Proposed Text for Section 4 thru 4.1.2.2,
Based on responses to Draft D1 Letter Ballot processed
at March 1995 Meeting

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Abstract: This paper presents the changes to section 4. thru 4.1.2.2 in the Draft Standard P802.11/D1 as a result of the Response to Draft D1 Letter Ballot processed at the March 1995 Meeting as shown in the companion Documents P802.11-95/65 and P802.11-95/66. Not all Letter Ballot comments were processed at the March 1995 Meeting.

Action: Adopt the changes in this paper to replace the relevent portions of Section 4 of P802.11/D1.

4. Frame and MPDU Formats

4.1. MAC Frame Formats

Each frame shall consist of the following basic components:

a) A *MAC Header*, which comprises~~includes~~ *frame* control~~information~~, *duration*, addressing and ~~,~~sequencing control information~~, fragmentation identification and duration~~.

b) A variable length *Frame Body*, that ~~may~~ contain*s* information specific to *the*~~various~~ frame *types*.

c) An IEEE 32-bit CRC.

4.1.1. General Frame Format

The MAC frame format comprises a set of fields that shall occur in a fixed order in all frames. ~~Some fields may be absent from some frame types.~~

Figure 4-1 depicts the general MAC frame format ~~and field order~~. *The fields that appear shaded are only present in certain frame types. Each field is defined in section 4.1.2. The format of the each of the individual frame types is defined in section 4.2.*~~The format of the MAC header for each of the frame types is defined subsequently. Subsequent sections define each of the fields of the MAC header.~~

A frame is an ordered octet string. The order of transmission of the octets of a frame shall be from left to right.
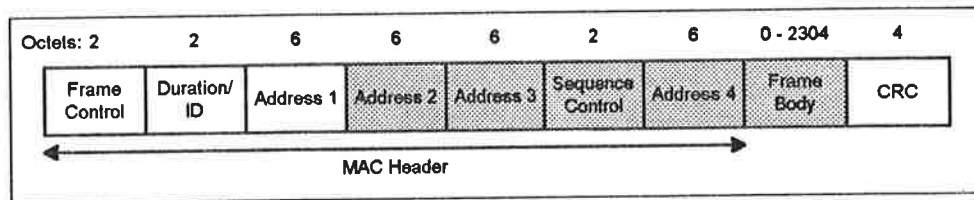
Octets: 2	2	6	6	6	2	6	0 - 2304	4
Frame Control	Duration/ ID	Address 1	Address 2	Address 3	Sequence Control	Address 4	Frame Body	CRC

MAC Header

Figure 4-1: MAC Frame Format

4.1.2. Frame Fields

4.1.2.1. Frame Control Field

The Frame Control field shall consist of the following sub-fields: Protocol Version, Type, Subtype, To DS, From DS, Last Fragment, Retry, Power Management and *WEP*~~Elements Present~~. The remaining subfields in the Frame Control field are reserved. All reserved bits and fields shall be *set to*~~sent as~~ '0'. Reserved bits and fields shall be ignored on reception.

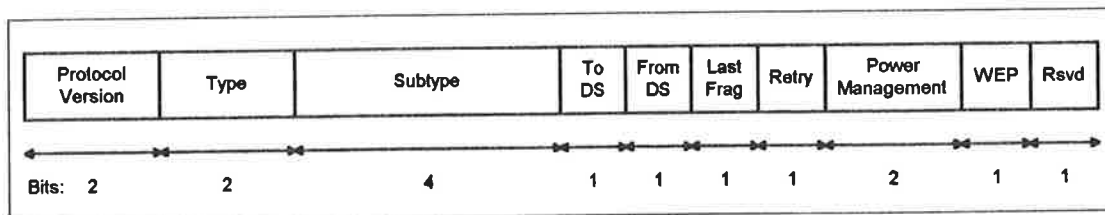| Protocol Version	Type	Subtype	To DS	From DS	Last Frag	Retry	Power Management	WEP	Rsvd
Bits: 2	2	4	1	1	1	1	2	1	1

Figure 4-2: Frame Control Field

4.1.2.1.1.   Protocol Version

The protocol version ~~This two bit~~ *field shall be* *two bits in length and shall be* invariant in size and placement across all revisions of the 802.11 standard. *For this revision of the standard the value of the protocol version shall be 0. All other values are reserved.* ~~The values shall be assigned sequentially starting with the value zero.~~ The revision level shall be incremented only when a fundamental incompatibility exists between *a new revision and this revision of the standard* ~~a lower revision and the current standard~~. A device that receives a frame with a higher revision level than it can understand shall discard the frame *without indication to LLC*.

4.1.2.1.2.   Type and Subtype

The Type field shall be two bits and the Subtype field four bits in length. The Type and Subtype fields shall *together* identify the function ~~and interpretation~~ of *the* ~~a~~ frame. There are three frame types: control, data and management. Each of the frame types ~~may~~ have several *defined* subtypes. The table below *defines* ~~lists~~ the valid combination*s* of Type and Subtype.

