc sensor) with networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:26
L13	2	"20030012168"	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:57
L14	60	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:47

L15	1	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets with voice	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:47
L16	1	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets same throughput	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:48
L17	60	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:51
L18	0	"200400095900"	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:54
L19	1	"20040095900"	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:54
L20	411	hybrid with mesh	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:20
L21	0	hybrid with mesh same infrastructure same adhoc	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:21
L22	14	hybrid with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:21
L23	10	adaptive with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:22
L24	64	(adhoc ad adj hoc ad-hoc) with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:23
L25	224	(mesh sensor adhoc ad-hoc) with networks and self adj configur$3	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:48
L26	112	(mesh sensor adhoc ad-hoc) with networks and self adj configur$3 and infrastructure	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:49
L27	13	mesh adj networks with hierarchy	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:33
L29	4	mesh adj networks with multiple with radios	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:35
L30	7	parent same child same mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:38
L31	0	mesh adj network with heirarchy	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:39
L32	32	mesh adj network with (hierarchial hierarchy)	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:41
L33	0	relay adj nodes with multiple adj radios	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:45

L34	0	relay adj nodes with multiple adj radios	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/03/10 12:19
L35	2443	parent adj node same child adj node	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:19
L36	19	mesh adj networks and parent adj node same child adj node	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:20
L37	1182	networks and parent adj node same child adj node	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:22
L38	29	networks and parent adj node same child adj node.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:22
L39	82	parent adj node same child adj node.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:24
L40	2	relay adj nodes same (parent with child)	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:32
L41	5	relay adj nodes same (hierarchy hierarchial)	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:35
L42	7625	nodes same (hierarchy hierarchial)	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L43	0	nodes same (hierarchy hierarchial) and roouting	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L44	2540	nodes same (hierarchy hierarchial) and routing	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L45	524	nodes same (hierarchy hierarchial) same routing	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L46	28	nodes same (hierarchy hierarchial) same routing.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
S1	14	pilot adj symbols with guard adj interval	US-PGPUB; USPAT	OR	OFF	2008/02/21 07:37
S2	0	EP1542488.pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:53
S3	0	EP1542488	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:53

S4	9	"1542488"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:53
S5	12	"015797"	US-PGPUB; USPAT	OR	OFF	2008/02/21 07:55
S6	1	"20050015797"	US-PGPUB; USPAT	OR	OFF	2008/02/21 07:56
S7	2	"20050015797"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:56
S8	91	pilot adj (pattern structure$) and multi adj carrier	US-PGPUB; USPAT	OR	OFF	2008/02/21 08:06
S9	91	pilot adj (cluster pattern structure$) and multi adj carrier	US-PGPUB; USPAT	OR	OFF	2008/02/21 08:06
S10	1	pilot with spreading adj vector	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:07
S11	394	pilot.ab. and (multi near2 carrier)	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:08
S12	156	pilot.ab. and (multi near2 carrier) and (sector$ antennas)	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:09
S13	44	pilot.ti. and (multi near2 carrier) and (sector$ antennas)	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:09
S14	0	"2004131007"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:25
S15	2	"20040131007"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:25
S16	29	pilot with orthogonal with sector	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:29
S17	0	"2003072255"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:42
S18	1	"20030072255"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:43
S19	1191	pilot with multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:43
S20	188	pilot near multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:43

S21	60	pilot near multiplexing and (OFDMA multi-carrier multiple adj carrier mimo)	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:44
S22	2452	sectors same antennas	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:01
S23	416	sectors same antennas and pilot with (symbols sequence pattern$)	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:02
S24	95	sectors same antennas and pilot with (symbols sequence pattern$) with orthogonal	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:02
S25	94	sectors same antennas and pilot with (symbols sequence pattern$) with orthogonal and (OFDMA OFDM carrier)	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:02
S26	6	sectorized same antennas and pilot with (symbols sequence pattern$) with orthogonal and (OFDMA OFDM carrier)	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:22
S27	10	("4539706" | "5058201" | "5109390" | "5282239" | "5384824" | "5404570" | "5640443" | "5729826" | "6026277").PN. OR ("7221904").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/02/21 11:22
S28	7	("6026277").URPN.	USPAT	OR	OFF	2008/02/21 11:23
S29	188	pilot near multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:40
S30	47	pilot near multiplexing. clm.	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:41
S31	5	pilot adj multiplexing. clm.	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:41
S32	2	pilot adj multiplexing.ab.	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:45
S33	19	pilot adj multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:45
S34	76571	((sector sectorized) with antenna antennas)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:47
S35	2289	((sector sectorized) with antenna antennas) and (multi adj carrier OFDMA)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:48

S36	508	((sector sectorized) with antenna antennas) and (multi adj carrier OFDMA) and pilot adj (symbols pattern)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:49
S37	19	((sector sectorized) with antenna antennas) same (multi adj carrier OFDMA) same pilot adj (symbols pattern)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:49
S38	21	((sector sectorized) with antenna antennas) same (multi adj carrier OFDMA) same pilot adj (symbols pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 12:50
S39	402	pilot adj symbols with orthogonal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 12:59
S40	87	pilot adj symbols with orthogonal same (sector cluster group set)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 13:49
S41	15	pilot adj symbols with scrambling adj code same (sector cluster group set)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 13:53
S42	85	pilot adj symbols with phase adj shift	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 14:05
S43	12	pilot adj symbols with phase adj shift same orthogonal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 14:06
S44	3032	(broadcast$3 beacon) with (frequency adj band)	US-PGPUB; USPAT	OR	OFF	2008/02/24 13:26
S45	127	"802.11" and (broadcast $3 beacon) with (frequency adj band)	US-PGPUB; USPAT	OR	OFF	2008/02/24 13:26

S46	0	"135380"	JPO	OR	OFF	2008/03/05 11:22
S47	2	"2002135380"	JPO	OR	OFF	2008/03/05 11:22
S48	2	"7158816"	US-PGPUB; USPAT	OR	OFF	2008/03/05 11:24
S49	1	"7280857"	US-PGPUB; USPAT	OR	OFF	2008/03/05 11:25
S50	0	"135380"	JPO	OR	OFF	2008/03/05 11:29
S51	1104	"135380"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/03/05 11:29
S52	6	"2002135380"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/03/05 11:29

3/10/2008 1:05:49 PM
C:\Documents and Settings\mmanoharan\My Documents\EAST\Workspaces\11083693_1.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11084330	DACOSTA ET AL.
	Examiner	Art Unit
	MUTHUSWAMY G MANOHARAN	2617

SEARCHED

Class	Subclass	Date	Examiner
370	315,338,349,328	3/10/2008	MGM

SEARCH NOTES

Search Notes	Date	Examiner
Searched EAST	3/10/2008	MGM
Consulted George Eng	3/10/2008	MGM

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11084330	DACOSTA ET AL.
	Examiner	**Art Unit**
	MUTHUSWAMY G MANOHARAN	2617

✓	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	03/10/2008								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	996565	(mesh sensor)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L2	7327	(mesh sensor adhoc ad-hoc) with networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L3	839	(mesh sensor adhoc ad-hoc) with networks and scalable	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L4	45	(mesh sensor adhoc ad-hoc) with networks and scalable.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:40
L5	758	(mesh sensor adhoc ad-hoc) with networks and (tworadios dual adj radios radios)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:45
L6	758	(mesh sensor adhoc ad-hoc) with networks and (two adj radios dual adj radios radios)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:45
L7	35	(mesh sensor adhoc ad-hoc) with networks.ab. and (two adj radios dual adj radios radios)	US-PGPUB; USPAT	OR	OFF	2008/03/10 07:45
L8	0	mulit adj radio$ with mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:17
L9	8	multi adj radio$ with mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:17
L10	13	multi adj (channel radio $) with (mesh densor adhoc) adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:25
L11	477	multi adj (channel radio $) with networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:25
L12	46	multi adj (channel radio $) with networks and (mesh adhoc sensor) with networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:26
L13	2	"20030012168"	US-PGPUB; USPAT	OR	OFF	2008/03/10 08:57
L14	60	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:47

L15	1	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets with voice	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:47
L16	1	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets same throughput	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:48
L17	60	(mesh sensor adhoc ad-hoc) with networks and concatenate$ with packets	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:51
L18	0	"200400095900"	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:54
L19	1	"20040095900"	US-PGPUB; USPAT	OR	OFF	2008/03/10 09:54
L20	411	hybrid with mesh	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:20
L21	0	hybrid with mesh same infrastructure same adhoc	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:21
L22	14	hybrid with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:21
L23	10	adaptive with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:22
L24	64	(adhoc ad adj hoc ad-hoc) with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:23
L25	224	(mesh sensor adhoc ad-hoc) with networks and self adj configur$3	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:48
L26	112	(mesh sensor adhoc ad-hoc) with networks and self adj configur$3 and infrastructure	US-PGPUB; USPAT	OR	OFF	2008/03/10 10:49
L27	13	mesh adj networks with hierarchy	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:33
L29	4	mesh adj networks with multiple with radios	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:35
L30	7	parent same child same mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:38
L31	0	mesh adj network with heirarchy	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:39
L32	32	mesh adj network with (hierarchial hierarchy)	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:41
L33	0	relay adj nodes with multiple adj radios	US-PGPUB; USPAT	OR	OFF	2008/03/10 11:45

L34	0	relay adj nodes with multiple adj radios	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/03/10 12:19
L35	2443	parent adj node same child adj node	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:19
L36	19	mesh adj networks and parent adj node same child adj node	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:20
L37	1182	networks and parent adj node same child adj node	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:22
L38	29	networks and parent adj node same child adj node.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:22
L39	82	parent adj node same child adj node.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:24
L40	2	relay adj nodes same (parent with child)	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:32
L41	5	relay adj nodes same (hierarchy hierarchial)	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:35
L42	7625	nodes same (hierarchy hierarchial)	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L43	0	nodes same (hierarchy hierarchial) and roouting	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L44	2540	nodes same (hierarchy hierarchial) and routing	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L45	524	nodes same (hierarchy hierarchial) same routing	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
L46	28	nodes same (hierarchy hierarchial) same routing.ab.	US-PGPUB; USPAT	OR	OFF	2008/03/10 12:36
S1	14	pilot adj symbols with guard adj interval	US-PGPUB; USPAT	OR	OFF	2008/02/21 07:37
S2	0	EP1542488.pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:53
S3	0	EP1542488	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:53

S4	9	"1542488"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:53
S5	12	"015797"	US-PGPUB; USPAT	OR	OFF	2008/02/21 07:55
S6	1	"20050015797"	US-PGPUB; USPAT	OR	OFF	2008/02/21 07:56
S7	2	"20050015797"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 07:56
S8	91	pilot adj (pattern structure$) and multi adj carrier	US-PGPUB; USPAT	OR	OFF	2008/02/21 08:06
S9	91	pilot adj (cluster pattern structure$) and multi adj carrier	US-PGPUB; USPAT	OR	OFF	2008/02/21 08:06
S10	1	pilot with spreading adj vector	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:07
S11	394	pilot.ab. and (multi near2 carrier)	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:08
S12	156	pilot.ab. and (multi near2 carrier) and (sector$ antennas)	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:09
S13	44	pilot.ti. and (multi near2 carrier) and (sector$ antennas)	US-PGPUB; USPAT	OR	OFF	2008/02/21 09:09
S14	0	"2004131007"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:25
S15	2	"20040131007"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:25
S16	29	pilot with orthogonal with sector	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:29
S17	0	"2003072255"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:42
S18	1	"20030072255"	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:43
S19	1191	pilot with multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:43
S20	188	pilot near multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:43

S21	60	pilot near multiplexing and (OFDMA multi-carrier multiple adj carrier mimo)	US-PGPUB; USPAT	OR	OFF	2008/02/21 10:44
S22	2452	sectors same antennas	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:01
S23	416	sectors same antennas and pilot with (symbols sequence pattern$)	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:02
S24	95	sectors same antennas and pilot with (symbols sequence pattern$) with orthogonal	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:02
S25	94	sectors same antennas and pilot with (symbols sequence pattern$) with orthogonal and (OFDMA OFDM carrier)	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:02
S26	6	sectorized same antennas and pilot with (symbols sequence pattern$) with orthogonal and (OFDMA OFDM carrier)	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:22
S27	10	("4539706" | "5058201" | "5109390" | "5282239" | "5384824" | "5404570" | "5640443" | "5729826" | "6026277").PN. OR ("7221904").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/02/21 11:22
S28	7	("6026277").URPN.	USPAT	OR	OFF	2008/02/21 11:23
S29	188	pilot near multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:40
S30	47	pilot near multiplexing. clm.	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:41
S31	5	pilot adj multiplexing. clm.	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:41
S32	2	pilot adj multiplexing.ab.	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:45
S33	19	pilot adj multiplexing	US-PGPUB; USPAT	OR	OFF	2008/02/21 11:45
S34	76571	((sector sectorized) with antenna antennas)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:47
S35	2289	((sector sectorized) with antenna antennas) and (multi adj carrier OFDMA)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:48

S36	508	((sector sectorized) with antenna antennas) and (multi adj carrier OFDMA) and pilot adj (symbols pattern)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:49
S37	19	((sector sectorized) with antenna antennas) same (multi adj carrier OFDMA) same pilot adj (symbols pattern)	US-PGPUB; USPAT	OR	OFF	2008/02/21 12:49
S38	21	((sector sectorized) with antenna antennas) same (multi adj carrier OFDMA) same pilot adj (symbols pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 12:50
S39	402	pilot adj symbols with orthogonal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 12:59
S40	87	pilot adj symbols with orthogonal same (sector cluster group set)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 13:49
S41	15	pilot adj symbols with scrambling adj code same (sector cluster group set)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 13:53
S42	85	pilot adj symbols with phase adj shift	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 14:05
S43	12	pilot adj symbols with phase adj shift same orthogonal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/21 14:06
S44	3032	(broadcast$3 beacon) with (frequency adj band)	US-PGPUB; USPAT	OR	OFF	2008/02/24 13:26
S45	127	"802.11" and (broadcast $3 beacon) with (frequency adj band)	US-PGPUB; USPAT	OR	OFF	2008/02/24 13:26

S46	0	"135380"	JPO	OR	OFF	2008/03/05 11:22
S47	2	"2002135380"	JPO	OR	OFF	2008/03/05 11:22
S48	2	"7158816"	US-PGPUB; USPAT	OR	OFF	2008/03/05 11:24
S49	1	"7280857"	US-PGPUB; USPAT	OR	OFF	2008/03/05 11:25
S50	0	"135380"	JPO	OR	OFF	2008/03/05 11:29
S51	1104	"135380"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/03/05 11:29
S52	6	"2002135380"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/03/05 11:29

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BIB DATA SHEET

CONFIRMATION NO. 3657

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/084,330	03/17/2005	370	2617	MESHP005

APPLICANTS

Francis daCosta, San Jose, CA;
Sriram Dyanandan, San Jose, CA;

**** CONTINUING DATA ***************************

This application is a CIP of 10/434,948 05/08/2003
and claims benefit of 60/554,246 03/17/2004
and claims benefit of 60/618,751 10/14/2004

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
04/23/2005

Foreign Priority claimed	☐ Yes ☑ No	☐ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	☐ Yes ☑ No		CA	21	9	7
Verified and Acknowledged	/MUTHUSWAMY GANAPATHY MANOHARAN/ Examiner's Signature	Initials				

ADDRESS

VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014
UNITED STATES

TITLE

Multiple-radio mission critical wireless mesh networks

FILING FEE RECEIVED		
1090	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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PATENT & TRADEMARK OFFICE

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	DACOSTA et al.	Examiner:	Muthuswamy Ganapathy Manoharan
Application No.:	11/084,330	Art Unit:	2617
Filed:	March 17, 2005	Docket No.:	MESHP005
Title:	MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS		

07/22/2008 HLE333 00000029 500685 11084330

01 FC:1801 810.00 DA
02 FC:1251 120.00 DA

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in a prepaid envelope addressed to: Mail Stop RCE, Commissioner for Patents, Mail Stop RCE, P.O. Box 1450, Alexandria, VA 22313-1450 on:

7/17, 2008. _____
Elaine Nguyen

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL FILED WITH AMENDMENT F

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

This is a Request for Continued Examination (RCE) under 37 CFR §1.114 of the above-identified application.

1. Submission required under 37 CFR §1.114

a. ☐ Previously submitted:

☐ Consider the amendment(s)/reply under 37 CFR §1.116 previously filed on _____

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

b. ☒ Enclosed:

☒ Amendment/Reply

☐ Affidavit(s)/Declaration(s)

☐ Information Disclosure Statement (IDS)

☐ Other

c. Fee Calculation: The fee for excess claims, if applicable, has been calculated as shown below.

					Small Entity			Large Entity	
					Rate	Fee		Rate	Fee
RCE FILING FEE					x $405 = $		OR	x $810 = $	810.00
CLAIMS	After RCE	*HP	Extra						
Total	10	20			x $25 = $		OR	x $50 = $	
Independent	3	7			x $105 = $		OR	x $210 = $	
Multiple Dependent Claims			-0-		x $185 = $		OR	x $370 = $	
*HP = Highest previously paid					TOTAL FEES $			TOTAL FEES $	**810.00**

2. Miscellaneous:

a. ☐ Suspension of action on the above-identified application is requested under 37 CFR §1.103(c) for a period of _____ months.

b ☐ Other _____

3. ☒ Applicant hereby petitions for an extension of time as follows:

		SMALL ENTITY			LARGE ENTITY	
		Rate	Add'l Fee		Rate	Add'l Fee
☒ Extension for Response within FIRST month		x $60 = $		OR	x $120 = $	**120.00**
☐ Extension for Response within SECOND month		x $230 = $		OR	x $460 = $	
☐ Extension for Response within THIRD month		x $525 = $		OR	x $1050 = $	
☐ Extension for Response within FOURTH month		x $820 = $		OR	x $1640 = $	
☐ Extension for Response within FIFTH month		x $1115 = $		OR	x $2230 = $	

4. ☒ Applicant(s) hereby petition that any additional required extension of time be granted.

5. ☐ Enclosed is our Check No. __ in the amount of $_____ to cover the RCE Fee required under 37 CFR §1.17 (e), the additional claim fee, if any, and/or extension of time fees.

6. ☒ Please charge Deposit Account No. 50-0685 (MESHP005) in the amount of $930.00 to cover the RCE Fee required under 37 CFR §1.17 (e), the additional claim fee, if any, and/or extension of time fees.

7. ☒ If the required fees are missing or any additional fees are required during the pendency of the subject application, please charge such fees or credit any overpayment to Deposit Account No. 50-0685 (MESHP005).

8. ☐ Applicant Initiated Interview Request Form.

9. ☒ Please continue to send correspondence to the following address:

CUSTOMER NO. 21912
VAN PELT, YI & JAMES LLP
10050 N. Foothill Blvd., Ste. 200
Cupertino, CA 95014

Date: 7/17/2008

Diana Y. Fu
Reg. No. 52,924
V 408-973-2593
F 408-973-2595

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	DACOSTA et al.	Examiner:	Muthuswamy Ganapathy Manoharan
Application No.:	11/084,330	Art Unit:	2617
Filed:	March 17, 2005	Docket No.:	MESHP005
Title:	MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS		

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7/17, 2008.

Elaine Nguyen

AMENDMENT F

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

Dear Sir:

This is in response to the Office Action mailed March 18, 2008. The following amendments and remarks are respectfully submitted.

IN THE SPECIFICATION

Please replace the paragraph beginning on page 24, line 26, with the following rewritten paragraph:

--

The backhaul radios can be dynamically configured to have one radio in AP mode and the other [[is]] in STA mode. The 2 radio mobile units are configured to have one radio in STA mode (to talk to the backhaul) with another radio in ad hoc mode to talk with peers. Either unit can fill in for the other – changes are software based and dynamically configurable. This favors economies of scale - the same hardware services both peer-to-peer and infrastructure requirements. Also, in the general case, most nodes would be of the 2-Radio configuration shown in FIG 4. In the event the node reaches the edge of a network and has to support ad hoc mesh (E1-E2-E3-E4) it will dynamically reconfigure itself to become a Hybrid node. Thus Node E1 could have been a 2-Radio unit but it would dynamically reconfigure itself to support the connectivity requirements of E2 ~~thar~~ that has been stranded because of a broken link with E3 (label 060, FIG 13).

--

Please replace the paragraph beginning on page 26, line 1, with the following rewritten paragraph:

--

Without a separate scanning, radio the NMS and adjoining nodes still know when a node goes down because control system heartbeats (sent on one channel and re-transmitted on another by a parent node) are not received. However only an external sensing radio can determine if there has been a mechanical failure - as a break in the cable. In the event of such malfunctions, scanning radios can dynamically reconfigure themselves to assume the functionality of the damaged unit. In short, scanning radios mesh to form "buddy" relationships (as in police teams) to monitor and "cover" each other. Scanning radios are critical in dynamic environments - where mesh nodes are mounted on cars and the mesh topology is rapidly changing. These include public safety and battlefield scenarios.

--

IN THE CLAIMS

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

Listing of Claims:

1. (Cancelled)

2. (Cancelled)

3. (Cancelled)

4. (Currently Amended) A full duplex wireless mesh network node comprising:

a first relay radio ~~receives~~ configured to receive exclusively packets from a parent mesh node~~, and~~;

a second relay radio ~~sends~~ configured to send exclusively packets to the parent mesh node~~, and~~;

a third relay radio ~~receives~~ configured to receive exclusively packets from a daughter mesh node[,]; and

a fourth relay radio ~~receives packets from~~ configured to send exclusively packets to the daughter mesh node; wherein

the four relay radios are configurable to perform their operations simultaneously.

5. (Cancelled)

6. (Cancelled)

7. (Cancelled)

8. (Cancelled)

9. (Currently Amended) A wireless mesh network node wirelessly connected to a current

parent node in a wireless mesh network, the wireless mesh network node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node comprising:

at least two relay radios; and

a ~~sensing~~ scanning radio configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node; wherein:

the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger.

~~such that the movement of another mesh node in a mesh network is observed by the sensing radio, and wherein said node communicates via the relay radios with other mesh nodes to control the packets transferred to and from the moving node such that packet transfer is not interrupted as the moving node dissociates and re-associates with other mesh nodes~~.

10. (New) The wireless mesh network node of Claim 9, wherein the scanning radio is further configured to diagnose faults in the at least two relay radios.

11. (New) The wireless mesh network node of Claim 9, wherein the scanning radio is used to diagnose faults in radios of another node in the mesh network.

12. (New) The wireless mesh network node of Claim 9, wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio.

13. (New) The wireless mesh network node of Claim 9, wherein packets are sent redundantly by the wireless mesh network node to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent-child connection with the current parent node and forms the new parent-child connection with the neighboring node.

14. (New) A hybrid mesh network node comprising:

at least two relay radios that operate on different RF channels, wherein:

the relay radios are dynamically configurable to operate in a first mode or in a second mode that is different from the first mode; and

in the first mode one of the relay radios is configured to operate exclusively in ad hoc mode, and the other one of the relay radios is configured to operate exclusively in STA mode.

15. (New) The hybrid mesh network node of Claim 14, wherein in the second mode one of the relay radios is configured to operate exclusively in AP mode and the other one of the relay radios is configured to operate exclusively in STA mode.

16. (New) The hybrid mesh network node of Claim 15, wherein the hybrid mesh network node is configured to switch from the second mode to the first mode when the relay radio operating exclusively in STA mode cannot connect with a similar node that is operating in the second mode.

17. (New) The hybrid mesh network node of Claim 15, wherein the hybrid mesh network node switches from the second mode to the first mode to support connectivity requirements of a stranded node that is within range.

REMARKS

Claims 1-3 and 5-8 have been cancelled. Claims 4 and 9 have been amended to clarify the subject matter regarded as the invention. New claims 10-17 are added. Claims 4 and 9-17 are pending.

Claim Rejections – 35 U.S.C. §103

Claims 4 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Elson et al. (US 2003/0012168) in view of Lee et al. (US 6982960).

The rejection is respectfully traversed.

With respect to Claim 4, support for the amendment may be found, as an example and without limitation, in FIG. 7 and on p.19, ll. 11-21. Neither Elson nor Lee, either singly or in combination, teaches a full duplex wireless mesh network node comprising "a first relay radio configured to receive exclusively packets from a parent mesh node; a second relay radio configured to send exclusively packets to the parent mesh node; a third relay radio configured to receive exclusively packets from a daughter mesh node; and a fourth relay radio configured to send exclusively packets to the daughter mesh node." Elson does not teach parent mesh node or daughter mesh node at all, and especially does not teach multiple radios in which "a first relay radio configured to receive exclusively packets from a parent mesh node; a second relay radio configured to send exclusively packets to the parent mesh node; a third relay radio configured to receive exclusively packets from a daughter mesh node; and a fourth relay radio configured to send exclusively packets to the daughter mesh node." Lee teaches a spanning tree in which each additional node is added as a child of the root node. Lee, 5:18-19. Lee, however, does not teach that the node includes multiple radios, and especially does not teach "a first relay radio configured to receive exclusively packets from a parent mesh node; a second relay radio configured to send exclusively packets to the parent mesh node; a third relay radio configured to receive exclusively packets from a daughter mesh node; and a fourth relay radio configured to send exclusively packets to the daughter mesh node." As such, Claim 4 is believed to be allowable.

With respect to Claim 9, support for the amendment may be found, as an example and without limitation, at p. 26, ll. 11-22 of the present application. Neither Elson nor Lee, either singly or in combination, teaches a scanning radio configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the other wireless mesh network node, the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger. As such, Claim 9 is believed to be allowable.

New Claims

New Claims 10-17 are added.

