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MOTOROLA, INC 1303 EAST ALGONQUIN ROAD IL01/3RD SCHAUMBURG, IL 60196			NGUYEN, TOAN D	
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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.

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Office Action Summary	Application No. 11/847,502	Applicant(s) AYOUB ET AL.	
	Examiner TOAN D. NGUYEN	Art Unit 2472	

-- 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 07 January 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) 1-22 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- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.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) 1-22 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 30 August 2007 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:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ 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) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/30/07, 01/07/09</u> . | 6) ☐ Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. 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 negated by the manner in which the invention was made.

2. 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).

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nerses et al. (US 7,639,663) in view of Burchfiel (US 7,483,711) further in view of Li et al. (US 2007/0213046).

For claim 1, Nerses et al. disclose method and apparatus for dynamic channel access within wireless networks, the method comprising:

dynamically selecting a radio device from the plurality of radio devices (a network node may be dynamically selected to serve as the controller node for the wireless Ad-Hoc network 20 includes a plurality of nodes 10, figure 1, col. 4, lines 45-48, and col. 6,

Art Unit: 2472

lines 38-40) based on a communication device criteria (if the node is configured as Controller Operation Unrestricted (a communication device criteria means), the node may be selected to serve as the controller, col. 6, lines 51-53); and

assigning a role of a central resource manager to the selected radio device (a network node may be dynamically selected to serve as the controller node (assigning a role of a central resource manager means) for the network, col. 6, lines 38-40) to assume responsibility of allocating resource to other radio devices within the ad hoc network (the primary function of the controller node is to manage resource allocation and route calculations for TDMA circuits (col. 6, lines 28-30), a combination of time block and TDMA frequency channel resources are utilized to allocate TDMA bandwidth, TDMA frequency channel can be assigned to only one pair of communicating nodes during any given time block, multipairs of communicating nodes may each be assigned different frequency channels to enable simultaneous transmissions within that block (allocating resource to other cognitive radio devices within the ad hoc network means), col. 8, lines 27-33).

However, Nerses et al. do not expressly disclose allocating frequency to other radio devices, the allocated frequency dependent on a determination of utilized frequencies within the ad hoc network. In an analogous art, Burchfiel disclose allocating frequency to other radio devices (a processor configured to assign receive frequencies to a multiplicity of nodes (allocating frequency to other cognitive radio devices means), col. 26, lines 43-45), the allocated frequency dependent on a determination of utilized frequencies (assign receive frequencies (allocated frequency means) to a multiplicity of

Art Unit: 2472

nodes to ensure that there are no adjacent nodes that use the same receive frequency (determination of utilized frequencies means) (col. 26, lines 44-46) within the ad hoc network (for a typical mobile ad hoc networks, nodes usually have 4 to 6 neighbors, col. 19, lines 59-60).

One skilled in the art would recognized the allocating frequency to other radio devices, the allocated frequency dependent on a determination of utilized frequencies within the ad hoc network, and would have applied Burchfiel's assign receive frequencies to multiplicity of nodes in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Burchfiel's spectrum-adaptive networking in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to assign receive frequencies to a multiplicity of nodes (col. 26, lines 43-45).

Furthermore, Nerses et al. in view of Burchfiel do not expressly disclose an ad hoc network comprising of cognitive radio devices. In an analogous art, Li et al. disclose an ad hoc network comprising of cognitive radio devices (a cognitive wireless network communication 100 can comprises a plurality of nodes, such as one or more base stations 102 (e.g., cellular, WiFi or ad hoc) in one or more sectors that receive, transmit, repeat, etc. wireless communication signals to each other and/or to one or more other nodes, such as mobiles devices (an ad hoc network comprising of cognitive radio devices means)(figure 1, paragraph [0053], lines 1-8).

One skilled in the art would recognized the ad hoc network comprising of cognitive radio devices, and would have applied Li et al.'s cognitive mobile device

Art Unit: 2472

in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Li et al.'s cognitive communications in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to receive, transmit, repeat, etc. wireless communication signals to each other and/or to one or more other nodes, such as mobiles devices (paragraph [0053], lines 6-8).

