802.11k™

# IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements

## Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

## Amendment 1: Radio Resource Measurement of Wireless LANs

## IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997, USA

12 June 2008

**IEEE Std 802.11k™-2008**
(Amendment to
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## Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

# Amendment 1: Radio Resource Measurement of Wireless LANs

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**LAN/MAN Standards Committee**
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**IEEE Computer Society**

Approved 9 May 2008

**IEEE SA-Standards Board**

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**Abstract:** This amendment specifies the extensions to IEEE Std 802.11 for Wireless LANs providing mechanisms for Radio Resource Measurement.
**Keywords:** local area network (LAN), measurement, network management, radio, radio resource

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# Introduction

This introduction is not part of IEEE Std 802.11k-2008, IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications—Amendment 1: Radio Resource Measurement of Wireless LANs.

Radio Resource Measurement is a key enabler to the next generation of Wireless LANs (WLANs). Radio Resource Measurement addresses some of the existing issues in using unlicensed radio environments to meet the requirements of emerging technologies. In addition, Radio Resource Measurement provides knowledge about the radio environment to improve performance and reliability.

The existing WLAN measurements and information about them are inadequate to move ahead to the next generation of WLAN. The proposed Radio Resource Measurement approach is to add measurements that extend the capability, reliability, and maintainability of WLANs through measurements and provide that information to upper layers in the communications stack. In addition, there are new applications that require quantifiable radio environment measurements in order to attain the necessary performance. These applications include voice over Internet Protocol (VoIP), video over IP, location based applications, as well as applications requiring mitigation of harsh radio environments (multifamily dwellings, airplanes, factories, municipalities, etc.).

WLAN Radio Resource Measurement addresses the MAC, the SME, the MLME primitives, the MIB, and the interface to upper layers. The Radio Resource Measurement scope is to define Radio Measurements and to provide mechanisms to higher layers for radio and network measurements. This amendment provides these mechanisms using request/response queries and an Object Identifier (OID) interface to upper layers in the MIB.

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# IEEE Standard for Information technology— Telecommunications and information exchange between systems— Local and metropolitan area networks— Specific requirements

## Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

# Amendment 1: Radio Resource Measurement of Wireless LANs

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NOTE—The editing instructions contained in this amendment define how to merge the material contained herein into the existing base standard to form the new comprehensive standard.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert and replace. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed either by using ~~strikethrough~~ (to remove old material) or underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editing instructions, change markings, and this NOTE will not be carried over into future editions because the changes will be incorporated into the base standard.

## 2. Normative references

***Insert the following reference in alphanumeric order:***

IETF RFC 3825, Dynamic Host Configuration Protocol Option for Coordinate-based Location Configuration Information, Polk, J., Schnizlein, J., Linsner, M., July 2004.

## 3. Definitions

***Insert the following definitions in alphabetical order, renumbering as necessary:***

**3.173 access point (AP) reachability:** An AP is reachable by a STA if pre-authentication messages can be exchanged between the STA and the target AP via the DS.

NOTE—As defined in 8.4.6.1.[1]

[1] Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

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**3.174 antenna connector:** The measurement point of reference for RF measurements in a STA. The antenna connector is the point in the STA architecture representing the input of the receiver (output of the antenna) for radio reception and the input of the antenna (output of the transmitter) for radio transmission. In systems using multiple antennas or antenna arrays, the antenna connector is a virtual point representing the aggregate output of (or input to) the multiple antennas. In systems using active antenna arrays with processing, the antenna connector is the output of the active array, which includes any processing gain of the active antenna subsystem.

**3.175 average noise power indicator (ANPI):** A MAC indication of the average noise plus interference power measured when the channel is idle as defined by three simultaneous conditions: 1) the Virtual CS mechanism indicates idle channel, 2) the STA is not transmitting a frame, and 3) the STA is not receiving a frame.

**3.176 azimuth:** The horizontal orientation of the front surface of a station or of a radio antenna system's main lobe measured clockwise from True North.

**3.177 basic service set (BSS) transition:** A STA movement from one BSS to another BSS in the same ESS.

**3.178 extended service set (ESS) transition:** A STA movement from one BSS in one ESS to another BSS in a different ESS.

**3.179 idle power indicator (IPI):** A PHY indication of the total channel power (noise and interference) as measured in the channel at the receiving antenna connector while the STA is idle, i.e., neither transmitting nor receiving a frame.

**3.180 LCI subject local:** The term used when the LCI request is for the location of the requesting STA, i.e., when the requesting STA asks "Where am I?".

**3.181 LCI subject remote:** The term used when the LCI request is for the location of the reporting STA, i.e., when the requesting STA asks "Where are you?".

**3.182 location configuration information (LCI):** As defined in IETF RFC 3825: includes latitude, longitude, and altitude, with resolution indicators for each.

NOTE—Information on references can be found in Clause 2.

**3.183 neighbor AP:** Any AP that is a potential service set transition candidate.

**3.184 non-operating channel:** A channel that is not the operating channel of the BSS or IBSS of which the STA is a member.

**3.185 operating channel:** The operating channel is the channel used by the serving AP of the BSS to transmit beacons. In an IBSS, the operating channel is the channel used by the IBSS DFS owner to transmit beacons.

**3.186 received channel power indicator (RCPI):** An indication of the total channel power (signal, noise, and interference) of a received IEEE 802.11™ frame measured on the channel and at the antenna connector used to receive the frame.

**3.187 received signal to noise indicator (RSNI):** An indication of the signal to noise plus interference ratio of a received IEEE 802.11 frame. RSNI is defined by the ratio of the received signal power (RCPI-ANPI) to the noise plus interference power (ANPI) as measured on the channel and at the antenna connector used to receive the frame.

NOTE—RCPI and ANPI might not be measured simultaneously; see 11.10.8.4 for details.

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**3.188 service set transition:** A STA movement from one BSS to another BSS, i.e., either a BSS transition or an ESS transition.

**3.189 serving AP:** The AP to which the STA is associated.

**3.190 validated AP:** An AP that has either been explicitly configured as a Neighbor or learned through a mechanism like the Beacon Report.

**3.191 wildcard BSSID:** A special BSSID value (all binary 1s) used to represent all BSSIDs.

**3.192 wildcard SSID:** A special SSID value (null) used to represent all SSIDs.

# 4. Abbreviations and acronyms

***Insert the following acronyms in alphabetical order:***

ANPI average noise power indicator

IPI idle power indicator

LCI location configuration information

RCPI received channel power indicator

RFC request for comments

RSNI received signal to noise indicator

TMPTT target measurement pilot transmission time

VoIP voice over Internet Protocol (IP)

# 5. General description

## 5.2 Components of the IEEE 802.11 architecture

***Insert the following subclauses after 5.2.6:***

### 5.2.7 Wireless LAN Radio Measurements

Wireless LAN (WLAN) Radio Measurements enable STAs to understand the radio environment in which they exist. WLAN Radio Measurements enable STAs to observe and gather data on radio link performance and on the radio environment. A STA may choose to make measurements locally, request a measurement from another STA, or may be requested by another STA to make one or more measurements and return the results. Radio Measurement data is made available to STA management and upper protocol layers where it may be used for a range of applications. The measurements enable adjustment of STA operation to better suit the radio environment. The Radio Resource Measurement service includes measurements that extends the capability, reliability, and maintainability of WLANs by providing standard measurements across vendors, and provides the resulting measurement data to upper layers in the communications stack.

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In addition to featuring standard measurements and delivering measurement information to upper layers, there are applications that require quantifiable radio environment measurements in order to attain the necessary performance levels. These applications include VoIP, video over IP, location based applications, as well as applications requiring mitigation of harsh radio environments (multifamily dwellings, airplanes, factories, municipalities, etc.). Radio Measurements address most of the existing issues in using unlicensed radio spectrum to meet the requirements of these emerging technologies.

To address the mobility requirements of technologies, such as VoIP and video streaming, Radio Measurements, such as Channel Load request/report and the Neighbor request/report, may be used to collect pre-handoff information, which can drastically speed up handoffs between cells within the same ESS. By accessing and using this information, the STAs (either in the APs or in the individual devices) can make intelligent decisions about the most effective way to utilize the available spectrum, power, and bandwidth for its desired communications.

The request/report measurements are as follows:

— Beacon
— Frame
— Channel Load
— Noise Histogram
— STA Statistics
— Location Configuration Information (LCI)
— Neighbor Report
— Link Measurement
— Transmit Stream/Category Measurement

The request-only mechanism is:

— Measurement Pause

The report-only mechanism is:

— Measurement Pilot

These measurement mechanisms provide the capability for a STA to manage and query its radio environment, and to make appropriate assessments about its health and efficiency. It is the first step in making WLAN smart and capable of making appropriate decisions for fast transition, for mesh connectivity, and for managing the radio environment for all wireless devices.

#### 5.2.7.1 Beacon

The Beacon request/report pair enables a STA to request from another STA a list of APs it can receive on a specified channel or channels. This measurement may be done by active mode (like active scan), passive mode (like passive scan), or beacon table modes. If the measurement request is accepted and is in passive mode, a duration timer is set and the measuring STA monitors the requested channel, measures beacon, probe response, and measurement pilot power levels (RCPI), and logs all beacons, probe responses, and measurement pilots received within the measurement duration. If the measurement request is in active mode, the measuring STA sends a probe request on the requested channel at the beginning of the measurement duration, then monitors the requested channel, measures beacon, probe response, and measurement pilot power levels (RCPI), and logs all beacons, probe responses, and measurement pilots received within the measurement duration. If the request is beacon table mode, then the measuring STA returns a Beacon Report containing the current contents of any stored beacon information for any supported channel with the requested SSID and BSSID without performing additional measurements.

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#### 5.2.7.2 Measurement Pilot

The Measurement Pilot frame is a compact Action frame transmitted periodically by an AP at a small interval relative to a Beacon Interval. The Measurement Pilot frame provides a subset of the information provided in a Beacon frame, is smaller than a Beacon, and is transmitted more often than a Beacon. The purpose of the Measurement Pilot frame is to assist a STA with scanning.

#### 5.2.7.3 Frame

The frame request/report pair returns a picture of all the channel traffic and a count of all the frames received at the measuring STA. For each unique Transmitter Address, the STA reports the Transmitter Address, number of frames received from this transmitter, average power level (RCPI) for these frames, and BSSID of the transmitter.

#### 5.2.7.4 Channel load

The channel load request/report pair returns the channel utilization measurement as observed by the measuring STA.

#### 5.2.7.5 Noise histogram

The noise histogram request/report pair returns a power histogram measurement of non-IEEE 802.11 noise power by sampling the channel when virtual carrier sense indicates idle and the STA is neither transmitting nor receiving a frame.