Support for new Claims 10-13 may be found, as an example and without limitation, on p.25, l. 17 - p.26, l. 22 of the present application. Claims 10-13 depend from Claim 9 and are believed to be allowable for the same reasons described above.

Support for new Claims 14-17 may be found, as an example and without limitation, on p.23, l. 22-p. 25, l.5 of the present application.

The foregoing amendments are not to be taken as an admission of unpatentability of any of the claims prior to the amendments.

Reconsideration of the application and allowance of all claims are respectfully requested based on the preceding remarks. If at any time the Examiner believes that an interview would be helpful, please contact the undersigned.

Respectfully submitted,



Dated: 7/17/2008

Diana Y. Fu
Registration No. 52,924
V 408-973-2593
F 408-973-2595

VAN PELT, YI & JAMES LLP
10050 N. Foothill Blvd., Suite 200
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PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/084,330	03/17/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			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	07/21/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 10	Minus	** 20	= 0	X $25 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 5	Minus	***7	= 0	X $105 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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:
/MINNIE JACKSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCcosta	MESHP005	3657

21912 7590 10/20/2008

VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	
ART UNIT	PAPER NUMBER
2617	
MAIL DATE	DELIVERY MODE
10/20/2008	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)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	MUTHUSWAMY G. MANOHARAN	2617	

-- 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 *1* 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 *21 July 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) *4 and 9-17* 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) _____ is/are rejected.

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

8)☒ Claim(s) *4 and 9-17* 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 _____ 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: _____.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 4, 9-13 are drawn to scanning radio to measure signal strength and performing handover/switch over between two nodes (parent node and a neighboring node), classified in class 370, subclass 338.

II. Claims 14-17 are drawn to switching mode between the AP mode and STA mode within a single network node, classified in class 370, and subclass 315.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as subcombinations disclosed as usable together in a single combination.

In the instant case, group I has separate utility such as switching parent node from one node to another neighboring node (handoff between two neighboring nodes) based on signal strength, which is different from group II, such as a hybrid node (having two modes of operations, AP mode and STA mode) and switching modes of operations within a single node, which is different from group I. Thus, groups I and II are patentability distinct from each other.

The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and the subcombinations are separately usable. In the instant case, subcombination Group 2 has separate utility such as hybrid node

that can operate as a client mode(STA mode) or server (relay mode) (See MPEP § 806.05(d)).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

A telephone call was made to the applicant's representative on 10/10/2008 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the

restriction requirement, the election shall be treated as an election without traverse.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUTHUSWAMY G. MANOHARAN whose telephone number is (571)272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Eng/
Supervisory Patent Examiner, Art Unit 2617

Print Form

PTO/SB/81 (07-08)
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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	11/084,330
Filing Date	March 17, 2005
First Named Inventor	Francis daCosta
Title	Multiple-Radio Mission Critical Wireless Mesh Networks
Art Unit	2617
Examiner Name	Muthuswamy G. Manoharan
Attorney Docket Number	0357-02205

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

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer 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: 27197

OR

☐ I hereby appoint Practitioner(s) named below 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:

Practitioner(s) Name	Registration Number

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

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OR

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

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Assignee of Record

Signature	/Francis daCosta/	Date	October 31, 2008
Name	Francis daCosta	Telephone	+1 (408) 373-7700
Title and Company	President, MESH DYNAMICS INC.		

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.

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

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: DACOSTA ET AL.

Application No./Patent No.: 11/084,330 Filed/Issue Date: 03/17/2005

Entitled:

MESH DYNAMICS INC. , 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 therefore is attached.

OR

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

1. From: Inventors To: Advanced Cybernetics Group, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 018004 , Frame 0663 , or for which a copy thereof is attached.

2. From: Advanced Cybernetics Group, Inc. To: Mesh Dynamics, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 019429 , Frame 0167 , 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.

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

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

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

/Francis daCosta/ October 31, 2008
Signature Date

Francis daCosta 408-373-7700
Printed or Typed Name Telephone Number

President, MESH DYNAMICS INC.
Title

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

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Electronic Acknowledgement Receipt

EFS ID:	4217975
Application Number:	11084330
International Application Number:	
Confirmation Number:	3657
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	21912
Filer:	Michael J. Cherskov
Filer Authorized By:	
Attorney Docket Number:	MESHP005
Receipt Date:	01-NOV-2008
Filing Date:	17-MAR-2005
Time Stamp:	14:47:15
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	Power of Attorney	02205PoA.pdf	749991 71c69cc0ee138a3c5e17c36660fd3f671eed0dcc	no	1

Warnings:	
Information:	

2	Power of Attorney	02205Ownership.pdf	429771 8d6059a08c68db974877b3c9a092b2a25791e290	no	1

Warnings:	
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Total Files Size (in bytes):	1179762

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

New Applications Under 35 U.S.C. 111

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

National Stage of an International Application under 35 U.S.C. 371

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

New International Application Filed with the USPTO as a Receiving Office

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

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/084,330	03/17/2005	Francis daCosta	0357-02205

CONFIRMATION NO. 3657

POA ACCEPTANCE LETTER

27197
CHERSKOV & FLAYNIK
THE CIVIC OPERA BUILDING
20 NORTH WACKER DRIVE, SUITE 1447
CHICAGO, IL 60606

OC000000033012194

Date Mailed: 11/12/2008

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/01/2008.

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

/squreshi/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/084,330	03/17/2005	Francis daCosta	MESHP005

CONFIRMATION NO. 3657

POWER OF ATTORNEY NOTICE

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

OC000000033012163

Date Mailed: 11/12/2008

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/01/2008.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/squreshi/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Francis daCosta, et al.

Title: MULTIPLE-RADIO MISSION CRITICAL WIRELESS MESH NETWORKS

Examiner: Muthuswamy Ganapathy MANOHARAN

Serial No.: 11/084,330

Filing Date: March 17, 2005

Atty. Docket: 0357/02205

Sent via EFS-Web on November 20, 2008

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

20 N. Wacker Drive
Chicago, Illinois 60606
(312) 621-1330

AMENDMENT AND ELECTION

Dear Sir:

In response to the Office Action of October 20, 2008, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page five of this paper.

As the current listing of claims indicates, Applicant hereby elects Group I (claims 4, 9-13) without traverse.

AMENDMENTS TO THE CLAIMS

Listing of Claims

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

1-3. (Cancelled)

4. (Previously Presented) A full duplex wireless mesh network node comprising:

a first relay radio configured to receive exclusively packets from a parent mesh node;

a second relay radio configured to send exclusively packets to the parent mesh node;

a third relay radio configured to receive exclusively packets from a daughter mesh node; and

a fourth relay radio configured to send exclusively packets to the daughter mesh node; wherein the four relay radios are configurable to perform their operations simultaneously.

5-8. (Cancelled)

9. (Previously Presented) A wireless mesh network node wirelessly connected to a current parent node in a wireless mesh network, the wireless mesh network node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node comprising:

at least two relay radios; and

a scanning radio configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node; wherein:

the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger.

10. (Previously Presented) The wireless mesh network node of Claim 9, wherein the scanning radio is further configured to diagnose faults in the at least two relay radios.

11. (Previously Presented) The wireless mesh network node of Claim 9, wherein the scanning radio is used to diagnose faults in radios of another node in the mesh network.

12. (Previously Presented) The wireless mesh network node of Claim 9, wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio.

13. (Previously Presented) The wireless mesh network node of Claim 9, wherein packets are sent redundantly by the wireless mesh network node to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent-child connection with the current parent node and forms the new parent-child connection with the neighboring node.

14. (Withdrawn) A hybrid mesh network node comprising:

at least two relay radios that operate on different RF channels, wherein:

the relay radios are dynamically configurable to operate in a first mode or in a second mode that is different from the first mode; and

in the first mode one of the relay radios is configured to operate exclusively in ad hoc mode, and the other one of the relay radios is configured to operate exclusively in STA mode.

15. (Withdrawn) The hybrid mesh network node of Claim 14, wherein in the second mode one of the relay radios is configured to operate exclusively in AP mode and the other one of the relay radios is configured to operate exclusively in STA mode.

16. (Withdrawn) The hybrid mesh network node of Claim 15, wherein the hybrid mesh network node is configured to switch from the second mode to the first mode when the relay radio operating exclusively in STA mode cannot connect with a similar node that is operating in the second mode.

17. (Withdrawn) The hybrid mesh network node of Claim 15, wherein the hybrid mesh network node switches from the second mode to the first mode to support connectivity requirements of a stranded node that is within range.

18. (New) The full duplex wireless mesh network node of Claim 4 further comprising a client service radio adapted to communicate with one or more network client radios.

19. (New) The wireless mesh network node of Claim 9 further comprising a client service radio adapted to communicate with one or more network client radios.

REMARKS/ARGUMENTS

By the present amendment, Applicant elects Group I, claims 4, 9-13, without traverse. Applicant submits new dependent claims 18 and 19 wherein each node also includes an optional service radio adapted to communicate with network clients. Inasmuch as new claims 18 and 19 depend from independent claims in Group I, the dependant claims also properly belong in Group I.

Support for the additional claim limitation is found in the Specification, ¶¶89-92 of the published application (U.S. Publication Number 2005/0232179). Discussed therein are different service radios that may be configured in each node, such as ¶90 which states that the node includes "one service radio to service both voice and data customers" and ¶91 which provides that nodes include "dedicated service radios operating on different frequencies for different types of client radios." As such, Applicant respectfully submits that the Specification supports the inclusion of a "service radio" as an element of the mesh nodes.

All communications in this matter should be sent to Applicant's current attorneys, Cherskov & Flaynik (Customer Number 27191). Applicant notes that the Power of Attorney reflecting this counsel appointment was accepted in this matter on November 12, 2008.

An earnest attempt has been made hereby to respond to the October 20, 2008 Restriction Requirement. Applicant submits that the amendments have put the application in a condition for allowance. Accordingly, Applicant respectfully requests that the Examiner issue a Notice of Allowance in this application.

Respectfully submitted,

CHERSKOV & FLAYNIK

Date: November 20, 2008

/Szymon M. Gurda/
Szymon M. Gurda
Reg. No. 58,451

Electronic Acknowledgement Receipt

EFS ID:	4322659
Application Number:	11084330
International Application Number:	
Confirmation Number:	3657
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02205
Receipt Date:	20-NOV-2008
Filing Date:	17-MAR-2005
Time Stamp:	11:10:04
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		election.pdf	79206 4cfed6df14b54418e6dbe20dea3a599f2bff491b	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response to Election / Restriction Filed	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	79206	

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

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

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

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

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/084,330	03/17/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			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 11/20/2008

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 12	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 3	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

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:
/BRENDA HARRISON/

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCcosta	0357-02205	3657

27197 7590 02/03/2009

CHERSKOV & FLAYNIK
THE CIVIC OPERA BUILDING
20 NORTH WACKER DRIVE, SUITE 1447
CHICAGO, IL 60606

EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	
ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
02/03/2009	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)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	MUTHUSWAMY G. MANOHARAN	2617	

-- 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 *20 November 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) *4,9-13,18 and 19* 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) *4,9-13,18 and 19* 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 _____ 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

Election/Restrictions

Claims 14-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 11/20/2008 is acknowledged.

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Crowhurst et al. (hereinafter Crowhurst) (US 2004/0137877).

Regarding **claim 4**, Elson teaches a full duplex wireless mesh network node comprising:

a first relay receives packets from a mesh node, and a second relay radio sends packets to a mesh node, and a third relay radio receives packets from a mesh node, and a fourth relay radio sends packets to a mesh node wherein the four relay radios are configurable to perform their operations simultaneously("simultaneous transmissions through multiple channels", Paragraph [0038]; "alternative embodiments can include any number of radios", "the base-remote master slave configuration provides for communication among the radios", Paragraph [0022]; Figure 2).

Elson did not teach specifically parent mesh node, daughter mesh node. However, Lee teaches in analogous art nodes including parent and child nodes (Figure 8). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use parent and child nodes in order to improve the organizing capability of the network.

The combinations of Elson and Lee did not teach specifically a first radio configured to receive exclusively, second radio to send exclusively, thirds radio to receive exclusively and fourth radio to send exclusively. However, Crowhurst teaches in an analogous art where a first/third radio configured to receive exclusively, second/fourth radio to send exclusively (separate transmitter/receiver stations, Paragraph [0005]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to modify the transceivers of Elson to have a separate transmitters and receivers to have a first radio configured to receive exclusively, second radio to send

exclusively, thirds radio to receive exclusively and fourth radio to send exclusively in order to have simpler and cheaper transmitters/receivers.

Regarding claim 18, Elson teaches the full duplex wireless mesh network node of claim further comprising a client service radio adapted to communicate with one or more network client radios (Figure 10).

Claims 9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Torbal (US 2004/0058678) in view over Elson et al. (hereinafter Elson) (US 2003/0012168).

Regarding **claim 9,** de Torbal teaches a wireless mesh network node (item 20 in Figure 2) wirelessly connected to a current parent node (item 12 in Figure 2) in a wireless mesh network (items 12, 28, 20, 14 in Figure 2), the wireless mesh network node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node ("direction of movement", Figure 2) comprising:

A scanning radio (item 24 in Figure 2) configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node (Figure 3, Paragraphs [0033-0034]); wherein the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger (figure 3, paragraphs [0033-0034]).

DeTorbal did not teach explicitly at least two radios. However, Elson teaches in an analogous art at least two radios (Figure 10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have at least two relay radios in order to communicate between the parent and the child node reliably.

Regarding **claim 19**, Elson teaches the full duplex wireless mesh network node of claim further comprising a client service radio adapted to communicate with one or more network client radios (Figure 10).

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Torbal (US 2004/0058678) in view over Elson et al. (hereinafter Elson) (US 2003/0012168) and Mahany (US 5546397).

Regarding **claim 10**, the combinations of DeTorbal and Elson teaches all the particulars of the claim except wherein the scanning radio is further configured to diagonose faults in the at least two relay radios. However, Mahany teaches in an analogous art wherein the scanning radio is further configured to diagonose faults in the at least two relay radios ("monitor the message … **self monitoring** … determines that one of the wireless adapters is not operating correctly", Col. 5, lines 25-28). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention wherein the scanning radio is further configured to diagnose faults in the at least two relay radios in order to provide infrastructure backup.

Regarding **claim 11**, the combinations of DeTorbal and Elson teaches all the particulars of the claim except wherein the scanning radio is to diagnose faults in radios

of another node in the mesh network. However, Mahany teaches in an analogous art wherein the scanning radio is to diagnose faults in radios of another node in the mesh network (item 45 in Figure 3). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the scanning radio is to diagnose faults in radios of another node in the mesh network in order provide infrastructure backup.

Regarding **claim 12,** the combinations of DeTorbal and Elson teaches all the particulars of the claim except wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio. Regarding claim 10, the combinations of DeTorbal and Elson teaches all the particulars of the claim except wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio (col. 5, lines 60-63). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio in order to have a fail safe system.

Regarding **claim 13,** deTorbal further teaches the wireless mesh network node wherein packets are sent redundantly by the wireless mesh network node (item A in Figure 2) to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent child connection with the current parent node and forms the new parent child connection with the neighboring node ("handover", Paragraph [0034]).

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUTHUSWAMY G. MANOHARAN whose telephone number is (571)272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Eng/
Supervisory Patent Examiner, Art Unit 2617

Notice of References Cited	Application/Control No. 11/084,330	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner MUTHUSWAMY G. MANOHARAN	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0058678	03-2004	deTorbal, Rene Fernand Emile	455/437
*	B	US-5,546,397	08-1996	Mahany, Ronald L.	370/310
*	C	US-2004/0137877	07-2004	Crowhurst et al.	455/411
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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
	11084330	DACOSTA ET AL.
	Examiner	**Art Unit**
	MUTHUSWAMY G MANOHARAN	2617

✓	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	03/10/2008	01/30/2009							
	1	✓	-							
	2	✓	-							
	3	✓	-							
	4	✓	✓							
	5	✓	-							
	6	✓	-							
	7	✓	-							
	8	✓	-							
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	12		✓							
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	14		N							
	15		N							
	16		N							
	17		N							
	18		✓							
	19		✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11084330	DACOSTA ET AL..
	Examiner	Art Unit
	MUTHUSWAMY G MANOHARAN	2617

SEARCHED			
Class	Subclass	Date	Examiner
370	315,338,349,328	3/10/2008	MGM

SEARCH NOTES		
Search Notes	Date	Examiner
Searched EAST	3/10/2008	MGM
Consulted George Eng	3/10/2008	MGM
updated search in EAST	1/28/2009	mgm

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"20050232179"	US-PGPUB; USPAT	OR	OFF	2009/01/28 11:53
L2	609	node$ with radios	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:09
L3	600	node$ with radios and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:09
L4	61	node$ with multiple near radios and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:09
L5	24	node$ with multiple near radios and relay and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:09
L6	187	node$ with radios and relay and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:20
L7	219	(access adj poin$ node $) with radios and relay and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:20
L8	9	(access adj poin$ node $) with radios.ab. and relay and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:21
L9	9	(access adj point$ node $) with radios.ab. and relay and network	US-PGPUB; USPAT	OR	OFF	2009/01/28 12:21

1/28/2009 12:38:59 PM
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L3	1	"20050232179" and exclusively	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:21
L4	1	"20050232179" and motion	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:21
L5	1	"20050232179" and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:24
L6	0	"20050232179" and faults	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:37
L7	0	"20050232179" and diagnose	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
L8	0	"20050232179" and faults	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
L9	1	"20050232179" and failure	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
L10	5	dacosta.in. and exclusively	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:49
L11	28	"6704301"	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:51
L12	43	("20010021639" | "20020055978" | "20020085719" | "20020097681" | "20020097696" | "20020159401" | "20020159409" | "20020176390" | "20020181427" | "20030002442" | "20030012176" | "20030012193" | "20030026356" | "20030114204" | "20030185169" | "20040001442" | "20040014491" | "20040137924" | "20050122925" | "20050181725" |	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 08:54

		"5166929" | "6026303" | "6046992" | "6298053" | "6363062" | "6426814" | "6597919" | "6665536" | "6683865" | "6704301" | "6831921" | "6850502" | "6859652" | "6865170" | "6876643" | "6892068" | "6904275" | "6909705" | "6912373" | "7058050" | "7164667" | "7190690" | "7200130").PN. OR ("7420952").URPN.				
L13	100	srikrishna.in.	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:59
L14	16	srikrishna.in. and radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:59
L15	1	dacosta.in. and third near2 radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:03
L16	165	radios with relay	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:20
L17	11	multiple near radios with relay	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:20
L18	0	"2002159409"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
L19	2	"20020159409"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
L20	0	"2003040336"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
L21	1	"20030040336"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
L22	1	"2003002513"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
L23	1	"20030002513"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
L24	1	"20030040335"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
L25	1	"20030040335"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
L26	14	"6363062"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:24
L27	5	"7031293"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:24

L28	3	("7031293").URPN.	USPAT	OR	OFF	2009/01/29 09:26
L29	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 10:00
L30	2	("7013138").URPN.	USPAT	OR	OFF	2009/01/29 10:02
L31	356	(third adj radio radios) with (relay repeater)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:03
L32	11	(third adj radio radios) with (relay repeater). ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:04
L33	234	(third adj radio radios) with (relay repeater) same (transmit$4 receiv$4)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:06
L34	1	("7161926").URPN.	USPAT	OR	OFF	2009/01/29 10:23
L35	20	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 10:23
L36	29	("6584080").URPN.	USPAT	OR	OFF	2009/01/29 10:25

L37	266	transmitters with receivers with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:34
L38	123	(repeaters relays) with (transmitters receivers transceivers) with multiple	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:35
L39	5574	radios and (repeater$2 relay$2)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:39
L40	1	radios and (repeater$2 relay$2) and exclusive with transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:39
L41	3581	370/328.ccls.	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:53
L42	265	370/328.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:53
L43	6130	(relays repeaters) and transmitters and receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
L44	962	(relays repeaters) same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
L45	16	(relays repeaters) same transmitters same receivers.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
L46	0	(relays repeaters) same exclusive with transmitters same receivers.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
L47	0	(relays repeaters) same exclusive with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
L48	2	(relays repeaters) same exclusively with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
L49	20	(relays repeaters) same separate with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:08
L50	962	(relays repeaters) same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:09
L51	31	(relays repeaters) same transmitters same receivers same radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:09

L52	94	(relays repeaters).ab. and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:12
L53	0	(relays repeaters).ab. and multi near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:14
L54	4	(relays repeaters) and multi near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:15
L55	62	(relays repeaters) and radios same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:16
L56	106	(relays repeaters) with radios and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:04
L57	6	(relays repeaters) with radios and interference same transmitters and receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:04
L58	106	(relays repeaters) with radios and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
L59	13764	transmitters with receivers and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
L60	175	transmitters with receivers and duplex$3 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
L61	12	transmitters with receivers same duplex $3 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
L62	2047	transmitters with receivers same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:06
L63	16	(repeaters relays) same transmitters with receivers same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:07
L64	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 12:09
L65	0	(repeaters relays) same separate with transmitter with receiver with module$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:10
L66	0	(repeaters relays) same separate with transmitter with receiver with module$	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:10

L67	111	(repeaters relays) same transmitter with receiver with module$	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
L68	0	(repeaters relays) same transmitter with receiver with module$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
L69	97	(repeaters relays) same transmitter$ with receiver$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
L70	28	(repeaters relays) same transmitter$ with receiver$ with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
L71	19	(repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:13
L72	29	("5883884").URPN.	USPAT	OR	OFF	2009/01/29 12:17
L73	574	(repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:19
L74	31	(repeaters relays) with interference.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
L75	11	"370"/$.ccls. and (repeaters relays) with interference.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
L76	121	"370"/$.ccls. and (repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
L77	167	"455"/$.ccls. and (repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
L78	3	"455"/$.ccls. and (repeaters relays) with mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:29
L79	8	"455"/$.ccls. and (repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:29
L80	8	"370"/$.ccls. and (repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:31

L81	12	"370"/$.ccls. and (repeater relay) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:32
L82	688	"370"/$.ccls. and (repeater relay) same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:34
L83	341	"370"/$.ccls. and (repeater relay) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:34
L84	5	"370"/$.ccls. and (repeater relay) with two adj transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:35
L85	8	("4546470").URPN.	USPAT	OR	OFF	2009/01/29 12:37
L86	20	(repeater relay) with two adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:38
L87	0	(repeater relay) with four adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:39
L88	0	(repeater relay) with "4" adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:39
L89	324	(repeater relay) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:40
L90	543	(repeater$ relay$) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:40
L91	25	(repeater$ relay$) with radios same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:41

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	4-radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:20
L2	0	four-radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:20
L3	65	four near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:20
L4	4	(transmitter$ with receiver$) same four near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:21
L7	206594	(repeater relay)	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:27
L8	252253	(repeater relay routers)	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:32
L9	6522	(repeater relay routers) with transmitter and receiver	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:36
L10	4009	(repeater relay routers) with transmitter with receiver	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:36
L11	126	(repeater relay routers) with transmitter with receiver same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:37
L12	1	(repeater relay routers) with separate with transmitter with receiver same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:53
L13	58	(repeater relay routers) with separate with transmitter with receiver	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:53
L14	1070	(repeater relay routers) with bi-directional	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:55
L15	16	(repeater relay routers) with bi-directional and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:55
L16	9677	(repeater relay routers) with radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:56

L17	1075	(repeater relay routers) with radio same transmitter$ same receiver$	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:57
L18	1110	(repeater relay routers) with radio$ same transmitter$ same receiver$	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:59
L19	168	(repeater relay routers) with radio$ same transmitter$ same receiver$.clm.	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:59
L20	152	(repeater relay routers) same transmitter$ same receiver$ and MESH ADJ NETWORK	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:07
L21	37	(repeater relay routers).ti. and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:07
L22	101	(repeater relay routers) same antennas and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:09
L23	22	(repeater relay routers) same antennas and (adhoc multi adj hop) adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:16
L24	11821	"455"/$.ccls. and (repeater relay)	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:22
L25	18	"455"/$.ccls. and (repeater relay).ab. and self adj interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:22
L26	37	("5596439").URPN.	USPAT	OR	OFF	2009/01/29 21:24
L27	1	(repeater relay routers nodes) same multi adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:25
L28	9	(repeater relay routers nodes) same multi near2 radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:28
L29	2788	(repeater relay routers nodes) with transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:29
L30	25	(repeater relay routers nodes) with separate near transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:29
L31	22	(repeater relay routers nodes) with separate near transmitter	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:34

L32	1082	radios with (relay$ repeater$ node$)	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:35
L33	36	radios with (relay$ repeater$ node$).ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:35
L34	18	("5734643").URPN.	USPAT	OR	OFF	2009/01/29 21:43
L35	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 21:46
L36	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 21:51
L37	1300	370/338.ccls. and (repeater$ relay)	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:55
L38	180	370/338.ccls. and (repeater$ relay) and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:55
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S2	1	"20050232179" and configured	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:18
S3	1	"20050232179" and exclusively	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:21
S4	1	"20050232179" and motion	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:21
S5	1	"20050232179" and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:24
S6	0	"20050232179" and faults	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:37
S7	0	"20050232179" and diagnose	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
S8	0	"20050232179" and faults	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
S9	1	"20050232179" and failure	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
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S11	28	"6704301"	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:51