For claim 2, Nerses et al. disclose wherein dynamically selecting the radio device from the plurality of radio devices based on the communication device criteria comprises ensuring that the selected cognitive radio device has a desired resource capability to perform functions of the central resource manager (the database (a desired resource capability to perform functions of the central resource manager means) of each node 10 (nodes 11, 30, 40) maintains information enabling that node to determine appropriate paths for routing messages through the network, col. 6, lines 12-15).

For claim 3, Nerses et al. disclose wherein ensuring that the selected cognitive radio device has the desired resource capability comprises determining at least one of number of transceivers on the cognitive radio device (the communication portion of a node 10 includes a transmitter 22, a receiver 24 (at least one of number of transceivers on the cognitive radio device means), col. 5, lines 49-50), or an amount of memory on the cognitive radio device, or an amount of network traffic being serviced by the cognitive radio device (the database (an amount of memory on the cognitive radio device means) of each node 10 (nodes 11, 30, 40) maintains information enabling that node to determine appropriate paths for routing messages through the network (or an

Art Unit: 2472

amount of network traffic being serviced by the cognitive radio device means), col. 6, lines 12-15).

For claim 4, Nerses et al. disclose wherein an earliest device entering the ad hoc network with the desired resource capability to perform functions of the central resource manager assigns itself the role of the central resource manager (the initiating node designates itself to be the controller node at step 408 (assigns itself the role of the central resource manager means) in response to determining that the initiating node has lowest MAC ID of all nodes in the LSA database (the desired resource capability to perform functions of the central resource manager means) that are configured as controller Operation Mandatory, col. 7, lines 41-44).

4. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nerses et al. (US 7,639,663) in view of Burchfiel (US 7,483,711) and Li et al. (US 2007/0213046) further in view of Moore et al. (US 7,299,042).

For claims 5-8, Nerses et al. in view of Burchfiel and Li et al. disclose further comprising:

determining frequency utilization of cognitive radio devices within the ad hoc network by the central resource manager (a combination of time block and TDMA frequency channel resources are utilized to allocate TDMA bandwidth, TDMA frequency channel can be assigned to only one pair of communicating nodes during any given time block, multipairs of communicating nodes may each be assigned different frequency channels to enable simultaneous transmissions within that block (determining frequency utilization of cognitive radio devices within the ad hoc network by the central

resource manager means), col. 8, lines 27-33);

maintaining a database based on the determined frequency utilization by the central resource manager (the database of each node 10 (nodes 11, 30, 40) maintains information enabling that node to determine appropriate paths for routing messages through the network, col. 6, lines 12-15).

receiving a frequency allocation request from a first cognitive radio device moving within the ad hoc network by the central resource manager (upon receipt of a TDMA circuit set-up request from a network node, the controller node attempts to determine a route with sufficient resource to support the requested TDMA circuit between the originating or source node and a designated destination node 40, col. 10, lines 51-56);

allocating a frequency to the first cognitive radio device in response to the received frequency allocation request by the central resource manager (TDMA frequency channel can be assigned (allocating a frequency means) to only one pair of communicating nodes during any given time block, col. 8, lines 29-31); and updating the database to remove the allocated frequency from the frequencies (if an entry is removed, the associated resources are released and the block allocation and channel allocation tables are updated accordingly, col. 11, line 67 to col. 12, line 3).