#### 5.2.7.6 STA statistics

The STA statistics request/report pair returns groups of values for STA counters and for BSS Average Access Delay. The STA counter group values include: transmitted fragment counts, multicast transmitted frame counts, failed counts, retry counts, multiple retry counts, frame duplicate counts, Request to Send (RTS) success counts, RTS failure counts, Acknowledgement (ACK) failure counts, received fragment counts, multicast received frame counts, FCS error counts, and transmitted frame counts. BSS Average Access Delay group values include: AP average access delay, average access delay for each access category, associated STA count, and channel utilization

#### 5.2.7.7 Location

The Location request/report pair returns a requested location in terms of latitude, longitude, and altitude. It includes types of altitude such as floors and permits various reporting resolutions. The requested location may be the location of the requestor (e.g., Where am I?) or the location of the reporting STA (e.g., Where are you?)

#### 5.2.7.8 Measurement pause

The measurement pause request is defined, but no report comes back from this request. The measurement pause permits the inclusion of a quantified delay between the execution of individual measurements that are provided in a series within a measurement request frame. The measurement pause used as the last measurement in a frame provides control of the measurement period when measurement request frames are to be repeated.

#### 5.2.7.9 Neighbor report

The neighbor report request is sent to an AP, which returns a neighbor report containing information about known neighbor APs that are candidates for a service set transition. Neighbor reports contain information

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from the table dot11RRMNeighborReportTable in the MIB concerning neighbor APs. This request/report pair enables a STA to gain information about the neighbors of the associated AP to be used as potential roaming candidates.

#### 5.2.7.10 Link measurement

The link measurement request/report exchange provides measurements of the RF characteristics of a STA to STA link. This measurement indicates the instantaneous quality of a link.

#### 5.2.7.11 Transmit stream/category measurement

The Transmit Stream/Category measurement is a request/report pair that enables a QoS STA to inquire of a peer QoS STA the condition of an ongoing traffic stream link between them. The Transmit Stream/Category Measurement Report provides the transmit-side performance metrics for the measured traffic stream. Trigger conditions included in the Transmit Stream/Category Measurement Request may initiate triggered Transmit Stream/Category Measurement Reports upon detection of the trigger condition.

## 5.3 Logical service interfaces

***Change the list of architectural services in 5.3 as follows:***

a) Authentication
b) Association
c) Deauthentication
d) Disassociation
e) Distribution
f) Integration
g) Data confidentiality
h) Reassociation
i) MSDU delivery
j) DFS
k) TPC
l) Higher layer timer synchronization (QoS facility only)
m) QoS traffic scheduling (QoS facility only)
n) Radio measurement

### 5.3.1 Station service (SS)

***Change the list of station services (SSs) in 5.3.1 as follows:***

a) Authentication
b) Deauthentication
c) Data confidentiality
d) MSDU delivery
e) DFS
f) TPC
g) Higher layer timer synchronization (QoS facility only)
h) QoS traffic scheduling (QoS facility only)
i) Radio measurement

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## 5.4 Overview of the services

***Change the first paragraph as follows:***

There are many services specified by IEEE Std 802.11. Six of the services are used to support medium access control (MAC) service data unit (MSDU) delivery between STAs. Three of the services are used to control IEEE 802.11 LAN access and confidentiality. Two of the services are used to provide spectrum management. One of the services provides support for LAN applications with QoS requirements. Another of the services provides support for higher layer timer synchronization. One of the services is used for radio measurement.

***Insert the following subclause after 5.4.6:***

### 5.4.7 Radio measurement service

The Radio Measurement Service provides the following:

— The ability to request and report radio measurements in supported channels.

— The ability to perform radio measurements in supported channels.

— An interface for upper layer applications to retrieve radio measurements using MLME primitives and/or MIB access.

— Information about neighbor APs.

# 7. Frame formats

## 7.2 Format of individual frame types

### 7.2.3 Management frames

#### 7.2.3.1 Beacon frame format

***Change the first paragraph and Table 7-8 as follows:***

The frame body of a management frame of subtype Beacon contains the information shown in Table 7-8. ~~If the dot11MultiDomainCapabilityEnabled attribute is true, a STA shall include a Country information element in the transmission of Beacon frames. Optionally, the Beacon frame format may also include the information described in either or both of FH Parameters and FH Pattern Table elements. If both FH Parameters and FH Pattern Table elements are sent, they shall describe the same hopping pattern. Note that the information described in FH Parameters and FH Pattern Table elements also may be contained in the Probe Response frame~~

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**Table 7-8—Beacon frame body**

| Order | Information | Notes |
|---|---|---|
| 11 | Country | The Country element is ~~shall be~~ present if ~~when~~ dot11MultiDomainCapabilityEnabled is true or dot11SpectrumManagementRequired is true~~.~~ or dot11RadioMeasurementEnabled is true. |
| 14 | Power Constraint | The Power Constraint element is ~~shall be~~ present if dot11SpectrumManagementRequired is true~~.~~ and can be present if dot11RadioMeasurementEnabled is true. |
| 16 | Quiet | The Quiet element can ~~may~~ be present if dot11SpectrumManagementRequired is true~~.~~ or dot11RadioMeasurementEnabled is true. |
| 18 | TPC Report | The TPC Report element is ~~shall be~~ present if dot11SpectrumManagementRequired is true~~.~~ or dot11RadioMeasurementEnabled is true. |
| 25 | AP Channel Report | If dot11RRMAPChannelReportEnabled is true, one AP Channel Report element is present for each regulatory class that has at least 1 channel to report. |
| 26 | BSS Average Access Delay | The BSS Average Access Delay element is present if dot11RRMBSSAverageAccessDelayEnabled is true and the value of the AP Average Access Delay field is not equal to 255 (measurement not available); otherwise, the BSS Average Access Delay element can be present if dot11RRMBSSAverageAccessDelayEnabled is true. |
| 27 | Antenna Information | The Antenna Information element is present if dot11RRMAntennaInformationEnabled is true and the value of the Antenna ID field is not equal to 0 (unknown antenna); otherwise, the Antenna Information element can be present if dot11RRMAntennaInformationEnabled is true. |
| 28 | BSS Available Admission Capacity | The BSS Available Admission Capacity element is present if dot11RRMBSSAvailableAdmissionCapacityEnabled is true with the following exceptions: 1) when Available Admission Capacity Bitmask equals 0 (Available Admission Capacity List contains no entries), or 2) when the BSS Load element is present and the Available Capacity Bitmask equals 256 (Available Admission Capacity List contains only the AC_VO entry). |
| 29 | BSS AC Access Delay | The BSS AC Access Delay element is present if dot11RRMBSSAverageAccessDelayEnabled is true and at least one field of the element is not equal to 255 (measurement not available); otherwise, the BSS AC Access Delay element can be present if dot11RRMBSSAverageAccessDelayEnabled is true. |
| 30 | Measurement Pilot Transmission Information | The Measurement Pilot Transmission Information is present if dot11RRMMeasurementPilotCapability is set to a value between 2 and 7. |


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**Table 7-8—Beacon frame body *(continued)***

| Order | Information | Notes |
|---|---|---|
| 31 | Multiple BSSID | The Multiple BSSID element is present if dot11RRMMeasurementPilotCapability is set to a value between 2 and 7 and the AP is a member of a Multiple BSSID Set (see 11.10.1) with two or more members. |
| 32 | RRM Enabled Capabilities | RRM Enabled Capabilities element is present if dot11RadioMeasurementEnabled is true. |

### 7.2.3.4 Association Request frame format

***Change order 6 and insert order 10 in Table 7-10 as follows:***

**Table 7-10—Association Request frame body**

| Order | Information | Notes |
|---|---|---|
| 6 | Power Capability | The Power Capability element is ~~shall be~~ present if dot11SpectrumManagementRequired is tru~~e.~~ or dot11RadioMeasurementEnabled is true. |
| 10 | RRM Enabled Capabilities | RRM Enabled Capabilities element is present if dot11RadioMeasurementEnabled is true. |

### 7.2.3.5 Association Response frame format

***Insert orders 7–9 into Table 7-11 as follows:***

**Table 7-11—Association Response frame body**

| Order | Information | Notes |
|---|---|---|
| 7 | RCPI | The RCPI information element is present if dot11RRMRCPIMeasurementEnabled is true. |
| 8 | RSNI | The RSNI information element is present if dot11RRMRSNIMeasurementEnabled is true. |
| 9 | RRM Enabled Capabilities | RRM Enabled Capabilities element is present if dot11RadioMeasurementEnabled is true. |

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### 7.2.3.6 Reassociation Request frame format

***Change order 7 and insert order 11 into Table 7-12 as follows:***

**Table 7-12—Reassociation Request frame body**

| Order | Information | Notes |
|---|---|---|
| 7 | Power Capability | The Power Capability element is ~~shall be~~ present if dot11SpectrumManagementRequired is true~~.~~ or dot11RadioMeasurementEnabled is true. |
| 11 | RRM Enabled Capabilities | RRM Enabled Capabilities element is present if dot11RadioMeasurementEnabled is true. |

### 7.2.3.7 Reassociation Response frame format

***Insert orders 7–9 into Table 7-13 as follows:***

**Table 7-13—Reassociation Response frame body**

| Order | Information | Notes |
|---|---|---|
| 7 | RCPI | The RCPI information element is present if dot11RRMRCPIMeasurementEnabled is true. |
| 8 | RSNI | The RSNI information element is present if dot11RRMRSNIMeasurementEnabled is true. |
| 9 | RRM Enabled Capabilities | RRM Enabled Capabilities element is present if dot11RadioMeasurementEnabled is true. |

### 7.2.3.8 Probe Request frame format

***Insert order 5 in Table 7-14 as follows:***

**Table 7-14—Probe Request frame body**

| Order | Information | Notes |
|---|---|---|
| 5 | DS Parameter Set | The DS Parameter Set information element is present within Probe Request frames generated by STAs using Clause 15, Clause 18, or Clause 19 PHYs if dot11RadioMeasurementEnabled is true.<br><br>The DS Parameter Set information element can be present within Probe Request frames generated by STAs using Clause 15, Clause 18, or Clause 19 PHYs if dot11RadioMeasurementEnabled is false. |


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### 7.2.3.9 Probe Response frame format

***Change the first paragraph and delete the second paragraph as follows:***

The frame body of a management frame of subtype Probe Response contains the information shown in Table 7-15. ~~If the dot11MultiDomainCapabilityEnabled attribute is true, the Probe Response frame contains a Country information element and all information elements identified by the Requested Element IDs of a Request information element. Note that the information returned as a result of a Probe Request frame with a Request information element may include the FH parameters and/or the FH Pattern Table possibly replicating optional elements identified by orders 12 and 13.~~ See additional details and procedures in 9.8.2.1and 11.1.3, respectively.