S12	43	("20010021639" | "20020055978" | "20020085719" | "20020097681" | "20020097696" | "20020159401" | "20020159409" | "20020176390" | "20020181427" | "20030002442" | "20030012176" | "20030012193" | "20030026356" | "20030114204" | "20030185169" | "20040001442" | "20040014491" | "20040137924" | "20050122925" | "20050181725" | "5166929" | "6026303" | "6046992" | "6298053" | "6363062" | "6426814" | "6597919" | "6665536" | "6683865" | "6704301" | "6831921" | "6850502" | "6859652" | "6865170" | "6876643" | "6892068" | "6904275" | "6909705" | "6912373" | "7058050" | "7164667" | "7190690" | "7200130").PN. OR ("7420952").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 08:54
S13	100	srikrishna.in.	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:59
S14	16	srikrishna.in. and radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:59
S15	1	dacosta.in. and third near2 radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:03
S16	165	radios with relay	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:20
S17	11	multiple near radios with relay	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:20
S18	0	"2002159409"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S19	2	"20020159409"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21

S20	0	"2003040336"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S21	1	"20030040336"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S22	1	"2003002513"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S23	1	"20030002513"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
S24	1	"20030040335"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
S25	1	"20030040335"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
S26	14	"6363062"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:24
S27	5	"7031293"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:24
S28	3	("7031293").URPN.	USPAT	OR	OFF	2009/01/29 09:26
S29	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 10:00
S30	2	("7013138").URPN.	USPAT	OR	OFF	2009/01/29 10:02
S31	356	(third adj radio radios) with (relay repeater)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:03
S32	11	(third adj radio radios) with (relay repeater). ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:04
S33	234	(third adj radio radios) with (relay repeater) same (transmit$4 receiv $4)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:06
S34	1	("7161926").URPN.	USPAT	OR	OFF	2009/01/29 10:23

S35	20	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 10:23
S36	29	("6584080").URPN.	USPAT	OR	OFF	2009/01/29 10:25
S37	266	transmitters with receivers with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:34
S38	123	(repeaters relays) with (transmitters receivers transceivers) with multiple	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:35
S39	5574	radios and (repeater$2 relay$2)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:39
S40	1	radios and (repeater$2 relay$2) and exclusive with transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:39
S41	3581	370/328.ccls.	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:53
S42	265	370/328.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:53
S43	6130	(relays repeaters) and transmitters and receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
S44	962	(relays repeaters) same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
S45	16	(relays repeaters) same transmitters same receivers.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
S46	0	(relays repeaters) same exclusive with transmitters same receivers.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
S47	0	(relays repeaters) same exclusive with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07

S48	2	(relays repeaters) same exclusively with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
S49	20	(relays repeaters) same separate with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:08
S50	962	(relays repeaters) same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:09
S51	31	(relays repeaters) same transmitters same receivers same radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:09
S52	94	(relays repeaters).ab. and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:12
S53	0	(relays repeaters).ab. and multi near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:14
S54	4	(relays repeaters) and multi near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:15
S55	62	(relays repeaters) and radios same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:16
S56	106	(relays repeaters) with radios and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:04
S57	6	(relays repeaters) with radios and interference same transmitters and receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:04
S58	106	(relays repeaters) with radios and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S59	13764	transmitters with receivers and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S60	175	transmitters with receivers and duplex$3 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S61	12	transmitters with receivers same duplex $3 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S62	2047	transmitters with receivers same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:06
S63	16	(repeaters relays) same transmitters with receivers same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:07

S64	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 12:09
S65	0	(repeaters relays) same separate with transmitter with receiver with module$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:10
S66	0	(repeaters relays) same separate with transmitter with receiver with module$	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:10
S67	111	(repeaters relays) same transmitter with receiver with module$	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S68	0	(repeaters relays) same transmitter with receiver with module$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S69	97	(repeaters relays) same transmitter$ with receiver$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S70	28	(repeaters relays) same transmitter$ with receiver$ with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S71	19	(repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:13
S72	29	("5883884").URPN.	USPAT	OR	OFF	2009/01/29 12:17
S73	574	(repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:19
S74	31	(repeaters relays) with interference.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S75	11	"370"/$.ccls. and (repeaters relays) with interference.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S76	121	"370"/$.ccls. and (repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S77	167	"455"/$.ccls. and (repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S78	3	"455"/$.ccls. and (repeaters relays) with mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:29

S79	8	"455"/$.ccls. and (repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:29
S80	8	"370"/$.ccls. and (repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:31
S81	12	"370"/$.ccls. and (repeater relay) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:32
S82	688	"370"/$.ccls. and (repeater relay) same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:34
S83	341	"370"/$.ccls. and (repeater relay) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:34
S84	5	"370"/$.ccls. and (repeater relay) with two adj transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:35
S85	8	("4546470").URPN.	USPAT	OR	OFF	2009/01/29 12:37
S86	20	(repeater relay) with two adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:38
S87	0	(repeater relay) with four adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:39
S88	0	(repeater relay) with "4" adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:39
S89	324	(repeater relay) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:40
S90	543	(repeater$ relay$) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:40
S91	25	(repeater$ relay$) with radios same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:41
S92	362	(repeater relay) with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:44
S93	646	(relay repeaters) with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:44
S94	941	(relay$ repeater$) with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:44

S95	6108	(relay$ repeater$) with transmitter$1 with receiver$1	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:45
S96	75	(relay$ repeater$) with transmitter$1 with receiver$1 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:45
S97	0	(relay$ repeater$) with simplex with transmitter $1 with receiver$1 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:55
S98	23	(relay$ repeater$) with mutual adj interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:55
S99	6	("5640384" | "5710756" | "5757783" | "6366584").PN. OR ("6728541").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 13:59
S100	2376	(relay$ repeater$) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:00
S101	6	bidirectional with (relay $ repeater$) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:01
S102	11	bi-directional with (relay $ repeater$) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:01
S103	11	(relay$ repeater$) with cross near interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:04

1/29/2009 10:32:00 PM
C:\Documents and Settings\mmanoharan\My Documents\EAST\Workspaces\default.wsp

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	13	mesh adj network and fault adj diagnos$4	US-PGPUB; USPAT	OR	OFF	2009/01/30 13:54
S1	1	"20050232179"	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:18
S2	1	"20050232179" and configured	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:18
S3	1	"20050232179" and exclusively	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:21
S4	1	"20050232179" and motion	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:21
S5	1	"20050232179" and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:24
S6	0	"20050232179" and faults	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:37
S7	0	"20050232179" and diagnose	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
S8	0	"20050232179" and faults	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
S9	1	"20050232179" and failure	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:38
S10	5	dacosta.in. and exclusively	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:49
S11	28	"6704301"	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:51
S12	43	("20010021639" | "20020055978" | "20020085719" | "20020097681" | "20020097696" | "20020159401" | "20020159409" | "20020176390" | "20020181427" | "20030002442" | "20030012176" | "20030012193" | "20030026356" | "20030114204" | "20030185169" | "20040001442" | "20040014491" | "20040137924" | "20050122925" | "20050181725" | "5166929" | "6026303" | "6046992" | "6298053" | "6363062" | "6426814" | "6597919" | "6665536" | "6683865" | "6704301" | "6831921" | "6850502" | "6859652" | "6865170" | "6876643" | "6892068" | "6904275" | "6909705" | "6912373" | "7058050" | "7164667" | "7190690" | "7200130").PN. OR ("7420952").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 08:54

S13	100	srikrishna.in.	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:59
S14	16	srikrishna.in. and radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 08:59
S15	1	dacosta.in. and third near2 radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:03
S16	165	radios with relay	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:20
S17	11	multiple near radios with relay	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:20
S18	0	"2002159409"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S19	2	"20020159409"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S20	0	"2003040336"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S21	1	"20030040336"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S22	1	"2003002513"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:21
S23	1	"20030002513"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
S24	1	"20030040335"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
S25	1	"20030040335"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:22
S26	14	"6363062"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:24
S27	5	"7031293"	US-PGPUB; USPAT	OR	OFF	2009/01/29 09:24
S28	3	("7031293").URPN.	USPAT	OR	OFF	2009/01/29 09:26
S29	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 10:00
S30	2	("7013138").URPN.	USPAT	OR	OFF	2009/01/29 10:02
S31	356	(third adj radio radios) with (relay repeater)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:03
S32	11	(third adj radio radios) with (relay repeater).ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:04

S33	234	(third adj radio radios) with (relay repeater) same (transmit$4 receiv $4)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:06
S34	1	("7161926").URPN.	USPAT	OR	OFF	2009/01/29 10:23
S35	20	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 10:23
S36	29	("6584080").URPN.	USPAT	OR	OFF	2009/01/29 10:25
S37	266	transmitters with receivers with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:34
S38	123	(repeaters relays) with (transmitters receivers transceivers) with multiple	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:35
S39	5574	radios and (repeater$2 relay$2)	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:39
S40	1	radios and (repeater$2 relay$2) and exclusive with transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:39
S41	3581	370/328.ccls.	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:53
S42	265	370/328.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 10:53
S43	6130	(relays repeaters) and transmitters and receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
S44	962	(relays repeaters) same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
S45	16	(relays repeaters) same transmitters same receivers.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:05
S46	0	(relays repeaters) same exclusive with transmitters same receivers. ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
S47	0	(relays repeaters) same exclusive with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
S48	2	(relays repeaters) same exclusively with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:07
S49	20	(relays repeaters) same separate with transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:08
S50	962	(relays repeaters) same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:09
S51	31	(relays repeaters) same transmitters same receivers same radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:09

S52	94	(relays repeaters).ab. and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:12
S53	0	(relays repeaters).ab. and multi near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:14
S54	4	(relays repeaters) and multi near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:15
S55	62	(relays repeaters) and radios same transmitters same receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 11:16
S56	106	(relays repeaters) with radios and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:04
S57	6	(relays repeaters) with radios and interference same transmitters and receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:04
S58	106	(relays repeaters) with radios and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S59	13764	transmitters with receivers and interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S60	175	transmitters with receivers and duplex$3 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S61	12	transmitters with receivers same duplex$3 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:05
S62	2047	transmitters with receivers same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:06
S63	16	(repeaters relays) same transmitters with receivers same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:07
S64	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 12:09
S65	0	(repeaters relays) same separate with transmitter with receiver with module$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:10
S66	0	(repeaters relays) same separate with transmitter with receiver with module$	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:10
S67	111	(repeaters relays) same transmitter with receiver with module$	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S68	0	(repeaters relays) same transmitter with receiver with module$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S69	97	(repeaters relays) same transmitter $ with receiver$ same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S70	28	(repeaters relays) same transmitter $ with receiver$ with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:11
S71	19	(repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:13
S72	29	("5883884").URPN.	USPAT	OR	OFF	2009/01/29 12:17
S73	574	(repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:19

S74	31	(repeaters relays) with interference.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S75	11	"370"/$.ccls. and (repeaters relays) with interference.ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S76	121	"370"/$.ccls. and (repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S77	167	"455"/$.ccls. and (repeaters relays) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:20
S78	3	"455"/$.ccls. and (repeaters relays) with mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:29
S79	8	"455"/$.ccls. and (repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:29
S80	8	"370"/$.ccls. and (repeaters relays) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:31
S81	12	"370"/$.ccls. and (repeater relay) same mutual with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:32
S82	688	"370"/$.ccls. and (repeater relay) same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:34
S83	341	"370"/$.ccls. and (repeater relay) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:34
S84	5	"370"/$.ccls. and (repeater relay) with two adj transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:35
S85	8	("4546470").URPN.	USPAT	OR	OFF	2009/01/29 12:37
S86	20	(repeater relay) with two adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:38
S87	0	(repeater relay) with four adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:39
S88	0	(repeater relay) with "4" adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:39
S89	324	(repeater relay) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:40
S90	543	(repeater$ relay$) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:40
S91	25	(repeater$ relay$) with radios same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:41
S92	362	(repeater relay) with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 12:44
S93	646	(relay repeaters) with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:44
S94	941	(relay$ repeater$) with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:44
S95	6108	(relay$ repeater$) with transmitter $1 with receiver$1	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:45
S96	75	(relay$ repeater$) with transmitter $1 with receiver$1 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:45

S97	0	(relay$ repeater$) with simplex with transmitter$1 with receiver$1 with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:55
S98	23	(relay$ repeater$) with mutual adj interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 13:55
S99	6	("5640384" | "5710756" | "5757783" | "6366584").PN. OR ("6728541").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/29 13:59
S100	2376	(relay$ repeater$) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:00
S101	6	bidirectional with (relay$ repeater $) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:01
S102	11	bi-directional with (relay$ repeater $) with interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:01
S103	11	(relay$ repeater$) with cross near interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 14:04
S104	0	4-radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:20
S105	0	four-radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:20
S106	65	four near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:20
S107	4	(transmitter$ with receiver$) same four near radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:21
S108	206594	(repeater relay)	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:27
S109	252253	(repeater relay routers)	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:32
S110	6522	(repeater relay routers) with transmitter and receiver	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:36
S111	4009	(repeater relay routers) with transmitter with receiver	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:36
S112	126	(repeater relay routers) with transmitter with receiver same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:37
S113	1	(repeater relay routers) with separate with transmitter with receiver same interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:53
S114	58	(repeater relay routers) with separate with transmitter with receiver	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:53
S115	1070	(repeater relay routers) with bi-directional	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:55
S116	16	(repeater relay routers) with bi-directional and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:55
S117	9677	(repeater relay routers) with radio	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:56
S118	1075	(repeater relay routers) with radio same transmitter$ same receiver$	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:57

S119	1110	(repeater relay routers) with radio $ same transmitter$ same receiver $	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:59
S120	168	(repeater relay routers) with radio $ same transmitter$ same receiver $.clm.	US-PGPUB; USPAT	OR	OFF	2009/01/29 20:59
S121	152	(repeater relay routers) same transmitter$ same receiver$ and MESH ADJ NETWORK	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:07
S122	37	(repeater relay routers).ti. and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:07
S123	101	(repeater relay routers) same antennas and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:09
S124	22	(repeater relay routers) same antennas and (adhoc multi adj hop) adj network	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:16
S125	11821	"455"/$.ccls. and (repeater relay)	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:22
S126	18	"455"/$.ccls. and (repeater relay).ab. and self adj interference	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:22
S127	37	("5596439").URPN.	USPAT	OR	OFF	2009/01/29 21:24
S128	1	(repeater relay routers nodes) same multi adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:25
S129	9	(repeater relay routers nodes) same multi near2 radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:28
S130	2788	(repeater relay routers nodes) with transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:29
S131	25	(repeater relay routers nodes) with separate near transmitters	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:29
S132	22	(repeater relay routers nodes) with separate near transmitter	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:34
S133	1082	radios with (relay$ repeater$ node $)	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:35
S134	36	radios with (relay$ repeater$ node $).ab.	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:35
S135	18	("5734643").URPN.	USPAT	OR	OFF	2009/01/29 21:43
S136	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 21:46
S137	33	("6690657").URPN.	USPAT	OR	OFF	2009/01/29 21:51
S138	1300	370/338.ccls. and (repeater$ relay)	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:55
S139	180	370/338.ccls. and (repeater$ relay) and radios	US-PGPUB; USPAT	OR	OFF	2009/01/29 21:55
S140	1	intermediate adj node with (radios)	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:46
S141	3	(separate with transmitter and receiver) same cheap	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:46

S142	14345	(separate with transmitter and receiver)	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:46
S143	8420	(separate with transmitter with receiver)	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:47
S144	132	(repeater relay) same (separate with transmitter with receiver)	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:47
S145	29	"370"/$.ccls. and (repeater relay) same (separate with transmitter with receiver)	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:49
S146	28	"455"/$.ccls. and (repeater relay) same (separate with transmitter with receiver)	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:49
S147	9	two adj radios same uplink same downlink	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:53
S148	0	four adj radios same uplink same downlink	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:53
S149	58	four adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:54
S150	51	network and four adj radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 07:54
S151	17	("20040063451" | "20040192331" | "20040198376" | "4578815" | "5987011" | "6104712" | "6111860" | "6119179" | "6212559" | "6243585" | "6259691" | "6298062" | "6327267" | "6330316" | "6421325" | "6449491" | "6600928").PN. OR ("7187941").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/30 08:02
S152	1941	(multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:06
S153	517	"370"/$.ccls. and (multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:07
S154	32	"370"/401.ccls. and (multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:07
S155	320583	"370"/("328,338,401,252").ccls. and (multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:09
S156	171	"370"/328,338,401,252.ccls. and (multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:09
S157	15	(repeater$ relay routers) with separate with transmitters with receivers	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:18
S158	68	(repeater$ relay routers) with separate with transmitter with receiver	US-PGPUB; USPAT	OR	OFF	2009/01/30 08:20
S159	232	cognitive adj radio	US-PGPUB; USPAT	OR	OFF	2009/01/30 09:33
S160	49	cognitive adj radio and scanning	US-PGPUB; USPAT	OR	OFF	2009/01/30 09:34

S161	40	scanning same signal adj strength same handover	US-PGPUB; USPAT	OR	OFF	2009/01/30 09:51
S162	1	(nodes routers relay) same scanning same signal adj strength same handover	US-PGPUB; USPAT	OR	OFF	2009/01/30 09:52
S163	1	(nodes routers relay) same scanning same signal adj strength same radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 09:52
S164	0	"20040095900" and scanning	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:17
S165	0	"20040095900" and strength	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:17
S166	96	inder near mehra and radio	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:38
S167	0	inder near mehra and coginitive near radio	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:38
S168	1	inder near mehra and cognitive near radio	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:38
S169	5	("20040028003" | "20050276276" | "20060099954" | "20060135083" | "20060270433").PN. OR ("7418245").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/30 10:39
S170	5	("20040028003" | "20050276276" | "20060099954" | "20060135083" | "20060270433").PN. OR ("7418245").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/01/30 10:42
S171	2	"20040028003"	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:42
S172	2	"20040028003" and scanning	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:42
S173	2968	radios and scanning	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:43
S174	255	radios same scanning	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:43
S175	14	radios same scanning and cognitive	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:44
S176	0	two near radios same scanning and cognitive	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:45
S177	3	two near radios same scanning	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:45
S178	10	two near radios same scan$3	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:45
S179	22	two near radios same signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:47
S180	6	radios same signal adj (strength quality) same handover	US-PGPUB; USPAT	OR	OFF	2009/01/30 10:49
S181	266	370/401.ccls. and handover	US-PGPUB; USPAT	OR	OFF	2009/01/30 11:46
S182	10	370/401.ccls. and (relay repeater) same handover	US-PGPUB; USPAT	OR	OFF	2009/01/30 11:46

S183	26	370/401.ccls. and (relay repeater) same handoff	US-PGPUB; USPAT	OR	OFF	2009/01/30 11:48
S184	43	mesh adj network and (relay repeater$) same radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 11:58
S185	129	mesh adj network and (relay repeater$) same (antennas radios)	US-PGPUB; USPAT	OR	OFF	2009/01/30 11:59
S186	30	mesh adj network.ab. and (relay repeater$) same (antennas radios)	US-PGPUB; USPAT	OR	OFF	2009/01/30 11:59
S187	43	mesh adj network and (relay repeater$) same radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 12:13
S188	55	((mulithop multi adj hop) mesh) adj network and (relay repeater$) same radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 12:27
S189	41	((mulithop multi adj hop) mesh) adj network and (routers relay repeater$) with radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 12:28
S190	614	((mulithop multi adj hop) mesh) adj network and radios	US-PGPUB; USPAT	OR	OFF	2009/01/30 12:31
S191	510	((multiple multi) adj radios)	US-PGPUB; USPAT	OR	OFF	2009/01/30 12:32
S192	62	370/338,401.ccls. and ((multiple multi) adj radios)	US-PGPUB; USPAT	OR	OFF	2009/01/30 12:32

1/30/2009 1:55:25 PM
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	25821	radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
L2	5160	radios with (two multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
L3	1235	radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
L4	101	radios with (two multiple) and signal adj (strength quality).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:04
L5	0	mesh adj network same radios with (two multiple) and signal adj (strength quality).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:05
L6	14	mesh adj network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:05
L7	14	(adhoc mesh) adj network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:12
L8	451	network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:12
L9	43	network same relay same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:13
L10	534	network same radios with (two multiple) and (scanning signal adj (strength quality))	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:17
L11	133	network same radios with (two multiple) and (scanning signal adj (strength quality)).clm.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:17
L12	65	radios.ab. and network same radios with (two multiple) and (scanning signal adj (strength quality))	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:24
L13	16	radios.ab. and (adhoc mesh) adj networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:29
L14	175	370/315,331,338,332.ccls. and mesh near2 networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:33

L15	53	370/315,331,338,332.ccls. and mesh near2 networks and (radios 2-radio)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:33
L16	171	"370"/$.ccls. and mesh near2 networks and (radios 3-radio 2-radio)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:37

10/4/2008 9:03:26 AM
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	25821	radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
L2	5160	radios with (two multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
L3	1235	radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
L4	101	radios with (two multiple) and signal adj (strength quality).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:04
L5	0	mesh adj network same radios with (two multiple) and signal adj (strength quality).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:05
L6	14	mesh adj network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:05
L7	14	(adhoc mesh) adj network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:12
L8	451	network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:12
L9	43	network same relay same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:13
L10	534	network same radios with (two multiple) and (scanning signal adj (strength quality))	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:17
L11	133	network same radios with (two multiple) and (scanning signal adj (strength quality)).clm.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:17
L12	65	radios.ab. and network same radios with (two multiple) and (scanning signal adj (strength quality))	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:24
L13	16	radios.ab. and (adhoc mesh) adj networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:29
L14	175	370/315,331,338,332.ccls. and mesh near2 networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:33
L15	53	370/315,331,338,332.ccls. and mesh near2 networks and (radios 2-radio)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:33
L16	171	"370"/$.ccls. and mesh near2 networks and (radios 3-radio 2-radio)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:37

L17	639	370/254.ccls. and radio$	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:28
L18	64	370/254.ccls. and radio$ and mesh adj network	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:29
L19	2730	370/254,315.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:38
L20	164	370/254,315.ccls. and scanning	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:38
L21	0	370/254,315.ccls. and two-radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
L22	0	370/254,315.ccls. and 2-radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
L23	78	370/254,315.ccls. and mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
L24	120	370/254,315.ccls. and mesh adj network	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
L25	28	370/254,315.ccls. and mesh adj network and radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
L26	5	mesh adj dynamics	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:45
L27	43	("20010021639" | "20020055978" | "20020085719" | "20020097681" | "20020097696" | "20020159401" | "20020159409" | "20020176390" | "20020181427" | "20030002442" | "20030012176" | "20030012193" | "20030026356" | "20030114204" | "20030185169" | "20040001442" | "20040014491" | "20040137924" | "20050122925" | "20050181725" | "5166929" | "6026303" | "6046992" | "6298053" | "6363062" | "6426814" | "6597919" | "6665536" | "6683865" | "6704301" | "6831921" | "6850502" | "6859652" | "6865170" | "6876643" | "6892068" | "6904275" | "6909705" | "6912373" | "7058050" | "7164667" | "7190690" | "7200130").PN. OR ("7420952").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/04 09:49

L28	13	("6665536").URPN.	USPAT	OR	OFF	2008/10/04 10:19
L29	0	("7107052").URPN.	USPAT	OR	OFF	2008/10/04 10:20
L30	203	(relay$2) with radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:22
L31	166	(relay$2) with radios and network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:23
L32	33	(relay$2) with radios and (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:23
L33	2294	(relay$2) and (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:30
L34	907	(relay$2) with node$2 and (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:30
L35	307	(relay$2) with node$2 same (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:30
L36	31	(relay$2) with node$2 same (mesh ad-hoc adhoc) near2 network and (handoff handover)	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:31
L37	13	(relay$2) with node$2.ab. same (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:34
L38	216	STA near2 mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:38
L39	81	STA near mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:38
L40	0	mulit near mode near AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:35
L41	1	multi near mode near AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:36
L42	389	mode near AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:36
L43	2077	hybrid with node	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:54
L44	8	hybrid with node same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:54
L45	68	(dual multi) near2 mode same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:55
L46	1	(dual multi) near2 mode with AP same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:55
L47	1	(dual multi) near2 mode with AP same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:55

L48	32	mode with AP same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:56
L49	0	mode with AP with (relay repeater) same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 12:00
L50	34	mode with AP with (relay repeater)	US-PGPUB; USPAT	OR	OFF	2008/10/04 12:00
L51	7	(ad-hoc adhoc mesh) with (relay repeater) adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:07
L52	16	(ad-hoc adhoc mesh multi-hop multihop) same (relay repeater) adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:08
L53	10	(ad-hoc adhoc mesh multi-hop multihop) and (relay repeater) adj mode.clm.	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:09
L54	0	(ad-hoc adhoc mesh multi-hop multihop) and (AP adj mode) with (relay repeater) adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:11
L55	2	(ad-hoc adhoc mesh multi-hop multihop) and (AP with (relay repeater))with simultaneously	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:12
L56	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater)) with mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:14
L57	290	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode) with switch$3	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:14
L58	4	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode) with switch$3.ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:14
L59	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:18
L60	131	(ad-hoc adhoc mesh multi-hop multihop).ab. and ((relay repeater)with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:18
L61	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:37
L62	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:37
L63	2	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	EPO	OR	OFF	2008/10/04 13:37
L64	700	(2-radios 4-radios two near radios four near radios)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:43
L65	15	(2-radios 4-radios two near radios four near radios).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:43

L66	83	(2-radios 4-radios two near radios four near radios) and (adhoc ad-hoc mesh) near2 network$	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:46
L67	49	370/315.ccls. and (adhoc mesh)	US-PGPUB; USPAT	OR	OFF	2008/10/04 14:05