Type Value	Type Description	Subtype Value	Subtype Description
00	Management	0000	Association Request
00	Management	0001	Association Response
00	Management	0010	Reassociation Request
00	Management	0011	Reassociation Response
00	Management	0100	Probe Request
00	Management	0101	Probe Response
00	Management	0110	Privacy Request
00	Management	0111	Privacy Response
00	Management	1000	Beacon
00	Management	1001	ATIM
00	Management	1010	Disassociation
00	Management	1011	Authentication
00	Management	1100	Connection Request
00	Management	1101	Grant Connection
00	Management	1110	End Connection
00	Management	1111	Reserved
01	Control	0000-1010	Reserved
01	Control	1011	RTS
01	Control	1100	CTS
01	Control	1101	ACK
01	Control	1110	CF End
01	Control	1111	*PS*-Poll
10	~~Asynchronous~~ Data	0000	Data
10	~~Asynchronous~~ Data	0001	Data + CF-Ack
10	~~Asynchronous~~ Data	0010	Data + CF-Poll
10	~~Asynchronous~~ Data	0011	Data + CF-Ack + CF-Poll
10	~~Asynchronous~~ Data	0100	Null Function (no data)
10	~~Asynchronous~~ Data	0101	CF-Ack (no data)
10	~~Asynchronous~~ Data	0110	CF-Poll (no data)
10	~~Asynchronous~~ Data	0111	CF-Ack + CF-Poll (no data)
10	~~Asynchronous~~ Data	1000-1111	Reserved

| 11 | Reserved | 0000-1111 | Reserved |

Table 4-1: Valid Type/Subtype Combinations

4.1.2.1.3.   To DS

The To DS field shall be one bit in length and shall be set to '1' in Data Type frames destined for the Distribution System. ~~This one bit field shall indicate that the frame is destined for the distribution system in an infrastructure network. This bit shall be transmitted as a one only if the frame Type = Data and the frame is entering the distribution system.~~ It shall be *set to '0' in all other frames*~~transmitted as a zero, otherwise~~.

4.1.2.1.4.   From DS

The From DS field shall be one bit in length and shall be set to '1' in Data Type frames exiting the Distribution System. ~~This one bit field shall indicate that the frame is being distributed from the distribution system in an infrastructure network. This bit shall be transmitted as a one only if the frame Type = Data and the frame is exiting the distribution system.~~ It shall be *set to '0' in all other frames*~~transmitted as a zero, otherwise~~.

The *permitted*~~possible~~ To/From DS bit combinations *and their meaning* are given in ~~the following~~ table *4.2.*~~:~~

To/From DS Values	*Meaning*~~Description~~
To DS = *'0'*~~False~~ From *DS* = *'0'*~~DS False.~~	A *Data* Frame direct from one *STA*~~tation~~ to another *STA*~~tation~~ *within the same BSS.*
To DS = *'1'*~~True~~ From DS = *'0'*~~False~~	Data Frame entering the DS.
To DS = *'0'*~~False~~ From DS = *'1'*~~True~~	Data Frame exiting the DS.
To DS = *'1'*~~True~~ From DS = *'1'*~~True~~	WDS frame being distributed *f*~~From~~ one AP to another AP.

Table 4-2: To / From DS Combinations

4.1.2.1.5.   Last Fragment

The Last Fragment field shall be one bit in length and ~~This one bit field~~ *shall be set to '1' in a frame containing* ~~indicate that this frame is~~ the last fragment of a fragmented MSDU, or the sole fragment of an unfragmented MSDU.

4.1.2.1.6.   Retry

The Retry field shall be one bit in length and ~~This one bit field~~ *shall be set to '1' in a Data Type frame that* ~~indicate that the frame~~ is a retransmission of an earlier frame. A station *shall*~~may~~ use this indication to aid in the process of eliminating duplicate frames.

4.1.2.1.7.   Power Management

The Power Management field shall be two bits in length and ~~The two bit field~~ *shall be used to* indicate the power management state and buffered traffic state of the station. *The value of this field shall remain constant in each frame within a frame sequence defined in section 4.3.* The value ~~sent~~ shall indicate the

state in which the station will be after the completion of the ~~transmission of the~~ frame *sequence*. The *permitted* values for this field *and their meaning* are given in table 4–32.

Value	Description
00	Active Mode (CAM or TAM), with More buffered frames
01	PSP - Power Save, Polling
10	PSNP - Power Save, No Polling
11	Active Mode (CAM or TAM), without More buffered frames

Table 4-3: Power Management Values

~~4.1.2.1.8.   Elements Present~~

~~If a frame's "Elements Present" control field is 1, then the frame body shall include one or more "elements". Certain frame types require that specific elements be present. These are defined in Section 4.2.3.~~

4.1.2.1.8   WEP

The WEP field shall be one bit in length and be set to '1' in a Data Type frame that has a frame body processed by the WEP algorithm. The WEP bit shall be set to '0' in all other frames.

4.1.2.2. Duration/ ~~or Connection~~ ID

The Duration/ID field shall be 16 bits in length. The contents of the this field shall be as follows:

a) *In Data Type frames transmitted during the contention free period that have frame body information associated with a time-bounded connection, the Duration/ID field shall carry the connection identity of the time-bound connection.*

b) *In Control Type frames of SubType PS-Poll, the Duration/ID field shall carry the station identity (SID) of the station that transmitted the frame.*

c) *In all other frames the Duration/ID field shall contain a duration value. For frames transmitted during the contention period the duration value shall be set to the time in microseconds from the end of the current frame to the end of the next anticipated frame of Type Control and Subtype ACK. For frames transmitted during the contention free period the duration value shall be set to 0. The duration value shall be used to update the Net Allocation Vector according to the procedures defined in section 5.*

~~The Duration field is a 16-bit field. It shall be used to distribute a value that shall update the Network Allocation Vector in stations receiving the frame. The duration shall be specified in microseconds. See section 5.xx for details of calculating the value for the duration field. During the contention free period the duration field may be replaced by a connection ID field. (Note: only contention free time-bounded data used a connection ID; contention based data and contention free asynchronous data do not use connection IDs).~~