

PROJECT 802 - LOCAL & METROPOLITAN AREA NETWORKS

**IEEE P802.11 Working Draft Standard
Wireless LAN Medium Access Control (MAC)
and
Physical Layer (PHY) Specifications**

Prepared by:
The Editors of IEEE 802.11

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Abstract: (The abstract will be prepared by IEEE staff.)

Keywords:

Note: This is an internal working document of the IEEE 802.11 Working Group on Wireless Medium Access Control and Physical Layer. As such, it is not a standard and may be changed as a result of further work by IEEE 802.11.

Foreword

(This foreword is not part of the Proposed Standard P802.11, Wireless MAC and PHY)

This standard is part of a family of standards for Local Area Networks (LANS).....

The following are now or have been voting members of the Wireless Medium Access Control and Physical Layer Working Group (P802.11). Those individuals who have served as editors are indicated by an asterisk next to their name:

Chair's Name, *Chair*

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Major Changes Since: November 1992

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- 1.3 Abbreviations - SAP
- 1.4 References - ISO 7498
- 1.6 Conventions - options - Issue 1.4

*** Section 2:**

- 2.1 Reference Model - 'boiler plate' statement leading the reference model
- 2.2 Distribution System Services - Issue 5.1

*** Section 3:**

- 3.1.1.1 Time-bounded Services - Issue 15.10

*** Section 8:**

- 8.2 Exposed DTE/DCE Interface - Issue 12.2A

(Editor's note: This section is based on Doc.:P802.11-92/4 and input from L. Van Der Jagt)

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Wireless Medium Access Control and Physical Layer Specification

1. General

1.1 Purpose

1.2 Definitions

(Editor's note: Extracted from P802.11-92/57 doc., otherwise indicated in each definition)

access point (AP). Any entity that has station functionality and provides access to the distribution system.

authentication. A higher layer process by which one station convinces other stations of its 'identity'.

basic service area (BSA). The area within which members of a basic service set can communicate.

basic service set (BSS). A set of stations controlled by a single coordination function.

channel. (Editor's note - From work done by the PHY Group in 07/92) - An instance of medium use for the purpose of passing packet data units that can coexist with other instances of medium use.

Example	<u>single channel</u>	<u>n-channel</u>
	1 narrowband channel	FDM channels
	DSS with 1 code	DSSS with CDMA

coordination function (CF). That logical function which determines when a station operating within a basic service set transmits and received via the wireless medium.

distributed coordination function (DCF). A class of possible coordination functions where the same coordination function logic is active in every station at any given time.

distribution system (DS). A system used to interconnect a set of basic service sets to create an extended service set.

distribution system medium (DSM). The medium used by a distribution system (for basic service set interconnections).

distribution system services (DSS). The set of services provided by the distribution system which enable the MAC to transport MAC service data units between basic service sets within an extended service set.

extended service area (ESA). The area within which members of an extended service set can communicate. An extended service area is larger or equal to a basic service area.

extended service set (ESS). A set of interconnected basic service sets which appear as a single basic service set to the logical link control (LLC).

MAC service data unit (MSDU). The MAC service data unit is information that is delivered as a unit between MAC service access points.

point coordination function (PCF). A class of possible coordination functions where the coordination function logic is active in only one station at any given time.

registration. A process by which a station gets its 'identity' (address signature, certificates, etc.).

sign-on. The process by which one station identifies (and possibly authenticates) itself, and exchanges operational parameters in order to participate in a basic service set.

Station (STA). Any device which contains an 802.11 conformant MAC and PHY interface to the wireless medium.

Wireless Medium (WM). The medium used to implement a wireless LAN.

1.3 Abbreviations

AP	=	access point
BSA	=	basic service area
BSS	=	basic service set
CF	=	coordination function
DCE	=	data communication equipment
DCF	=	distributed coordination function
DS	=	distribution system
DSM	=	distribution system medium
DSS	=	distribution system services
DTE	=	data terminal equipment
ESA	=	extended service area
ESS	=	extended service set
LLC	=	logical link control
MAC	=	medium access control
MSDU	=	MAC service data unit
PAR	=	project authorization request
PCF	=	point coordination function
PHY	=	physical layer
SAP	=	service access point
STA	=	station
WM	=	wireless medium

1.4 References

[1] ISO 7498:1984, Information Processing Systems - Open Systems Interconnection - Basic Reference Model