~~A STA shall return only the information elements that it supports. In an improperly formed Request information element, a STA may ignore the first information element requested that is not ordered properly and all subsequent information elements requested. In the probe response frame, the STA shall return the requested information elements in the same order as requested in the Request information element.~~

***Change orders 10, 13, 15, 17, and Last-n, and insert orders 23–30 in Table 7-15 as follows:***

**Table 7-15—Probe Response frame body**

| Order | Information | Notes |
|---|---|---|
| 10 | Country | Included if dot11MultiDomainCapabilityEnabled is true or dot11SpectrumManagementRequired is true~~.~~ or dot11RadioMeasurementEnabled is true. |
| 13 | Power Constraint | ~~Shall be i~~Included if dot11SpectrumManagementRequired is true~~.~~ and can be included if dot11RadioMeasurementEnabled is true. |
| 15 | Quiet | ~~May~~Can be included if dot11SpectrumManagementRequired is true~~.~~ or if dot11RadioMeasurementEnabled is true. |
| 17 | TPC Report | ~~Shall be i~~Included if dot11SpectrumManagementRequired is true~~.~~ or dot11RadioMeasurementEnabled is true. |
| 23 | Measurement Pilot Transmission Information | Included if dot11RRMMeasurementPilotCapability is set to a value between 2 and 7. |
| 24 | Multiple BSSID | Included if dot11RRMMeasurementPilotCapability is set to a value between 2 and 7 and the AP is a member of a Multiple BSSID Set (see 11.10.11) with two or more members. |
| 25 | RRM Enabled Capabilities | RRM Enabled Capabilities element is present if dot11RadioMeasurementEnabled is true. |
| 26 | AP Channel Report | If dot11RRMAPChannelReportEnabled is true, one AP Channel Report element can be present for each regulatory class that has at least 1 channel to report. |
| 27 | BSS Average Access Delay | The BSS Average Access Delay element can be present if dot11RRMBSSAverageAccessDelayEnabled is true and the value of the AP Average Access Delay field is not equal to 255 (measurement not available). |

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**Table 7-15—Probe Response frame body *(continued)***

| Order | Information | Notes |
|---|---|---|
| 28 | Antenna Information | The Antenna Information element can be present if dot11RRMAntennaInformationEnabled is true and the value of the Antenna ID field is not equal to 0 (unknown antenna). |
| 29 | BSS Available Admission Capacity | The BSS Available Admission Capacity element can be present if dot11RRMBSSAvailableAdmissionCapacityEnabled is true with the following exceptions: 1) when Available Admission Capacity Bitmask equals 0 (Available Admission Capacity List contains no entries), or 2) when the BSS Load element is present and the Available Capacity Bitmask equals 256 (Available Admission Capacity List contains only the AC_VO entry). |
| 30 | BSS AC Access Delay | The BSS AC Access Delay element can be present if dot11RRMBSSAverageAccessDelayEnabled is true and at least one field of the element is not equal to 255 (measurement not available). |
| Last-*n* | Requested information elements | Elements requested by the Request information element of the Probe Request frame~~.~~ are included if dot11MultiDomainCapabilityEnabled is true. See 11.1.3.2.1. |

## 7.3 Management frame body components

### 7.3.1 Fields that are not information elements

#### 7.3.1.4 Capability Information field

***Change the contents of Figure 7-22 as follows:***

| B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
|---|---|---|---|---|---|---|---|
| ESS | IBSS | CF Pollable | CF-Poll Request | Privacy | Short Preamble | PBCC | Channel Agility |

| B8 | B9 | B10 | B11 | B12 | B13 | B14 | B15 |
|---|---|---|---|---|---|---|---|
| Spectrum Mgmt | QoS | Short Slot Time | APSD | ~~Reserved~~ Radio Measurement | DSSS-OFDM | Delayed Block Ack | Immediate Block Ack |

**Figure 7-22—Capability Information field**

***Insert the following text at the end of 7.3.1.4:***

A STA sets the Radio Measurement subfield in the Capability Information field to 1 when the MIB attribute dot11RadioMeasurementEnabled is true, and sets it to 0 otherwise.

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### 7.3.1.11 Action field

***Insert the following rows into Table 7-24 and change the reserved value as shown:***

**Table 7-24—Category values**

| Code | Meaning | See subclause |
|---|---|---|
| 4 | Public | 7.4.7 |
| 5 | Radio measurement | 7.4.6 |
| ~~4~~6–126 | Reserved | — |

***Insert the following subclauses after 7.3.1.17:***

### 7.3.1.18 Measurement Pilot Interval field

The Measurement Pilot Interval field represents the number of time units (TUs) between target measurement pilot transmission times (TMPTTs). The length of the Measurement Pilot Interval field is 1 octet. The Measurement Pilot Interval field is illustrated in Figure 7-36a.

| | Measurement Pilot Interval |
|---|---|
| **Octets:** | 1 |

**Figure 7-36a—Measurement Pilot Interval fixed field**

### 7.3.1.19 Max Transmit Power field

The Max Transmit Power field is a 2's complement signed integer and is 1 octet in length, providing an upper limit, in units of dBm, on the transmit power as measured at the output of the antenna connector to be used by that AP on the current channel. The maximum tolerance for the value reported in Max Transmit Power field shall be 5 dB. The value of the Max Transmit Power field shall be less than or equal to the Max Regulatory Power value for the current channel. The Max Transmit Power field is illustrated in Figure 7-36b.

| | B0 B7 |
|---|---|
| | Max Transmit Power |
| Octets: | 1 |

**Figure 7-36b—Max Transmit Power field**

### 7.3.1.20 Transmit Power Used field

The Transmit Power Used field is a 2's complement signed integer and is 1 octet in length. It shall be less than or equal to the Max Transmit Power and indicates the actual power used as measured at the output of the antenna connector, in units of dBm, by a STA when transmitting the frame containing the Transmit

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Power Used field. The Transmit Power Used value is determined anytime prior to sending the frame in which it is contained and has a tolerance of ±5 dB. The Transmit Power Used field is illustrated in Figure 7-36c.

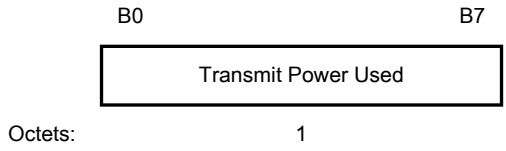


**Figure 7-36c—Transmit Power Used field**

### 7.3.2 Information elements

***Insert a column to the right of the Length column in Table 7-26 as shown. Insert Element IDs and change the Measurement Request, Measurement Report, and Reserved rows as follows:***

**Table 7-26—Element IDs**

| Information Element | Element ID | Length (in octets) | Extensible |
|---|---|---|---|
| Measurement Request (see 7.3.2.21) | 38 | 5 to ~~16~~257 | Subelements, for formats using 7.3.21.4 to 7.3.21.11. |
| Measurement Report (see 7.3.2.22) | 39 | 5 to ~~24~~257 | Subelements, for formats using 7.3.22.4 to 7.3.22.10. |
| AP Channel Report (see 7.3.2.36) | 51 | 3 to 257 | |
| Neighbor Report (see 7.3.2.37) | 52 | 15 to 257 | Subelements |
| RCPI (see 7.3.2.38) | 53 | 3 | Yes |
| Reserved | 54–62 | | |
| BSS Average Access Delay (see 7.3.2.39) | 63 | 3 | Yes |
| Antenna Information (see 7.3.2.40) | 64 | 3 | Yes |
| RSNI (see 7.3.2.41) | 65 | 3 | Yes |
| Measurement Pilot Transmission Information (see 7.3.2.42) | 66 | 3 to 257 | Subelements |
| BSS Available Admission Capacity (see 7.3.2.43) | 67 | 4 to 28 | Yes |
| BSS AC Access Delay (see 7.3.2.44) | 68 | 6 | Yes |
| Reserved | 69 | | |
| RRM Enabled Capabilities (see 7.3.2.45) | 70 | 7 | Yes |


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**Table 7-26—Element IDs *(continued)***

| Information Element | Element ID | Length (in octets) | Extensible |
|---|---|---|---|
| Multiple BSSID (see 7.3.2.46) | 71 | 3 to 257 | Subelements |
| Reserved | ~~51~~72–126 | | |

***Insert the following paragraph at the end of 7.3.2:***

A Yes in the Extensible column of an element listed in Table 7-26 indicates that the Length of the element might be extended in future revisions or amendments of this standard. See 9.14.1. When the Extensible column of an element is set to Subelements, then the element might be extended in future revision or amendments of this standard by defining additional subelements. See 9.14.2.

### 7.3.2.12 Request information element

***Delete the last paragraph, and add the following paragraph:***

~~A STA shall return only those information elements that it supports. In an improperly formed Request information element, a STA may ignore the first information element requested that is not ordered properly and all subsequent information elements requested. In the probe response frame, the STA shall return the requested information elements in the same order requested in the Request information element of the probe request frame.~~

See 11.1.3.2.1 for additional requirements.

### 7.3.2.18 TPC Report element

***Change 7.3.2.18 as follows:***

The TPC Report element contains transmit power and link margin information sent in response to a TPC Request element or a Link Measurement Request frame. A TPC Report element is included in a Beacon frame or Probe Response frame without a corresponding request. The format of the TPC Report element is shown in Figure 7-55.

| | Element ID | Length | Transmit Power | Link Margin |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 |

**Figure 7-55—TPC Report element format**

The Length field in octets is set to 2.

The Transmit Power field is ~~shall be~~ set to the transmit power used to transmit the frame containing the TPC Report element. The field is coded as a 2's complement signed integer in units of decibels relative to 1 mW. The maximum tolerance for the transmit power value reported in the TPC Response element shall be ±5 dB. This tolerance is defined as the difference, in decibels, between the reported power value and the actual EIRP of the STA (~~measured~~ when transmitting 1500 octet frames or maximum MPDU sized-frames, whichever is smaller).

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The Link Margin field contains the link margin for~~at~~ the receive time and for the receive rate of ~~at which~~ the frame containing the TPC Request element or the Link Measurement Request frame~~was received~~. The field is coded as a 2's complement signed integer in units of decibels. The Link Margin field ~~shall be~~ is set to 0 and shall be ignored when a TPC Report element is included in a Beacon frame or Probe Response frame. The measurement method of Link Margin is beyond the scope of this standard.

The TPC Report element is included in TPC Report frames, as described in 7.4.1.4; Link Measurement Report frames as described in 7.4.6.4; Beacon frames, as described in 7.2.3.1; and Probe Response frames, as described in 7.2.3.9. The use of TPC Report elements and frames is described in 11.8.4.

### 7.3.2.21 Measurement Request element

***Change 7.3.2.21 as follows:***

The Measurement Request element contains a request that the receiving STA undertake the specified measurement action. The Measurement Request element is included in Spectrum Management Measurement Request frames as described in 7.4.1.1 or Radio Measurement Request frames as described in 7.4.6.1. Measurement Types 0, 1, and 2 are defined for spectrum management and shall only be included in Spectrum Management Measurement Request frames. The use of Measurement Request elements for spectrum management is described in 11.9.6. Measurement Types 3 through 9 and 255 are defined for radio measurement and shall only be included in Radio Measurement Request frames. The use of Measurement Request elements for radio measurement is described in 11.10.