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	226	repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:34
L2	0	repeater adj mode and AP adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:34
L3	6	repeater adj mode and AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:35
L4	1	repeater adj mode same AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:35
L5	25	"6393261"	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:40
L6	4	"6393261" AND REPEATER	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:42
L7	50	"5546397"	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:43
L8	36	("6047175").URPN.	USPAT	OR	OFF	2008/10/04 19:51
L9	1347	(access adj point AP) with (relay repeater)	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:53
L10	47	(access adj point AP) with (relay repeater).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 19:57
L11	200	(access adj point AP) with (relay repeater) same (mesh WLAN adhoc)	US-PGPUB; USPAT	OR	OFF	2008/10/04 20:03
L12	0	("7321578").URPN.	USPAT	OR	OFF	2008/10/04 20:19
S92	25821	radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
S93	5160	radios with (two multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
S94	1235	radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:03
S95	101	radios with (two multiple) and signal adj (strength quality).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:04
S96	0	mesh adj network same radios with (two multiple) and signal adj (strength quality).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:05
S97	14	mesh adj network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:05
S98	14	(adhoc mesh) adj network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:12

S99	451	network same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:12
S100	43	network same relay same radios with (two multiple) and signal adj (strength quality)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:13
S101	534	network same radios with (two multiple) and (scanning signal adj (strength quality))	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:17
S102	133	network same radios with (two multiple) and (scanning signal adj (strength quality)).clm.	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:17
S103	65	radios.ab. and network same radios with (two multiple) and (scanning signal adj (strength quality))	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:24
S104	16	radios.ab. and (adhoc mesh) adj networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:29
S105	175	370/315,331,338,332.ccls. and mesh near2 networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:33
S106	53	370/315,331,338,332.ccls. and mesh near2 networks and (radios 2-radio)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:33
S107	171	"370"/$.ccls. and mesh near2 networks and (radios 3-radio 2-radio)	US-PGPUB; USPAT	OR	OFF	2008/10/04 08:37
S108	639	370/254.ccls. and radio$	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:28
S109	64	370/254.ccls. and radio$ and mesh adj network	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:29
S110	2730	370/254,315.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:38
S111	164	370/254,315.ccls. and scanning	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:38
S112	0	370/254,315.ccls. and two-radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
S113	0	370/254,315.ccls. and 2-radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
S114	78	370/254,315.ccls. and mesh adj networks	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
S115	120	370/254,315.ccls. and mesh adj network	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
S116	28	370/254,315.ccls. and mesh adj network and radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:44
S117	5	mesh adj dynamics	US-PGPUB; USPAT	OR	OFF	2008/10/04 09:45

S118	43	("20010021639" | "20020055978" | "20020085719" | "20020097681" | "20020097696" | "20020159401" | "20020159409" | "20020176390" | "20020181427" | "20030002442" | "20030012176" | "20030012193" | "20030026356" | "20030114204" | "20030185169" | "20040001442" | "20040014491" | "20040137924" | "20050122925" | "20050181725" | "5166929" | "6026303" | "6046992" | "6298053" | "6363062" | "6426814" | "6597919" | "6665536" | "6683865" | "6704301" | "6831921" | "6850502" | "6859652" | "6865170" | "6876643" | "6892068" | "6904275" | "6909705" | "6912373" | "7058050" | "7164667" | "7190690" | "7200130").PN. OR ("7420952").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/04 09:49
S119	13	("6665536").URPN.	USPAT	OR	OFF	2008/10/04 10:19
S120	0	("7107052").URPN.	USPAT	OR	OFF	2008/10/04 10:20
S121	203	(relay$2) with radios	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:22
S122	166	(relay$2) with radios and network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:23
S123	33	(relay$2) with radios and (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:23
S124	2294	(relay$2) and (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:30
S125	907	(relay$2) with node$2 and (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:30
S126	307	(relay$2) with node$2 same (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:30
S127	31	(relay$2) with node$2 same (mesh ad-hoc adhoc) near2 network and (handoff handover)	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:31

S128	13	(relay$2) with node$2.ab. same (mesh ad-hoc adhoc) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:34
S129	216	STA near2 mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:38
S130	81	STA near mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 10:38
S131	0	mulit near mode near AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:35
S132	1	multi near mode near AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:36
S133	389	mode near AP	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:36
S134	2077	hybrid with node	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:54
S135	8	hybrid with node same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:54
S136	68	(dual multi) near2 mode same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:55
S137	1	(dual multi) near2 mode with AP same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:55
S138	1	(dual multi) near2 mode with AP same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:55
S139	32	mode with AP same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 11:56
S140	0	mode with AP with (relay repeater) same (adhoc mesh) near2 network	US-PGPUB; USPAT	OR	OFF	2008/10/04 12:00
S141	34	mode with AP with (relay repeater)	US-PGPUB; USPAT	OR	OFF	2008/10/04 12:00
S142	7	(ad-hoc adhoc mesh) with (relay repeater) adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:07
S143	16	(ad-hoc adhoc mesh multi-hop multihop) same (relay repeater) adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:08
S144	10	(ad-hoc adhoc mesh multi-hop multihop) and (relay repeater) adj mode.clm.	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:09
S145	0	(ad-hoc adhoc mesh multi-hop multihop) and (AP adj mode) with (relay repeater) adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:11
S146	2	(ad-hoc adhoc mesh multi-hop multihop) and (AP with (relay repeater))with simultaneously	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:12
S147	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater)) with mode	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:14

S148	290	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode) with switch$3	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:14
S149	4	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode) with switch$3.ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:14
S150	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:18
S151	131	(ad-hoc adhoc mesh multi-hop multihop).ab. and ((relay repeater)with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:18
S152	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:37
S153	1028	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:37
S154	2	(ad-hoc adhoc mesh multi-hop multihop) and ((relay repeater) with mode)	EPO	OR	OFF	2008/10/04 13:37
S155	700	(2-radios 4-radios two near radios four near radios)	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:43
S156	15	(2-radios 4-radios two near radios four near radios).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:43
S157	83	(2-radios 4-radios two near radios four near radios) and (adhoc ad-hoc mesh) near2 network$	US-PGPUB; USPAT	OR	OFF	2008/10/04 13:46
S158	49	370/315.ccls. and (adhoc mesh)	US-PGPUB; USPAT	OR	OFF	2008/10/04 14:05
S159	196	cognitive adj radio	US-PGPUB; USPAT	OR	OFF	2008/10/04 14:56
S160	3868	radios near2 (two multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:20
S161	3888	radios near2 (two four multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:20
S162	1066	radios near1 (two four multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:20
S163	46	radios near1 (two four multiple) and (disassociat$3)	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:21
S164	33	radios near1 (two four multiple) and (disassociat$3) and signal adj strength	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:21
S165	21	("5857144").URPN.	USPAT	OR	OFF	2008/10/04 15:48
S166	236	radios near1 (two four multiple) and scanning	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:58
S167	2	radios near1 (two four multiple) and scanning same failure	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:58

S168	10	radios near1 (two four multiple) and scanning same reliability	US-PGPUB; USPAT	OR	OFF	2008/10/04 15:59
S169	10	radios near1 (two four multiple) and scanning same reliability	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:00
S170	239	radios near1 (two four multiple) and scanning	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:01
S171	21	radios near1 (two four multiple) and scanning and faults	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:02
S172	1	radios near1 (two four multiple) and scanning adj radio with relay with radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:05
S173	1	radios near1 (two four multiple) and scanning adj radio with relay	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:06
S174	1	radios near1 (two four multiple) and scanning adj radio with (repeater relay)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:06
S175	0	radios near1 (two four multiple) and scan$3 adj radio with (repeater relay)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:06
S176	1	radios near1 (two four multiple) and scan$4 adj radio with (repeater relay)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:06

S177	1	radios near1 (two four multiple) and scan$4 adj radio same (repeater relay)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:06
S178	80	radios near1 (two four multiple) and ((repeater relay) with failure fault$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/04 16:07
S179	11	370/254.ccls. and 370/315.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/04 16:15
S180	36	("4926495" | "5117501" | "5212724" | "5253253").PN. OR ("5323384").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/04 16:22

10/4/2008 8:21:00 PM
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	14868	(repeater relay) with mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:40
L2	467	(repeater relay) with mode.ab.	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:40
L3	1535	(repeater relay) with mode.clm.	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:41
L4	3114	(repeater relay) with mode and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:41
L5	11	(repeater relay) with mode same adhoc	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:41
L6	150	(repeater relay) with mode same (mesh ad-hoc adhoc ap)	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:51
L7	132	(repeater relay) with mode same (mesh ad-hoc adhoc WLAN)	US-PGPUB; USPAT	OR	OFF	2008/10/09 11:51
L8	8158	370/315,338,331.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:05
L9	1860	370/315,338,331.ccls. and (repeater relay)	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:05
L10	558	370/315,338,331.ccls. and (repeater relay).clm.	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:05
L11	370	370/315,338,331.ccls. and (repeater relay).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:05
L12	198	370/315,338,331.ccls. and (repeater relay).ti.	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:05
L13	3	370/315.ccls. and 370/338.ccls. and 370/331.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:06
L14	53	370/315.ccls. and (370/338.ccls. 370/331. ccls.)	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:17
L15	553	370/315.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:27
L16	85	370/315.ccls. and (multi adj hop)	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:27
L17	44	370/315.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2008/10/09 12:33
L18	8	370/315.ccls. and repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:26
L19	0	multihop with repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:27

L20	0	multi-hop with repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:28
L21	1	multi-hop same repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:28
L22	226	repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:28
L23	25	repeater adj mode.clm.	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:28
L24	0	(mesh adhoc) same repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:30
L25	1	(mesh ad-hoc multi-hop) same repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:30
L26	33	(mesh ad-hoc multi-hop) and repeater adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:30
L27	42	(mesh ad-hoc multi-hop) and relay adj mode	US-PGPUB; USPAT	OR	OFF	2008/10/09 13:56
S110	1788	(repeater relay) same (adhoc ad-hoc mesh adj network WLAN wireless adj LAN)	US-PGPUB; USPAT	OR	OFF	2008/10/09 10:40
S111	18	(repeater relay) same (adhoc ad-hoc mesh adj network WLAN wireless adj LAN) same hybrid	US-PGPUB; USPAT	OR	OFF	2008/10/09 10:41
S112	19	(repeater relay) same (adhoc ad-hoc mesh adj network WLAN wireless adj LAN) same hybrid	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/09 10:45
S113	3860	(repeater relay) same hybrid	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/09 10:47
S114	480	(repeater relay) same hybrid.ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/09 10:47
S115	29	"455"/$.ccls. and (repeater relay) same hybrid.ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/09 10:47

10/ 9/ 2008 2:09:54 PM
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(mesh adhoc adj networks) same softhandoff	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:18
L2	2	(mesh adhoc adj networks) same soft adj handoff	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:18
L3	2	(mesh ad-hoc adj networks) same soft adj handoff	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:20
L4	7	(mesh ad-hoc adj network) same soft adj handoff	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:20
L5	12	(mesh ad-hoc adj network) same soft adj (handover handoff)	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:21
L6	33	(multi adj hop) and soft adj (handoff handover)	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:22
L7	1	"20040094903"	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:29
L8	1	"20040090843"	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:29
L9	2	"20040090943"	US-PGPUB; USPAT	OR	OFF	2008/10/10 09:29
L10	43	("20010021639" | "20020055978" | "20020085719" | "20020097681" | "20020097696" | "20020159401" | "20020159409" | "20020176390" | "20020181427" | "20030002442" | "20030012176" | "20030012193" | "20030026356" | "20030114204" | "20030185169" | "20040001442" | "20040014491" | "20040137924" | "20050122925" | "20050181725" | "5166929" | "6026303" | "6046992" |	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/10 09:32

		"6298053" | "6363062" | "6426814" | "6597919" | "6665536" | "6683865" | "6704301" | "6831921" | "6850502" | "6859652" | "6865170" | "6876643" | "6892068" | "6904275" | "6909705" | "6912373" | "7058050" | "7164667" | "7190690" | "7200130").PN. OR ("7420952").URPN.				
L11	2	("7200130").URPN.	USPAT	OR	OFF	2008/10/10 09:41
L12	31	("5224150" | "5473667" | "5654959" | "5673031" | "5787174" | "5812531" | "5973613" | "6006090" | "6046992" | "6104279" | "6104333" | "6195006" | "6314091" | "6421731" | "6452910" | "6459685" | "6459894" | "6490687" | "6535498" | "6549786" | "6636737" | "6717516" | "6754250" | "6763231" | "6775258" | "6795688" | "6826165" | "6831896" | "6885847" | "6904275" | "6925074").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/10 09:42
L13	8	("5305467" | "5815811" | "5949760" | "6046992" | "6400702" | "6580700" | "6600734" | "6680923").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/10 09:47
L14	19	("6717516").URPN.	USPAT	OR	OFF	2008/10/10 09:49
L15	3	("6745027" | "6873825").PN. OR ("7190690").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/10/10 09:53
L16	1	(multi near2 radios) and soft adj (handoff handover)	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:15

L17	357709	((multi near hop) adhoc ad-hoc mesh)	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:16
L18	10710	((multi near hop) adhoc ad-hoc mesh) near2 network$	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:16
L19	1118	((multi near hop) adhoc ad-hoc mesh) near2 network$ and radios	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:16
L20	5	relay$2.ti. and ((multi near hop) adhoc ad-hoc mesh) near2 network$ and radios	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:17
L21	17	relay$2.ab. and ((multi near hop) adhoc ad-hoc mesh) near2 network$ and radios	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:18
L22	2	"20040095907"	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:23
L23	1	"20050185606"	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:23
L24	6	(multiple near2 radios) and soft adj (handoff handover)	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:25
L25	746	(multiple near2 radios)	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:34
L26	13	(multiple near2 radios).ti.	US-PGPUB; USPAT	OR	OFF	2008/10/10 10:35
L27	7	"6147983"	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:01
L28	6	("6147983").URPN.	USPAT	OR	OFF	2008/10/10 11:02
L29	746	(multiple near2 radios)	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:06
L30	0	(multiple near2 radios) same "455"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:06
L31	0	(multiple near2 radios) same "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:06
L32	232	(multiple near2 radios) and "370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:06
L33	341	(multiple near2 radios) and "455"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:06
L34	39	(multiple near2 radios).ab. and "455"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:07
L35	878	radios.ab.	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:37

L36	179	radios same (AP)	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:37
L37	16	radios same (AP) same (adhoc multihop multi-hop mesh)	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:38
L38	19	radios same (AP) same (ad-hoc adhoc multihop multi-hop mesh)	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:38
L39	50	radios same (AP) same (ad-hoc adhoc multihop multi-hop mesh multiple)	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:38
L40	2	"20040095907"	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:48
L41	1	"20050185606"	US-PGPUB; USPAT	OR	OFF	2008/10/10 11:48
L42	5	(infrastructure same adhoc same switch$3 with mode)	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:04
L43	13	(infrastructure same adhoc same switch$3 with mode)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/10 12:06
L44	116	(ad-hoc peer-to-peer) with switch$3 with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:06
L45	12	(adhoc) with switch$3 with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:18
L46	221830	meash near2 access adj point switch$3 with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:20
L47	0	meash near2 access adj point and switch$3 with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:20
L48	4	mesh near2 access adj point and switch$3 with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:20
L49	7	mesh near2 access adj point with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:23
L50	1562	(ad-hoc peer-to-peer) with mode	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:25
L51	523	(ad-hoc peer-to-peer) with mode with (Ap access adj point infrastructure)	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:25

L52	24	(ad-hoc peer-to-peer) with mode with (Ap access adj point infrastructure).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:25
L53	11	duplex with mesh with node	US-PGPUB; USPAT	OR	OFF	2008/10/10 12:51
L54	1	"20060146712"	US-PGPUB; USPAT	OR	OFF	2008/10/10 13:26
L55	124	radios.ab. and (ad-hoc infrastructure peer-to-peer)	US-PGPUB; USPAT	OR	OFF	2008/10/10 13:29
L56	146	radios.ab. and (mesh ad-hoc infrastructure peer-to-peer)	US-PGPUB; USPAT	OR	OFF	2008/10/10 13:29
L57	517	radios and (mesh ad-hoc infrastructure peer-to-peer).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/10 13:35
L58	43	radios.clm. and (mesh ad-hoc infrastructure peer-to-peer).ab.	US-PGPUB; USPAT	OR	OFF	2008/10/10 13:35

10/10/2008 1:48:03 PM
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PTO/SB/30EFS (06-09)
Approved for use through 07/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11/084,330	Filing Date	2007-03-17	Docket Number (if applicable)	0357-02205	Art Unit	2617
First Named Inventor	daCosta, Francis			Examiner Name	Muthuswamy Ganapathy Manoharan		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other Extension of Time Request

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (06-09)
Approved for use through 07/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Szymon M. Gurda/	Date (YYYY-MM-DD)	2009-07-03
Name	Szymon M. Gurda	Registration Number	58451

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

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

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Francis daCosta, et. al.
Application Serial No.:	11/084,330
Filing Date:	March 17, 2005
Examiner:	Muthuswamy Ganapathy Manoharan
Art Unit:	2617
Atty. Docket:	0357/02205

Submitted via EFS-Web on July 3, 2009

Commissioner for Patents
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Alexandria VA 22313-1450

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Chicago, Illinois 60654
(312) 621-1330

RCE, AMENDMENT, AND RESPONSE TO OFFICE ACTION

Dear Sir:

In response to the February 3, 2009 Official Action issued in this matter, please enter the following Amendment and consider the following Remarks.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page seven of this paper.

RCE Transmittal is attached.

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows. Applicant respectfully reserves the right to prosecute any originally presented or canceled claims in a continuing or future application.

This listing of claims replaces all prior versions, and listing, of claims in the application:

1-3. (Cancelled)

4. (Currently Amended) A full duplex wireless mesh network node comprising:

a first relay radio configured to receive exclusively packets from a parent mesh node, said first relay radio operating on a first RF channel;

a second relay radio configured to send exclusively packets to the parent mesh node, said second relay radio operating on a second RF channel;

a third relay radio configured to receive exclusively packets from a daughter mesh node, said third relay radio operating on a third RF channel; and

a fourth relay radio configured to send exclusively packets to the daughter mesh node, said fourth relay radio operating on a fourth RF channel; wherein the four relay radios are configurable to perform their operations simultaneously, and wherein said first through fourth RF channels are different from one another.

.

5-8. (Cancelled)

9. (Currently Amended) A wireless mesh network node wirelessly connected to a current parent node in a wireless mesh network, the wireless mesh network node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node comprising:

at least two relay radios; and

a scanning radio having a single antenna and configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node; wherein:

the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger.

10. (Previously Presented) The wireless mesh network node of Claim 9, wherein the scanning radio is further configured to diagnose faults in the at least two relay radios.

11. (Previously Presented) The wireless mesh network node of Claim 9, wherein the scanning radio is used to diagnose faults in radios of another node in the mesh network.

12. (Previously Presented) The wireless mesh network node of Claim 9, wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio.

13. (Previously Presented) The wireless mesh network node of Claim 9, wherein packets are sent redundantly by the wireless mesh network node to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent-child connection with the current parent node and forms the new parent-child connection with the neighboring node.

14.-17. (Cancelled)

18. (Previously Presented) The full duplex wireless mesh network node of Claim 4 further comprising a client service radio adapted to communicate with one or more network client radios.

19. (Previously Presented) The wireless mesh network node of Claim 9 further comprising a client service radio adapted to communicate with one or more network client radios.

20. (New) The wireless mesh network node of Claim 9 wherein said wireless mesh network node, said current parent node, and said neighboring node are all in motion.

21. (New) The wireless mesh network node of Claim 20 wherein said wireless mesh network node, said current parent node, and said neighboring node only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio.

22. (New) The wireless mesh network node of Claim 19 wherein said wireless mesh network node, said current parent node, said neighboring node, and at least one of said network client radios are all in motion.

23. (New) The wireless mesh network node of Claim 22 wherein said wireless mesh network node, said current parent node, and said neighboring node, and said at least one of said network client radios only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio.

24. (New) A wireless mesh network node wirelessly connected to a current parent node in a wireless mesh network wherein connections between relay radios are only made to form a tree-like structure, the wireless mesh network

node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node comprising:

at least two relay radios;

a scanning radio having a single antenna and configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node; and

a client service radio adapted to communicate with one or more network client radios; wherein:

the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger; and

said wireless mesh network node, said current parent node, said neighboring node, and at least one of said network client radios are all in motion.

25. (New) The full duplex wireless mesh network node of Claim 4 wherein the relay radios of said mesh node and any neighboring nodes only connect to each other to form a tree-like structure.

REMARKS/ARGUMENTS

Claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Crowhurst et al. (hereinafter Crowhurst) (US 2004/0137877).

Claims 9 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over deTorbal (US 2004/0058678) in view over Elson et al. (hereinafter Elson) (US 2003/0012168).

Claims 10-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over deTorbal (US 2004/0058678) in view over Elson et al. (hereinafter Elson) (US 2003/0012168) and Mahany (US 5546397).

Claim 18 was rejected under 35 U.S.C. 103(a) as being unpatentable over Elson.

Claim 4

In paragraph [0005], lines 1-11, Crowhurst states:

> "[0005] However, it is possible for a relay station to use equipment which does not include a wide-band amplifier, but instead uses separate receivers, filters and amplifiers for each transmission channel. The relay station may have separate transmitter/receiver stations, each equipped with a receiver and a transmitter, dedicated to each radio frequency channel in the frequency band in which the passive security system is operated. Then the relay station would not have to scan the frequency band of the security system to locate the channels, both of which are used for spectral authentication of the data and transponders."

Here, Crowhust is describing a prior art system for attacking a wireless security key system for a vehicle where the attacking system intercepts the key

code by monitoring the transmission from a key and relaying it to the vehicle to gain access (see para [0003] in Crowhurst, lines 1-5). In para [0005] Crowhurst is describing a system that used separate receivers to intercept the transmitted codes on specific channels as opposed to using a wideband amplifier:

> "does not include a wide-band amplifier, but instead uses separate receivers, filters and amplifiers for each transmission channel."

He then states in para [0005] above that:

> "The relay station may have separate transmitter/receiver stations, each equipped with a receiver and a transmitter, dedicated to each radio frequency channel."

Since the purpose of the attacking relay system Crowhurst is describing is to intercept and relay information on a specific channel, it follows that his reference to "separate transmitter/receiver stations" that are "dedicated to each radio frequency channel" must indicate that the transmitter and receiver of a "separate transmitter/receiver stations" are operating on the same channel since this is the only way that information could be successfully relayed from the electronic key to the base station located in the vehicle.

Crowhurst not combinable with Elson and Lee

As such, Applicant would like to point out that Crowhurst is not combinable with Elson and Lee to produce applicant's invention since Crowhurst requires transmit and receive channels to be the same and applicant's invention requires them to be different. Thus, such a combination would be non-functional.

Claim 4 has been amended to be consistent with applicant's invention regarding the use of multiple radios on a single mesh node and operating those multiple radios on different, non-interfering channels to maximize the use of available RF spectrum, therefore increasing throughput and decreasing latency.

As amended claim 4 now requires "wherein said first through fourth RF channels are different from one another". Support for multiple radios on a node being assigned different, non interfering channels is found in paragraphs [0050], [0051], and [0070] in applicant's published application.

Claim 9

Claim 9 has been amended to clarify that a scanning radio per applicant's invention requires "a scanning radio having a single antenna". Support for this can be found in Paragraphs [0113] to [0116] and also in paragraph [0119] and figure 17 in applicant's published application.

The office action rejected claims 9 and 19 based on the combination of deTorbal and Elson. deTorbal discloses a mobile communications system specifically for improving the simultaneous handover of multiple mobile radios located in a moving vehicle:

> "[0006] A vehicle transporting a group of mobile radios includes an on-board radio unit that identifies active radio connections between mobile radios in the group and a serving radio base station that will need to be handed over to a target radio base station. Radio transmitting circuitry in the on-board radio unit sends a message to the target radio

> base station with the identified connections to prepare the target radio base station for their handover. The on-board radio unit may be integrated with or connected to a typical mobile radio that is augmented to include a first omni-directional antenna for communication with the serving radio base station and a second directional antenna for communication with the target radio base station. The moving vehicle may be a train, airplane, bus, ship, or other people transporter."

As indicated above and throughout deTorbal's specification, he requires the use of two antennas for the OBRU (On Board Radio Unit) 26 that controls the communication that facilitates better handoff - one antenna to communicate with the current base station and one antenna to communicate with the target basestation (the basestation that the mobile phones in the vehicle will be handed-off to). Further, deTorbal requires the antenna for communicating with the target base station to be a directional antenna. This works only for the applications addressed by deTorbal where the vehicle path is predictable - especially for the train application that is the primary focus of his invention:

[0005], lines 8-11 in deTorbal:

> " … Early handover initiation is possible because the route of the moving vehicle is known or is predictable, and therefore, the target base station(s) are known or may be predicted in advance..."

[0007], lines 1-3 in deTorbal:

> "…A handover preparation controller in the on-board radio unit, knowing a direction or route of travel of the vehicle…"

Applicant's invention supports mission critical applications such as First Responders and Military applications where motion can occur randomly and in any direction. Having to point a directional antenna in the direction of motion -

especially for a soldier, fireman, or policeman - would create a non-functional communication system. Thus, applicant respectfully submits that the combination of deTorbal with Elson would produce a non-functional system and would not produce applicant's invention. It would also require two antennas where applicant's invention only requires one.

Also, deTorbal determines the position of the vehicle according to GPS readings to provide the advanced notice of impending handoff (para [0026]:

> "The OBRU controller 48 stores the planned route including the positions of the radio base stations along the route. It maintains a list of the active connections and keeps track of the location of the train using a global positioning satellite (GPS) mechanism (not shown)."