Nerses et al. disclose further comprising detecting frequency occupancy by non-cognitive radio devices (non-deterministic (e.g., CSMA) traffic types (e.g., received from a host computer system or a flight computer (non-cognitive radio devices means) with respect to an NLOS-LS network, col. 5, lines 31-33); and updating the database to

Art Unit: 2472

remove the occupied frequencies from the frequencies (if an entry is removed, the associated resources are released and the block allocation and channel allocation tables are updated accordingly, col. 11, line 67 to col. 12, line 3 as set forth in claim 6); further comprising: receiving a frequency de-allocation request from the first cognitive radio device departing from the ad hoc network by the central resource manager (lower precedence circuits that terminate at the requested destination means, col. 15, lines 3-16); de-allocating the frequency from the first cognitive radio device in response to the received frequency de-allocation request by the central resource manager (the controller node creates a resource deallocation packet, and this deallocation packet replaces the resource allocation packet associated with the TDMA circuit means, col. 16, lines 16-20); and updating the database including the frequencies to reflect the de-allocated frequency (if an entry is removed, the associated resources are released and the block allocation and channel allocation tables are updated accordingly, col. 11, line 67 to col. 12, line 3 as set forth in claim 7); further comprising detecting vacated frequencies by non-cognitive radio devices or cognitive radio devices that have abruptly departed the network (the controller node removes the circuit from the active list and generates a resource deallocation message to send to the network means, col. 21, lines 57-61); and updating the database including the frequencies to reflect the vacated frequencies (col. 22, lines 14-17 as set forth in claim 8).

However, Nerses et al. in view of Burchfiel and Li et al. do not expressly disclose vacant frequencies based on the determined frequency utilization by the central resource manager. In an analogous art, Moore et al. disclose vacant frequencies based

on the determined frequency utilization by the central resource manager (the master device may transmit a local beacon signal to inform other devices of the present of the network and its availability, and additionally, this local beacon signal may include information on which frequency bands the master device knows to be available or “clear” (vacant frequencies based on the determined frequency utilization by the central resource manager means), col. 13, lines 2-7).

One skilled in the art would recognized the vacant frequencies based on the determined frequency utilization by the central resource manager, and would have applied Moore et al.’s master device in Nerses et al.’s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Moore et al.’s common signaling method and apparatus in Nerses et al.’s method and apparatus for dynamic channel access within wireless networks with the motivation being to include information on which frequency bands the master device knows to be available or “clear” (col. 13, lines 5-7).

5. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nerses et al. (US 7,639,663) in view of Burchfiel (US 7,483,711) and Li et al. (US 2007/0213046) and Mighani et al. (US 2008/0192713) further in view of Moore et al. (US 7,299,042).

For claims 9-11, Nerses et al. in view of Burchfiel and Li et al. do not expressly disclose further comprising the central resource manager:

selecting a backup cognitive radio device from other one of the cognitive radio devices within the ad hoc network by the central resource manager device, and

periodically communicating a list of vacant frequencies from the central resource manager to the backup cognitive radio device.

In an analogous art, Mighani et al. disclose: selecting a backup cognitive radio device from other one of the cognitive radio devices (each cluster in the mesh network will have a lead node (the central resource manager means) and a back-up node (a backup cognitive radio device means), the lead node is active, and the back-up node is in a standby mode, and both the lead and the back-up nodes are considered as members of the next higher level of hierarchy, paragraph [0056], lines 1-6), within the ad hoc network by the central resource manager (mesh network 100 may be implemented using Ah hoc On-Demand Distance Vector (AODV), paragraph [0023], lines 2-4).

Mighani et al. disclose transferring the role of the central resource manager to the backup cognitive radio device by the central resource manager when the central resource manager departs from the ad hoc network (the back-up node should normally itself store the same set routing and other active connections information stored in the lead node so that, in case of failure of the lead node, the back-up node assume the role of the failed lead node (transferring the role of the central resource manager to the backup cognitive radio device by the central resource manager means), and it should be noted that the failed lead node when and if it is restored to being again functional then assume the role of a back-up node and remain in a standby mode, paragraph [0056], lines 13-19 as set forth in claim 10); and further comprising transferring the role of the central resource manager to the backup cognitive radio device when a time

Art Unit: 2472

period since assigning the role of the central resource manager equals a predefined time period (if no acknowledgement is received within a configurable time period, the packet is re-transmitted (paragraph [0071]), and in the event of the failure of a lead node for given mesh, any other node in that mesh could assume the role of lead node, paragraph [0073], lines 9-11 as set forth in claim 11).

