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(54) **Title:** TECHNIQUES FOR MANAGEMENT OF SHARED RESOURCES IN WIRELESS MULTI-COMMUNICATION DEVICES

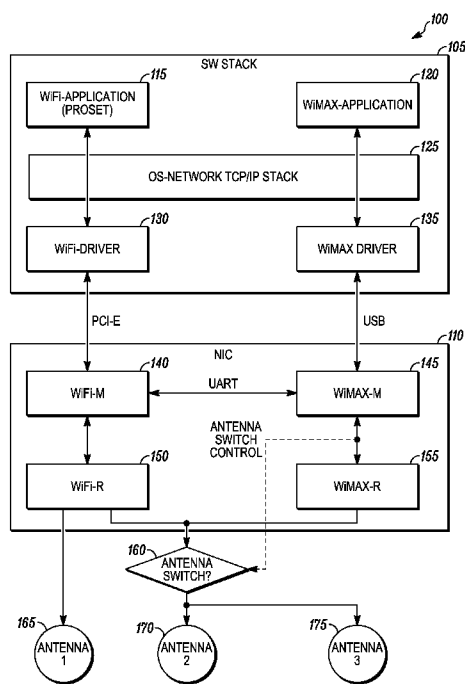


FIG. 1

(57) **Abstract:** An embodiment of the present invention provides an apparatus, comprising a network adapter configured for wireless communication using more than one technology, and wherein the network adapter is configured to share a plurality of shared hardware components by limiting access to the air to one comm only at given time by designating one comm that owns the shared hardware components as a primary comm and all other comms are secondary comms, wherein the primary comm allows the secondary comms to use the shared hardware components when it is in an idle-state but when the primary comm returns from the idle state, it claims ownership of the shared resources and the secondary comms release the shared resources.



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**AMENDED CLAIMS****received by the International Bureau on 17 February 2010 (17.02.2010)****1. An apparatus, comprising:**

a network adapter configured for wireless communication over a wireless transmission medium using more than one wireless communication protocol;  
and

wherein said network adapter is configured to share a plurality of shared hardware components by limiting access to the wireless transmission medium to one communication protocol only at given time by designating one communication protocol that is assigned to the shared hardware components as a primary communication protocol and all other communication protocol are assigned as secondary communication protocols, wherein said primary communication protocol allows said secondary communication protocols to use said shared hardware components when the primary communication protocol is in an idle-state, and wherein when said primary communication protocol returns from said idle state, the primary communication protocol is configured to claim ownership of said shared resources and said secondary communication protocols are configured to be released from said shared resources,

wherein said idle-state is a state where a communication protocol does not need the shared resources in order to maintain an association to the communication protocol.

**2. The apparatus of claim 1, wherein said primary communication protocol is a WiMAX communication protocol and said secondary communication protocol is a WiFi communication protocol.**

**3. The apparatus of claim 2, wherein said WiFi communication protocol is configured to use a WiMAX communication protocol idle time for said WiFi communication protocol to scan for available networks and thereafter provide an application layer with the available scan list to allow applications to apply a WiFi profile to thereby create a WiFi connection without causing said WiMAX**

communication protocol to break a connection.

4. The apparatus of claim 3, wherein when said WiMAX communication protocol is associated during a WiMAX idle-state, before going to idle, said WiMAX communication protocol is configured to send a message including "WiMAX=INACTIVE, priority=idle" to said WiFi communication protocol.

5. The apparatus of claim 3, wherein, when said WiFi communication protocol is unassociated and the WiFi communication protocol is arranged to scan for available WiFi networks, to send a request to an associated WiFi driver which is configured to maintain an internal un-associated scan schedule, and to wake up for said scan request and indicates priority of unassociated scan, according to the scan request type.

6. The apparatus of claim 5, wherein said network adapter is configured to perform priority resolution and configured to check whether each is entitled for radio ownership and after said WiFi communication protocol has started scanning, the WiFi communication protocol is configured to be interrupted by a WiMAX communication protocol listen action when the WiMAX communication protocol is arranged to wake up as part of the WiMAX idle associated state.