This teaches away from the use of signal strengths to control handoffs as required by applicant's claim 9.

Claim 13

Further, deTorbal requires that mobile radios located in the moving vehicle make their own decision regarding handoff. This wil disrupt their communication with the connected base station and reduce performance:

> "[0025] The on-board radio unit 26 does not control or become involved in the normal communications between the mobile radios 28 and the cellular network."

Thus, deTorbal's solution would not support a make before break capability for his OBRU (On Board Radio Unit) 26 for controlling the communication that facilitates better handoff. He requires that the OBRU "not

control or become involved in the normal communications between the mobile radios 28 and the cellular network". Further, where "make-before break" methods have been used in the art, they are not performed by an additional "Scanning" radio in order to preserve high performance for the communications between connected mesh network nodes as required by applicant's invention.

Since mobile/cellular radios each have one radio only, for deTorbal's invention they would need to interrupt their communication with the "serving radio base station" in order to communicate with the "target radio base station" in order to facilitate the best possible handoff. This interruption of connectivity is unacceptable in mission critical applications such as First Responder or Military applications addressed by applicant. The purpose of having two relay radios on a mesh node per applicant's invention is primarily for increased performance compared with a one radio system. In mission critical applications, this extra performance supports critical voice and video communications between a First Responder or Soldier and their Command and Control Center. By adding a scanning radio to handle communications with all other neighboring mesh nodes, including any communications that implement a "make before break" function such as that required by applicant's claim 13, applicant's invention preserves the high performance connection between the mesh network nodes along the mesh relay communications path.

New dependent Claims 20 and 22

deTorbal relies on base stations that have a fixed location. Elson also does not speak to mobility of mesh nodes for his invention. Applicant's mesh nodes per claim 9 are typically used for mission critical applications where most or all of the mesh relay nodes are mobile. Thus, the wireless mesh network node per claim 9 may be moving, as well as its parent node and its neighboring node per claim 9. As such, new claims 20 and 22 have been added to further require that each of these nodes are in motion and therefore present a different problem compared with that which deTorbal is addressing.

See applicant's figures 14 and 15 for support for the mobility of mesh nodes and clients as well as the remarks concerning new independent claim 24.

New dependent Claim 21 and 23

New claims 21 and 23 add the requirement for the mesh to strictly form a tree-like structure. Neither Elson nor deTorbal disclose a strict tree-like structure. Notice in Figure 3 in Elson that node 323 communicates with both 311 and 312, and that node 312 communicates with node 313 via either node 324 or node 325. Overall, this describes an ad-hoc structure (consistent with the title of Elson's invention "LOW-LATENCY MULTI-HOP AD HOC WIRELESS NETWORK"). It does not describe a strict tree-like structure as required by applicant's claim 21. The reasons why it is advantageous to form a mesh that only connects with a tree like structure are defined in paragraph [0097] in applicant's specification, and are further discussed in paragraphs [0021], [0039], [0041], [0049], [0081], and [0083].

New independent Claim 24

New independent claim 24 adds further requirements regarding the mobility of radios and also requires the mesh formed to follow a strict tree-like topological connectivity. Since mesh nodes according to applicant's invention can function as base stations to service clients (such as VoIP client radios that are not mesh relay nodes), the scanning radio in a mobile mesh node according to applicant's invention can be used to guide changes in connectivity of a mobile mesh node as it disconnects from one parent mesh relay node and makes a new parent connection to another mesh relay node. As well, the same scanning radio can facilitate changes in connectivity of client radios that are not part of a mesh node (a mesh node defined per the subject application as having relay capability).

Consider a mission critical military application similar to that shown in figures 14 and 15 of the subject application. Here, mesh nodes are mounted on

vehicles and firemen (fig.14) or soldiers (fig. 15) have client radios for VoIP and/or video communication. Both vehicles and people may all be simultaneously mobile and may move in random directions relative to each other. A scanning radio that is part of a vehicle-mounted mesh node can facilitate handoffs for changes in mesh connectivity as well as changes in client connectivity - and do so without the mesh relay radios or the client relay radios having to interrupt their primary, mission-related information transmissions. This is key since those transmissions may carry video or voice messages upon which lives depend. Note that in figures 14 and 15, as well as figures 4-8, the mesh topology supported is specifically limited to a tree-like structure. The reasons why this is advantageous are defined in paragraph [0097] in applicant's specification, and are further discussed in paragraphs [0021], [0039], [0041], [0049], [0081], and [0083].

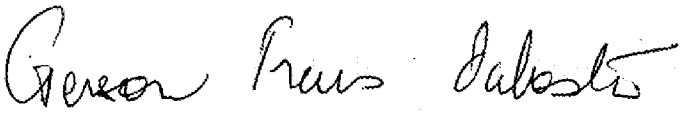
New dependant Claim 25

New claim 25 is supported by the arguments for new claims 21 and 23 regarding the requirement that the mesh form a strict tree-like structure.

An earnest attempt has been made hereby to respond to the February 3, 2009 office action. All claims are deemed in condition for allowance. Claims 4, 9-13, and 18-25 currently are pending in the application.

Dated: July 3, 2009

Respectfully submitted,



Francis daCosta

Representative of the assignee of the application, Mesh Dynamics Inc.

PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Francis daCosta, et. al.
Application Serial No.:	11/084,330
Filing Date:	March 17, 2005
Examiner:	Muthuswamy Ganapathy Manoharan
Art Unit:	2617
Atty. Docket:	0357/02205

Submitted via EFS-Web on July 3, 2009

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Alexandria VA 22313-1450

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PETITION TO EXTEND TIME

Dear Sir:

Applicant respectfully requests that the time for response to the Final Office Action dated Feb. 3, 2009 be extended by two (2) months to July 3, 2009. The statutory fee for this extension ($245.00) will be paid using EFS-Web.

Respectfully submitted,
CHERSKOV & FLAYNIK

By: /Szymon M. Gurda/
Szymon M. Gurda (Reg. No. 58,451)

Electronic Patent Application Fee Transmittal

Application Number:	11084330
Filing Date:	17-Mar-2005
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Filer:	Szymon Maciej Gurda
Attorney Docket Number:	0357-02205

Filed as Small 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:				
Extension-of-Time:				
Extension - 2 months with $0 paid	2252	1	245	245

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	2801	1	405	405
		Total in USD ($)		**650**

Electronic Acknowledgement Receipt

EFS ID:	5641830
Application Number:	11084330
International Application Number:	
Confirmation Number:	3657
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02205
Receipt Date:	03-JUL-2009
Filing Date:	17-MAR-2005
Time Stamp:	18:55:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$650
RAM confirmation Number	6826
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Request for Continued Examination (RCE)	RCECover.pdf	698542 4c3764737b8c76f69278c9edf16eef6620df4ac0	no	3
Warnings:					
Information:					
2		RCE.pdf	106201 7980dd3cb07a8b47ae6b891559bc9d6aa5e6d12d	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Request for Continued Examination (RCE)	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	13

Warnings:					
Information:					
3	Extension of Time	Extend.pdf	52109 4bb04c08e4793a022ea7b10d652ecdea22e78cb6	no	1
Warnings:					
Information:					
4	Fee Worksheet (PTO-875)	fee-info.pdf	31416 18dcf99260e27e9b20b8f465a50c146d3c91c6db	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	888268		

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

New Applications Under 35 U.S.C. 111

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

National Stage of an International Application under 35 U.S.C. 371

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. 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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/084,330	03/17/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			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	07/03/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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:
/STANLEY JORDAN/

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCosta	0357-02205	3657

27197 7590 09/28/2009

MICHAEL J. CHERSKOV
300 NORTH STATE STREET
SUITE 5102
CHICAGO, IL 60654

EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	
ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
09/28/2009	ELECTRONIC

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 the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mail@cherskov.com
sgurda@cherskov.com
mcherskov@cherskov.com

Office Action Summary	Application No.	Applicant(s)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	MUTHUSWAMY G. MANOHARAN	2617	

-- 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 *03 July 2009*.

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) *4,9-13 and 18-25* 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) *4,9-13 and 18-25* 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 _____ 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

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/3/2009 has been entered.

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 18 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Lee et al. (hereinafter Lee) (US 6982960) and Crowhurst et al. (hereinafter Crowhurst) (US 2004/0137877).

Regarding **claim 4**, Elson teaches a full duplex wireless mesh network node comprising:

a first relay receives packets from a mesh node said first relay radio operating on a first RF channel, and a second relay radio sends packets to a mesh node said second relay radio operating on a second RF channel, and a third relay radio receives packets from a mesh node said third relay radio operating on a third RF channel, and a fourth relay radio sends packets to a mesh node said forth relay radio operating on a fourth RF channel wherein the four relay radios are configurable to perform their operations simultaneously wherein said first through fourth RF channels are different from one another("simultaneous transmissions through multiple channels", "radios may be tuned to independent channels", Paragraph [0038]; "alternative embodiments can include any number of radios", "the base-remote master slave configuration provides for communication among the radios", Paragraph [0022]; Figure 2).

Elson did not teach specifically parent mesh node, daughter mesh node. However, Lee teaches in analogous art nodes including parent and child nodes (Figure 8). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use parent and child nodes in order to improve the organizing capability of the network.

The combinations of Elson and Lee did not teach specifically a first radio configured to receive exclusively, second radio to send exclusively, thirds radio to receive exclusively and fourth radio to send exclusively. However, Crowhurst teaches in an analogous art where a first/third radio configured to receive exclusively, second/fourth radio to send exclusively (separate transmitter/receiver stations, Paragraph [0005]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to modify the transceivers of Elson to have a separate transmitters and receivers to have a first radio configured to receive exclusively, second radio to send exclusively, thirds radio to receive exclusively and fourth radio to send exclusively in order to have simpler and cheaper transmitters/receivers.

Regarding **claim 18,** Elson teaches the full duplex wireless mesh network node of claim further comprising a client service radio adapted to communicate with one or more network client radios (Figure 10).

Regarding **claim 25**, Lee teaches the mesh network node wherein the relay radios of said mesh node and any neighboring nodes only cconnect to each other to form a tree-like structure (Figure 8)

Claims 9, 19 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch et al. (hereinafter Averbuch) (US 5867785) in view over Elson et al. (hereinafter Elson) (US 2003/0012168).

Regarding **claim 9,** Averbuch teaches a wireless mesh network node (item 212 in Figure 2) wirelessly connected to a current parent node (item 204 in Figure 2) in a wireless mesh network (Figure 2), the wireless mesh network node being in motion

relative to the current parent node and a neighboring node, the wireless mesh network node (abstract, Figure 2) comprising:

A scanning radio having a single antenna configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node (col. 7, lines 50-67); wherein the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger ("handoff", col. 7, line 50-67).

Averbuch did not teach explicitly at least two radios. However, Elson teaches in an analogous art at least two radios (Figure 10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have at least two relay radios in order to communicate between the parent and the child node reliably.

Regarding **claim 19**, Elson teaches the full duplex wireless mesh network node of claim further comprising a client service radio adapted to communicate with one or more network client radios (Figure 10).

Regarding **claim 20**, Averbuch teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, and said neighboring node are all in motion (Figure 2, col. 7, lines 50-67).

Regarding **claim 21,** Averbuch teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, and said

neighboring node only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio (Figure 2).

Regarding **claim 22,** Averbuch teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, said neighboring node, and at least one of said network client radios are all in motion (figure 2, Abstract).

Regarding **claim 23**, Averbuch teaches the wireless mesh network node of Claim wherein said wireless mesh network node, said current parent node, and said neighboring node, and said at least one of said network client radios only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio (Figure 2).

Claim 24 is rejected for the same reason as set forth in claims 9 and 20.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch et al. (hereinafter Averbuch) (US 5867785) in view over Elson et al. (hereinafter Elson) (US 2003/0012168) and Mahany (US 5546397).

Regarding **claim 10**, the combinations of Averbuch and Elson teaches all the particulars of the claim except wherein the scanning radio is further configured to diagonose faults in the at least two relay radios. However, Mahany teaches in an analogous art wherein the scanning radio is further configured to diagonose faults in the at least two relay radios (“monitor the message … **self monitoring** … determines that one of the wireless adapters is not operating correctly", Col. 5, lines 25-28). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention wherein the

scanning radio is further configured to diagnose faults in the at least two relay radios in order to provide infrastructure backup.

Regarding **claim 11**, the combinations of Averbuch and Elson teaches all the particulars of the claim except wherein the scanning radio is to diagnose faults in radios of another node in the mesh network. However, Mahany teaches in an analogous art wherein the scanning radio is to diagnose faults in radios of another node in the mesh network (item 45 in Figure 3). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the scanning radio is to diagnose faults in radios of another node in the mesh network in order provide infrastructure backup.

Regarding **claim 12,** the combinations of Averbuch and Elson teaches all the particulars of the claim except wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio. Regarding claim 10, the combinations of Averbuch and Elson teaches all the particulars of the claim except wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio (col. 5, lines 60-63). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio in order to have a fail safe system.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch et al. (hereinafter Averbuch) (US 5867785) in view over Elson et al. (hereinafter Elson) (US 2003/0012168) and Naghian (US 2004/0203787).

Regarding **claim 13,** Averbuch further teaches the wireless mesh network node wherein packets are sent redundantly by the wireless mesh network node (item A in Figure 2) to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent child connection with the current parent node and forms the new parent child connection with the neighboring node ("handover", Paragraph [0034]). The combination of Averbuch and Elson did not teach specifically packets are sent redundantly by the wireless node. However, Naghian teaches in an analogous art a system wherein packets are sent redundantly by the wireless node ("soft handoff", Paragraph [0101]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use a system packets are sent redundantly by the wireless node in order to avoid any data loss.

Response to Arguments

Applicant's arguments filed 7/3/2009 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Crowhurst teaches a first/third radio configured to receive exclusively, second/fourth radio to send

exclusively (separate transmitter/receiver stations, Paragraph [0005]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to modify the transceivers of Elson to have a separate transmitters and receivers to have a first radio configured to receive exclusively, second radio to send exclusively, thirds radio to receive exclusively and fourth radio to send exclusively in order to have simpler and cheaper transmitters/receivers.

Applicant's arguments with respect to amended claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUTHUSWAMY G. MANOHARAN whose telephone number is (571)272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Eng/
Supervisory Patent Examiner, Art Unit 2617

Notice of References Cited	Application/Control No. 11/084,330	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner MUTHUSWAMY G. MANOHARAN	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,867,785	02-1999	Averbuch et al.	455/436
*	B	US-2004/0203787	10-2004	Naghian, Siamak	455/437
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	mutli near radios	US-PGPUB; USPAT	OR	OFF	2009/09/14 12:49
L2	0	mutli near2 radios	US-PGPUB; USPAT	OR	OFF	2009/09/14 12:49
L3	914	multiple near2 radios	US-PGPUB; USPAT	OR	OFF	2009/09/14 12:51
L4	71	370/338.ccls. and multiple near2 radios	US-PGPUB; USPAT	OR	OFF	2009/09/14 12:51
L5	2	"20050226179"	US-PGPUB; USPAT	OR	OFF	2009/09/14 13:14
L6	14	("20020061729" | "20020072329" | "20050111383" | "20050163144" | "20070173195" | "6631273" | "6728514" | "6804491" | "6819943" | "6954798" | "6965568" | "7009573" | "7031293").PN. OR ("7362737").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/14 13:15

EAST Search History (Interference)

<This search history is empty>

9/14/2009 1:23:08 PM
C:\Documents and Settings\mmanoharan\My Documents\EAST\Workspaces\10666373.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11084330	DACOSTA ET AL.
	Examiner	**Art Unit**
	MUTHUSWAMY G MANOHARAN	2617

✓	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	03/10/2008	01/30/2009	09/21/2009						
	1	✓	-	-						
	2	✓	-	-						
	3	✓	-	-						
	4	✓	✓	✓						
	5	✓	-	-						
	6	✓	-	-						
	7	✓	-	-						
	8	✓	-	-						
	9	✓	✓	✓						
	10		✓	✓						
	11		✓	✓						
	12		✓	✓						
	13		✓	✓						
	14		N	-						
	15		N	-						
	16		N	-						
	17		N	-						
	18		✓	✓						
	19			✓						
	20			✓						
	21			✓						
	22			✓						
	23			✓						
	24			✓						
	25			✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11084330	DACOSTA ET AL.
	Examiner	Art Unit
	MUTHUSWAMY G MANOHARAN	2617

SEARCHED			
Class	Subclass	Date	Examiner
370	315,338,349,328	3/10/2008	MGM

SEARCH NOTES		
Search Notes	Date	Examiner
Searched EAST	3/10/2008	MGM
Consulted George Eng	3/10/2008	MGM
updated search in EAST	1/28/2009	mgm
updated search in EAST	9/21/2009	mgm

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	16051	(multihop multi-hop mesh) same network	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
L2	317	(multihop multi-hop mesh) same network same (joining leaving)	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
L3	3	(multihop multi-hop mesh) same network same (joining leaving) same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00

EAST Search History (Interference)

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9/19/2009 10:16:44 PM
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	19	(war police fire) same mesh adj networks	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:02
L2	11	(node with (joining leaving)) same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:16
L3	218	(node with (joining leaving)) and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:17
L4	6	(node with (joining leaving)) same parent adj node and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:17
S75	35	"6704301"	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:44
S76	26	"6704301" and radio	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:45
S77	171	radios and third adj radio	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:50
S78	144	network and radios and third adj radio	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:51
S79	16051	(multihop multi-hop mesh) same network	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
S80	317	(multihop multi-hop mesh) same network same (joining leaving)	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
S81	3	(multihop multi-hop mesh) same network same (joining leaving) same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00

S82	7455	(system adj information adj block SIB)	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S83	278	"370"/$.ccls. and (system adj information adj block SIB)	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S84	315	"455"/$.ccls. and (system adj information adj block SIB)	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S85	60	S83 and S84	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S86	533	S83 S84	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S87	210	S86 and measurement$	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:38
S88	51	S86 and measurement$ same list	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:38

EAST Search History (Interference)

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"5867785".pn. and signal	US-PGPUB; USPAT	OR	OFF	2009/09/21 10:12
L2	1	"20040137877"	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:12
L3	1	"6982960".pn.	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:12
L4	0	"6982960".pn. and soft adj handoff	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:29
L5	14	averbuch and soft adj handoff	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:34
L6	0	"6982960".pn. and soft	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:37
L7	0	"6982960".pn. and soft near (handoff handover)	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:37
L8	0	"6982960" and soft near (handoff handover)	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:38
L9	0	"6982960" and soft near (handoff hand adj over)	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:38
L10	5	train with soft near handoff	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:38
L11	222	soft near handoff.ti.	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:39
L12	1	soft near handoff.ti. and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:39
L13	1	soft near handoff same mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:40
L14	0	dcosta.in. and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:42
L15	3	"11084330" and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/09/21 11:42
L16	36	"5546397" and (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:03
L17	2	soft near (handoff handover) same scanning near radio	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:06

L18	0	soft near (handoff handover) same mesh adj network same neigboring adj node	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:07
L19	2	soft near (handoff handover) same mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:07
L20	18	soft near (handoff handover) and adhoc	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:44
L21	16	soft near (handoff handover) and mesh adj network	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:45
L22	51	soft near (handoff handover) and multi near hop	US-PGPUB; USPAT	OR	OFF	2009/09/21 12:46
L23	3	"11084330"	US-PGPUB; USPAT	OR	OFF	2009/09/21 13:10
S75	35	"6704301"	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:44
S76	26	"6704301" and radio	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:45
S77	171	radios and third adj radio	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:50
S78	144	network and radios and third adj radio	US-PGPUB; USPAT	OR	OFF	2009/09/19 15:51
S79	16051	(multihop multi-hop mesh) same network	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
S80	317	(multihop multi-hop mesh) same network same (joining leaving)	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
S81	3	(multihop multi-hop mesh) same network same (joining leaving) same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/19 22:00
S82	7455	(system adj information adj block SIB)	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S83	278	"370"/$.ccls. and (system adj information adj block SIB)	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S84	315	"455"/$.ccls. and (system adj information adj block SIB)	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37

S85	60	S83 and S84	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S86	533	S83 S84	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:37
S87	210	S86 and measurement $	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:38
S88	51	S86 and measurement $ same list	US-PGPUB; USPAT	OR	OFF	2009/09/20 16:38
S89	19	(war police fire) same mesh adj networks	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:02
S90	11	(node with (joining leaving)) same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:16
S91	218	(node with (joining leaving)) and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:17
S92	6	(node with (joining leaving)) same parent adj node and signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:17
S93	0	train same wireless adj netwrok same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:19
S94	0	train.ab. and netwrok same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:20
S95	13	train.ab. and network same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:20
S96	696	train and network same signal adj strength	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:24
S97	21	train and network same signal adj strength.ab.	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:24
S98	61	train and network same signal adj strength.clm.	US-PGPUB; USPAT	OR	OFF	2009/09/20 20:24
S102	1	"5867785".pn.	US-PGPUB; USPAT	OR	OFF	2009/09/21 08:44

EAST Search History (Interference)

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PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Francis daCosta, et. al.
Application Serial No.:	11/084,330
Filing Date:	March 17, 2005
Examiner:	Muthuswamy Ganapathy Manoharan
Art Unit:	2617
Atty. Docket:	0357/02205

Submitted via EFS-Web on January 28, 2010

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AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION

Dear Sir:

In response to the September 28, 2009 Official Action issued in this matter, please enter the following Amendment and consider the following Remarks.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page six of this paper.

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows. Applicant respectfully reserves the right to prosecute any originally presented or canceled claims in a continuing or future application. This listing of claims replaces all prior versions, and listing, of claims in the application:

1-8. (Cancelled)

9. (Currently Amended) A wireless mesh network node wirelessly connected to a current parent node in a wireless mesh network, the wireless mesh network node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node comprising:

at least two relay radios wherein the at least two relay radios operate on the same network wherein the at least two relay radios comprise a first relay radio operating on a first frequency and a second relay radio operating on a second frequency wherein the first frequency and the second frequency are different from one another; and

a scanning radio operating on said first and second frequencies, and also operating on a third frequency that is different from the first frequency and the second frequency, having a single antenna and configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node; wherein:

the signal strengths are used by the mesh node to associate and communicate with ~~cause~~ the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger.

10. (Currently Amended) The wireless mesh network node of Claim 9, wherein the scanning radio is further configured to diagnose faults in the internal connections of at least two relay radios.

11. (Previously Presented) The wireless mesh network node of Claim 9, wherein the scanning radio is used to diagnose faults in radios of another node in the mesh network.

12. (Previously Presented) The wireless mesh network node of Claim 9, wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio.

13. (Currently Amended) The wireless mesh network node of Claim 9, wherein packets are sent redundantly by the wireless mesh network node to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent-child connection with the current parent node and the wireless mesh network node forms the new parent-child connection with the neighboring node, the decision to sever the existing parent-child connection and form the new parent-child connection being made by the wireless mesh network node.

14.-18. (Cancelled)

19. (Previously Presented) The wireless mesh network node of Claim 9 further comprising a client service radio adapted to communicate with one or more network client radios.

20. (Currently Amended) The wireless mesh network node of Claim 9 wherein said wireless mesh network node, said current parent node, and said neighboring node are moving independently of one another ~~all in motion~~.

21. (Previously Presented) The wireless mesh network node of Claim 20 wherein said wireless mesh network node, said current parent node, and said neighboring node only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio.

22. (Currently Amended) The wireless mesh network node of Claim 19 wherein said wireless mesh network node, said current parent node, said neighboring node, and at least one of said network client radios are moving independently of one another ~~all in motion~~.

23. (Previously Presented) The wireless mesh network node of Claim 22 wherein said wireless mesh network node, said current parent node, and said neighboring node, and said at least one of said network client radios only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio.

24. (Currently Amended) A wireless mesh network node wirelessly connected to a current parent node in a wireless mesh network wherein connections between relay radios are only made to form a tree-like structure, the wireless mesh network node being in motion relative to the current parent node and a neighboring node, the wireless mesh network node comprising:

at least two relay radios;

a scanning radio dedicated to scanning and having a single antenna and configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node; and

a client service radio adapted to communicate with one or more network client radios; wherein:

the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting that the signal strength between the wireless mesh node and the current parent node is

becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger; and

said wireless mesh network node, said current parent node, said neighboring node, and at least one of said network client radios are moving independently of one another ~~all in motion~~.

25. (Cancelled)

REMARKS/ARGUMENTS

Claims 4, 18 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elson et al. (hereinafter Elson) (US 2003/0012168) in view over Lee et al. (hereinafter Lee) (US 6982960) and Crowhurst et al. (hereinafter Crowhurst) (US 2004/0137877).

Claims 9, 19 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch et al. (hereinafter Averbuch) (US 5867785) in view over Elson. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch in view over and Mahany (hereinafter Mahany)(US 5546397). Finally, claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch in view of Elson and Naghian (hereinafter Naghain)(US 2004/0203787).