One skilled in the art would recognized the selecting a backup cognitive radio device from other one of the cognitive radio devices within the ad hoc network by the central resource manager device, and would have applied Mighani et al.'s back-up node in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Mighani et al.'s hierarchical mesh network for wireless access in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to have a lead node and a back-up node (paragraph [0056], lines 1-2).

However, Nerses et al. in view of Burchfiel and Li et al. and Mighani et al. do not expressly disclose periodically communicating a list of vacant frequencies to the backup cognitive radio device. In an analogous art, Moore et al. disclose periodically communicating a list of vacant frequencies to the backup cognitive radio device (the master device may transmit a local beacon signal to inform other devices (one of other devices can be the backup cognitive radio device means) of the present of the network and its availability, and additionally, this local beacon signal may include information on which frequency bands the master device knows to be available or "clear" (a list of vacant frequencies means), col. 13, lines 2-7).

One skilled in the art would recognized the periodically communicating a list of vacant frequencies to the backup cognitive radio device, and would have applied Moore et al.'s master device in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Moore et al.'s common signaling method and apparatus in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to include information on which frequency bands the master device knows to be available or "clear" (col. 13, lines 5-7).

6. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nerses et al. (US 7,639,663) in view of Burchfiel (US 7,483,711) and Mighani et al. (US 2008/0192713) and Moore et al. (US 7,299,042) further in view of Li et al. (US 2007/0213046).

For claim 21, Nerses et al. disclose method and apparatus for dynamic channel access within wireless networks, the method comprising:

dynamically selecting a radio device from the plurality of radio devices (a network node may be dynamically selected to serve as the controller node for the wireless Ad-Hoc network 20 includes a plurality of nodes 10, figure 1, col. 4, lines 45-48, and col. 6, lines 38-40) based on a communication device criteria (if the node is configured as Controller Operation Unrestricted (a communication device criteria means), the node may be selected to serve as the controller, col. 6, lines 51-53); and

assigning a role of a central resource manager to the selected radio device (a network node may be dynamically selected to serve as the controller node (assigning a

Art Unit: 2472

role of a central resource manager means) for the network, col. 6, lines 38-40) to assume responsibility of allocating resource to other cognitive radio devices within the ad hoc network (the primary function of the controller node is to manage resource allocation and route calculations for TDMA circuits (col. 6, lines 28-30), a combination of time block and TDMA frequency channel resources are utilized to allocate TDMA bandwidth, TDMA frequency channel can be assigned to only one pair of communicating nodes during any given time block, multipairs of communicating nodes may each be assigned different frequency channels to enable simultaneous transmissions within that block (allocating resource to other cognitive radio devices within the ad hoc network means), col. 8, lines 27-33).

However, Nerses et al. do not expressly disclose allocating frequency to other radio devices. In an analogous art, Burchfiel disclose allocating frequency to other radio devices (a processor configured to assign receive frequencies to a multiplicity of nodes (allocating frequency to other cognitive radio devices means), col. 26, lines 43-45) within the ad hoc network (for a typical mobile ad hoc networks, nodes usually have 4 to 6 neighbors, col. 19, lines 59-60).

One skilled in the art would recognized the allocating frequency to other radio devices within the ad hoc network, and would have applied Burchfiel's assign receive frequencies to multiplicity of nodes in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Burchfiel's spectrum-adaptive networking in Nerses et al.'s method and apparatus

for dynamic channel access within wireless networks with the motivation being to assign receive frequencies to a multiplicity of nodes (col. 26, lines 43-45).

Nerses et al. in view of Burchfiel do not expressly disclose:

selecting a backup radio device from other one of the radio devices within the ad hoc network by the central resource manager;

periodically communicating a list of vacant frequencies from the central resource manager to the backup radio device; and

transferring the role of the central resource manager to the backup radio device by the central resource manager.

