
IEEE P802.11
Wireless LANs

Comparison of MAC PICS versus WPAN requirements

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Abstract

In this submission we consider a comparison of the MAC portion of the existing IEEE 802.11 PICS as it relates to the requirements of a WPAN application. The intent of this submission is to assist the WPAN SG in understanding how the existing 802.11 MAC can be adapted to work as a MAC for a WPAN.

Discussion

In our investigation of the 802.11 MAC, as it applies to WPAN applications, we concluded that a small number of changes to the 802.11 MAC could be made that would tailor it more closely for meeting the WPAN requirements. These changes include

- Providing stations with the ability to rotate the AP responsibility, including a mechanism that will recognize when an AP is lost
- Adding power management modes to the AP
- Removing the RTS/CTS handshake
- Significantly slimming the MIB, and
- Eliminating support for IBSS

These changes extend the current capabilities of 802.11 and simplify the implementation of 802.11 stations.

There are still two "classes" of 802.11 devices in a WPAN

- 1) Devices capable of becoming a WPAN AP, and
- 2) Devices that are independent stations (not capable of becoming a WPAN AP)

These device classes are likely to differ somewhat in complexity and cost. Our idea of a WPAN consists of a "few" devices capable of being WPAN APs and the rest being independent stations.

The MAC portion of the PICS in Annex A of the 802.11 standard is reproduced below, twice. The first instance of the PICS is completed with the IUT being a hypothetical WPAN AP. The second instance of the PICS is completed with the IUT being a WPAN station. Each PICS shows where the WPAN devices differ from current 802.11 devices. It is at these points of difference, where WPAN devices would be non-compliant with the current 802.11 standard and new conditional items would be used to create the new IUT classes for WPAN AP and WPAN station. These new items would be CF6 for a WPAN AP and CF7 for a WPAN station.

Following is the dual listing of the Annex:

A. Annex - Protocol Implementation Conformance Statement (PICS) Proforma (normative)

A.4 PICS Proforma—IEEE Std 802.11-1997[†]

A.4.3 IUT Configuration (AP capable)

Item	IUT Configuration	Status	Support
* CF1	What is the configuration of the IUT? Access Point (AP)	O.1	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* CF2	Independent Station (NOT an AP)	O.1	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* CF3	Frequency Hopping Spread Spectrum PHY Layer for the 2.4GHz Band	O.2	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* CF4	Direct Sequence Spread Spectrum PHY Layer for the 2.4GHz Band	O.2	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* CF5	Infrared PHY Layer	O.2	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

[†] Copyright release for PICS proforma: Users of this standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

A.4.4 MAC Protocol

A.4.4.1 MAC Protocol Capabilities

Item	Protocol Capability	Status	Support
	Are the following MAC protocol capabilities supported?		
PC1	Authentication Service	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC1.1	Authentication State	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC1.2	Open System Authentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC1.3	Shared Key Authentication	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
* PC2	WEP Privacy Algorithm	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC2.1	WEP Encryption Procedure	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC2.2	WEP Decryption Procedure	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC2.3	Security Services Management	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC3	Distributed Coordination Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.1	Net Allocation Vector (NAV) Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.2	Interframe Space Usage & Timing	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.3	Random Backoff Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.4	DCF Access Procedure	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.5	Random Backoff Procedure	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.6	Recovery Procedures and Retransmit Limits	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.7	RTS/CTS Procedure	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC3.8	Directed MPDU Transfer	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.9	Broadcast & Multicast MPDU Transfer	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.10	MAC Level Acknowledgment	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.11	Duplicate Detection and Recovery	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* PC4	Point Coordinator	CF1:O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC4.1	Maintenance of CFP Structure & Timing	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC4.2	PCF MPDU Transfer from Point Coordinator	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
* PC4.3	PCF MPDU Transfer to Point Coordinator	PC4:O	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC4.4	Overlapping PC Provisions	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC4.5	Polling List Maintenance	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
* PC5	CF-Pollable	CF2:O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC5.1	Interpretation of CFP Structure & Timing	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC5.2	PCF MPDU Transfer to/from CF-Pollable STA	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC5.3	Polling List Update	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC6	Fragmentation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC7	Defragmentation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC8	MAC Data Service	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC8.1	Reorderable-Multicast Service Class	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC8.2	Strictly-Ordered Service Class	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC9	Multirate Support	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* PC10	Multiple Outstanding MSDU Support	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC10.1	Multiple Outstanding MSDU Transmission Restrictions	PC10:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11	Timing Synchronization	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC11.1	Timing in an Infrastructure Network	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC11.2	Timing in an Independent BSS	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.3	Beacon Generation Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC11.4	TSF Synchronization & Accuracy	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC11.5	Infrastructure BSS Initialization	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC11.6	Independent BSS Initialization	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.7	Passive Scanning	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.8	Active Scanning	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.9	Probe Response	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC11.10	Hop Synchronization Function	CF3:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC12	Infrastructure Power Management	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC12.1	Station Power Management Modes	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.2	TIM Transmission	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC12.3	Access Point Function During Contention Period	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC12.4	Access Point Function During CFP	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