The format of the Measurement Request element is shown in Figure 7-58.

| | Element ID | Length | Measurement Token | Measurement Request Mode (see Figure 7-59) | Measurement Type | Measurement Request |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 | 1 | variable |

**Figure 7-58—Measurement Request element format**

| | ~~Reserved (0)~~ Parallel | Enable | Request | Report | Duration Mandatory | Reserved (0) |
|---|---|---|---|---|---|---|
| **Bit:** | 0 | 1 | 2 | 3 | 4 | ~~4~~5–7 |

**Figure 7-59—Measurement Request Mode field**

The value of the Length field in octets is variable and depends on the length of the Measurement Request field. The minimum value of the Length field is 3 (based on a minimum length for the Measurement Request field of 0 octets).

The Measurement Token is ~~shall be~~ set to a nonzero number that is unique among the Measurement Request elements sent in a particular Measurement Request frame.

The Measurement Request Mode field (shown in Figure 7-59) is a bit field with the following bits defined:

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— The Parallel bit (bit 0) is used to request that more than one measurement is to be started in parallel. Parallel is set to 1 to request that the measurement is to start at the same time as the measurement described by the next Measurement Request element in the same Measurement Request frame. Parallel is set to 0 if the measurements are to be performed in sequence. The Parallel bit is reserved when Enable is set to 1, in the last or only measurement request element in the frame, or when the value of the Measurement Type field is 0, 1, or 2 (Spectrum Management measurements). See 11.10.5.

— The Enable bit (bit 1) is used to differentiate between a request to make a measurement and a request to control the measurement requests and triggered or autonomous reports generated by the destination STA. The Enable bit is further described in Table 7-28. ~~indicates whether this element is used to request the destination STA to enable or disable the sending of measurement requests and autonomous measurement reports of a specified type to this STA. The Enable bit shall be set to 1 when the Request bit and Report bit are valid. The Enable bit shall be set to 0 when the Request bit and Report bit are invalid.~~

— Request bit (bit 2) is described in Table 7-28. ~~indicates whether the STA receiving the request shall enable or disable measurement requests of the type specified in the Measurement Type field. The Request bit shall be set to 1 when enabling a measurement request. The Request bit shall be set to 0 when disabling a measurement request or when the Request bit is invalid (i.e. when Enable bit is set to 0 or when the Measurement Type field contains a reserved measurement request type value).~~

— Report bit (bit 3) is described in Table 7-28. ~~indicates whether the STA receiving the request shall enable or disable autonomous measurement reports of the type specified in the Measurement Type field. The Report bit shall be set to 1 when enabling an autonomous measurement report. The Report bit shall be set to 0 when disabling an autonomous measurement report or when the Report bit is invalid (i.e. when Enable bit is set to 0 or when the Measurement Type field contains a reserved measurement report type value).~~

— The Duration Mandatory bit (bit 4) indicates whether the measurement duration contained within the Measurement Request is interpreted as mandatory by the STA receiving the request. A value of 0 indicates that the duration requested is a maximum duration, and the requesting STA will accept measurement results taken over any shorter duration. A value of 1 indicates that the duration requested is a mandatory duration. The Duration Mandatory bit is reserved when the Enable bit is set to 1, or when the value of the Measurement Type field is 0, 1, 2, 8, or 255. See 11.10.3.

— All other bits are reserved and ~~shall be~~ set to 0.

The use of the Enable, Request, and Report bits is ~~also~~ summarized in Table 7-28. See 11.9.6 and 11.10.5 for the description of how a STA ~~shall~~ handles requests to enable or disable measurement requests and autonomous reports. See 11.10.7 for a description of the use of the Enable and Report bits in triggered reporting.

**Table 7-28—Summary of use of Enable, Request, and Report bits**

| Bits | | | ~~Meaning of bits~~Measurement request meaning |
|---|---|---|---|
| **Enable** | **Request** | **Report** | |
| 0 | ~~0~~Reserved | ~~0~~Reserved | The transmitting STA is requesting that the destination STA make a Measurement of type indicated in the Measurement Type field.<br>When Enable is set to 0, Request and Report bits are reserved and set to 0 ~~invalid and shall be set to 0.~~ |
| ~~0~~ | ~~0~~ | ~~1~~ | ~~Not allowed~~ |
| ~~0~~ | ~~1~~ | ~~0~~ | ~~Not allowed~~ |

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**Table 7-28—Summary of use of Enable, Request, and Report bits *(continued)***

| Bits | | | ~~Meaning of bits~~Measurement request meaning |
|---|---|---|---|
| **Enable** | **Request** | **Report** | |
| ~~0~~ | ~~1~~ | ~~1~~ | ~~Not allowed~~ |
| 1 | 0 | 0 | The transmitting STA is requesting that the destination STA not send any~~it be sent neither~~ measurement requests or ~~nor autonomous measurement~~ reports of the type~~s~~ indicated in the Measurement Type field. |
| 1 | 1 | 0 | The transmitting STA is indicating to the destination STA that it ~~will~~ can accept measurement requests and is requesting the destination STA not to send ~~it not be sent~~ autonomous or triggered measurement reports of the type~~s~~ indicated in the Measurement Type field (see NOTE). |
| 1 | 0 | 1 | The transmitting STA is requesting that the destination STA ~~it~~ not send~~be sent~~ measurement requests and indicating it will accept autonomous or triggered measurement reports of the type~~s~~ indicated in the Measurement Type field. |
| 1 | 1 | 1 | The transmitting STA is indicating to the destination STA that it ~~will~~ can accept measurement requests and can~~will~~ accept autonomous or triggered measurement reports of the type indicated in the Measurement Type field. |
| NOTE—This setting corresponds to the default STA behavior. | | | |

The Measurement Type field is~~shall be~~ set to a number that identifies a type of measurement request or ~~a~~ measurement report. Those Measurement Types that have been allocated for measurement requests are shown in Table 7-29 and measurement reports are shown in Table 7-30 (in 7.3.2.22).

**Table 7-29—Measurement Type definitions for measurement requests**

| Name | Measurement Type | Measurement Use |
|---|---|---|
| Basic Request | 0 | Spectrum Management |
| Clear Channel assessment (CCA) request | 1 | |
| Receive power indication (RPI) histogram request | 2 | |


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**Table 7-29—Measurement Type definitions for measurement requests *(continued)***

| Name | Measurement Type | Measurement Use |
|---|---|---|
| Channel load request | 3 | Radio Resource Measurement |
| Noise histogram request | 4 | |
| Beacon request | 5 | |
| Frame request | 6 | |
| STA statistics request | 7 | |
| LCI request | 8 | |
| Transmit stream/category measurement request | 9 | |
| Reserved | ~~3~~10–254 | N/A |
| Measurement Pause request | 255 | Radio Resource Measurement |

~~The Measurement Request field shall be null when the Enable bit is set to 1 and shall contain the specification of the measurement request, as described in 7.3.2.19.1 through 7.3.2.19.3, when the Enable bit is set to 0.~~

When the Enable bit is set to 0, the Measurement Request field contains the specification of a single measurement request corresponding to the Measurement Type as described in 7.3.2.21.1 through 7.3.2.21.11. When the Enable bit is set to 1, the Measurement Request field is only present when requesting a triggered measurement.

~~The Measurement Request element is included in a Measurement Request frame as described in 7.4.1.1. The use of Measurement Request elements and frames is described in 11.10.6.~~

***Insert the following subclauses after 7.3.2.21.3:***

### 7.3.2.21.4 Channel Load Request

The Measurement Request field corresponding to a Channel Load Request is shown in Figure 7-62a.

.

| | Regulatory Class | Channel Number | Randomization Interval | Measurement Duration | Optional Subelements |
|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 2 | 2 | variable |

**Figure 7-62a—Measurement Request field format for Channel Load Request**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

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Channel Number indicates the channel number for which the measurement request applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

Randomization Interval specifies the upper bound of the random delay to be used prior to making the measurement, expressed in units of TUs. See 11.10.2.

The Measurement Duration field is set to the preferred or mandatory duration of the requested measurement, expressed in units of TUs. See 11.10.3.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29a. A Yes in the Extensible column of a subelement listed in Table 7-29a indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-29a—Optional Subelement IDs for Channel Load Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Channel Load Reporting Information | 2 | Yes |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 244 | |
| 222–255 | Reserved | | |

The Channel Load Reporting Information subelement indicates the condition for issuing a Channel Load Report. Channel Load Reporting Information subelement data field format is shown in Figure 7-62b and contains a 1-octet Reporting Condition subfield and a 1-octet Channel Load Reference Value subfield. The Reporting Condition is described in Table 7-29b. The Channel Load Reference value is a Channel Load value as defined in 11.10.8.3 and is the reference value for the indicated Reporting Condition.

| | Reporting Condition | Channel Load Reference Value |
|---|---|---|
| **Octets:** | 1 | 1 |

**Figure 7-62b—Channel Load Reporting Information data field format**


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**Table 7-29b—Reporting Condition for Channel Load Report**

| Condition for report to be issued | Reporting Condition |
|---|---|
| Report to be issued after each measurement (default, used when Channel Load Reporting Information subelement is not included in Channel Load Request). | 0 |
| Report to be issued when measured Channel Load is equal to or greater than the reference value. | 1 |
| Report to be issued when measured Channel Load is equal to or less than the reference value. | 2 |
| Reserved | 3–255 |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.21.5 Noise Histogram Request

The Measurement Request field corresponding to a Noise Histogram Request is shown in Figure 7-62c.

| | Regulatory Class | Channel Number | Randomization Interval | Measurement Duration | Optional Subelements |
|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 2 | 2 | variable |

**Figure 7-62c—Measurement Request field format for Noise Histogram Request**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement request applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

Randomization Interval specifies the upper bound of the random delay to be used prior to making the measurement, expressed in units of TUs. See 11.10.2.

