IEEE P802.11
Wireless LANs

MAC-PHY Service Primitives
Proposed Starting Point Text for Section 6 of Document P802.11/20

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Author: by Larry Van Der Jagt
Knowledge Implementations, Inc.
32 Conklin Road
Warwick, NY 10990
Voice: 914-986-3492
FAX: 914-986-6441
EMail kiilvdj@attmail.com

This document provides information and wording that the author believes can form a workable starting point for Section 6 of the IEEE 802.11 Draft Standard.6 PhL-MAC(DLL) Service Specification. The reader should note that the IEC/ISA Fieldbus Data Link Protocol Specification is liberally used as the basis for this work.

This document is intended to provide for layering that is consistent with ISO 7498 that requires that the (N+1)layer entity (the MAC sublayer of the Data Link Layer in this case) not be concerned with, and that an (N)-service interface (the Medium Independent Sublayer of the Physical Layer in this case) not overly constrain, the means by which the (N)-layer provides its (N)-services. Thus the Ph-service interface does not require the Data Link Entity (DLE)to be aware of internal details of the Physical Entity (PhE) such as preamble, postamble and frame delimiters and should not prevent the PhE from using appropriate evolving technologies.

Note that this work provides for three Service Access Points. One for the basic data transport service, one for the exchange of parameteric information between the PhE and the DLL on a frame-by-frame basis and one for the transport of Layer Management Information.

The work will be broken up into several sections. The first deals with putting words to items already in document 20. Namely, the primitives that exist for the purposes of transmitting data. This section appears in this submission. Subsequent sections will deal with primitives that exist for the purposes of optimizing the probability of successful data transfer and for the support of multiple PhE types. This work will be the subject of other submissions.

Primitives That Exist for Data Transfer

Outline

6.1 Overview of Ph-Services (PhS)

6.2 Detailed Service Specification

6.1 Overview of Ph-Services:

6.1.1 General Description of Services Provided

The interface specification proposed provides the following basic services.

1) Transfer Physical Layer Interface Data Units (PhIDUs) between DLL and   Ph-Layer in a manner consistent with ISO 7498

2) This specification is intended to insure interoperability between conformant stations of the same Physical Layer type

3) The intention is to support a variety of different Ph's, using a common medium independent interface, there are three Ph types currently in active work: Direct Sequence Spread Spectrum (DSSS) in the 2.54 GHz ISM Band, Frequency Hopping Spread Spectrum (FHSS) in the 2.54 GHz ISM Band and baseband IR.

4) In addition to PhIDU's, information regarding the characteristics of the receive signal and current state of Ph Control Parameter Vector are passed across the Ph-DLL interface on a frame by frame basis. There is also the capability for the adjustment of transmission parameters by the Data Link Layer on a frame by frame basis. This is in addition to conventional station management information on a per request basis.

6.1.2 Overview of Interactions

The transmission of normal data between PhE's and DLE's takes place via the Physical Service Access Point (PhSAP).

The PhE determines the timing of all transmissions. When the MAC Entity (ME) has a MAC protocol data unit (MPDU) to transmit and the MAC protocol gives the MAC entity (ME) the right to transmit the ME shall send the MPDU including the concatenated FCS by making a sequence of PHY-DATA.requests. This sequence of requests consists of a single request specifying START-OF-ACTIVITY, followed by xxx to yyy (minimum and maximum packet sizes to be determined) consecutive requests specifying data, and concluded by a single request specifying END-OF-DATA-AND-ACTIVITY.

The Ph-Entity (PhE) signals its completion of each Ph-DATA.request and its readiness to accept a new Ph-DATA.request with a PHh-DATA.confirmation primitive. A second Ph-DATA.request should not be issued until the Ph-DATA.confirmation corresponding to the first request has been received from the PhE.