In an analogous art, Mighani et al. disclose:

selecting a backup radio device from other one of the radio devices (each cluster in the mesh network will have a lead node (the central resource manager means) and a back-up node (a backup radio device means), the lead node is active, and the back-up node is in a standby mode, and both the lead and the back-up nodes are considered as members of the next higher level of hierarchy, paragraph [0056], lines 1-6), within the ad hoc network by the central resource manager (mesh network 100 may be implemented using Ah hoc On-Demand Distance Vector (AODV), paragraph [0023], lines 2-4);

transferring the role of the central resource manager to the backup radio device by the central resource manager (the back-up node should normally itself store the same set routing and other active connections information stored in the lead node so that, in case of failure of the lead node, the back-up node assume the role of the failed

Art Unit: 2472

lead node (transferring the role of the central resource manager to the backup radio device by the central resource manager means), and it should be noted that the failed lead node when and if it is restored to being again functional then assume the role of a back-up node and remain in a standby mode, paragraph [0056], lines 13-19).

One skilled in the art would recognized the transferring the role of the central resource manager to the backup radio device by the central resource manager, and would have applied Mighani et al.'s back-up node in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Mighani et al.'s hierarchical mesh network for wireless access in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to have a lead node and a back-up node (paragraph [0056], lines 1-2).

Nerses et al. in view of Burchfiel and Mighani et al. do not expressly disclose periodically communicating a list of vacant frequencies from the central resource manager to the backup radio device. In an analogous art, Moore et al. disclose periodically communicating a list of vacant frequencies from the central resource manager to the backup radio device (the master device may transmit a local beacon signal to inform other devices (one of other devices can be the backup cognitive radio device means) of the present of the network and its availability, and additionally, this local beacon signal may include information on which frequency bands the master device knows to be available or "clear" (a list of vacant frequencies from the central resource manager means), col. 13, lines 2-7).

One skilled in the art would recognized the periodically communicating a list of vacant frequencies from the central resource manager to the backup radio device, and would have applied Moore et al.'s master device in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Moore et al.'s common signaling method and apparatus in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to include information on which frequency bands the master device knows to be available or "clear" (col. 13, lines 5-7).

Furthermore, Nerses et al. in view of Burchfiel and Mighani et al. and Moore et al. do not expressly disclose an ad hoc network comprising of cognitive radio devices. In an analogous art, Li et al. disclose an ad hoc network comprising of cognitive radio devices (a cognitive wireless network communication 100 can comprises a plurality of nodes, such as one or more base stations 102 (e.g., cellular, WiFi or ad hoc) in one or more sectors that receive, transmit, repeat, etc. wireless communication signals to each other and/or to one or more other nodes, such as mobiles devices (an ad hoc network comprising of cognitive radio devices means)(figure 1, paragraph [0053], lines 1-8).

One skilled in the art would recognized the ad hoc network comprising of cognitive radio devices, and would have applied Li et al.'s cognitive mobile device in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Li et al.'s cognitive communications in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to receive, transmit, repeat, etc.

wireless communication signals to each other and/or to one or more other nodes, such as mobiles devices (paragraph [0053], lines 6-8).

For claim 22, Nerses et al. in view of Burchfiel disclose further comprising:

determining frequency utilization of cognitive radio devices within the ad hoc network by the central resource manager (a combination of time block and TDMA frequency channel resources are utilized to allocate TDMA bandwidth, TDMA frequency channel can be assigned to only one pair of communicating nodes during any given time block, multipairs of communicating nodes may each be assigned different frequency channels to enable simultaneous transmissions within that block (determining frequency utilization of cognitive radio devices within the ad hoc network by the central resource manager means), col. 8, lines 27-33);

maintaining a database based on the determined frequency utilization by the central resource manager (the database of each node 10 (nodes 11, 30, 40) maintains information enabling that node to determine appropriate paths for routing messages through the network, col. 6, lines 12-15).