The Measurement Duration field is set to the preferred or mandatory duration of the requested measurement, expressed in units of TUs. See 11.10.3.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29c. A Yes in the Extensible column of a subelement listed in Table 7-29c indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element

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is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-29c—Optional Subelement IDs for Noise Histogram Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Noise Histogram Reporting Information | 2 | Yes |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 244 | |
| 222–255 | Reserved | | |

The Noise Histogram Reporting Information subelement indicates the condition for issuing a Noise Histogram Report. The Noise Histogram Reporting Information subelement data field format is shown in Figure 7-62d and contains a 1-octet Reporting Condition subfield and a 1-octet ANPI Reference Value subfield. The Reporting Condition is described in Table 7-29d. The ANPI Reference Value is an ANPI value as defined in 11.10.8.4 and is the reference value for the indicated Reporting Condition.

| | Reporting Condition | ANPI Reference Value |
|---|---|---|
| **Octets:** | 1 | 1 |

**Figure 7-62d—Noise Histogram Reporting Information data field format**

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

**Table 7-29d—Reporting Condition for Noise Histogram Report**

| Condition for report to be issued | Reporting Condition |
|---|---|
| Report to be issued after each measurement (default, used when Noise Histogram Reporting Information subelement is not included in Noise Histogram Request). | 0 |
| Noise Histogram Report to be issued when measured ANPI is equal to or greater than the reference value. | 1 |
| Noise Histogram Report to be issued when measured ANPI is equal to or less than the reference value. | 2 |
| Reserved | 3–255 |

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### 7.3.2.21.6 Beacon Request

The Measurement Request field corresponding to a Beacon Request is shown in Figure 7-62e.

| | Regulatory Class | Channel Number | Randomization Interval | Measurement Duration |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 2 | 2 |

| | Measurement Mode | BSSID | Optional Subelements |
|---|---|---|---|
| **Octets:** | 1 | 6 | variable |

**Figure 7-62e—Measurement Request field format for Beacon Request**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement request applies. Channel Number is defined within a Regulatory Class as shown in Annex J. A Channel Number of 0 indicates a request to make iterative measurements for all supported channels in the Regulatory Class where the measurement is permitted on the channel and the channel is valid for the current regulatory domain. A Channel Number of 255 indicates a request to make iterative measurements for all supported channels in the current Regulatory Class listed in the latest AP Channel Report received from the serving AP. The procedures for iterative measurements on multiple channels are described in 11.10.8.1.

Randomization Interval specifies the upper bound of the random delay to be used prior to making the measurement, expressed in units of TUs. See 11.10.2.

The Measurement Duration field is set to the preferred or mandatory duration of the requested measurement, expressed in units of TUs. See 11.10.3.

Measurement Mode indicates the mode to be used for the measurement. The valid measurement modes are listed in Table 7-29e. The procedures for each mode are described in 11.10.8.1.

**Table 7-29e—Measurement Mode definitions for Beacon Request element**

| Mode | Value |
|---|---|
| Passive | 0 |
| Active | 1 |
| Beacon Table | 2 |
| Reserved | 3–255 |

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The BSSID field indicates the BSSID of the BSS(s) for which a beacon report is requested. When requesting beacon reports for all BSSs on the channel, the BSSID field contains the wildcard BSSID; otherwise the BSSID field contains a specific BSSID for a single BSS.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29f. A Yes in the Extensible column of a subelement listed in Table 7-29f indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-29f—Optional Subelement IDs for Beacon Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | SSID | 0 to 32 | |
| 1 | Beacon Reporting Information | 2 | Yes |
| 2 | Reporting Detail | 1 | Yes |
| 3–9 | Reserved | | |
| 10 | Request | 0 to 237 | |
| 11–50 | Reserved | | |
| 51 | AP Channel Report | 1 to 237 | |
| 52–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 237 | |
| 222–255 | Reserved | | |

The SSID subelement indicates the ESS(s) or IBSS(s) for which a beacon report is requested. When SSID is not included in a Beacon Request, the default “wildcard SSID” is used; otherwise the SSID is included in the Beacon Request and contains a specific SSID for a single ESS or IBSS. The wildcard SSID is used to represent all possible SSIDs. The SSID element is described in 7.3.2.1.

The Beacon Reporting Information subelement indicates the condition for issuing a Beacon Report. The Beacon Reporting Information subelement may be included in a Beacon Request only for repeated measurements. The Beacon Reporting Information subelement data field format is shown in Figure 7-62f and contains a 1-octet Reporting Condition subfield and a 1-octet Threshold/Offset Reference Value subfield. The Reporting Condition is described in Table 7-29g. The Threshold/Offset Reference Value provides either the threshold value or the offset value to be used for conditional reporting. For Reporting Conditions 1 to 4, the threshold value is an unsigned 8-bit integer in units of 0.5 dBm. For Reporting Conditions 5 to 10, the offset value is an 8-bit two’s complement integer in units of 0.5 dBm. The indicated

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Reporting Condition applies individually to each measured Beacon, Measurement Pilot, or Probe Response. Reporting Conditions are further described in 11.10.8.1.

| | Reporting Condition | Threshold/Offset Reference Value |
|---|---|---|
| **Octets:** | 1 | 1 |

**Figure 7-62f—Beacon Reporting Information data field format**

**Table 7-29g—Reporting Condition for Beacon Report**

| Condition for report to be issued in Repeated Measurement | Reporting Condition |
|---|---|
| Report to be issued after each measurement (default, used when Beacon Reporting Information subelement is not included in Beacon Request). | 0 |
| The measured RCPI level is greater than the threshold indicated in the Threshold/ Offset Reference Value. | 1 |
| The measured RCPI level is less the threshold indicated in the Threshold/Offset Reference Value. | 2 |
| The measured RSNI level is greater than the threshold indicated in the Threshold/ Offset Reference Value. | 3 |
| The measured RSNI level is less than the threshold indicated in the Threshold/Offset Reference Value. | 4 |
| The measured RCPI level is greater than a threshold defined by an offset from the serving AP's reference RCPI, where the offset is indicated in the Threshold/Offset Reference Value. | 5 |
| The measured RCPI level is less than a threshold defined by an offset from the serving AP's reference RCPI, where the offset is indicated in the Threshold/Offset Reference Value. | 6 |
| The measured RSNI level is greater than a threshold defined by an offset from the serving AP's reference RSNI, where the offset is indicated in the Threshold/Offset Reference Value. | 7 |
| The measured RSNI level is less than a threshold defined by an offset from the serving AP's reference RSNI, where the offset is indicated in the Threshold/Offset Reference Value. | 8 |
| The measured RCPI level is in a range bound by the serving AP's reference RCPI and an offset from the serving AP's reference RCPI, where the offset is indicated in the Threshold/Offset Reference Value. | 9 |
| The measured RSNI level is in a range bound by the serving AP's reference RSNI and an offset from the serving AP's reference RSNI, where the offset is indicated in the Threshold/Offset Reference Value. | 10 |
| Reserved | 11–255 |

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The Reporting Detail subelement contains a 1-octet Reporting Detail data field that defines the level of detail per AP to be reported to the requesting STA. The Reporting Detail values are defined in Table 7-29h. The indicated Reporting Detail applies individually to each measured Beacon, Measurement Pilot, or Probe Response. If the Reporting Detail equals 1, a Request information element can be included in the optional subelements field. If included, the Request information element lists the Element IDs of the elements requested to be reported in the Reported Frame Body of the Beacon Report.

**Table 7-29h—Reporting Detail values**

| Level of detail requested | Reporting Detail |
|---|---|
| No fixed length fields or elements | 0 |
| All fixed length fields and any requested elements in the Request information element if present | 1 |
| All fixed length fields and elements (default, used when Reporting Detail subelement is not included in Beacon Request) | 2 |
| Reserved | 3–255 |

The Request, AP Channel Report, and Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.12, 7.3.2.36, and 7.3.2.26, respectively). Multiple AP Channel Report and Vendor Specific subelements can be included in the list of Optional Subelements.

If one or more AP Channel Report elements are included, they indicate that iterative measurements are requested first on the channel(s) indicated by the Regulatory Class and Channel Number fields included in the Beacon Request, and second on the channel(s) indicated by the Regulatory Class and Channel List fields of each AP Channel Report element included in the Beacon Request. The procedures for iterative measurements on multiple channels are described in 11.10.8.1.

### 7.3.2.21.7 Frame Request

The Measurement Request field corresponding to a Frame Request is shown Figure 7-62g.

| | Regulatory Class | Channel Number | Randomiza-tion Interval | Measure-ment Duration | Frame Request Type | MAC Address | Optional sub-elements |
|---|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 2 | 2 | 1 | 6 | variable |

**Figure 7-62g—Measurement Request field format for Frame Request**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement request applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

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Randomization Interval specifies the upper bound of the random delay to be used prior to making the measurement, expressed in units of TUs. See 11.10.2.

The Measurement Duration field is set to the preferred or mandatory duration of the requested measurement, expressed in units of TUs. See 11.10.3.

The Frame Request Type indicates which subelements are requested in the Frame Report. The value of 1 signifies that a Frame Count Report is requested. The values 0 and 2 to 255 are reserved.

If the MAC Address field is the wildcard address, then all frames are counted towards the Frame Report generated in response to this Frame Request. For other MAC addresses, only frames matching this MAC address as the Transmitter Address are counted towards the Frame Report generated in response to this Frame Request.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29i. A Yes in the Extensible column of a subelement listed in Table 7-29i indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

**Table 7-29i—Optional Subelement IDs for Frame Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 237 | |
| 222–255 | Reserved | | |

### 7.3.2.21.8 STA Statistics Request

The Measurement Request field corresponding to a STA Statistics Request is shown in Figure 7-62h.

| | Peer MAC Address | Randomization Interval | Measurement Duration | Group Identity | Optional Subelements |
|---|---|---|---|---|---|
| **Octets:** | 6 | 2 | 2 | 1 | variable |

**Figure 7-62h—Measurement Request field format for STA Statistics Request**

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The Peer MAC Address field is the RA or TA MAC address for the frame statistics of this measurement.

Randomization Interval specifies the upper bound of the random delay to be used prior to making the measurement, expressed in units of TUs. See 11.10.2.

The Measurement Duration field is set to the duration of the requested measurement in TUs.

Group Identity indicates the requested statistics group according to Table 7-29j.

**Table 7-29j—Group Identity for a STA Statistics Request**

| Statistics Group Name | Group Identity |
|---|---|
| STA Counters from dot11CountersTable | 0 |
| STA Counters from dot11MacStatistics group | 1 |
| QoS STA Counters for UP0 from dot11QosCountersTable | 2 |
| QoS STA Counters for UP1 from dot11QosCountersTable | 3 |
| QoS STA Counters for UP2 from dot11QosCountersTable | 4 |
| QoS STA Counters for UP3 from dot11QosCountersTable | 5 |
| QoS STA Counters for UP4 from dot11QosCountersTable | 6 |
| QoS STA Counters for UP5 from dot11QosCountersTable | 7 |
| QoS STA Counters for UP6 from dot11QosCountersTable | 8 |
| QoS STA Counters for UP7 from dot11QosCountersTable | 9 |
| BSS Average Access Delays as described in 7.3.2.39 and 7.3.2.44 | 10 |
| Reserved | 11–255 |

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29k. A Yes in the Extensible column of a subelement listed in Table 7-29k indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

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**Table 7-29k—Optional Subelement IDs for STA Statistics Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 239 | |
| 222–255 | Reserved | | |

### 7.3.2.21.9 Location Configuration Information Request

The Measurement Request field corresponding to an LCI request is shown in Figure 7-62i.

| | Location Subject | Latitude Requested Resolution | Longitude Requested Resolution | Altitude Requested Resolution | Optional Subelements |
|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 | variable |

**Figure 7-62i—Measurement Request field format for LCI Request**

The Location Subject field of a LCI request is a single octet. See Table 7-29l.