Item	Protocol Capability	Status	Support
PC12.5	Receive Function During Contention Period	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.6	Receive Function During CFP	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.7	Aging Function	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC13	Independent BSS Power Management	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC13.1	Initialization of Power Management	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC13.2	STA Power State Transitions	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC13.3	ATIM and Frame Transmission	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC14	Association & Reassociation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC14.1	Association State	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC14.2	STA Association Procedure	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC14.3	AP Association Procedure	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC14.4	STA Reassociation Procedure	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC14.5	AP Reassociation Procedure	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC15	Management Information Base	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC15.1	SMT Object Class	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* PC15.2	Privacy Package	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC15.3	MAC Object Class	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* PC15.4	MAC Statistics Package	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC15.3	Resource Type Object Class	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

A.4.4.2 MAC Frames

Item	MAC Frame	Status	Support
	Is transmission of the following MAC frames supported?		
FT1	Association Request	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT2	Association Response	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FT3	Reassociation Request	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT4	Reassociation Response	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FT5	Probe Request	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT6	Probe Response	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT7	Beacon	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT8	ATIM	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT9	Disassociation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT10	Authentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT11	Deauthentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT12	PS-Poll	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT13	RTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FT14	CTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FT15	ACK	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT16	CF-End	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT17	CF End+CF-Ack	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT18	Data	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT19	Data + CF-Ack	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT20	Data + CF-Poll	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT21	Data + CF-Ack+CF-Poll	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT22	Null	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT23	CF-Ack (no data)	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT24	CF-Poll (no data)	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT25	CF-Ack+CF-Poll (no data)	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

Item	MAC Frame	Status	Support
	Is reception of the following MAC frames supported?		
FR1	Association Request	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FR2	Association Response	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR3	Reassociation Request	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FR4	Reassociation Response	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR5	Probe Request	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR6	Probe Response	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Item	MAC Frame	Status	Support
FR7	Beacon	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR8	ATIM	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR9	Disassociation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR10	Authentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR11	Deauthentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR12	PS-Poll	CF1:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FR13	RTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR14	CTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR15	ACK	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR16	CF-End	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR17	CF End+CF-Ack	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR18	Data	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR19	Data + CF-Ack	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR20	Data + CF-Poll	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR21	Data + CF-Ack+CF-Poll	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR22	Null	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR23	CF-Ack (no data)	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR24	CF-Poll (no data)	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR25	CF-Ack+CF-Poll (no data)	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

A.4.4.3 Frame Exchange Sequences

Item	Frame Exchange Sequence	Status	Support
	Are the following Frame Sequences Supported?		
FS1	Basic Frame Sequences	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FS2	CF-Frame Sequences	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

A.4.4.4 MAC Addressing Functions

Item	MAC Address Function	Status	Support
	Are the following MAC Addressing Functions Supported?		
AD1	STA Universal Individual IEEE802 Address	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
AD2	BSS Identifier Generation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
AD3	Receive Address Matching	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

A.4.3 IUT Configuration (Station only)

Item	IUT Configuration	Status	Support
* CF1	What is the configuration of the IUT? Access Point (AP)	O.1	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* CF2	Independent Station (NOT an AP)	O.1	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* CF3	Frequency Hopping Spread Spectrum PHY Layer for the 2.4GHz Band	O.2	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* CF4	Direct Sequence Spread Spectrum PHY Layer for the 2.4GHz Band	O.2	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* CF5	Infrared PHY Layer	O.2	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