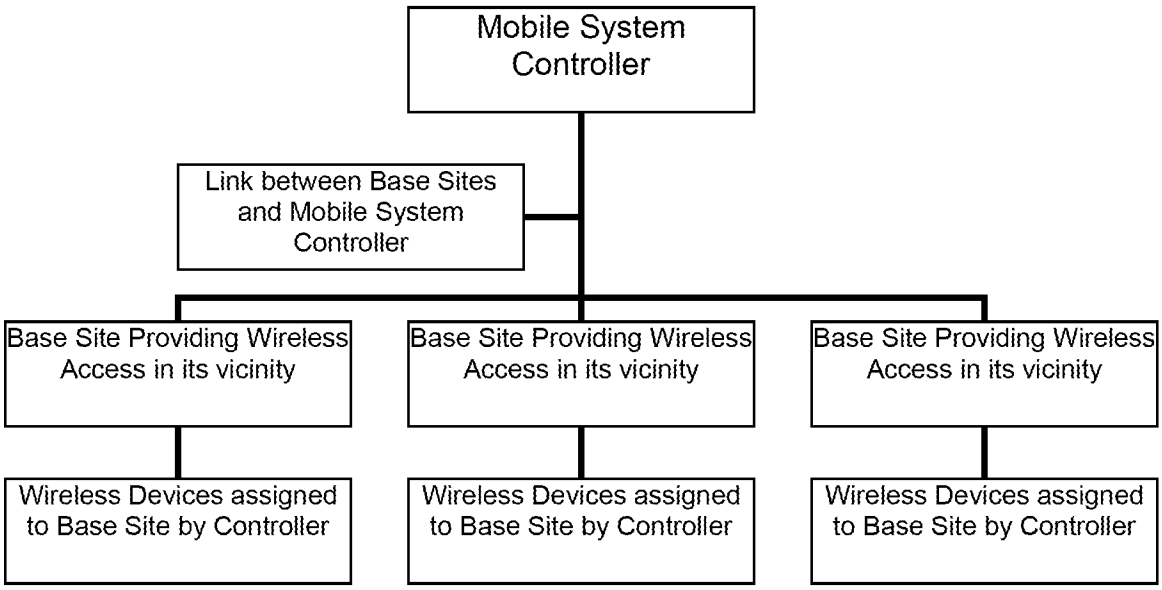
Pursuant to the instant amendment, applicant hereby cancels, without prejudice to a continuation filing, the claims relating to full-duplex nodes, specifically claims 4, 18, and 25. Consequently, applicant does not address the proposed combination of Elson, Lee, and Crowhurst.

Claim 9 is amended to require that each relay radio use a <u>different frequency</u>. Further, claim 9 includes the limitation that the scanning radio scan <u>all frequencies</u> for a suitable signal. Support for these limitations is found in the specification ¶114 which provides that "radios are operating on non-interfering frequencies" and that "external scanning radio is also needed to gauge the signal strength of a prospective parent node."

<u>Avenbuch Fails to Disclose a Mesh Network and Forecloses an Unstructured Mesh Network</u>

Claims 9, 19 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch et al. (hereinafter Averbuch) (US 5867785) in view over Elson.

Examiner claims that Averbuch teaches a wireless mesh network node (item 212 in Figure 2). Applicant disagrees. The network nodes in Averbuch, called base sites, do not form a mesh network. In Averbuch wireless network clients, such as radio equipped phones (items 210-212) communicate with local base sites (202-205). The base sites are connected to the mobile system controller (200), which in turn communicates with external networks through a repeater (206). The wireless network of Averbuch is a simple tree, as opposed to a true mesh:



Pursuant to Averbuch, the base sites do not make decisions relative to client handoffs. Instead, Averbuch's mobile system controller (200) must intervene for any operation involving the base sites. For instance, if a phone wanders from one base site (204) to another (205):

"the mobile system controller 200 determines whether the moving mobile communication unit 212 is to be handed off…Once the mobile system controller 200 determines that a local handoff is necessary (e.g., when the received signal quality of the communication degrades below the handoff threshold), the mobile system controller 200 allocates a new communication resource 227 at the target mobile base site 205 and instructs the moving mobile communication unit 212 to begin transmitting and receiving…" Averbuch, col. 7, lines 60-67.

Contrary to the disclosure of Averbuch, the mesh nodes in the instant invention communicate with one another through the mesh without a central controller directing all the traffic.

As presently pending, claim 9 covers the situation where a child node moves its data traffic flow from a current parent node to a neighbor node inasmuch as the signal strength of the neighboring node is stronger. The mesh node changes the parent relationship by associating and communicating with the neighbor node directly, not through a controller.

Averbuch's link (230) between base sites is static. It does not allow base sites to move and change order. In fact, given that all base sites are merely "children nodes" of the mobile system controller and its repeater, Averbuch does not disclose any changes. For this reason, Averbuch is only applicable to a static environment (such as coupled train cars) and not mesh nodes that are moving independently of one another. The only movement and handing off-of signals in Averbuch is disclosed in terms of the central repeater and a ground-based network and network devices moving between different base sites. Averbuch fails to disclose any movement and changes of relationship between base sites themselves.

Furthermore, as presently claimed in claim 24, the mesh node includes a radio dedicated to scanning. The system disclosed in Averbuch merely senses signal strength (as most conventional wireless devices do). However, it fails to disclose a dedicated scanning radio in base sites or any other element. In cellular communications systems, such as Averbuch as well as prior art mesh networks, the radios are utilized primarily for data and voice transmission. In order to scan other frequencies, the devices must interrupt their primary task, greatly reducing performance. The inclusion of a scanning radio in the instant invention is novel in that it places a premium on performance while providing excellent mobility - a combination of characteristics that are appropriate for mission critical applications such as the military and first responders.

Given that Averbuch uses a different network topology, Averbuch teaches away from the approach used by the instant invention. While the examiner

suggests a combination between Averbuch and Elson, there is no disclosure in Elson of the instant mesh structure either. Applicant respectfully submits that given the structural differences between the instant invention (mesh network) and the hierarchy of Averbuch, no reference, including Elson, can be combined with Averbuch without disregarding and countering the primary disclosure of Averbuch, which is requirement of a central controller to oversee changes in the network.

Elson Uses Multiple Radios for
Multiple Networks, while Instant Nodes Connect
Within Same Network

As is the case with Averbuch, the network structure disclosed by Elson involves a different communication paradigm and so it does not anticipate the instant invention. In Elson, nodes communicate with one another, but only via a "base node" (110). ¶23. Further, while the examiner claims that Elson discloses the instant invention's multiple radio feature, the applicant disagrees.

Elson discloses multiple radios which are used to facilitate communication between separate networks. Elson discloses a node with two or more radios "communication among numerous clusters by enabling each node to operate on two or more star networks." ¶24. See also "The multi-radio nodes described below solve the long-standing problem that restricts most commercial spread spectrum modem solutions to local cluster/star networks...each radio supports communications with separate network clusters." ¶21. Further, "a dual-radio node of an embodiment [having] two modems operate simultaneously, each on an independent network or cluster." ¶36 (emphasis added).

As presently claimed, the multiple relay radios of the current node operate on the same network. In order to obtain throughput benefits in its "star" architecture, Elson requires the multiple radios to be used solely for communications between different networks. The instant invention uses multiple radios all within a single network, contrary to the limitations imposed by Elson's configuration.

Given that Elson requires multiple radios to be consigned to multiple networks, applicant respectfully submits that Elson cannot anticipate the instant invention which uses multiple radios on the same network.

Applicant respectfully submits that Elson, either alone or in combination with Averbuch fails to disclose a multiple radio mesh node wherein each radio operates on a different frequency, and two of the radios are dedicated to relaying of data while a third radio is for used for scanning.

Mahany Limits Its Error Checking to
The Wired Network, Contrary to the Instant Invention

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Averbuch in view over and Mahany.

Examiner claims that the error-checking function covered by claim 10 is disclosed by Mahany. Applicant respectfully disagrees.

The multiple radio embodiment shown in Mahany is directed to detecting breaks in the physical uplink infrastructure, such as depicted in Figure 3 (item 45). Per Mahany, when a break in the network occurs, one of the dual radios may be devoted to the infrastructure role played by the physical uplink before it was severed.

Similarly, during the self-monitoring mode discussed by Mahany in Col. 5, lines 19, 35, the "promiscuous" radio is being used to compare the messages being sent by the transmitting radio with those being received from the physical uplink.

In claim 10, the scanning radio seeks transmitting faults caused by internal connections in *either* radio. It is not merely comparing the output of the transmitting radio as compared with the data being sent up the physical uplink. As the specification provides in paragraph 115, "only an external sensing radio can determine if there has been [an internal] mechanical failure" Nothing in Averbuch nor in Mahany suggests the use of a single scanning radio to diagnose problems in the internal connections in both of the relay radios.

Naghian References a CDMA Soft Handover
Which Requires Central Station Signal Selection

Examiner has rejected dependant claim 13 in light of Naghian's discussion of "soft handovers." A "soft handover," as briefly mentioned in Naghian, is a standard feature of the CDMA standard. Standard cellular phones are capable of a "soft handover." In this operation, the uplink station reviews the quality of the signals being received by the device and the uplink determines which of the two signals to continue, and which to end.

As is presently claimed, the handoff in the instant invention occurs without a central or uplink station deciding which signal to keep and which to terminate. In the instant invention the wireless mesh network node is the one that both establishes a relationship with the neighboring node and also terminates the relationship with the previous parent node. The CDMA standard requires a central uplink station to decide which of the connections should be maintained and how any hand-over occurs. In the instant invention it is the node (or client) that independently chooses to terminate its connection to a parent and establishes a new connection. It is impossible to remove this supervisory element and remain within theCDMA standard.

Per the attached book excerpt from UMTS Networks: Architecture, Mobility, and Services by Heikki Kaaranen, et. al., Wiley; 2 edition (April 1, 2005), the WCDMA specification provides several handover mechanisms in the system. All of them rely on hand-over decision making algorithms (NEHO and MEHO). In NEHO (network evaluated handover), the network infrastructure makes the handover decision, while in MEHO (mobile evaluated handover), the network device provides the information about its signal strength and the decision about network switching is shared between the device and the network infrastructure.

As presently claimed, in the distributed mesh framework, each node separately and independently makes its decisions about association. The benefit of the current approach is that the instant mesh network is scalable. Furthermore, there is no need for a central infrastructure that makes decisions for

the nodes. As such, the nodes are capable of responding to changing traffic even in instances where there is no connection to a central location.

In summary, as presently pending, the mesh nodes are capable of changing associations on the basis of network use without the interference of a central control framework, as described in the WCDMA protocol as required by Naghian.

Applicant respectfully submits that the claims, as amended, define allowable subject matter and respectfully requests that a Notice of Allowance be issued. If the Examiner feels that a telephonic interview will expedite allowance, he is urged to call the undersigned at the phone number provided. Claims 9-13, and 19-24 are currently pending.

Dated: January 28, 2010

Respectfully submitted,

CHERSKOV & FLAYNIK

/Szymon M. Gurda/

_____

Szymon M. Gurda
Reg. No. 58,451

UMTS Networks: Architecture, Mobility, and Services by Heikki Kaaranen, et. al., Wiley; 2 edition (April 1, 2005), page 115.

- Periodic reporting.
- Time-to-trigger.

So, the WCDMA specification provides various measurement criteria to support the handover mechanisms in the system. In order to improve system performance it is pivotal to select the most appropriate measurement procedure and measurement criteria as well as the filtering intervals to do with handover mechanisms. Handover signalling load can be optimised by fine-tuning the trade-off between handover criteria, handover measurements and the traffic model utilised in network planning.

The decision phase consists of assessment of the overall QoS of the connection and comparing it with the requested QoS attributes and estimates from neighbouring cells. Depending on the outcome of this comparison, the handover procedure may or may not be triggered.

The SRNC checks whether the values indicated in measurement reports trigger any criteria set. If they do, then it allows the handover to take place.

As far as handover decision-making is concerned, there are two main types:

- Network Evaluated HandOver (NEHO).
- Mobile Evaluated HandOver (MEHO).

In the case of NEHO, the network SRNC makes the handover decision, while in the MEHO approach the UE mainly prepares the handover decision. In the case of a combination of NEHO and MEHO, the decision is made jointly by the SRNC and the UE.

Note that, even in a MEHO, the final decision about handover execution is made by the SRNC. The reason is that the RNC is responsible for the overall RRM of the system and, thus, it is aware of the overall load of the system and other necessary information needed for handover execution.

Handover decision-making is based on the measurements reported by the UE and the BS as well as the criteria set by the handover algorithm. The handover algorithms, as such, are not subject to standardisation; rather, they are implementation-dependent aspects of the system. Therefore, advanced handover algorithms may be utilised freely, based on the available parameters in association with the network element measurement capabilities, traffic distribution, network planning, network infrastructure and overall traffic strategy applied by operators.

The general principles underpinning a handover algorithm are presented in Figure 5.14. In this example it is assumed that the decision-making criteria of the algorithm are based on the pilot signal strength reported by the UE. The following terms and parameters are used in this handover algorithm example:

- *Upper threshold*: the level at which the signal strength of the connection is at the maximum acceptable level with respect to the requested QoS.
- *Lower threshold*: the level at which the signal strength of the connection is at the minimum acceptable level to satisfy the required QoS. Thus, the signal strength of the connection should not fall below it.

Electronic Patent Application Fee Transmittal

Application Number:	11084330
Filing Date:	17-Mar-2005
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Filer:	Szymon Maciej Gurda
Attorney Docket Number:	0357-02205

Filed as Small 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:				
Extension-of-Time:				
Extension - 1 month with $0 paid	2251	1	65	65

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**65**

Electronic Acknowledgement Receipt

EFS ID:	6904701
Application Number:	11084330
International Application Number:	
Confirmation Number:	3657
Title of Invention:	Multiple-radio mission critical wireless mesh networks
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02205
Receipt Date:	28-JAN-2010
Filing Date:	17-MAR-2005
Time Stamp:	18:43:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$65
RAM confirmation Number	8342
Deposit Account	501709
Authorized User	CHERSKOV,MICHAEL J

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	2205Ext.pdf	80285 1fb310f714d3540604d0a0bb529b5111e26c2bd2	no	1
Warnings:					
Information:					
2		2205ResponseFiled.pdf	2664432 cf88906fd2f1b8205d231fdbcd672e429254295e	yes	13

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	5
Applicant Arguments/Remarks Made in an Amendment	6	13

Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29590 e87eaf260b1e1dc7f07add1677ee41a98a635b9e	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	2774307	

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.

PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Francis daCosta, et. al.
Application Serial No.:	11/084,330
Filing Date:	March 17, 2005
Examiner:	Muthuswamy Ganapathy Manoharan
Art Unit:	2617
Atty. Docket:	0357/02205

Submitted via EFS-Web on January 28, 2010

Commissioner for Patents
Box 1450
Alexandria VA 22313-1450

300 N. State St.
Chicago, Illinois 60654
(312) 621-1330

PETITION TO EXTEND TIME

Sir:

It is respectfully requested that the time for response to the Official Action dated September 28, 2009, be extended one (1) month to January 28, 2010.

Payment of the $65.00 extension of time fee will be arranged using the EFS-Web electronic filing system. The Office is authorized to charge any deficiency or credit any overpayment to the undersigned's Deposit Account No. 501709.

Respectfully submitted,

CHERSKOV & FLAYNIK

By */Szymon M. Gurda/*
Szymon M. Gurda (Reg. No. 58,451)

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. 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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/084,330	03/17/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			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 01/28/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCcosta	0357-02205	3657

27197 7590 05/26/2010

MICHAEL J. CHERSKOV
300 NORTH STATE STREET
SUITE 5102
CHICAGO, IL 60654

EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	
ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
05/26/2010	ELECTRONIC

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 the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mail@cherskov.com
sgurda@cherskov.com
mcherskov@cherskov.com

Office Action Summary	Application No.	Applicant(s)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	MUTHUSWAMY G. MANOHARAN	2617	

-- 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 *28 January 2010*.

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) *9-13 and 19-24* 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) *9-13 and 19-24* 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 _____ 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) 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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 9, 13 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naghian et al. (hereinafter Naghian) (US 2005/0153725) in view over Elson et al. (hereinafter Elson) (US 2003/0012168) and Famolari (US 2003/0147424).

Regarding **claim 9,** Naghian teaches a wireless mesh network node wirelessly connected to a current parent node in a wireless mesh network, the wireless mesh network node being in motion (macro mobility, P[0064]) relative to the current parent

node(item 330A in Figure 3) and a neighboring node(item 330B in Figure 3), the wireless mesh network node (item 350 in Figure 3) comprising:

A single antenna configured to measure the signal strength between the wireless mesh network node and the current parent node and the signal strength between the wireless mesh network node and the neighboring node (handover ... to improve the link quality, P[0076]); wherein the signal strengths are used to cause the neighboring node to become a new parent to the wireless mesh network node upon detecting the signal strength between the wireless mesh node and the current parent node is becoming weaker and the signal strength between the wireless mesh node and the neighboring node is becoming stronger(mobile router changes its location from a mesh network to another mesh network… the movements between the networks are handled with a method that is compatible with the current standards, P[0064]).

Naghian did not teach specifically at least two relay radios wherein the at least two relay radios operate on the same network wherein at least two relay radios wherein the at least two relay radios operate on the same network wherein the at least two relay radios comprise a first relay radio operating on a first frequency and a second relay radio operating on a second frequency wherein the first frequency and the second frequency are different form one another. However, Elson teaches in an analogous art at least two relay radios operate on the same network wherein at least two relay radios wherein the at least two relay radios operate on the same network wherein the at least two relay radios comprise a first relay radio operating on a first frequency and a second relay radio operating on a second frequency wherein the first frequency and the second

frequency are different form one another(Naghian: network including multi-radio nodes … the radios may be tuned to independent channels, P[0038]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have at least two relay radios operate on the same network wherein at least two relay radios wherein the at least two relay radios operate on the same network wherein the at least two relay radios comprise a first relay radio operating on a first frequency and a second relay radio operating on a second frequency wherein the first frequency and the second frequency are different form one another in order to communicate between the parent and the child node reliably and also communicating between different network standards.

The combination of Naghian and Elson did not teach specifically a scanning radio. However, Famolari teaches in an analogous art a scanning radio(item 410 in Figure 4). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the scanning radio of Famori operating on said first and second frequencies and also operating on a third frequency that is different form the first frequency and the second frequency in order to perform mobility management without any break in service.

Regarding **claim 13,** Naghian further teaches the wireless mesh network node wherein packets are sent redundantly by the wireless mesh network node to the current parent node and the neighboring node while the wireless mesh network node severs its existing parent child connection with the current parent node and the wireless mesh network node forms the new parent child connection with the neighboring node the

decision to sever the existing parent-child connection and form the new parent child connection being made by the wireless mesh network node(connection with more than one neighboring TNs ...inter TN handovers …utilize macro mobility diversity techniques to improve the link quality, P[0076]).

Regarding **claim 18,** Elson teaches the full duplex wireless mesh network node of claim further comprising a client service radio adapted to communicate with one or more network client radios (Figure 10).

Regarding **claim 19**, Elson teaches the full duplex wireless mesh network node of claim further comprising a client service radio adapted to communicate with one or more network client radios (Figure 10).

Regarding **claim 20**, Naghian teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, and said neighboring node are all in motion (micro/macro mobility of Naghian includes parent node, wireless mesh network node and neighboring node, Figure 3, P[0061-0064]).

Regarding **claim 21,** Naghian teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, and said neighboring node only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio (Figure 3).

Regarding **claim 22,** Naghian teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, said neighboring node, and at least one of said network client radios are all in motion (figure 2, Abstract).

Regarding **claim 23**, Naghian teaches the wireless mesh network node wherein said wireless mesh network node, said current parent node, and said neighboring node, and said at least one of said network client radios only connect to each other to form a tree-like structure, excluding the connectivity of the scanning radio (Figure 3).

Claim 24 is rejected for the same reason as set forth in claim 9 and 20. Famolari teaches a dedicated scanning radio (item 410 in Figure 4).

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naghian et al. (hereinafter Naghian) (US 2005/0153725) in view over Elson et al. (hereinafter Elson) (US 2003/0012168), Famolari (US 2003/0147424) and Mahany (US 5546397).

Regarding **claim 10**, the combinations of Naghian, Elson and Famolari teaches all the particulars of the claim except wherein the scanning radio is further configured to diagonose faults in the at least two relay radios. However, Mahany teaches in an analogous art wherein the scanning radio is further configured to diagonose faults in the internal connection of at least two relay radios ("monitor the message … **self monitoring** … determines that one of the wireless adapters is not operating correctly", Col. 5, lines 25-28). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention wherein the scanning radio is further configured to diagnose faults in the at least two relay radios in order to provide infrastructure backup.

Regarding **claim 11**, the combinations of Naghian, Elson and Famolari teaches all the particulars of the claim except wherein the scanning radio is to diagnose faults in radios of another node in the mesh network. However, Mahany teaches in an analogous

art wherein the scanning radio is to diagnose faults in radios of another node in the mesh network (item 45 in Figure 3). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the scanning radio is to diagnose faults in radios of another node in the mesh network in order provide infrastructure backup.

Regarding **claim 12,** the combinations of Naghian, Elson and Famolari teaches all the particulars of the claim except wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio. However, However, Mahany teaches in an analogous art wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio (backup in the event of failure, abstract). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention wherein in the event that one of the relay radios fails, the scanning radio becomes a replacement for the failed relay radio in order to have a fail safe system.

Response to Arguments

Applicant's arguments filed 1/28/2010 have been fully considered but they are moot in view of new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUTHUSWAMY G. MANOHARAN whose telephone number is (571)272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Eng/
Supervisory Patent Examiner, Art Unit 2617

Notice of References Cited	Application/Control No. 11/084,330	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner MUTHUSWAMY G. MANOHARAN	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0147424	07-2004	Syldath et al.	510/421
*	B	US-2005/0153725	07-2005	Naghian et al.	455/520
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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
	11084330	DACOSTA ET AL.
	Examiner	**Art Unit**
	MUTHUSWAMY G MANOHARAN	2617

✓	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	03/10/2008	01/30/2009	09/21/2009	05/21/2010					
	1	✓	-	-	-					
	2	✓	-	-	-					
	3	✓	-	-	-					
	4	✓	✓	✓	-					
	5	✓	-	-	-					
	6	✓	-	-	-					
	7	✓	-	-	-					
	8	✓	-	-	-					
	9	✓	✓	✓	✓					
	10		✓	✓	✓					
	11		✓	✓	✓					
	12		✓	✓	✓					
	13		✓	✓	✓					
	14		N	-	-					
	15		N	-	-					
	16		N	-	-					
	17		N	-	-					
	18		✓	✓	-					
	19			✓	✓					
	20			✓	✓					
	21			✓	✓					
	22			✓	✓					
	23			✓	✓					
	24			✓	✓					
	25			✓	-					

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	6692	(mesh multihop) near network	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:14
L3	1097	(mesh multihop) near network and (scanning tuning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:14
L4	172	(mesh multihop) near network and (scanning tuning) and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:14
L5	10	(mesh multihop) near network and (scanning tuning) with radio and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:19
S1	33913	cognitive	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
S2	481	cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
S3	48	mesh and cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:10
S4	271	mesh near network same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:17
S5	3	"7057566"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
S6	6	"7085224"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
S7	0	"71646673"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
S8	6	"7164667"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
S9	10	"7181530"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:33
S10	6	"7251238"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:34
S11	2	"20040095907"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:39
S12	2	"20050185606"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:40
S13	314	scanning same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 11:59
S14	7	scanning with signal near strength same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 11:59

S15	780	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:03
S16	1	parent near node same multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:04
S17	118	node same multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:05
S18	37	srikrishna and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:13
S19	785	mesh near network and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
S20	0	mesh near network and radios same relaiability	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
S21	35	mesh near network and radios same reliability	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
S22	101	370/338.ccls. and mesh near network and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
S23	688	370/338.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
S24	301	370/338.ccls. and radios and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
S25	140	370/338.ccls. and radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:21
S26	1	370/338.ccls. and separate with radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:29
S27	2	370/338.ccls. and scanning near radio and radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:30
S28	4	370/338.ccls. and scanning near antenna and antennas	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:30
S29	4	370/338.ccls. and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:31
S30	2	mesh near node and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:31
S31	1687	scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:32
S32	33	signal near strength same scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:32
S33	0	signal near strength same 2-radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35

S34	0	signal near strength same "2-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
S35	0	signal near strength same "1-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
S36	688	370/338.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:44
S37	38	370/338.ccls. and radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:44
S38	3	370/338.ccls. and "3-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:14
S39	38	"6697013"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:17
S40	28	"3-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:18
S41	3937	(multi multiple) near radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
S42	265	370/338.ccls. and (multi multiple) near radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
S43	20	370/338.ccls. and (multi multiple) near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
S44	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/03 13:32
S45	34	multiple near2 radios.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:49
S46	1104	radios.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:50
S47	4614	second near radio.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
S48	1086	second near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
S49	45	third near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
S50	282	radios.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:54

S51	6	370/338.ccls. and radios.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:54
S52	0	separate near scanning adj radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S53	879	separate near radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S54	1829	scan$5 near2 radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S55	7	multiple near radios and scan$5 near2 radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S56	782	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:06
S57	65	multiple near radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:06
S58	10	("20040246932" | "5612948" | "5648969" | "6052600" | "6144850" | "6181734" | "6757268" | "6980537" | "7120456").PN. OR ("7457299").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/04 07:12
S59	1	multi near radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:14
S60	68	multi near radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:14
S61	1713	370/338.ccls. and (radios antennas)	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:15
S62	125	370/338.ccls. and (radios antennas).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:15
S63	278	370/338.ccls. and (radios antennas).clm.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:29
S64	182	370/338.ccls. and (radios antennas).clm. and (NOT S62)	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:30
S65	24	("20040151129" | "20050073990" | "20050107103" | "20050135295" | "20050135302" | "20050165950" | "20050192037" | "20050201340" | "20050243765" | "20050249114" | "20050254459" | "20060028984" | "20060078001" | "20060146868" |	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/04 07:32