7. An method, comprising:  
configuring a network adapter for wireless communication over a wireless transmission medium using more than one wireless communication protocol;  
and

configuring said network adapter to share a plurality of shared hardware components by limiting access to the wireless transmission medium to one communication protocol only at given time by designating one communication protocol that is assigned the shared hardware components as a primary communication protocol and all other communication protocols are secondary communication protocols, wherein said primary communication protocol allows said secondary communication protocol to use said shared hardware components when the primary communication protocol is in an idle-state, and wherein when said primary

communication protocol returns from said idle state, the primary communication protocol is configured to claim ownership of said shared resources and said secondary communication protocols are configured to be released said shared resources,

wherein said idle-state is a state where a communication protocol does not need the shared resources in order to maintain an association to the communication protocol.

8. The method of claim 7, wherein said primary communication protocol is a WiMAX communication protocol and said secondary communication protocol is a WiFi communication protocol.

9. The method of claim 8, further comprising using, by said WiFi communication protocol, a WiMAX communication protocol idle time for said WiFi communication protocol to scan for available networks and thereafter provide an application layer with the available scan list and to allow applications to apply a WiFi profile to thereby create a WiFi connection without causing said WiMAX communication protocol to break a connection.

10. The method of claim 9, further comprising associating said WiMAX communication protocol during a WiMAX idle-state and, before going to the idle-state, said WiMAX communication protocol is configured to send a message including "WiMAX=INACTIVE, priority=idle" to said WiFi communication protocol.

11. The method of claim 10, wherein, when said WiFi communication protocol is unassociated and the WiFi communication protocol is arranged to scan for available WiFi networks, the WiFi communication protocol is configured to send a request to an associated WiFi driver that is configured to maintain an internal un-associated scan schedule, to wake up for said scan request and to indicate priority of unassociated scan, according to the scan request type.

12. The method of claim 11, further comprising performing priority resolution and checking whether each is entitled for radio ownership by said network

adapter and after said WiFi communication protocol has started scanning, wherein the WiFi communication protocol is arranged to be interrupted by a WiMAX listen action when the WiMAX communication protocol wakes up as part of the WiMAX idle associated state.

13. An article comprising a storage medium having stored thereon instructions, that, when executed by a computing platform, results in configuring a network adapter for wireless communication over a wireless transmission medium using more than one wireless communication protocol; and

configuring said network adapter to share a plurality of shared hardware components by limiting access to the wireless transmission medium to one communication protocol only at given time by designating one communication protocol that is assigned the shared hardware components as a primary communication protocol and all other communication protocol are secondary communication protocol, wherein said primary communication protocol is configured to allow said secondary communication protocol to use said shared hardware components when the primary communication protocol is in an idle-state, and wherein when said primary communication protocol returns from said idle state, the primary communication protocol is configured to claim ownership of said shared resources and said secondary communication protocols are configured to be released said shared resources,

wherein said idle-state is a state where a communication protocol does not need the shared resources in order to maintain an association to the communication protocol.

14. The article of claim 13, wherein said primary communication protocol is a WiMAX communication protocol and said secondary communication protocol is a WiFi communication protocol.

15. The article of claim 14, comprising further instructions that when executed further comprise using, by said WiFi communication protocol, WiMAX communication protocol idle time for said WiFi communication protocol to scan for available networks and thereafter provide an application layer with the available scan

list and allows applications to apply a WiFi profile to thereby create a WiFi connection without causing said WiMAX communication protocol to break a connection.

16. The article of claim 15, comprising further instructions that when executed further comprise associating said WiMAX communication protocol during the idle-state and, before going to the idle-state, said WiMAX communication protocol sending a message including "WiMAX=INACTIVE, priority=idle" to said WiFi communication protocol.

17. The article of claim 15, wherein when said WiFi communication protocol is unassociated and is arranged to scan for available WiFi networks, the WiFi communication protocol is configured to send a request to an associated WiFi driver which maintains an internal un-associated scan schedule, said WiFi communication protocol is arranged to wake up for said scan request and to indicate priority of unassociated scan, according to the scan request type.