**Table 7-29l—Location subject definition**

| Value | Location Subject |
|---|---|
| 0 | LCI Subject Local |
| 1 | LCI Subject Remote |
| 2–255 | Reserved |

The term Local refers to the location of the requesting STA, and Remote refers to the location of the reporting STA.

NOTE—Local LCI Measurement Request is used by requesting STA to obtain its own location, asking “Where am I?”. Remote LCI Measurement Request is used by requesting STA to obtain the location of the reporting STA, asking “Where are you?”.

Latitude Requested Resolution is the number of valid most significant bits requested for the fixed-point value of Latitude in degrees. Values above 34 (decimal), the specified maximum number of bits of Latitude, are reserved.

Longitude Requested Resolution is the number of valid most significant bits requested for the fixed-point value of Longitude in degrees. Values above 34 (decimal), the specified maximum number of bits of Longitude, are reserved.

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Altitude Requested Resolution is the number of valid most significant bits requested for the Altitude, which has either of two types, as described in 7.3.2.22.9. Values above 30 (decimal), the specified maximum number of bits of Altitude, are reserved.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29m. A Yes in the Extensible column of a subelement listed in Table 7-29m indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-29m—Optional Subelement IDs for LCI Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Azimuth Request | 1 | Yes |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 246 | |
| 222–255 | Reserved | | |

The Azimuth Request subelement is present when requesting azimuth information. The Azimuth Request subelement is as shown in Figure 7-62j.

| | Subelement ID | Length | Azimuth Request |
|---|---|---|---|
| **Octets:** | 1 | 1 | 1 |

**Figure 7-62j—Azimuth Request subelement format**

The value of the subelement ID is equal to the Azimuth Request value in Table 7-29m.

The Length field value is set to 1.

The Azimuth Request field of an Azimuth Request subelement is shown in Figure 7-62k.


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| | B0-B3 | B4 | B5 B6 B7 |
|---|---|---|---|
| | Azimuth Resolution Requested | Azimuth Type | Reserved |
| **Bits:** | 4 | 1 | 3 |

**Figure 7-62k—Azimuth Request field**

Azimuth Resolution Requested is the number of valid most significant bits requested for the fixed-point value of Azimuth, reported in integer degrees. Values above 9 are reserved.

Azimuth Type (bit 4) is set to 1 to request a report of the Azimuth of radio reception and is set to 0 to request a report of the Azimuth of front surface of the reporting STA.

NOTE—A geographic feature is an abstraction of a real world phenomenon; it is a geographic feature if it is associated with a location relative to the Earth. The designation of a horizontal plane is relative to the Earth. The designation of the "front surface" of a station is arbitrary, but refers to an orientable surface (possessing a centerline) of the station. It is common to use a direction cosine matrix to convert from one coordinate system to another, i.e., body-centered coordinates to earth-centered coordinates.

The Vendor Specific subelement has the same format as the Vendor Specific element (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.21.10 Transmit Stream/Category Measurement Request

The Transmit Stream/Category Measurement applies to TIDs for Traffic Streams associated with TSPECs and also to TIDs for Traffic Categories for QoS traffic without TSPECs. The Measurement Request field corresponding to a Transmit Stream/Category Measurement Request is shown in Figure 7-62l.

| | Randomization Interval | Measurement Duration | Peer STA Address | Traffic Identifier | Bin 0 Range | Optional Subelements |
|---|---|---|---|---|---|---|
| **Octets:** | 2 | 2 | 6 | 1 | 1 | variable |

**Figure 7-62l—Measurement Request field format for Transmit Stream/Category Measurement Request**

Randomization Interval is set to the desired maximum random delay in the measurement start time, expressed in units of TUs. The use of Randomization Interval is described in 11.10.2. When requesting a triggered Transmit Stream/Category Measurement, Randomization Interval is not used and is set to 0. See 11.10.8.8.

The Measurement Duration is set to the duration of the requested measurement, expressed in units of TUs except when setting up a triggered QoS measurement, when it is not used and is set to 0.

The Peer STA Address contains a MAC address indicating the RA in the MSDUs to be measured.

The Traffic Identifier field contains the TID subfield as shown in Figure 7-62m.

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| | B0 B3 | B4 B7 |
|---|---|---|
| | Reserved | TID |
| **Bits:** | 4 | 4 |

**Figure 7-62m—Traffic Identifier field**

The TID subfield indicates the TC or TS for which traffic is to be measured.

Bin 0 Range indicates the delay range of the first bin (Bin 0) of the Transmit Delay Histogram, expressed in units of TUs. The Bin 0 Range value is used to calculate the delay ranges of the other 5 bins making up the histogram. The delay range for each bin increases in a binary exponential fashion as described in 7.3.2.22.10.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. The optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29n. A Yes in the Extensible column of a subelement listed in Table 7-29n indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-29n—Optional Subelement IDs for Transmit Stream/Category Measurement Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Triggered Reporting | 6 | Yes |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 238 | |
| 222–255 | Reserved | | |

The Triggered Reporting subelement is used to specify measurement trigger thresholds. It is only present if requesting triggered transmit stream/category measurement reporting. The Triggered Reporting subelement field format is shown in Figure 7-62n.


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| | Subelement ID | Length | Triggered Reporting |
|---|---|---|---|
| **Octets:** | 1 | 1 | 6 |

**Figure 7-62n—Triggered Reporting subelement format**

The value of the subelement ID is equal to the Triggered Reporting value in Table 7-29n.

The value of the Length field in octets is equal to 6.

The Triggered Reporting field is as shown in Figure 7-62o.

| | Trigger Conditions | Average Error Threshold | Consecutive Error Threshold | Delay Threshold | Measurement Count | Trigger Time-out |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 7-62o—Triggered Reporting field**

Trigger Conditions is a bit-field that specifies reporting triggers when requesting a triggered transmit stream/category measurement. The format of the Trigger Conditions bit-field is shown in Figure 7-62p.

| | B0 | B1 | B2 | B3 B7 |
|---|---|---|---|---|
| | Average | Consecutive | Delay | Reserved |
| **Bits:** | 1 | 1 | 1 | 5 |

**Figure 7-62p—Trigger Conditions bit-field**

— Average is set to 1 to request that a Transmit Stream/Category Measurement Report be generated when the number of MSDUs for the TC or TS given by the TID that are discarded out of the number of preceding MSDUs specified in Measurement Count is greater than or equal to the value given in Average Error Threshold. MSDUs discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit or dot11LongRetryLimit, or due to the MSDU lifetime having been reached, are counted.

— Consecutive is set to 1 to request that a Transmit Stream/Category Measurement Report be generated when the number of MSDUs for the TC or TS given by the TID that are discarded in succession is greater than or equal to the value given in Consecutive Error Threshold. MSDUs discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit or dot11LongRetryLimit, or due to the MSDU lifetime having been reached, are counted.

— Delay is set to 1 to request that a Transmit Stream/Category Measurement Report be generated when the number of consecutive MSDUs for the TC, or TS given by the TID that experience a transmit delay greater than or equal to the value specified in the Delay Threshold subfield, is greater than or equal to the value given in Delayed MSDU Count. Delay is measured from the time the MSDU is passed to the MAC until the point at which the entire MSDU has been successfully transmitted, including receipt of the final ACK from the peer STA if the QoSAck service class is being used.

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The Average Error Threshold field contains a value representing the number of discarded MSDUs to be used as the threshold value for the Average trigger condition.

The Consecutive Error Threshold field contains a value representing the number of discarded MSDUs to be used as the threshold value for the Consecutive trigger condition.

The Delay Threshold field contains two subfields as shown in Figure 7-62q.

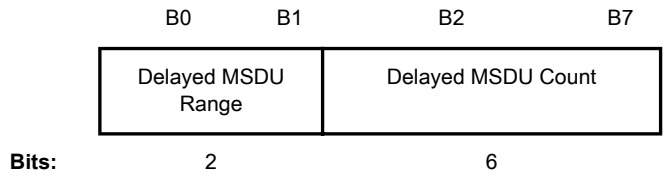


**Figure 7-62q—Delay Threshold subfield**

Delayed MSDU Range contains a value representing the MSDU transmit delay at or above which an MSDU will be counted towards the Delayed MSDU Count threshold. Delayed MSDU Range is encoded as a value representing the lower bound of a bin in the Transmit Delay Histogram as shown in Table 7-29o. The Transmit Delay Histogram is defined in 7.3.2.22.10.

**Table 7-29o—Delayed MSDU Range Definitions**

| Delayed MSDU Range | Condition |
|---|---|
| 0 | Transmit Delay = Lower Bound of Bin 2 |
| 1 | Transmit Delay = Lower Bound of Bin 3 |
| 2 | Transmit Delay = Lower Bound of Bin 4 |
| 3 | Transmit Delay = Lower Bound of Bin 5 |

Delayed MSDU Count contains a value representing the number of MSDUs to be used as the threshold value for the Delay trigger condition.

The Measurement Count field contains a number of MSDUs. This value is used to calculate an average discard count for the Average trigger condition. It is also used in place of measurement duration in determining the scope of the reported results when a report is triggered; see 11.10.8.8.

The Trigger Timeout field contains a value, expressed in units of 100 TU, during which a measuring STA will not generate further triggered transmit stream/category measurement reports after a trigger condition has been met. See 11.10.8.8.

The Vendor Specific subelement has the same format as the Vendor Specific element (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

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### 7.3.2.21.11 Measurement Pause Request

The Measurement Request field corresponding to a Measurement Pause Request is shown in Figure 7-62r. The Measurement Pause Request cannot be processed in parallel with any other Measurement Request. See 11.10.8.7.

| | Pause Time | Optional Subelements |
|---|---|---|
| **Octets:** | 2 | variable |

**Figure 7-62r—Measurement Request field format for Measurement Pause Request**

The Pause Time field contains a number between 1 and 65 535 representing the time period for which measurements are suspended or paused. The time unit for the Pause Time is 10 TUs. The Pause Time value 0 is reserved. Measurement Pause Requests are used to provide time delays between the execution times of measurement request elements in a Measurement Request frame.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-29p. A Yes in the Extensible column of a subelement listed in Table 7-29p indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-29p—Optional Subelement IDs for Measurement Pause Request**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 248 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.22 Measurement Report element

***Change 7.3.2.22 as follows:***

The Measurement Report element contains a measurement report. The format of the Measurement Report element is shown in Figure 7-63. The Measurement Report element is included in Spectrum Management Measurement Report frames as described in 7.4.1.2, or Radio Measurement Report frames as described in 7.4.6.2. Measurement Types 0, 1, and 2 are used for spectrum management and are only included in

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spectrum management Measurement Report frames. All other Measurement Types are used for radio measurement and are only included in Radio Measurement Report frames. The use of Measurement Report elements and frames for spectrum management is described in 11.9.6. The use of Measurement Report elements and frames for radio measurement is described in 11.10.

| | Element ID | Length | Measurement Token | Measurement Report Mode (see Figure 7-64) | Measurement Type | Measurement Report |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 | 1 | variable |

**Figure 7-63—Measurement Report element format**

| | Late | Incapable | Refused | Reserved |
|---|---|---|---|---|
| **Bit:** | 0 | 1 | 2 | 3-7 |

**Figure 7-64—Measurement Report Mode field**

The value of the Length field in octets is variable and depends on the length of the Measurement Report field. The minimum value of the Length field is 3.