		"20060164969" | "20060203795" | "20060256765" | "20060268792" | "5717688" | "6917598" | "7043195" | "7103371" | "7158803" | "7440436").PN. OR ("7583648").URPN.				
S66	0	("7664085").URPN.	USPAT	OR	OFF	2010/05/04 07:56
S67	0	"10825089"	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:10
S68	1	"10/825089"	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:10
S69	0	"20040090943" AND MOTION	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:13
S70	1	"20050232179" and motion	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:14
S71	0	"20040090943" AND handoff	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:15
S72	2	"20040090943" AND moving	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:15
S73	0	"20050232179" and handoff	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:17
S74	0	"20050232179" and handover	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:17
S75	106	mesh near nodes and mobile near nodes	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:26
S76	3	mesh near nodes and mobile near nodes same roaming	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:26
S77	2772	mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:29
S78	809	"370"/$.CCLS. AND mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:29
S79	809	"370"/$.ccls. and mesh near network and attach $3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:29
S80	202	"370"/$.ccls. and parent and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:30
S81	0	"370"/$.ccls. and parent and raom$3 and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:30

S82	44	"370"/$.ccls. and parent and roam$3 and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:30
S83	2	"20040090943" AND signal near strength	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:32
S84	90	"370"/$.ccls. and mobile near (router node) and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:53
S85	2448	(multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:56
S86	32	(multi multiple) with radios same reliability	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:56
S87	0	"6393261" and relaibility	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:58
S88	9	"6393261" and reliability	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:58
S89	36	"5179559"	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:27
S90	109	radios same monitoring with channel$	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:28
S91	12	(multiple multi) with radios same monitoring with channel$	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:29
S92	406	dedicated with monitoring with channel $	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:30
S93	63	(transceiver radio) with dedicated with monitoring with channel $	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:30
S94	30	(transceiver radio) with dedicated with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:33
S95	824	(MULTI multiple) near radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:34
S96	19	(MULTI multiple) near radios same scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:34
S97	3	370/338.ccls. and scanning with dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:37
S98	34	370/338.ccls. and scan $4 with dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:38
S99	8	370/338.ccls. and scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:41
S100	1	"20040058678"	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:52

S101	588926	cognitive witth scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S102	561442	cognitive near radio witth scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S103	16	cognitive near radio with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S104	16	cognitive near radio with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S105	13073	channel with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:57
S106	3	dedicated near (radio antenna) same channel with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:57
S107	3	dedicated near (radio antenna) same channel with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:58
S108	2548	(radio antenna) same channel with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:58
S109	2610794	(multiple multi) (radio$ antenna$) same channel with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:58
S110	57	(multiple multi) near (radio$ antenna$) same channel with scan $4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:59
S111	56	mesh near (network node) with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:02
S112	3028	mesh near (network node) and (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:11
S113	99	mesh near (network node) and (channel) near (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:11
S114	35	mesh near (network node) and (radios antennas) and (channel) near (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:11
S115	9	dedicated near3 scan$4 near3 (radio antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/04 11:09
S116	7	dedicated near3 (tune tuning) near3 (radio antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/04 11:11
S117	0	dedicated near3 (tune tuning) near3 (radio antenna)	EPO	OR	OFF	2010/05/04 11:13
S118	0	dedicated near3 (scan scanning tune tuning) near3 (radio antenna)	EPO	OR	OFF	2010/05/04 11:13

S119	2	dedicated near3 (scan scanning tune tuning) near3 (device radio antenna)	EPO	OR	OFF	2010/05/04 11:13
S120	2859	(scan scanning tune tuning) near3 (device radio antenna)	EPO	OR	OFF	2010/05/04 11:13
S121	0	mesh near (node router) with (scan scanning tune tuning) near3 (device radio antenna)	EPO	OR	OFF	2010/05/04 11:14
S122	2	mesh near (node router) with (scan scanning tune tuning) near3 (device radio antenna)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:14
S123	4	mesh near (node router) same (scan scanning tune tuning) near3 (device radio antenna)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:15
S124	70	mesh near (node router) with (radios antennas)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:16
S125	0	scann8ing near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:29
S126	1065	scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:29
S127	8	370/338.ccls. and scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:30
S128	4	370/338.ccls. and scanning near antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:30
S129	8	370/338.ccls. and scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:33

S130	45	370/338.ccls. and dedicated near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:34
S131	19	370/338.ccls. and dedicated near radio same (frequency channel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:34
S132	106	("455"/$.ccls. 370/338. ccls) and mesh near (router node)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:56
S133	106	("455"/$.ccls. 370/338. ccls) and mesh near (router node)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:58
S134	31	("455"/$.ccls. 370/338. ccls) and mesh near (router node) same (associat$3 join$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:15
S135	0	("455"/$.ccls. 370/338. ccls) and mesh near (router node) same scanning near2 interface	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:20
S136	0	("455"/$.ccls. 370/338. ccls) and mesh near (router node) same scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S137	0	("455"/$.ccls. 370/338. ccls) and mesh near (router node) and scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S138	61783	("455"/$.ccls. 370/338. ccls) and d scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S139	526	("455"/$.ccls. 370/338. ccls) and scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21

S140	38	("455"/$.ccls. 370/338.ccls) and mesh and scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:22
S141	1	("455"/$.ccls. 370/338.ccls) and dedicated near scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:23
S142	476	("455"/$.ccls. 370/338.ccls) and dedicated near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:23
S143	9	("455"/$.ccls. 370/338.ccls) and dedicated near radio same tuning	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:24
S144	5	("455"/$.ccls. 370/338.ccls) and dedicated near radio with measurements	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:25
S145	0	("455"/$.ccls. 370/338.ccls) and indipendent near radio with measurements	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:26
S146	0	("455"/$.ccls. 370/338.ccls) and independent near radio with measurements	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:26
S147	0	("455"/$.ccls. 370/338.ccls) and independent near scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:26
S148	11	("455"/$.ccls. 370/338.ccls) and independent with scanning with radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:27
S232	13	forensics.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/12 09:44
S233	1	"20090042532"	US-PGPUB; USPAT	OR	OFF	2010/05/12 09:48
S234	851	quality with (subchannels subband)	US-PGPUB; USPAT	OR	OFF	2010/05/12 11:48

S235	431	OFDM$ and quality with (subchannels subband)	US-PGPUB; USPAT	OR	OFF	2010/05/12 11:49
S236	23	OFDM$ and quality with (subchannels subband). ab.	US-PGPUB; USPAT	OR	OFF	2010/05/12 11:49
S237	52	OFDM$ and quality with (subchannels subband) with measur$6	US-PGPUB; USPAT	OR	OFF	2010/05/12 12:44
S238	45	OFDM$ and quality with (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 12:45
S239	10	blind and OFDM$ and quality with (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 12:51
S240	14	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:00
S241	0	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure) same CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S242	23	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure) and \ CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S243	0	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure) and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S244	149	OFDM$ and (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S245	30	OFDM$ and (subchannels subband) with (measuring measurement measured measure) and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 14:00

S246	0	quality with measurements.ab. and OFDM$ and (subchannels subband) with (measuring measurement measured measure) and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 14:02
S247	255	"6236365"	US-PGPUB; USPAT	OR	OFF	2010/05/14 08:59
S248	1	"6236365".pn.	US-PGPUB; USPAT	OR	OFF	2010/05/14 08:59
S249	1	"6466938".pn.	US-PGPUB; USPAT	OR	OFF	2010/05/14 08:59
S250	1461	admission same (Quality near (service parameters))	US-PGPUB; USPAT	OR	OFF	2010/05/14 09:52
S251	0	admission same (Quality near (service parameters)) same linley	US-PGPUB; USPAT	OR	OFF	2010/05/14 09:52
S252	0	admission same (Quality near (service parameters)) same lindley	US-PGPUB; USPAT	OR	OFF	2010/05/14 09:53
S253	592116	admission same (Quality near (service parameters)) same lindley's equation	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:02
S254	0	admission same (Quality near (service parameters)) same lindley's near equation	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:02
S255	211	admission same (Quality near (service parameters)) and delay same (success error)	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:03
S256	53	admission same (Quality near (service parameters)) and delay same (success error) and equation	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:03
S257	4	"6745036"	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:09
S258	461	455/456.1.ccls. and beacon	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:15
S259	23	455/456.1.ccls. and beacon with identity	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:16
S260	92	455/456.1.ccls. and reference near device	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:23

S261	1	"20050227689"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:03
S262	54	channel near quality near indicator .ti.	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:27
S263	0	channel near quality near indicator near2 time near frquency.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:27
S264	3	channel near quality near indicator near2 time near frequency.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:27
S265	2	"20050105589"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:28
S266	1	"2005068884"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:29
S267	2	"20050068884"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:30
S268	6	carrier near FMA	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:58
S269	822	carrier near FDMA	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:58
S270	3629	carrier near FDMA and measurement wsame CQI	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:59
S271	47	carrier near FDMA and measurement same CQI	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:59
S272	346	FDMA and measurement same (channel near quality CQI)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:06
S273	1	"20030137955"	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:21
S274	6708	(channel near (state quality) near (index information) CQI)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:22
S275	137	(channel near (state quality) near (index information) CQI) same multi near carrier	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23
S276	419	(channel near (state quality) near (index information) CQI) same (MC-FDMA OFDMA multi near carrier)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23
S277	137	(channel near (state quality) near (index information) CQI) same (MC-FDMA and OFDMA multi near carrier)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23

S278	81	(channel near (state quality) near (index information) CQI) same (MC-FDMA and OFDMA multi near carrier) and measurement$	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23
S279	3	(channel near (state quality) near (index information) CQI) same (MC-FDMA and OFDMA multi near carrier) and measurement$ with (base near stations)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:28
S280	322	(channel near (state quality) near (index information) CQI) same (base near stations)	US-PGPUB; USPAT	OR	OFF	2010/05/16 14:00
S281	22	(channel near (state quality) near (index information) CQI) same (base near stations).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/16 14:00
S282	28	(channel near (state quality) near (index information) CQI) same (base near stations) and measurements with (MS UE)	US-PGPUB; USPAT	OR	OFF	2010/05/16 14:18
S283	139	((channel near (state quality) near (index information)) CQI) same measurements and (OFDMA MC-FDMA)	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:02
S284	8	((channel near (state quality) near (index information)) CQI) same measurements. clm. and (OFDMA MC-FDMA)	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:30
S285	6	((channel near (state quality) near (index information)) CQI) same measurements. ab. and (OFDMA MC-FDMA)	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:38
S286	122	((channel near (state quality) near (index information)) CQI) same measurements and (sub adj (band channel carrier))	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:40

S287	16	((channel near (state quality) near (index information)) CQI) same measurements and (sub adj (band channel carrier)).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:41
S296	258	overlay with coding	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:08
S297	5	overlay with coding.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:08
S298	6	overlay with coding and pulse near position near modulation	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:09
S299	9	superposition with coding and pulse near position near modulation	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:19
S300	122	((channel near (state quality) near (index information)) CQI) same measurements and (sub adj (band channel carrier))	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:50
S301	27	bienas	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:13
S302	12	bienas and ofdma	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:13
S303	1789	measurement and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:15
S304	153	measurement.ab. and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:16
S305	30	("20050025039" | "20050058097" | "20050094550" | "20050105589" | "20050111429" | "20050157639" | "20050169229" | "20050201295" | "20050277422" | "5682407" | "5790549" | "5886988" | "6788733" | "6816832" | "7016319" | "7047006" | "7062295" | "7149192" | "7170928" | "7209460" | "7231183" | "7245879" | "7257406" | "7260405" | "7272190" | "7286609" | "7299801" | "7317750" |	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/17 08:05

		"7391750").PN. OR ("7457588").URPN.				
S306	374	measurement.clm. and (measurment measur $3) and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 08:20
S307	119	(sub near (band$ channel$ carrier$)) and measurement.clm. and (measurment measur$3) and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 08:21
S308	49	(sub near (band$ channel$ carrier$)) and (measurment measur$3) same (adjacent neighbor) with base adj station and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:25
S309	5	(sub near (band$ channel$ carrier$)) and second near (measurment measur $3) same base adj station and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:43
S310	2	"20050105589"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:46
S311	1	"2005068884"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:48
S312	2	"20050068884"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:49
S313	1	"20030137955"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:50
S314	2	"20030223354"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:51
S315	46	(sub near (band$ channel$ carrier$)) with (measurment measur$3) same base adj station and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:55
S316	146	MFZ	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:25
S317	3	MFZ and ofdm	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:25
S318	65	(CQI channel near quality) with measurements.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:35
S319	69	(CQI channel near (conditions quality)) with measurements.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:35

S320	4	(CQI channel near (conditions quality)) with measurements.ab. and OFDM$.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:36
S321	30	(CQI channel near (conditions quality)) with measurements.ab. and OFDM$	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:36
S322	103	(CQI channel near (conditions quality)) with measurements with report$3 and OFDM $	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:04
S323	6	measurement.ti. and (CQI channel near (conditions quality)) with measurements with report$3 and OFDM $	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:04
S324	4	measurement.ti. and (CQI channel near (conditions quality)) with measurements with report$3 and LTE	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:15
S325	43	(CQI channel near (conditions quality)) with measurements with report$3 and LTE	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:20
S326	1	"20060165060"	US-PGPUB; USPAT	OR	OFF	2010/05/17 12:54
S327	1	"20070026810"	US-PGPUB; USPAT	OR	OFF	2010/05/17 13:37
S328	1	"20070026810" and "110"	US-PGPUB; USPAT	OR	OFF	2010/05/17 13:37
S329	1	"20070026810" and base near station	US-PGPUB; USPAT	OR	OFF	2010/05/17 13:37
S330	134	(CQI quality) with (measurement) with threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:20
S331	2	(CQI quality) with (measurement) with threshold same ("no further measurement" abort$3) and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:20
S332	134	(CQI quality) with (measurement) with threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:21

S333	22	(CQI quality) with (second with measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:27
S334	2	(CQI quality) same battery same (measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:32
S335	621	(CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:34
S336	6	battery same (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:34
S337	110	battery and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:35
S338	8	battery near save and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:36
S339	18	power near save and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:41
S340	30	serving near cell and neighboring near cells and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:02

S341	6897	measurement with bandwidth	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:27
S342	63	measurement with bandwidth and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:27
S343	87	second with subcarriers with (greater less) with first	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:45
S344	4	CQI and second with subcarriers with (greater less) with first	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:45
S345	16	CQI and measurement with efficient	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:47
S346	1	CQI and scalable near bandwidth and measurement with efficient	US-PGPUB; USPAT	OR	OFF	2010/05/18 12:02
S347	10	mesh near network with radio with sensing	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:44
S348	38	mesh near network with radio with (monitoring scanning sensing)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:45
S349	5	mesh near network with radios with (monitoring scanning sensing)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:45
S350	791	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:46
S351	81	370/338.ccls. and multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:47
S352	144	370/338.ccls. and (plurality near2 (transceivers antennas)) and dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:55
S353	1	370/338.ccls. and (plurality near2 (transceivers antennas)) and dedicated with (sensing mo9nitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:56
S354	4	370/338.ccls. and (plurality near2 (transceivers antennas)) and dedicated with (sensing monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:57

S355	164	370/338.ccls. and (plurality near2 (transceivers antennas)) and (sensing monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:58
S356	3	370/338.ccls. and (plurality near2 (transceivers antennas)) and (sensing monitoring scanning) near transceiver	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:59
S357	30	370/338.ccls. and (plurality near2 (transceivers antennas)) and (sensing monitoring scanning) with transceiver	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:59
S358	7	370/338.ccls. and (plurality near2 (transceivers antennas)) with node and (sensing monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 14:01
S359	201	370/338.ccls. and plurality with transceivers	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:07
S360	139	370/338.ccls. and plurality with transceivers and (monitoring scanning dedicated)	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:08
S361	6	370/338.ccls. and plurality with transceivers and (monitoring scanning dedicated) with (tranceiver antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:11
S362	26	("5410738").URPN.	USPAT	OR	OFF	2010/05/19 17:18
S363	12	("6349200").URPN.	USPAT	OR	OFF	2010/05/19 17:20
S364	11	370/338.ccls. and plurality with radios and (monitoring scanning dedicated) with (radio tranceiver antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:22
S365	1	370/338.ccls. and plurality with radios and scanning with channels	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:28

S366	53	plurality with radios and scanning with channels	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:29
S367	6	(multi-hop mesh multhop) near network and plurality with radios and scanning with channels	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:30
S368	0	(multi-hop mesh multhop) near network and directiona adj antenna with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:32
S369	8	(multi-hop mesh multhop) near network and directional adj antenna with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:32
S370	274	(multi-hop mesh multhop) near network and radio with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:36
S371	1	(multi-hop mesh multhop) near network and dedicated with radio with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:36
S372	3	(multi-hop mesh multhop) near network and dedicated with radio with tun$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:37
S373	0	(multi-hop mesh multhop) near network and dedicated with antenna with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:39
S374	145	(multi-hop mesh multhop) near network and antenna with scan $4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:39
S375	2	(multi-hop mesh multhop) near network and exclusively with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:40
S376	20	dedicated with scanning with antenna	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:40

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S151	16	"5867785"	USPAT; UPAD	OR	OFF	2010/05/04 08:05

5/19/2010 7:24:12 PM
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	33913	cognitive	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
L2	481	cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
L3	48	mesh and cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:10
L4	271	mesh near network same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:17
L5	3	"7057566"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
L6	6	"7085224"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
L7	0	"71646673"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
L8	6	"7164667"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
L9	10	"7181530"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:33
L10	6	"7251238"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:34
L11	2	"20040095907"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:39
L12	2	"20050185606"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:40
L13	314	scanning same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 11:59
L14	7	scanning with signal near strength same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 11:59
L15	780	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:03
L16	1	parent near node same multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:04
L17	118	node same multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:05
L18	37	srikrishna and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:13

L19	785	mesh near network and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
L20	0	mesh near network and radios same relaiability	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
L21	35	mesh near network and radios same reliability	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
L22	101	370/338.ccls. and mesh near network and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
L23	688	370/338.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
L24	301	370/338.ccls. and radios and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
L25	140	370/338.ccls. and radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:21
L26	1	370/338.ccls. and separate with radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:29
L27	2	370/338.ccls. and scanning near radio and radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:30
L28	4	370/338.ccls. and scanning near antenna and antennas	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:30
L29	4	370/338.ccls. and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:31
L30	2	mesh near node and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:31
L31	1687	scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:32
L32	33	signal near strength same scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:32
L33	0	signal near strength same 2-radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
L34	0	signal near strength same "2-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
L35	0	signal near strength same "1-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35

L46	688	370/338.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:44
L47	38	370/338.ccls. and radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:44
L48	3	370/338.ccls. and "3-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:14
L49	38	"6697013"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:17
L50	28	"3-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:18
L51	3937	(multi multiple) near radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
L52	265	370/338.ccls. and (multi multiple) near radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
L53	20	370/338.ccls. and (multi multiple) near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
L54	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/03 13:32
L55	34	multiple near2 radios.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:49
L56	1104	radios.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:50
L57	4614	second near radio.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
L58	1086	second near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
L59	45	third near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51

EAST Search History (Interference)

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11084330	DACOSTA ET AL.
	Examiner	Art Unit
	MUTHUSWAMY G MANOHARAN	2617

SEARCHED

Class	Subclass	Date	Examiner
370	315,338,349,328	3/10/2008	MGM

SEARCH NOTES

Search Notes	Date	Examiner
Searched EAST	3/10/2008	MGM
Consulted George Eng	3/10/2008	MGM
updated search in EAST	1/28/2009	mgm
updated search in EAST	9/21/2009	mgm
updated search in EAST	5/21/2010	mgm
consulted George Eng and Nick Corsaro	5/21/2010	mgm

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	55	(scan$3) with dedicated with radio	US-PGPUB; USPAT	OR	OFF	2010/05/20 08:30
L2	0	(mesh multi-hop multihop) near2 network and joining and leaving same signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:07
L3	5	(mesh multi-hop multihop) near2 network and joining same signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:08
L4	120	(mesh multi-hop multihop) near2 network and joining and leaving and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:08
L5	13	(mesh multi-hop multihop) near2 network and (joining leaving) same signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:09
L6	1456	(mesh multi-hop multihop) near2 network and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:10
L7	284	(mesh multi-hop multihop) near2 network.ab. and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:10
L8	274	(mesh multi-hop multihop) near2 network and threshold same signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:10
L9	2	"20030120809"	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:14

L10	2	"20050277443"	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:14
L11	2	"20030012168"	US-PGPUB; USPAT	OR	OFF	2010/05/20 09:41
L13	23	370/338.ccls. and parent near node same (signal near strength RSSI)	US-PGPUB; USPAT	OR	OFF	2010/05/20 10:24
L14	8	370/338.ccls. and joining same (signal near strength RSSI)	US-PGPUB; USPAT	OR	OFF	2010/05/20 10:27
L15	28	370/338.ccls. and join $4 same (signal near strength RSSI)	US-PGPUB; USPAT	OR	OFF	2010/05/20 10:30
L16	19	manoharan near muthuswamy	US-PGPUB; USPAT	OR	OFF	2010/05/20 10:32
L17	604	energy near efficient. ti.	US-PGPUB; USPAT	OR	OFF	2010/05/20 10:33
L18	136	battery and energy near efficient.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/20 10:34

EAST Search History (Interference)

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1981	scanning with dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:45
L2	920	network and scanning with dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:45
L3	401	network and scanning with dedicated and (join$3 leav$3)	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:46
L4	65	wireless near network and scanning with dedicated and (join$3 leav$3)	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:46
L5	10	("20020064245" | "20030110484" | "5561701" | "5689507" | "6477183" | "6590928" | "6718395" | "6968219" | "7031294").PN. OR ("7369576").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/20 06:54
L6	0	C3I and mesh near network	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:57
L7	649	Command with control and mesh near network	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:58
L8	18	Command with control with intelligence and mesh near network	US-PGPUB; USPAT	OR	OFF	2010/05/20 06:58

EAST Search History (Interference)

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5/20/2010 7:07:45 AM
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	211	"455"/$.ccls. and (dedicated separate) with (radio transceiver receiver) with (scanning tuning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 20:34
S1	33913	cognitive	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
S2	481	cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
S3	48	mesh and cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:10
S4	271	mesh near network same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:17
S5	3	"7057566"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
S6	6	"7085224"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
S7	0	"71646673"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
S8	6	"7164667"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
S9	10	"7181530"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:33
S10	6	"7251238"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:34
S11	2	"20040095907"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:39
S12	2	"20050185606"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:40
S13	314	scanning same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 11:59
S14	7	scanning with signal near strength same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 11:59
S15	780	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:03
S16	1	parent near node same multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:04
S17	118	node same multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:05

S18	37	srikrishna and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:13
S19	785	mesh near network and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
S20	0	mesh near network and radios same relaiability	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
S21	35	mesh near network and radios same reliability	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:18
S22	101	370/338.ccls. and mesh near network and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
S23	688	370/338.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
S24	301	370/338.ccls. and radios and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:20
S25	140	370/338.ccls. and radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:21
S26	1	370/338.ccls. and separate with radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:29
S27	2	370/338.ccls. and scanning near radio and radios same frequency and signal adj strength	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:30
S28	4	370/338.ccls. and scanning near antenna and antennas	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:30
S29	4	370/338.ccls. and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:31
S30	2	mesh near node and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:31
S31	1687	scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:32
S32	33	signal near strength same scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:32
S33	0	signal near strength same 2-radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
S34	0	signal near strength same "2-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
S35	0	signal near strength same "1-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:35
S36	688	370/338.ccls. and radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:44

S37	38	370/338.ccls. and radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 12:44
S38	3	370/338.ccls. and "3-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:14
S39	38	"6697013"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:17
S40	28	"3-radio"	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:18
S41	3937	(multi multiple) near radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
S42	265	370/338.ccls. and (multi multiple) near radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
S43	20	370/338.ccls. and (multi multiple) near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:28
S44	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/03 13:32
S45	34	multiple near2 radios.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:49
S46	1104	radios.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:50
S47	4614	second near radio.clm.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
S48	1086	second near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
S49	45	third near radio.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:51
S50	282	radios.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:54
S51	6	370/338.ccls. and radios.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/03 13:54
S52	0	separate near scanning adj radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04

S53	879	separate near radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S54	1829	scan$5 near2 radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S55	7	multiple near radios and scan$5 near2 radio same frequency	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:04
S56	782	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:06
S57	65	multiple near radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:06
S58	10	("20040246932" | "5612948" | "5648969" | "6052600" | "6144850" | "6181734" | "6757268" | "6980537" | "7120456").PN. OR ("7457299").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/04 07:12
S59	1	multi near radios.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:14
S60	68	multi near radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:14
S61	1713	370/338.ccls. and (radios antennas)	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:15
S62	125	370/338.ccls. and (radios antennas).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:15
S63	278	370/338.ccls. and (radios antennas).clm.	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:29
S64	182	370/338.ccls. and (radios antennas).clm. and (NOT S62)	US-PGPUB; USPAT	OR	OFF	2010/05/04 07:30
S65	24	("20040151129" | "20050073990" | "20050107103" | "20050135295" | "20050135302" | "20050165950" | "20050192037" | "20050201340" | "20050243765" | "20050249114" | "20050254459" | "20060028984" | "20060078001" | "20060146868" | "20060164969" | "20060203795" | "20060256765" | "20060268792" | "5717688" | "6917598" | "7043195" |	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/04 07:32