The PhE reports, using the data service access point (DSAP), a received transmission with a sequence of Ph-DATA.indications which shall consist of:

a) a single indication specifying START-OF-ACTIVITY, followed by consecutive indications specifying DATA, followed by a single indication specifying END-OF-DATA, and concluded by a single indication specifying END-OF-ACTIVITY.

b) a single indication specifying START-OF-ACTIVITY, followed by consecutive indications specifying DATA, followed by a single indication specifying END-OF-DATA-AND-ACTIVITY.

or,

c) a single indication specifying START-OF-ACTIVITY optionally followed by one or more consecutive indications specifying DATA, and concluded by a single indication specifying END-OF-ACTIVITY (note: this last sequence is indicative of an incomplete or incorrect reception).

In addition, the PhE reports, using the signal parameter vector a set of PhE-specific parameters (for instance, signal quality, channel used, received signal strength etc.), using the Physical Parameter Service Access Point (PhPSAP). This reporting is synchronous with the reporting of the data on a frame by frame basis. In addition, when requested by station management, information on the managed objects will be reported by the PhE through the Layer Management Service Access Point (LMSAP).

6.1.3 Basic Service and Options

PhEs shall support the transfer of MAC Protocol Data Units (MPDU).
PhEs shall support a single channel. Support of additional channels is optional. If more than one channel is implemented, the MAC will be informed about the number of channels and the channel in use through the use of the PSAP. The MAC will be able to change channels using the PSAP.

PhEs shall support a single level of transmit power. Support of additional levels is optional. If more than one level is implemented, the MAC will be informed about the number of levels and the level in use through the use of the PSAP. The MAC will be able to change transmit power levels using the PSAP.

PhEs shall report the received signal strength relative to one threshold level. Support of additional thresholds is optional. If more than one threshold is implemented, the MAC will be informed about the number of thresholds, the value of the threshold, through the use of the PSAP. The MAC will be able to change channels using the PSAP.

PhEs shall implement a jabber control function. (Note: the need for an indication of a jabber control condition to the MAC is to be determined later).

6.2 Detailed Service Specification

6.2.1 Ph_DATA.request (class, data)

The parameter **class** specifies the Ph-interface control information component of the Ph-Interface Data Unit (PhIDU). Its possible values are:

START-OF-ACTIVITY - transmission of PhPDU's which precede Ph-User data should commence (i.e. start sending preamble and Ph-headers)

DATA - the single octet value of indicating data transfer

END-OF-DATA-AND-ACTIVITY - the PhPDU that terminates the transmission Ph-user data should be transmitted after the last preceding Ph-user data, culminating in the cessation of active transmission.

The parameter **data** specifies the PHY Interface Data component of the PHhIDU. It consists of one octet of PHY user data to be transmitted.

6.2.2 PHY_data.indication (class, data)

The parameter **class** specifies the Ph-Interface control information component of the Ph-Interface Data Unit. Its possible values are:

START-OF-ACTIVITY - reception of an apparent transmission from one or more PhEs has commenced

DATA- specifies that the associated data parameter was received as part of a continuous correctly formed reception

END-OF-DATA - the ongoing continuous correctly formed reception of Ph-user data has concluded with correct reception of PhPDU implying end of data

END-OF-ACTIVITY- the ongoing reception (of an apparent transmission from one or more PHYEs) has concluded, with no further evidence of PhE transmission

END-OF-DATA-AND-ACTIVITY - the simultaneous occurrence of end of data and activity

The parameter **data** specifies the Ph-Interface data component of the PhIDU. It consists of one octet of Ph-user data that was received successfully.

6.2.3 Ph-DATA.confirm (status)

The parameter status specifies either success or the locally detected reason for inferring failure. Ph-DATA.confirm provides the critical timing feedback necessary to inhibit the MAC from starting a second transmission before the first is completed. The final Ph_DATA.confirmation should not be issued until the PhE has completed the current transmission.

This concludes this submission future submissions will deal with the service primitives for the parameter service access point and Layer management access point.