The Measurement Token field is ~~shall be~~ set to the Measurement Token in the corresponding Measurement Request element. If the Measurement Report element is being sent autonomously, then the Measurement Token is set to 0.

The Measurement Report Mode field (shown in Figure 7-64) is used to indicate the reason for a failed or rejected measurement request. The Measurement Report Mode is a bit field with the following bits defined:

— Late bit (bit 0) indicates whether this STA is unable to carry out a measurement request because it received the request after the requested measurement time. The Late bit is ~~shall be~~ set to 1 to indicate the request was too late. The Late bit is ~~shall be~~ set to 0 to indicate the request was received in time for the measurement to be executed. The Late bit only applies to spectrum management measurement and is set to 0 in all measurement report elements for radio resource measurement types (see Table 7-30).

— Incapable bit (bit 1) indicates whether this STA is incapable of generating a report of the type specified in the Measurement Type field that was previously requested by the destination STA of this Measurement Report element. The Incapable bit is ~~shall be~~ set to 1 to indicate the STA is incapable. The Incapable bit is ~~shall be~~ set to 0 to indicate the STA is capable or the report is autonomous.

— Refused bit (bit 2) indicates whether this STA is refusing to generate a report of the type specified in the Measurement Type field that was previously requested by the destination STA of this Measurement Report element. The Refused bit is ~~shall be~~ set to 1 to indicate the STA is refusing. The Refused bit is ~~shall be~~ set to 0 to indicate the STA is not refusing or the report is autonomous.

— All other bits are reserved ~~and shall be set to 0~~.

No more than one bit is set within a Measurement Report Mode field. All bits within the Measurement Mode field are set to 0 if the results of a successful measurement request or an autonomous measurement are being reported.

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The Measurement Type field is ~~shall be~~ set to a number that identifies the measurement report. Those Measurement Types that have been allocated are shown in Table 7-30.

The Measurement Report field ~~shall be null~~ is not present when the Late bit is set to 1, the Incapable bit is set to 1, or the Refused bit is set to 1. Otherwise, it ~~shall~~ contains ~~the specification of the~~ a single measurement report, as described in 7.3.2.22.1 through 7.3.2.22.~~3~~10.

**Table 7-30—Measurement Type definitions for measurement reports**

| Name | Measurement Type | Measurement Use |
|---|---|---|
| Basic report | 0 | Spectrum Management |
| CCA report | 1 | |
| RPI histogram report | 2 | |
| Channel load report | 3 | Radio Resource Measurement |
| Noise histogram report | 4 | |
| Beacon report | 5 | |
| Frame report | 6 | |
| STA statistics report | 7 | |
| LCI report | 8 | |
| Transmit stream/category measurement report | 9 | |
| Reserved | ~~3~~10–255 | N/A |

~~The Measurement Report element is included in a Measurement Report frame as described in 7.4.1.2. The use of Measurement Report elements and frames is described in 11.6.6.~~

***Insert the following subclauses after 7.3.2.22.3:***

### 7.3.2.22.4 Channel Load Report

The format of the Measurement Report field corresponding to a Channel Load Report is shown in Figure 7-68a.

| | Regulatory Class | Channel Number | Actual Measurement Start Time | Measurement Duration | Channel Load | Optional Subelements |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 8 | 2 | 1 | variable |

**Figure 7-68a—Measurement Report field format for Channel Load Report**

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Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement report applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

Actual Measurement Start Time is set to the value of the measuring STA's TSF timer at the time the measurement started.

Measurement Duration is set to the duration over which the Channel Load Report was measured, expressed in units of TUs.

Channel Load contains the proportion of measurement duration for which the measuring STA determined the channel to be busy. Procedure for Channel Load measurement and definition of channel load values are found in 11.10.8.3.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31a. A Yes in the Extensible column of a subelement listed in Table 7-31a indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-31a—Optional Subelement IDs for Channel Load Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 237 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.22.5 Noise Histogram Report

The format of the Measurement Report field of a Noise Histogram Report is shown in Figure 7-68b.

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| | Regulatory Class | Channel Number | Actual Measurement Start Time | Measurement Duration | Antenna ID | ANPI |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 8 | 2 | 1 | 1 |

| | IPI 0 Density | IPI 1 Density | IPI 2 Density | . . . | IPI 8 Density | IPI 9 Density | IPI 10 Density | Optional sub-elements |
|---|---|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 5 | 1 | 1 | 1 | variable |

**Figure 7-68b—Measurement Report field format for Noise Histogram Report**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement report applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

Actual Measurement Start Time is set to the value of the measuring STA's TSF timer at the time the measurement started.

Measurement Duration is set to the duration over which the Noise Histogram Report was measured, expressed in units of TUs.

Antenna ID is set to the identifying number for the antenna(s) used for this measurement. Antenna ID is defined in 7.3.2.40.

ANPI is set to the average noise plus interference power value measured during the indicated Measurement Duration while the indicated channel is idle as described in 11.10.8.4.

The Noise Histogram Report contains the IPI densities, as defined in 11.10.8.4, observed in the channel for the eleven IPI levels defined in Table 7-31b.

**Table 7-31b—IPI Definitions for a Noise Histogram Report**

| IPI Level | IPI Measured Power (dBm) |
|---|---|
| 0 | IPI ≤ – 92 |
| 1 | –92 < IPI ≤ –89 |
| 2 | –89 < IPI ≤ –86 |
| 3 | –86 < IPI ≤ –83 |
| 4 | –83 < IPI ≤ –80 |
| 5 | –80 < IPI ≤ –75 |

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**Table 7-31b—IPI Definitions for a Noise Histogram Report *(continued)***

| IPI Level | IPI Measured Power (dBm) |
|---|---|
| 6 | –75 < IPI ≤ –70 |
| 7 | –70 < IPI ≤ –65 |
| 8 | –65 < IPI ≤ –60 |
| 9 | –60 < IPI ≤ –55 |
| 10 | –55 < IPI |

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31c. A Yes in the Extensible column of a subelement listed in Table 7-31c indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-31c—Optional Subelement IDs for Noise Histogram Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 225 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.22.6 Beacon Report

The format of the Measurement Report field corresponding to a Beacon Report is shown in Figure 7-68c.


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| | Regulatory Class | Channel Number | Actual Measurement Start Time | Measurement Duration | Reported Frame Information |
|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 8 | 2 | 1 |

| | RCPI | RSNI | BSSID | Antenna ID | Parent TSF | Optional Sub-elements |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 6 | 1 | 4 | variable |

**Figure 7-68c—Measurement Report field format for Beacon Report**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement report applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

Actual Measurement Start Time is set to the value of the measuring STA's TSF timer at the time the measurement started.

Measurement Duration is set to the duration over which the Beacon Report was measured, expressed in units of TUs.

The Length field equals the length of the remaining fields in the Beacon Report field excluding the optional subelements in units of octets, and is equal to 14 plus the number of octets in the Reported Frame Body.

The Reported Frame Information field contains two subfields as shown in Figure 7-68d.

| | B0 B6 | B7 |
|---|---|---|
| | Condensed PHY Type | Reported Frame Type |
| **Bits:** | 7 | 1 |

**Figure 7-68d—Reported Frame Information field**

Condensed PHY Type indicates the physical medium type on which the Beacon, Measurement Pilot, or Probe Response frame being reported was received. It has an integer value between 0 and 127 coded according to the value of dot11PHYType.

Reported Frame Type indicates the type of frame reported. A value of 0 indicates a Beacon or Probe Response frame; a value of 1 indicates a Measurement Pilot frame.

RCPI indicates the received channel power of the Beacon, Measurement Pilot, or Probe Response frame in dBm, as defined in the RCPI measurement clause for the indicated PHY Type.

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RSNI indicates the received signal to noise indication for the Beacon, Measurement Pilot, or Probe Response frame in dB, as described in 7.3.2.41.

The BSSID field contains the BSSID from the Beacon, Measurement Pilot, or Probe Response frame being reported.

The Antenna ID field contains the identifying number for the antenna(s) used for this measurement. Antenna ID is defined in 7.3.2.40.

The Parent TSF field contains the lower 4 octets of the measuring STA's TSF timer value at the start of reception of the first octet of the timestamp field of the reported Beacon, Measurement Pilot, or Probe Response frame at the time the Beacon, Measurement Pilot, or Probe Response frame being reported was received.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31d. A Yes in the Extensible column of a subelement listed in Table 7-31d indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-31d—Optional Subelement IDs for Beacon Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Reported Frame Body | 0 to 224 | |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 224 | |
| 222–255 | Reserved | | |

The Reported Frame Body subelement contains the requested fields and elements of the frame body of the reported Beacon, Measurement Pilot, or Probe Response frame. If the Reporting Detail subelement of the corresponding Beacon Request equals 0, the Reported Frame Body subelement is not included in the Beacon Report. If the Reporting Detail subelement equals 1, all fixed fields and any information elements whose Element IDs are present in the Request information element in the corresponding Beacon Request are included in the Reported Frame Body subelement, in the order that they appeared in the reported frame. If the Reporting Detail field equals 2, all fixed fields and information elements are included in the order they appeared in the reported frame. Reported TIM elements are truncated such that only the first 4 octets of the element are reported and the element length field is modified to indicate the truncated length of 4. If the Reported Frame Body subelement would cause the Measurement Report element to exceed the maximum information element size, then the Reported Frame Body subelement is truncated so that the last information element in the Reported Frame Body subelement is a complete information element.

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The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.22.7 Frame Report

The format of the Measurement Report field corresponding to a Frame Report is shown in Figure 7-68e.

| | Regulatory Class | Channel Number | Actual Measurement Start Time | Measurement Duration | Optional Subelements |
|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 8 | 2 | variable |

**Figure 7-68e—Measurement Report field format for Frame Report**

Regulatory Class indicates the channel set for which the measurement request applies. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for which the measurement request applies. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the channel number for which the measurement report applies. Channel Number is defined within a Regulatory Class as shown in Annex J.

Actual Measurement Start Time is set to the value of the measuring STA's TSF timer at the time the measurement started.