receiving a frequency allocation request from a first cognitive radio device moving within the ad hoc network by the central resource manager (upon receipt of a TDMA circuit set-up request from a network node, the controller node attempts to determine a route with sufficient resource to support the requested TDMA circuit between the originating or source node and a designated destination node 40, col. 10, lines 51-56);

allocating a frequency to the first cognitive radio device in response to the

Art Unit: 2472

received frequency allocation request by the central resource manager (TDMA frequency channel can be assigned (allocating a frequency means) to only one pair of communicating nodes during any given time block, col. 8, lines 29-31); and updating the database to remove the allocated frequency from the frequencies (if an entry is removed, the associated resources are released and the block allocation and channel allocation tables are updated accordingly, col. 11, line 67 to col. 12, line 3).

However, Nerses et al. in view of Burchfiel and Mighani et al. do not expressly disclose vacant frequencies based on the determined frequency utilization by the central resource manager. In an analogous art, Moore et al. disclose vacant frequencies based on the determined frequency utilization by the central resource manager (the master device may transmit a local beacon signal to inform other devices of the present of the network and its availability, and additionally, this local beacon signal may include information on which frequency bands the master device knows to be available or “clear” (vacant frequencies based on the determined frequency utilization by the central resource manager means), col. 13, lines 2-7).

One skilled in the art would recognize the vacant frequencies based on the determined frequency utilization by the central resource manager, and would have applied Moore et al.’s master device in Nerses et al.’s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Moore et al.’s common signaling method and apparatus in Nerses et al.’s method and apparatus for dynamic channel access within wireless networks with the motivation

being to include information on which frequency bands the master device knows to be available or “clear” (col. 13, lines 5-7).

7. Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nerses et al. (US 7,639,663) in view of Smith et al. (US 7,400,888) further in view of Li et al. (US 2007/0213046).

For claim 12, Nerses et al. disclose method and apparatus for dynamic channel access within wireless networks, comprising:

at least one transceiver (the communication portion of a node 10 includes a transmitter 22, receiver 24, figure 3, transmitter 22 and receiver 24, col. 5, lines 49-50) for communicating with other radio devices within the ad hoc network (wireless Ad-Hoc network 20 includes a plurality of nodes 10, a portion of network 10 may serve as source nodes 30 while other network nodes 10 may serve as destination nodes 40 to receive transmitted data from the source nodes, figure 1, col. 4, lines 49-52);

a processor (a processor 26, figure 3, col. 5, line 50) for determining resource capability of the radio device (initially, each network device includes a controller node 11 (FIGS. 1-2) to manage resource and route assignment for TDMA operation (determining resource capability means), col. 6, lines 36-38) to dynamically select the radio device to assign a role of a central resource manager based on the determined resource capability (a network node may be dynamically selected to serve as the controller node, col. 6, lines 38-40);

wherein the processor assigns the role of the central resource manager to the radio device (a network node may be dynamically selected to serve as the controller

node (the role of the central resource manager means), col. 6, lines 38-40) when the radio device has a desired resource capability (a desired resource capability to perform frequency allocation management means), col. 6, lines 36-38) to perform frequency allocation management in the ad hoc network (the primary function of the controller node is to manage resource allocation and route calculations for TDMA circuits (col. 6, lines 28-30), a combination of time block and TDMA frequency channel resources are utilized to allocate TDMA bandwidth, TDMA frequency channel can be assigned to only one pair of communicating nodes during any given time block, multipairs of communicating nodes may each be assigned different frequency channels to enable simultaneous transmissions within that block (perform frequency allocation management in the ad hoc network means), col. 8, lines 27-33); and

a memory for maintaining a database in the ad hoc network (the database of each node 10 (e.g., nodes 11, 30, 40) maintains information enabling that node to determine appropriate paths for routing messages through the network, col. 6, lines 12-15).