1.5 Conformance Requirements

1.6 Conventions

Options. While the need for options within a standard is recognized, only the absolute minimum number of options should be specified. (editor's note: Issue 1.4)

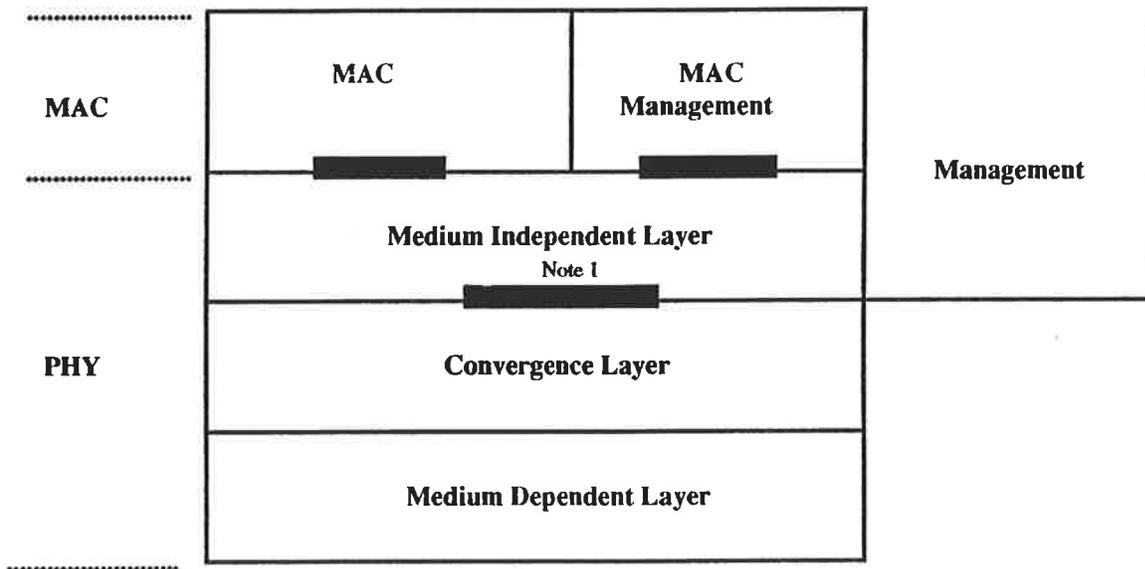
2. General Description

2.1 Reference Model

(editor's note: added as header for the model)

The standard presents the architectural view, emphasizing the separation of the system into two major parts: the MAC of the data link layer and the PHY. These layers are intended to correspond closely to the lowest layers of the ISO Basic Reference Model of OSI (ISO 7498 [1]).

(Editor's note: Model approved as the 'starting point' for further work - 07/92)



Note 1 - Optional exposed DTE/DCE interface

General Overview of the 802.11 MAC and PHY Layers

2.2 Distribution System Services

(editor's note: Issue 5.1)

As stated in the 'Definition' section (1.2) of this document, a distribution system is used to interconnect a set of basic service sets (BSS) to create an extended service set (ESS). The 'interconnection' between basic service sets may be provided by existing installed networks (e.g. LAN, WAN). Therefore, the internal functions of the distribution system (DS) shall not be specified; only the services that a distribution system provides to the WLAN are defined.

3. MAC Service Definition

3.1 Overview of MAC Services

3.1.1 General Description of Services Provided

3.1.1.1 Time-bounded Services

(editor's note: Issue 15.10)

The peer-to-peer Time-bounded services shall be provided at the MAC/LLC boundary (MAC-SAP to MAC-SAP).

3.1.2 Overview of Interactions

3.1.3 Basic Service and Options

3.2 Detailed Service Specification

3.2.1 MA_UNIT_DATA-Request

3.2.2 MA_UNIT_DATA-Indication

3.2.3 Others

4. MAC Protocol Data Unit Structure

5. MAC Sub-layer Functional Description

5.1 MAC Sub-layer Architecture

5.2 MAC States Machines

6. PHY Service Specification

6.1 Overview of PHY Services

6.1.1 General Description of Service Provided

6.1.2 Overview of Interactions

6.1.3 Basic Services and Options

6.2 Detailed Service Specifications

6.2.1 PH_DATA_UNIT-Request

6.2.2 PH_DATA_UNIT-Indication

6.2.3 Others

7. PHY Protocol Data Unit Structure

8. PHY Layer Functional Description

8.1 PHY Layer Architecture

8.2 Exposed DTE-DCE Interface Specification

(editor's note: Issue 12.2A)

The data terminal equipment (DTE) / data communication equipment (DCE) interface is defined as an interface between the PHY medium independent (PMI) and the PHY medium dependent (PMD) layers. An implementation may or may not expose the interface. However, if the DTE/DCE interface is exposed, it must conform to the IEEE 802.11 standard to claim conformance to this standard.