A.4.4 MAC Protocol**A.4.4.1 MAC Protocol Capabilities**

Item	Protocol Capability	Status	Support
	Are the following MAC protocol capabilities supported?		
PC1	Authentication Service	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC1.1	Authentication State	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC1.2	Open System Authentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC1.3	Shared Key Authentication	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
* PC2	WEP Privacy Algorithm	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC2.1	WEP Encryption Procedure	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC2.2	WEP Decryption Procedure	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC2.3	Security Services Management	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC3	Distributed Coordination Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.1	Net Allocation Vector (NAV) Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.2	Interframe Space Usage & Timing	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.3	Random Backoff Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.4	DCF Access Procedure	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.5	Random Backoff Procedure	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.6	Recovery Procedures and Retransmit Limits	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.7	RTS/CTS Procedure	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC3.8	Directed MPDU Transfer	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.9	Broadcast & Multicast MPDU Transfer	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.10	MAC Level Acknowledgment	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC3.11	Duplicate Detection and Recovery	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* PC4	Point Coordinator	CF1:O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC4.1	Maintenance of CFP Structure & Timing	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC4.2	PCF MPDU Transfer from Point Coordinator	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
* PC4.3	PCF MPDU Transfer to Point Coordinator	PC4:O	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC4.4	Overlapping PC Provisions	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC4.5	Polling List Maintenance	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
* PC5	CF-Pollable	CF2:O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC5.1	Interpretation of CFP Structure & Timing	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC5.2	PCF MPDU Transfer to/from CF-Pollable STA	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC5.3	Polling List Update	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC6	Fragmentation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC7	Defragmentation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC8	MAC Data Service	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC8.1	Reorderable-Multicast Service Class	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC8.2	Strictly-Ordered Service Class	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC9	Multirate Support	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
* PC10	Multiple Outstanding MSDU Support	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC10.1	Multiple Outstanding MSDU Transmission Restrictions	PC10:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11	Timing Synchronization	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC11.1	Timing in an Infrastructure Network	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.2	Timing in an Independent BSS	CF2:M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC11.3	Beacon Generation Function	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Item	Protocol Capability	Status	Support
PC11.4	TSF Synchronization & Accuracy	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC11.5	Infrastructure BSS Initialization	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.6	Independent BSS Initialization	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC11.7	Passive Scanning	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC11.8	Active Scanning	CF2:M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC11.9	Probe Response	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC11.10	Hop Synchronization Function	CF3:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC12	Infrastructure Power Management	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC12.1	Station Power Management Modes	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC12.2	TIM Transmission	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.3	Access Point Function During Contention Period	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.4	Access Point Function During CFP	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.5	Receive Function During Contention Period	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC12.6	Receive Function During CFP	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC12.7	Aging Function	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC13	Independent BSS Power Management	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC13.1	Initialization of Power Management	CF2:M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC13.2	STA Power State Transitions	CF2:M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC13.3	ATIM and Frame Transmission	CF2:M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PC14	Association & Reassociation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC14.1	Association State	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
PC14.2	STA Association Procedure	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC14.3	AP Association Procedure	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC14.4	STA Reassociation Procedure	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
PC14.5	AP Reassociation Procedure	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC15	Management Information Base	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC15.1	SMT Object Class	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* PC15.2	Privacy Package	PC2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PC15.3	MAC Object Class	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
* PC15.4	MAC Statistics Package	O	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
PC15.3	Resource Type Object Class	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

A.4.4.2 MAC Frames

Item	MAC Frame	Status	Support
	Is transmission of the following MAC frames supported?		
FT1	Association Request	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FT2	Association Response	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT3	Reassociation Request	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FT4	Reassociation Response	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT5	Probe Request	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FT6	Probe Response	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FT7	Beacon	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FT8	ATIM	CF2:M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
FT9	Disassociation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT10	Authentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT11	Deauthentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT12	PS-Poll	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FT13	RTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FT14	CTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FT15	ACK	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT16	CF-End	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT17	CF End+CF-Ack	PC4:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT18	Data	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT19	Data + CF-Ack	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT20	Data + CF-Poll	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT21	Data + CF-Ack+CF-Poll	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT22	Null	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FT23	CF-Ack (no data)	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

Item	MAC Frame	Status	Support
FT24	CF-Poll (no data)	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FT25	CF-Ack+CF-Poll (no data)	PC4.3:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

Item	MAC Frame	Status	Support
	Is reception of the following MAC frames supported?		
FR1	Association Request	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR2	Association Response	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FR3	Reassociation Request	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR4	Reassociation Response	CF2:M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FR5	Probe Request	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR6	Probe Response	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR7	Beacon	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR8	ATIM	CF2:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
FR9	Disassociation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR10	Authentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR11	Deauthentication	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR12	PS-Poll	CF1:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR13	RTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR14	CTS	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR15	ACK	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR16	CF-End	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR17	CF End+CF-Ack	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR18	Data	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR19	Data + CF-Ack	M	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
FR20	Data + CF-Poll	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR21	Data + CF-Ack+CF-Poll	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR22	Null	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FR23	CF-Ack (no data)	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR24	CF-Poll (no data)	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
FR25	CF-Ack+CF-Poll (no data)	PC5:M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

A.4.4.3 Frame Exchange Sequences

Item	Frame Exchange Sequence	Status	Support
	Are the following Frame Sequences Supported?		
FS1	Basic Frame Sequences	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
FS2	CF-Frame Sequences	(PC4 OR PC5):M	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

A.4.4.4 MAC Addressing Functions

Item	MAC Address Function	Status	Support
	Are the following MAC Addressing Functions Supported?		
AD1	STA Universal Individual IEEE802 Address	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
AD2	BSS Identifier Generation	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
AD3	Receive Address Matching	M	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>