However, Nerses et al. do not expressly disclose a memory for maintaining a database including vacant frequencies. In an analogous art, Smith et al. disclose a memory for maintaining a database including vacant frequencies (each node compiles a list of preferred frequencies (a database including vacant frequencies means) for use, figure 9, col. 10, lines 21-22).

One skilled in the art would recognized the memory for maintaining a database including vacant frequencies, and would have applied Smith et al.'s list of preferred

Art Unit: 2472

frequencies in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Smith et al.'s distributed multi-beam wireless system in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to provide each node a list of preferred frequencies for use (col. 10, lines 21-22).

Furthermore, Nerses et al. in view of Smith et al. do not expressly disclose cognitive radio devices within the ad hoc network. In an analogous art, Li et al. disclose cognitive radio devices within the ad hoc network (a cognitive wireless network communication 100 can comprises a plurality of nodes, such as one or more base stations 102 (e.g., cellular, WiFi or ad hoc) in one or more sectors that receive, transmit, repeat, etc. wireless communication signals to each other and/or to one or more other nodes, such as mobiles devices (cognitive radio devices within the ad hoc network means)(figure 1, paragraph [0053], lines 1-8).

One skilled in the art would recognized the cognitive radio devices within the ad hoc network, and would have applied Li et al.'s cognitive mobile device in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Li et al.'s cognitive communications in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to receive, transmit, repeat, etc. wireless communication signals to each other and/or to one or more other nodes, such as mobiles devices (paragraph [0053], lines 6-8).

For claim 13, Nerses et al. disclose wherein the resource capability is based on at least one of number of transceivers on the cognitive radio device (the communication portion of a node 10 includes a transmitter 22, a receiver 24 (at least one of number of transceivers on the cognitive radio device means), col. 5, lines 49-50), or an amount of memory on the cognitive radio device, or an amount of network traffic being serviced by the cognitive radio device (the database (an amount of memory on the cognitive radio device means) of each node 10 (nodes 11, 30, 40) maintains information enabling that node to determine appropriate paths for routing messages through the network (or an amount of network traffic being serviced by the cognitive radio device means), col. 6, lines 12-15).

For claim 14, Nerses et al. disclose wherein the processor (a processor 26, figure 3, col. 5, line 50) determines frequency utilization of other cognitive radio devices within the ad hoc network when the processor assigns the cognitive radio device, the role of the central resource manager (a combination of time block and TDMA frequency channel resources are utilized to allocate TDMA bandwidth, TDMA frequency channel can be assigned to only one pair of communicating nodes during any given time block, multipairs of communicating nodes may each be assigned different frequency channels to enable simultaneous transmissions within that block (determines frequency utilization of other cognitive radio devices within the ad hoc network means), col. 8, lines 27-33).

For claim 15, Nerses et al. disclose wherein the at least one transceiver (a transmitter 22 and a receiver 24 (transceiver means), figure 3, col. 5, lines 49-50) receives a frequency allocation request from a first cognitive radio device moving within

the ad hoc network (upon receipt of a TDMA circuit set-up request from a network node, the controller node attempts to determine a route with sufficient resource to support the requested TDMA circuit between the originating or source node and a designated destination node 40, col. 10, lines 51-56).

For claim 16, Nerses et al. disclose wherein the processor (a processor 26, figure 3, col. 5, line 50) processes the frequency allocation request, allocates a frequency to the first cognitive radio device from the database including the vacant frequencies, and updates the database to remove the allocated frequency from the vacant frequencies (TDMA frequency channel can be assigned (allocating a frequency means) to only one pair of communicating nodes during any given time block, col. 8, lines 29-31).

For claim 17, Nerses et al. disclose wherein the at least one transceiver (a transmitter 22 and a receiver 24 (transceiver means), figure 3, col. 5, lines 49-50) receives a frequency de-allocation request from the first cognitive radio device departing from the ad hoc network (the controller node creates a resource deallocation packet, and this deallocation packet replaces the resource allocation packet associated with the TDMA circuit means, col. 16, lines 16-20).