		"7103371" | "7158803" | "7440436").PN. OR ("7583648").URPN.				
S66	0	("7664085").URPN.	USPAT	OR	OFF	2010/05/04 07:56
S67	0	"10825089"	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:10
S68	1	"10/825089"	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:10
S69	0	"20040090943" AND MOTION	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:13
S70	1	"20050232179" and motion	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:14
S71	0	"20040090943" AND handoff	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:15
S72	2	"20040090943" AND moving	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:15
S73	0	"20050232179" and handoff	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:17
S74	0	"20050232179" and handover	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:17
S75	106	mesh near nodes and mobile near nodes	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:26
S76	3	mesh near nodes and mobile near nodes same roaming	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:26
S77	2772	mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:29
S78	809	"370"/$.CCLS. AND mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:29
S79	809	"370"/$.ccls. and mesh near network and attach $3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:29
S80	202	"370"/$.ccls. and parent and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:30
S81	0	"370"/$.ccls. and parent and raom$3 and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:30
S82	44	"370"/$.ccls. and parent and roam$3 and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:30
S83	2	"20040090943" AND signal near strength	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:32

S84	90	"370"/$.ccls. and mobile near (router node) and mesh near network and attach$3	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:53
S85	2448	(multi multiple) with radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:56
S86	32	(multi multiple) with radios same reliability	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:56
S87	0	"6393261" and relaibility	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:58
S88	9	"6393261" and reliability	US-PGPUB; USPAT	OR	OFF	2010/05/04 08:58
S89	36	"5179559"	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:27
S90	109	radios same monitoring with channel$	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:28
S91	12	(multiple multi) with radios same monitoring with channel$	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:29
S92	406	dedicated with monitoring with channel $	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:30
S93	63	(transceiver radio) with dedicated with monitoring with channel $	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:30
S94	30	(transceiver radio) with dedicated with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:33
S95	824	(MULTI multiple) near radios	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:34
S96	19	(MULTI multiple) near radios same scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:34
S97	3	370/338.ccls. and scanning with dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:37
S98	34	370/338.ccls. and scan $4 with dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:38
S99	8	370/338.ccls. and scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:41
S100	1	"20040058678"	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:52
S101	588926	cognitive witth scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S102	561442	cognitive near radio witth scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S103	16	cognitive near radio with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56

S104	16	cognitive near radio with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:56
S105	13073	channel with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:57
S106	3	dedicated near (radio antenna) same channel with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:57
S107	3	dedicated near (radio antenna) same channel with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:58
S108	2548	(radio antenna) same channel with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:58
S109	2610794	(multiple multi) (radio$ antenna$) same channel with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:58
S110	57	(multiple multi) near (radio$ antenna$) same channel with scan $4	US-PGPUB; USPAT	OR	OFF	2010/05/04 09:59
S111	56	mesh near (network node) with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:02
S112	3028	mesh near (network node) and (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:11
S113	99	mesh near (network node) and (channel) near (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:11
S114	35	mesh near (network node) and (radios antennas) and (channel) near (monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/04 10:11
S115	9	dedicated near3 scan$4 near3 (radio antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/04 11:09
S116	7	dedicated near3 (tune tuning) near3 (radio antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/04 11:11
S117	0	dedicated near3 (tune tuning) near3 (radio antenna)	EPO	OR	OFF	2010/05/04 11:13
S118	0	dedicated near3 (scan scanning tune tuning) near3 (radio antenna)	EPO	OR	OFF	2010/05/04 11:13
S119	2	dedicated near3 (scan scanning tune tuning) near3 (device radio antenna)	EPO	OR	OFF	2010/05/04 11:13

S120	2859	(scan scanning tune tuning) near3 (device radio antenna)	EPO	OR	OFF	2010/05/04 11:13
S121	0	mesh near (node router) with (scan scanning tune tuning) near3 (device radio antenna)	EPO	OR	OFF	2010/05/04 11:14
S122	2	mesh near (node router) with (scan scanning tune tuning) near3 (device radio antenna)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:14
S123	4	mesh near (node router) same (scan scanning tune tuning) near3 (device radio antenna)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:15
S124	70	mesh near (node router) with (radios antennas)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:16
S125	0	scann8ing near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:29
S126	1065	scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:29
S127	8	370/338.ccls. and scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:30
S128	4	370/338.ccls. and scanning near antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:30
S129	8	370/338.ccls. and scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:33
S130	45	370/338.ccls. and dedicated near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:34

S131	19	370/338.ccls. and dedicated near radio same (frequency channel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:34
S132	106	("455"/$.ccls. 370/338.ccls) and mesh near (router node)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:56
S133	106	("455"/$.ccls. 370/338.ccls) and mesh near (router node)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 11:58
S134	31	("455"/$.ccls. 370/338.ccls) and mesh near (router node) same (associat$3 join$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:15
S135	0	("455"/$.ccls. 370/338.ccls) and mesh near (router node) same scanning near2 interface	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:20
S136	0	("455"/$.ccls. 370/338.ccls) and mesh near (router node) same scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S137	0	("455"/$.ccls. 370/338.ccls) and mesh near (router node) and scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S138	61783	("455"/$.ccls. 370/338.ccls) and d scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S139	526	("455"/$.ccls. 370/338.ccls) and scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:21
S140	38	("455"/$.ccls. 370/338.ccls) and mesh and scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:22

S141	1	("455"/$.ccls. 370/338.ccls) and dedicated near scanning near2 radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:23
S142	476	("455"/$.ccls. 370/338.ccls) and dedicated near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:23
S143	9	("455"/$.ccls. 370/338.ccls) and dedicated near radio same tuning	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:24
S144	5	("455"/$.ccls. 370/338.ccls) and dedicated near radio with measurements	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:25
S145	0	("455"/$.ccls. 370/338.ccls) and indipendent near radio with measurements	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:26
S146	0	("455"/$.ccls. 370/338.ccls) and independent near radio with measurements	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:26
S147	0	("455"/$.ccls. 370/338.ccls) and independent near scanning near radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:26
S148	11	("455"/$.ccls. 370/338.ccls) and independent with scanning with radio	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/04 12:27
S232	13	forensics.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/12 09:44
S233	1	"20090042532"	US-PGPUB; USPAT	OR	OFF	2010/05/12 09:48
S234	851	quality with (subchannels subband)	US-PGPUB; USPAT	OR	OFF	2010/05/12 11:48
S235	431	OFDM$ and quality with (subchannels subband)	US-PGPUB; USPAT	OR	OFF	2010/05/12 11:49
S236	23	OFDM$ and quality with (subchannels subband).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/12 11:49

S237	52	OFDM$ and quality with (subchannels subband) with measur$6	US-PGPUB; USPAT	OR	OFF	2010/05/12 12:44
S238	45	OFDM$ and quality with (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 12:45
S239	10	blind and OFDM$ and quality with (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 12:51
S240	14	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:00
S241	0	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure) same CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S242	23	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure) and \ CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S243	0	blind and OFDM$ and (subchannels subband) with (measuring measurement measured measure) and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S244	149	OFDM$ and (subchannels subband) with (measuring measurement measured measure)	US-PGPUB; USPAT	OR	OFF	2010/05/12 13:59
S245	30	OFDM$ and (subchannels subband) with (measuring measurement measured measure) and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 14:00

S246	0	quality with measurements.ab. and OFDM$ and (subchannels subband) with (measuring measurement measured measure) and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/12 14:02
S247	255	"6236365"	US-PGPUB; USPAT	OR	OFF	2010/05/14 08:59
S248	1	"6236365".pn.	US-PGPUB; USPAT	OR	OFF	2010/05/14 08:59
S249	1	"6466938".pn.	US-PGPUB; USPAT	OR	OFF	2010/05/14 08:59
S250	1461	admission same (Quality near (service parameters))	US-PGPUB; USPAT	OR	OFF	2010/05/14 09:52
S251	0	admission same (Quality near (service parameters)) same linley	US-PGPUB; USPAT	OR	OFF	2010/05/14 09:52
S252	0	admission same (Quality near (service parameters)) same lindley	US-PGPUB; USPAT	OR	OFF	2010/05/14 09:53
S253	592116	admission same (Quality near (service parameters)) same lindley's equation	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:02
S254	0	admission same (Quality near (service parameters)) same lindley's near equation	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:02
S255	211	admission same (Quality near (service parameters)) and delay same (success error)	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:03
S256	53	admission same (Quality near (service parameters)) and delay same (success error) and equation	US-PGPUB; USPAT	OR	OFF	2010/05/14 10:03
S257	4	"6745036"	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:09
S258	461	455/456.1.ccls. and beacon	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:15
S259	23	455/456.1.ccls. and beacon with identity	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:16
S260	92	455/456.1.ccls. and reference near device	US-PGPUB; USPAT	OR	OFF	2010/05/14 11:23

S261	1	"20050227689"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:03
S262	54	channel near quality near indicator .ti.	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:27
S263	0	channel near quality near indicator near2 time near frquency.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:27
S264	3	channel near quality near indicator near2 time near frequency.ti.	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:27
S265	2	"20050105589"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:28
S266	1	"2005068884"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:29
S267	2	"20050068884"	US-PGPUB; USPAT	OR	OFF	2010/05/14 13:30
S268	6	carrier near FMA	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:58
S269	822	carrier near FDMA	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:58
S270	3629	carrier near FDMA and measurement wsame CQI	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:59
S271	47	carrier near FDMA and measurement same CQI	US-PGPUB; USPAT	OR	OFF	2010/05/16 12:59
S272	346	FDMA and measurement same (channel near quality CQI)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:06
S273	1	"20030137955"	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:21
S274	6708	(channel near (state quality) near (index information) CQI)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:22
S275	137	(channel near (state quality) near (index information) CQI) same multi near carrier	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23
S276	419	(channel near (state quality) near (index information) CQI) same (MC-FDMA OFDMA multi near carrier)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23
S277	137	(channel near (state quality) near (index information) CQI) same (MC-FDMA and OFDMA multi near carrier)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23

S278	81	(channel near (state quality) near (index information) CQI) same (MC-FDMA and OFDMA multi near carrier) and measurement$	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:23
S279	3	(channel near (state quality) near (index information) CQI) same (MC-FDMA and OFDMA multi near carrier) and measurement$ with (base near stations)	US-PGPUB; USPAT	OR	OFF	2010/05/16 13:28
S280	322	(channel near (state quality) near (index information) CQI) same (base near stations)	US-PGPUB; USPAT	OR	OFF	2010/05/16 14:00
S281	22	(channel near (state quality) near (index information) CQI) same (base near stations).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/16 14:00
S282	28	(channel near (state quality) near (index information) CQI) same (base near stations) and measurements with (MS UE)	US-PGPUB; USPAT	OR	OFF	2010/05/16 14:18
S283	139	((channel near (state quality) near (index information)) CQI) same measurements and (OFDMA MC-FDMA)	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:02
S284	8	((channel near (state quality) near (index information)) CQI) same measurements. clm. and (OFDMA MC-FDMA)	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:30
S285	6	((channel near (state quality) near (index information)) CQI) same measurements. ab. and (OFDMA MC-FDMA)	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:38
S286	122	((channel near (state quality) near (index information)) CQI) same measurements and (sub adj (band channel carrier))	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:40

S287	16	((channel near (state quality) near (index information)) CQI) same measurements and (sub adj (band channel carrier)).ab.	US-PGPUB; USPAT	OR	OFF	2010/05/16 16:41
S296	258	overlay with coding	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:08
S297	5	overlay with coding.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:08
S298	6	overlay with coding and pulse near position near modulation	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:09
S299	9	superposition with coding and pulse near position near modulation	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:19
S300	122	((channel near (state quality) near (index information)) CQI) same measurements and (sub adj (band channel carrier))	US-PGPUB; USPAT	OR	OFF	2010/05/16 17:50
S301	27	bienas	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:13
S302	12	bienas and ofdma	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:13
S303	1789	measurement and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:15
S304	153	measurement.ab. and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 07:16
S305	30	("20050025039" | "20050058097" | "20050094550" | "20050105589" | "20050111429" | "20050157639" | "20050169229" | "20050201295" | "20050277422" | "5682407" | "5790549" | "5886988" | "6788733" | "6816832" | "7016319" | "7047006" | "7062295" | "7149192" | "7170928" | "7209460" | "7231183" | "7245879" | "7257406" | "7260405" | "7272190" | "7286609" | "7299801" | "7317750" |	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/17 08:05

		"7391750").PN. OR ("7457588").URPN.				
S306	374	measurement.clm. and (measurment measur $3) and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 08:20
S307	119	(sub near (band$ channel$ carrier$)) and measurement.clm. and (measurment measur$3) and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 08:21
S308	49	(sub near (band$ channel$ carrier$)) and (measurment measur$3) same (adjacent neighbor) with base adj station and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:25
S309	5	(sub near (band$ channel$ carrier$)) and second near (measurment measur $3) same base adj station and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:43
S310	2	"20050105589"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:46
S311	1	"2005068884"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:48
S312	2	"20050068884"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:49
S313	1	"20030137955"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:50
S314	2	"20030223354"	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:51
S315	46	(sub near (band$ channel$ carrier$)) with (measurment measur$3) same base adj station and OFDMA	US-PGPUB; USPAT	OR	OFF	2010/05/17 09:55
S316	146	MFZ	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:25
S317	3	MFZ and ofdm	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:25
S318	65	(CQI channel near quality) with measurements.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:35
S319	69	(CQI channel near (conditions quality)) with measurements.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:35

S320	4	(CQI channel near (conditions quality)) with measurements.ab. and OFDM$.ab.	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:36
S321	30	(CQI channel near (conditions quality)) with measurements.ab. and OFDM$	US-PGPUB; USPAT	OR	OFF	2010/05/17 10:36
S322	103	(CQI channel near (conditions quality)) with measurements with report$3 and OFDM $	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:04
S323	6	measurement.ti. and (CQI channel near (conditions quality)) with measurements with report$3 and OFDM $	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:04
S324	4	measurement.ti. and (CQI channel near (conditions quality)) with measurements with report$3 and LTE	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:15
S325	43	(CQI channel near (conditions quality)) with measurements with report$3 and LTE	US-PGPUB; USPAT	OR	OFF	2010/05/17 11:20
S326	1	"20060165060"	US-PGPUB; USPAT	OR	OFF	2010/05/17 12:54
S327	1	"20070026810"	US-PGPUB; USPAT	OR	OFF	2010/05/17 13:37
S328	1	"20070026810" and "110"	US-PGPUB; USPAT	OR	OFF	2010/05/17 13:37
S329	1	"20070026810" and base near station	US-PGPUB; USPAT	OR	OFF	2010/05/17 13:37
S330	134	(CQI quality) with (measurement) with threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:20
S331	2	(CQI quality) with (measurement) with threshold same ("no further measurement" abort$3) and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:20
S332	134	(CQI quality) with (measurement) with threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:21

S333	22	(CQI quality) with (second with measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:27
S334	2	(CQI quality) same battery same (measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:32
S335	621	(CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:34
S336	6	battery same (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:34
S337	110	battery and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:35
S338	8	battery near save and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:36
S339	18	power near save and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 10:41
S340	30	serving near cell and neighboring near cells and (CQI quality) same (measuring measured measure$1 measurement) same threshold and (OFDM LTE)	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:02

S341	6897	measurement with bandwidth	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:27
S342	63	measurement with bandwidth and CQI	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:27
S343	87	second with subcarriers with (greater less) with first	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:45
S344	4	CQI and second with subcarriers with (greater less) with first	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:45
S345	16	CQI and measurement with efficient	US-PGPUB; USPAT	OR	OFF	2010/05/18 11:47
S346	1	CQI and scalable near bandwidth and measurement with efficient	US-PGPUB; USPAT	OR	OFF	2010/05/18 12:02
S347	10	mesh near network with radio with sensing	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:44
S348	38	mesh near network with radio with (monitoring scanning sensing)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:45
S349	5	mesh near network with radios with (monitoring scanning sensing)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:45
S350	791	multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:46
S351	81	370/338.ccls. and multiple near radios	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:47
S352	144	370/338.ccls. and (plurality near2 (transceivers antennas)) and dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:55
S353	1	370/338.ccls. and (plurality near2 (transceivers antennas)) and dedicated with (sensing mo9nitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:56
S354	4	370/338.ccls. and (plurality near2 (transceivers antennas)) and dedicated with (sensing monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:57

S355	164	370/338.ccls. and (plurality near2 (transceivers antennas)) and (sensing monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:58
S356	3	370/338.ccls. and (plurality near2 (transceivers antennas)) and (sensing monitoring scanning) near transceiver	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:59
S357	30	370/338.ccls. and (plurality near2 (transceivers antennas)) and (sensing monitoring scanning) with transceiver	US-PGPUB; USPAT	OR	OFF	2010/05/19 13:59
S358	7	370/338.ccls. and (plurality near2 (transceivers antennas)) with node and (sensing monitoring scanning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 14:01
S359	201	370/338.ccls. and plurality with transceivers	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:07
S360	139	370/338.ccls. and plurality with transceivers and (monitoring scanning dedicated)	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:08
S361	6	370/338.ccls. and plurality with transceivers and (monitoring scanning dedicated) with (tranceiver antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:11
S362	26	("5410738").URPN.	USPAT	OR	OFF	2010/05/19 17:18
S363	12	("6349200").URPN.	USPAT	OR	OFF	2010/05/19 17:20
S364	11	370/338.ccls. and plurality with radios and (monitoring scanning dedicated) with (radio tranceiver antenna)	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:22
S365	1	370/338.ccls. and plurality with radios and scanning with channels	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:28

S366	53	plurality with radios and scanning with channels	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:29
S367	6	(multi-hop mesh multhop) near network and plurality with radios and scanning with channels	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:30
S368	0	(multi-hop mesh multhop) near network and directiona adj antenna with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:32
S369	8	(multi-hop mesh multhop) near network and directional adj antenna with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:32
S370	274	(multi-hop mesh multhop) near network and radio with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:36
S371	1	(multi-hop mesh multhop) near network and dedicated with radio with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:36
S372	3	(multi-hop mesh multhop) near network and dedicated with radio with tun$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:37
S373	0	(multi-hop mesh multhop) near network and dedicated with antenna with scan$4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:39
S374	145	(multi-hop mesh multhop) near network and antenna with scan $4	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:39
S375	2	(multi-hop mesh multhop) near network and exclusively with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:40
S376	20	dedicated with scanning with antenna	US-PGPUB; USPAT	OR	OFF	2010/05/19 17:40
S377	6692	(mesh multihop) near network	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:14
S378	1097	(mesh multihop) near network and (scanning tuning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:14
S379	172	(mesh multihop) near network and (scanning tuning) and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:14

S380	10	(mesh multihop) near network and (scanning tuning) with radio and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:19
S381	0	(multiple near radios mulit near radios) and (scanning tuning) with radio and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:24
S382	0	(multiple near radios multi near radios) and (scanning tuning) with radio and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:25
S383	7	(multiple near radios multi near radios) and (scanning tuning) and joining	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:25
S384	626	(dedicated separate) with (radio transceiver receiver) with (scanning tuning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:27
S385	45	"370"/$.ccls. and (dedicated separate) with (radio transceiver receiver) with (scanning tuning)	US-PGPUB; USPAT	OR	OFF	2010/05/19 19:27

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S151	16	"5867785"	USPAT; UPAD	OR	OFF	2010/05/04 08:05

5/19/2010 8:46:00 PM
C:\Documents and Settings\mmanoharan\My Documents\EAST\Workspaces\11083693_1.wsp

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	33913	cognitive	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
L2	481	cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:09
L3	48	mesh and cognitive near2 radio	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:10
L4	271	mesh near network same radios	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:17
L5	3	"7057566"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
L6	6	"7085224"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:31
L7	0	"71646673"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
L8	6	"7164667"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:32
L9	10	"7181530"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:33
L10	6	"7251238"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:34
L11	2	"20040095907"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:39
L12	2	"20050185606"	US-PGPUB; USPAT	OR	OFF	2010/05/03 10:40

EAST Search History (Interference)

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5/3/2010 11:44:16 AM
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1691	scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/08 17:54
L2	4	370/338.ccls. and scanning near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/08 17:55
L3	26	("5809431" | "5884181" | "6018659" | "6049593" | "6553020").PN. OR ("6850502").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/08 18:01
L4	0	mult near (antenna radio) same network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:08
L5	672	multi near (antenna radio) same network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:08
L6	2360	(multiple multi) near (antenna radio) same network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:08
L7	3952	(multiple multi) near (antenna$ radio$) same network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:08
L8	2590	("370"/$.ccls. "455"/$.ccls.) and (multiple multi) near (antenna$ radio$) same network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:14
L9	188	("370"/$.ccls. "455"/$.ccls.) and (multiple multi) near (antenna$ radio$) same network. ab.	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:15
L10	566984	("370"/$.ccls. "455"/$.ccls.) and (multiple multi) near (antenna$ radio$) same network. ab. ands scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:16
L11	18	("370"/$.ccls. "455"/$.ccls.) and (multiple multi) near (antenna$ radio$) same network. ab. and scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:16
L12	332	("370"/$.ccls. "455"/$.ccls.) and scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:21

L13	300	("370"/338.ccls. "455"/$.ccls.) and scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:21
L14	8	("370"/338.ccls.) and scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:21
L15	0	("370"/338.ccls.) and dedicated near antenna with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:22
L16	0	("370"/338.ccls.) and dedicated with antenna with scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:22
L17	44	("370"/338.ccls.) and dedicated with antenna	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:23
L18	12	("370"/338.ccls.) and dedicated near antenna	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:23
L19	94	(multiple multi) near (antenna$ radio$) same mesh near network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:26
L20	7298	(mesh multihop multi-hop) near network	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:52
L21	216	(mesh multihop multi-hop) near network and (multiple plurality) near2 radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:52
L22	229	(mesh multihop multi-hop) near network and (multiple plurality multi) near2 radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:52
L23	507	(mesh multihop multi-hop) near network and (multiple plurality multi) near2 (transceivers radios)	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:53
L24	51	(mesh multihop multi-hop) near network and (multiple plurality multi) near2 (transceivers radios). ab.	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:53
L25	18	(mesh multihop multi-hop) near network and (multiple plurality multi) near2 (transceivers radios) and dedicated near2 (antenna radio)	US-PGPUB; USPAT	OR	OFF	2010/05/08 18:57

L26	106	370/338.ccls. and dedicated near2 (antenna radio)	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:03
L27	5	370/338.ccls. and dedicated near2 (antenna radio) and joining	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:03
L28	106	370/338.ccls. and dedicated near2 (antenna radio)	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:04
L29	59	370/338.ccls. and dedicated near (antenna radio)	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:04
L30	764	scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:08
L31	0	dedicated near scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:08
L32	1	dedicated with scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:08
L33	9	("6330458").URPN.	USPAT	OR	OFF	2010/05/08 19:10
L34	2	"20040090943" and scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:58
L35	2	"20040090943" and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 19:59
L36	2	"20040090943" and signal near strength and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:03
L37	1	("370"/338.ccls.) and osann.in.	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:06
L38	8	("370"/338.ccls.) and scanning near radio	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:07
L39	1	("370"/338.ccls.) and scanning near signal near strength	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:10
L40	38	battle near field and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:29
L41	32	battle near field and radios and network	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:29
L42	582	ships and radios and network	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:40
L43	41	(mesh adhoc) near network and ships and radios and network	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:41
L44	801	(mesh adhoc) near network and radios and network	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:43

L45	9	(mesh adhoc) near network and radios and (joining same leaving)	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:44
L46	29	(mesh adhoc) near network and radios same signal near strength	US-PGPUB; USPAT	OR	OFF	2010/05/08 20:58
L47	1	"20050232179" and scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 21:10
L48	0	"20050232179" and dedicated near scanning	US-PGPUB; USPAT	OR	OFF	2010/05/08 21:12
L49	1	"20050232179" and dedicated	US-PGPUB; USPAT	OR	OFF	2010/05/08 21:12
L50	2	"20030012168" and signal near strength	US-PGPUB; USPAT	OR	OFF	2010/05/08 21:29
L51	21	("20020196763" | "20030133422" | "20040264379" | "20060018285" | "4649524" | "4812820" | "4855713" | "4951029" | "5241542" | "5247564" | "5295154" | "5428636" | "5475687" | "5553076" | "5659195" | "5732074" | "5854994" | "6028857" | "6208247" | "7013138").PN. OR ("7161926").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/05/08 21:32
L52	264	mesh near networks and (vehicles automobiles)	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:24
L53	85	mesh near networks and (vehicles automobiles) and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:24
L54	4	mesh near networks. ab. and (vehicles automobiles) and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:24
L55	0	multihop near networks. ab. and (vehicles automobiles) and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:27

L56	0	multi-hop near networks.ab. and (vehicles automobiles) and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:27
L57	19	multi-hop near networks and (vehicles automobiles) and radios	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:27
L58	1520018	de torbal	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:43
L59	5	detorbal	US-PGPUB; USPAT	OR	OFF	2010/05/08 22:43

EAST Search History (Interference)

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5/8/2010 11:06:04 PM
C:\Documents and Settings\mmanoharan\My Documents\EAST\Workspaces\11083693_1.wsp

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/084,330	03/17/2005	Francis daCosta	0357-02205	3657

27197 7590 12/13/2010

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EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	

ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
12/13/2010	ELECTRONIC

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 the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mail@cherskov.com
sgurda@cherskov.com
mcherskov@cherskov.com

Notice of Abandonment	Application No.	Applicant(s)	
	11/084,330	DACOSTA ET AL.	
	Examiner	Art Unit	
	MUTHUSWAMY G. MANOHARAN	2617	

-- 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 *26 May 2010*.
   (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:

Examiner confirmed with Applicant's representative that the no response has been filed.

/George Eng/
Supervisory Patent Examiner, Art Unit 2617

/Muthuswamy G Manoharan/
Examiner, Art Unit 2617

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.