

link provided by the underlying MAC+physical layer, and the establishment and maintenance of logical point-to-point connections over the shared data link, and/or the provision of acknowledgements for individual messages, on behalf of those network protocols needing such connection-oriented or acknowledged connectionless services, as is well-known in the art.

[0019] Medium Access Control 220 performs the channel access function, which ensures that only one station at a time can transmit signals onto the shared-communications channel, as well as frame addressing and detection, the generation and checking of frame check sequences, and LLC protocol data unit delimiting. In addition, Medium Access Control may provide additional services including encryption, authentication, and QoS provisioning, as well as related, non-communication functions such as power management, as is well-known in the art.

[0020] Physical Control 230 administers the physical transmission of signals to other stations and the physical receipt of signals from other stations via the network medium (e.g., radio, Ethernet, etc.), as is well-known in the art.

[0021] FIG. 3 depicts a conceptual architectural diagram of a wireless station in accordance with the illustrative embodiment of the present invention. As shown in FIG. 3, Medium Access Control 220 is partitioned into Upper Medium Access Control 310 and Lower Medium Access Control 320. Upper Medium Access Control 310 provides a subset of medium-access-control services that are independent of Physical Control 230, including transmit queueing, encryption, decryption, authentication, association, re-association, scanning, distribution, and traffic categorization (for the purposes of, for example but without limitation, quality-of-service (QoS) provisioning), as is well-known in the art. The Upper Medium Access Control may also perform those functions within MAC data service and MAC management service that are independent of Physical Control 230, including power management, queue management, duplicate detection and filtering, fragmentation, defragmentation, queue management.

[0022] Lower Medium Access Control 320 provides remaining medium-access-control services (i.e., those that are dependent on Physical Control 230), including channel access, receive validation (e.g., frame control sequence, forward error correction, etc.), and those that involve hard real-time functions and/or are physical layer-implementation dependent, such as response control (e.g., clear-to-send [CTS], acknowledgement [ACK], etc.), as are well-known in the art.

[0023] There are four criteria for determining which functions belong to lower medium access control 320:

- [0024] i. Functions that are specific to a given physical layer or given type of physical layer;
- [0025] ii. Functions that require knowledge of the internal state of the physical layer or knowledge of implementation-specific operational characteristics of the physical layer;
- [0026] iii. Hard real-time functions necessary to generate conformant communication (signaling) sequences as viewed on the (wireless) medium; and

[0027] iv. Particular other functions that “belong” in the Lower Medium Access Control because of general implementation considerations, or because a party with sufficient clout (e.g., Microsoft, etc.) wants them to be there.

[0028] As shown in FIG. 3, Upper Medium Access Control 310 outputs data to Lower Medium Access Control 320 via path 311, and receives data from Lower Medium Access Control 320 via path 312. Similarly, Lower Medium Access Control 320 outputs data to Physical Control 230 via path 221, and receives data from Physical Control 230 via path 222. In some embodiments these two, logical paths may be multiplexed onto a single electrical or optical interconnection.

[0029] FIG. 4 depicts data-flow diagram 400 for the illustrative embodiment of the present invention. As shown in FIG. 4, Upper Medium Access Control 310 receives a service data unit (service data unit-1) from Logical Link Control 210; performs the appropriate functions with respect to service data unit-1 in accordance with the requested service (i.e., functions without hard real-time constraints and independent of Physical Control 230), as is well-understood in the art; generates a protocol data unit (protocol data unit-1); and outputs protocol data unit-1, accompanied in some cases by control information (e.g. desired transmit data rate and/or modulation, packet lifetime or retry limits, transmission priority, etc.) to Lower Medium Access Control 320. Lower Medium Access Control 320 receives protocol data unit-1 as a service data unit (service data unit-2); performs the appropriate functions with respect to service data unit-2 in accordance with the requested service (i.e., functions with hard real-time constraints and/or dependent on Physical Control 230); generates protocol data unit protocol data unit-2; and outputs protocol data unit-2 and associated control information (e.g. channel selection, modulation type, preamble length, etc.) to Physical Control 230.

[0030] Physical Control 230 transmits an outgoing signal based on protocol data unit2 and receives an incoming signal (e.g., acknowledgement [ACK], etc.), as is well-known in the art, and outputs data and reception status (e.g. received signal strength, signal quality, modulation utilized by sender, etc.) based on the incoming signal to Lower Medium Access Control 320. Lower Medium Access Control 320 receives the outputted data from Physical Control 230 as protocol data unit protocol data unit-3; performs the appropriate functions with respect to protocol data unit-3 and associated reception status in accordance with the indicated service; generates service data unit service data unit-3; and outputs service data unit-3 to Upper Medium Access Control 310. Upper Medium Access Control 310 receives service data unit-3 from Lower Medium Access Control 320 as protocol data unit protocol data unit-4; performs the appropriate functions with respect to protocol data unit-4 in accordance with the indicated service; generates service data unit service data unit-4; and outputs service data unit-4 to Logical Link Control 210.

[0031] FIG. 5 depicts a block diagram of the salient components of Upper Medium Access Control 310 in accordance with the illustrative embodiment of the present invention. As depicted in FIG. 5, Upper Medium Access Control 310 comprises circuitry 510, memory 520, and circuitry 530,