For claim 18, Nerses et al. disclose wherein the processor (a processor 26, figure 3, col. 5, line 50) processes the de-allocation request, deallocates the frequency from the first cognitive radio device (the controller node creates a resource deallocation packet, and this deallocation packet replaces the resource allocation packet associated with the TDMA circuit means, col. 16, lines 16-20), and updates the database including the vacant frequencies to reflect the de-allocated frequency (if an entry is removed, the

associated resources are releases and the block allocation and channel allocation tables are updated accordingly (col. 11, line 67 to col. 12, line 3).

8. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nerses et al. (US 7,639,663) in view of Smith et al. (US 7,400,888) and Li et al. (US 2007/0213046) and Mighani et al. (US 2008/0192713) further in view of Moore et al. (US 7,299,042).

For claim 19, Nerses et al. in view of Smith et al. and Li et al. do not expressly disclose wherein the processor selects a backup cognitive radio device from other one of the cognitive radio devices within the ad hoc network and periodically communicates a list of vacant frequencies from the central resource manager to the backup cognitive radio device.

In an analogous art, Mighani et al. disclose wherein the processor selects a backup cognitive radio device from other one of the cognitive radio devices within the ad hoc network (each cluster in the mesh network will have a lead node and a back-up node (a backup cognitive radio device means), the lead node is active, and the back-up node is in a standby mode, and both the lead and the back-up nodes are considered as members of the next higher level of hierarchy, paragraph [0056], lines 1-6), within the ad hoc network (mesh network 100 may be implemented using Ad hoc On-Demand Distance Vector (AODV), paragraph [0023], lines 2-4).

Mighani et al. disclose wherein the processor transfers the role of the central resource manager to the backup cognitive radio device when the central resource manager departs from the ad hoc network (the back-up node should normally itself

Art Unit: 2472

store the same set routing and other active connections information stored in the lead node so that, in case of failure of the lead node, the back-up node assume the role of the failed lead node (transfers the role of the central resource manager to the backup cognitive radio device means), and it should be noted that the failed lead node when and if it is restored to being again functional then assume the role of a back-up node and remain in a standby mode, paragraph [0056], lines 13-19 as set forth in claim 20).

One skilled in the art would recognized the processor transfers the role of the central resource manager to the backup cognitive radio device when the central resource manager departs from the ad hoc network, and would have applied Mighani et al.'s back-up node in Nerses et al.'s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Mighani et al.'s hierarchical mesh network for wireless access in Nerses et al.'s method and apparatus for dynamic channel access within wireless networks with the motivation being to have a lead node and a back-up node (paragraph [0056], lines 1-2).

However, Nerses et al. in view of Smith et al. and Mighani et al. do not expressly disclose periodically communicates a list of vacant frequencies to the backup cognitive radio device. In an analogous art, Moore et al. disclose periodically communicates a list of vacant frequencies to the backup cognitive radio device (the master device may transmit a local beacon signal to inform other devices (one of other devices can be the backup cognitive radio device means) of the present of the network and its availability, and additionally, this local beacon signal may include information on which frequency

Art Unit: 2472

bands the master device knows to be available or “clear” (a list of vacant frequencies means), col. 13, lines 2-7).

One skilled in the art would recognized the periodically communicates a list of vacant frequencies to the backup cognitive radio device, and would have applied Moore et al.’s master device in Nerses et al.’s resource allocation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Moore et al.’s common signaling method and apparatus in Nerses et al.’s method and apparatus for dynamic channel access within wireless networks with the motivation being to include information on which frequency bands the master device knows to be available or “clear” (col. 13, lines 5-7).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TOAN D. NGUYEN whose telephone number is (571)272-3153. The examiner can normally be reached on M-F (7:00AM-4:30PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, William Trost can be reached on 571-272-7872. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2472

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/T. D. N./

Examiner, Art Unit 2472

/William Trost/

Supervisory Patent Examiner, Art Unit 2472