8.3 PHY Layer State Machines

8.3.1 Medium Independent Sub-layer Functions

(Editor's note: From work done by the PHY Group in 07/92)

All PHYs shall support a single channel. Support of additional channel is optional. If more than one channel is implemented a method of informing the MAC about the number of channels, the channel in use and to allow the MAC to change channels will be implemented.

All PHYs shall support a single level of transmit power. Support of additional transmit power levels is optional. If more than one transmit power level is implemented a method of informing the MAC about the number of levels available and the value of these levels and to allow the MAC to modify these levels will be implemented.

All PHYs shall report the status of receive signal strength relative to one threshold. Additional thresholds are optional. If more than one level is supported a method of informing the MAC regarding the number of levels, and the values of these levels will be implemented. The indication of receive power will be delivered on a frame by frame basis.

8.3.2 Convergence Sub-layer Functions

8.3.2.1 GHz ISM Band DSSS Convergence Sub-layer Function

8.3.2.2 Ghz ISM Band FHSS Convergence Sub-layer Function

8.3.2.3 Infrared Convergence Sub-layer Function

8.4 Medium Dependent Sub-layer Functions

8.4.1 GHz ISM Band DSSS Medium Dependent Sub-layer Function

8.4.2 Ghz ISM Band FHSS Medium Dependent Sub-layer Function

8.4.3 Baseband Infrared Medium Dependent Sub-layer Description

Annexes

Annex A Normative Annex

Annex B Informative Annex

Appendices

Appendix - I. Functional Requirements

(Editor's note: this section is extracted from P802.11-92/57)

I.1 Externally Imposed Requirements.

Documents which contain functional requirements that are hereby incorporated as 802.11 functional requirements:

- 802 Functional Requirements (document number P802-91/152).
- 802.11 PAR (P802.11-91/58)
- The 802.11 PAR supersedes the 802 Functional Requirements (P802-91/152) where they conflict.

I.2 General Requirements.

The primary service provided by 802.11 is to deliver MSDUs between LLCs.

Continuity of service to the layers within an ESS will be supported.

The MAC must accommodate any PHY transmission rate between 1 and 20 Mbit/s.

The 802.11 MAC and PHY will support the application described in the 802.11 Market Requirements Document.

Any function or service unique to wireless networks will be handled within the 802.11 standard.

802.11 will support multicast services (including broadcast services).

The standard will support network management services.

I.3 Data Service Types.

802.11 will provide two classes of MSDU delivery service:

- 1) An asynchronous MSDU delivery service.
- 2) a Time-bounded MSDU delivery service.

All 802.11 implementations will support the asynchronous class service.

Stations using the asynchronous and/or time-bounded service must coexist within the same BSS.

I.4 Coordination Functions.

All 802.11 implementations will support a common default coordination function.

There will be a method for dynamically switching from the default coordination function and any other defined coordination function.

9. Layer Management

9.1 Overview of Layer Management Functions

9.2 MAC Sub-layer Management Interface

9.3 PHY Layer Management Interface

10. Medium Definitions

10.1 GHz ISM Band Diffuse Medium Definition

10.1.1 General Purpose Office Environment

10.1.2 Large Geometry Hostile Environment

10.2 GHz ISM Band Directed Medium Definition

10.2.1 General Purpose Office Environment

10.2.2 Large Geometry Hostile Environment

10.3 Directed Infrared Medium Definition

10.4 Diffused Infrared Medium Definition

A single MAC shall be used to support all coordination functions.
There shall be mechanisms defined to resolve medium use conflicts.

I.5 MAC / PHY Interface.

A single MAC will be used to support multiple PHYs.

A single MAC/PHY interface will be defined.

If the MAC/PHY interface is exposed, a conformant implementation must adhere to the defined MAC/PHY interface.

I.6 Security.

The standard shall support registration services.

The standard shall support authentication services.