Measurement Duration is set to the duration over which the Frame Report was measured, expressed in units of TUs.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. The optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31e. A Yes in the Extensible column of a subelement listed in Table 7-31e indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-31e—Optional Subelement IDs for Frame Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Frame Count Report | 0 to 228 | |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 238 | |
| 222–255 | Reserved | | |

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The Frame Count Report subelement is used to report information about frames sent by a transmitter. The Frame Count Report subelement is as shown in Figure 7-68f.

| | | | Zero or more entries |
|---|---|---|---|
| | Subelement ID | Length | Frame Report Entry |
| **Octets:** | 1 | 1 | n x 19 |

**Figure 7-68f—Frame Count Report subelement format**

The value of the subelement ID is equal to the Frame Count Report value in Table 7-31e.

The Length field value is equal to 19 times the number of Frame Count Report Entries included.

The format of the Frame Report Entry is shown in Figure 7-68g.

| | Transmit Address | BSSID | PHY Type | Aver-age RCPI | Last RSNI | Last RCPI | Antenna ID | Frame Count |
|---|---|---|---|---|---|---|---|---|
| **Octets:** | 6 | 6 | 1 | 1 | 1 | 1 | 1 | 2 |

**Figure 7-68g—Frame Report Entry field format**

The Transmit Address field contains the Transmitter Address (TA) from the frames being reported.

The BSSID field contains the BSSID from the frames being reported.

PHY Type indicates the physical medium type for the frame(s) being reported. Valid entries are coded according to the value of dot11PHYType.

Average RCPI indicates the average value for the received channel power of frames received and counted in this Frame Report Entry as described in 11.10.8.2. Average RCPI is reported in dBm, as defined in the RCPI measurement clause for the PHY Type.

Last RSNI indicates the received signal to noise indication of the most recently measured frame counted in this Frame Report Entry in dB, as described in 7.3.2.41.

Last RCPI indicates the received channel power of the most recently measured frame counted in this Frame Report entry. Last RCPI is reported in dBm, as defined in the RCPI measurement clause for the PHY Type.

The Antenna ID field contains the identifying number for the antenna(s) used to receive the most recently measured frame counted in this Frame Report entry. Antenna ID is defined in 7.3.2.40.

Frame Count is a count of the data and management frames received with the indicated Transmit Address and BSSID during the measurement duration. The value 65 535 indicates a count of 65 535 or more.

The Vendor Specific subelement has the same format as the Vendor Specific element (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

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### 7.3.2.22.8 STA Statistics Report

The format of the Measurement Report field of a STA Statistics Report is shown in Figure 7-68h.

| | Measurement Duration | Group Identity | Statistics Group Data | Optional Subelements |
|---|---|---|---|---|
| **Octets:** | 2 | 1 | variable | variable |

**Figure 7-68h—Measurement Report field format for STA Statistics Report**

The STA Statistics Report reports the change in the requested Statistics Group Data values measured within the Measurement Duration. When the Measurement Duration is set to 0 the current values of the requested Statistics Group Data is reported, rather than the change.

The Measurement Duration is set to the duration over which the change in Statistics Group Data was measured and reported, expressed in units of TUs. A Measurement Duration value of 0 indicates a report of the current values of the Statistics Group Data.

Group Identity indicates the requested statistics group describing the Statistics Group Data according to Table 7-31f.

Statistics Group Data contains the requested statistics from the MIB in Annex D or Annex Q related to the interface on which the request was received according to Table 7-31f. Units used for reporting a statistic or change in statistic are the units used to define the statistic in Annex D or Annex Q. When Measurement Duration value is non-zero, the reported data values for statistics that are not counters are the current values of the statistics data at the end of the Measurement Duration.

**Table 7-31f—Group Identity for a STA Statistics Report**

| Group Identity Requested | Statistics Group Data field length (octets) | Statistics Returned |
|---|---|---|
| 0 | 28 | dot11Counters Group for the Interface on which the STA Statistics Request was received (with the exception of WEPUndecryptableCount and those counters listed in Group Identity 1):<br><br>dot11TransmittedFragmentCount (Counter32),<br>dot11MulticastTransmittedFrameCount (Counter32),<br>dot11FailedCount (Counter32),<br>dot11ReceivedFragmentCount (Counter32),<br>dot11MulticastReceivedFrameCount (Counter32),<br>dot11FCSErrorCount (Counter32),<br>dot11TransmittedFrameCount (Counter32) |

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**Table 7-31f—Group Identity for a STA Statistics Report *(continued)***

| Group Identity Requested | Statistics Group Data field length (octets) | Statistics Returned |
|---|---|---|
| 1 | 24 | dot11MACStatistics Group for the Interface on which the STA Statistics Request was received:<br><br>dot11RetryCount (Counter32),<br>dot11MultipleRetryCount (Counter32),<br>dot11FrameDuplicateCount (Counter32),<br>dot11RTSSuccessCount (Counter32),<br>dot11RTSFailureCount (Counter32),<br>dot11ACKFailureCount (Counter32) |
| 2 | 52 | dot11QosCounters Group for UP0 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |
| 3 | 52 | dot11QosCounters Group for UP1 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |


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**Table 7-31f—Group Identity for a STA Statistics Report *(continued)***

| Group Identity Requested | Statistics Group Data field length (octets) | Statistics Returned |
|---|---|---|
| 4 | 52 | dot11QosCounters Group for UP2 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |
| 5 | 52 | dot11QosCounters Group for UP3 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |
| 6 | 52 | dot11QosCounters Group for UP4 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |

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**Table 7-31f—Group Identity for a STA Statistics Report *(continued)***

| Group Identity Requested | Statistics Group Data field length (octets) | Statistics Returned |
|---|---|---|
| 7 | 52 | dot11QosCounters Group for UP5 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |
| 8 | 52 | dot11QosCounters Group for UP6 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |
| 9 | 52 | dot11QosCounters Group for UP7 for the Interface on which the STA Statistics Request was received:<br><br>dot11QosTransmittedFragmentCount (Counter32),<br>dot11QosFailedCount (Counter32),<br>dot11QosRetryCount (Counter32),<br>dot11QosMultipleRetryCount (Counter32),<br>dot11QosFrameDuplicateCount (Counter32),<br>dot11QosRTSSuccessCount (Counter32),<br>dot11QosRTSFailureCount (Counter32),<br>dot11QosACKFailureCount (Counter32),<br>dot11QosReceivedFragmentCount (Counter32),<br>dot11QosTransmittedFrameCount (Counter32),<br>dot11QosDiscardedFrameCount (Counter32),<br>dot11QosMPDUsReceivedCount (Counter32),<br>dot11QosRetriesReceivedCount (Counter32) |


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**Table 7-31f—Group Identity for a STA Statistics Report *(continued)***

| Group Identity Requested | Statistics Group Data field length (octets) | Statistics Returned |
|---|---|---|
| 10 | 7 | dot11BSSAverageAccessDelay Group (only available at an AP):<br><br>dot11STAStatisticsAPAverageAccessDelay (INTEGER),<br>dot11STAStatisticsAverageAccessDelayBestEffort (INTEGER),<br>dot11STAStatisticsAverageAccessDelayBackGround (INTEGER),<br>dot11STAStatisticsAverageAccessDelayVideo (INTEGER),<br>dot11STAStatisticsAverageAccessDelayVoice (INTEGER),<br>dot11STAStatisticsStationCount (INTEGER),<br>dot11STAStatisticsChannelUtilization (INTEGER) |
| 11–255 | | Reserved |

The format of the Measurement Report field for dot11Counters Group is shown in Figure 7-68i.

| | dot11TransmittedFragmentCount | dot11MulticastTransmittedFrameCount | dot11FailedCount | dot11ReceivedFragmentCount | dot11MulticastReceivedFrameCount |
|---|---|---|---|---|---|
| **Octets:** | 4 | 4 | 4 | 4 | 4 |

| | dot11FCSErrorCount | dot11transmittedFrameCount |
|---|---|---|
| **Octets:** | 4 | 4 |

**Figure 7-68i—Measurement Report field format for dot11Counters Group**

The format of the Measurement Report field for dot11MACStatistics is shown in Figure 7-68j.

| | dot11RetryCount | dot11MultipleRetryCount | Dot11FrameDuplicateCount | dot11RTSSuccessCount | dot11RTSFailureCount |
|---|---|---|---|---|---|
| **Octets:** | 4 | 4 | 4 | 4 | 4 |

| | dot11ACKFailureCount |
|---|---|
| **Octets:** | 4 |

**Figure 7-68j—Measurement Report field format for dot11MACStatistics Group**

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The format of the Measurement Report field for dot11QosCounters Group for UPx is shown in Figure 7-68k, where x is 0 – 7 and where the listed variables are obtained from the column of the QoS Counters Table indexed by x + 1. For example, the variables for dot11QosCounters Group for UP2 are from the third column of the dot11QosCountersTable, obtained from the dot11QosCountersEntry in which dot11QosCountersIndex is set to 3.

| | | | | | |
|---|---|---|---|---|---|
| | dot11Qos Transmitted Fragment Count | dot11Qos FailedCount | dot11Qos RetryCount | dot11Qos Multiple RetryCount | dot11Qos Frame DuplicateCount |
| **Octets:** | 4 | 4 | 4 | 4 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| | dot11Qos RTS SuccessCount | dot11Qos RTS FailureCount | dot11Qos ACK FailureCount | dot11Qos Received FragmentCount | dot11Qos Transmitted Frame Count |
| **Octets:** | 4 | 4 | 4 | 4 | 4 |

| | | | |
|---|---|---|---|
| | dot11Qos Discarded FrameCount | dot11Qos MPDUs ReceivedCount | dot11Qos Retries ReceivedCount |
| **Octets:** | 4 | 4 | 4 |

**Figure 7-68k—Measurement Report field format for dot11QosCounters Group for UPx**

The format of the Measurement Report field for dot11BSSAverageAccessDelay Group is shown in Figure 7-68l. Non-QoS APs set dot11STAStatisticsAverageAccessDelayBestEffort, dot11STA-StatisticsAverageAccessDelayBackGround, dot11STAStatisticsAverageAccessDelayVideo, and dot11STAStatisticsAverageAccessDelayVoice to 255 (not available).


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| | | | | | |
|---|---|---|---|---|---|
| | dot11STA StatisticsAP AverageAccess Delay | dot11STA Statistics AverageAccess DelayBestEffort | dot11STA Statistics AverageAccess Delay BackGround | dot11STA Statistics AverageAccess DelayVideo | dot11STA Statistics AverageAccess DelayVoice |
| **Octets:** | 1 | 1 | 1 | 1 | 1 |

| | | |
|---|---|---|
| | dot11STA Statistics StationCount | dot11STA Statistics Channel Utilization |
| **Octets:** | 2 | 1 |

**Figure 7-68l—Measurement Report field format for dot11BSSAverageAccessDelay Group**

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31g. A Yes in the Extensible column of a subelement listed in Table 7-31g indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-31g—Optional Subelement IDs for STA Statistics Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 240 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.22.9 Location Configuration Information Report

An LCI Report includes Latitude, Longitude, Altitude, and optional Azimuth information. The LCI report format is shown in Figure 7-68m.

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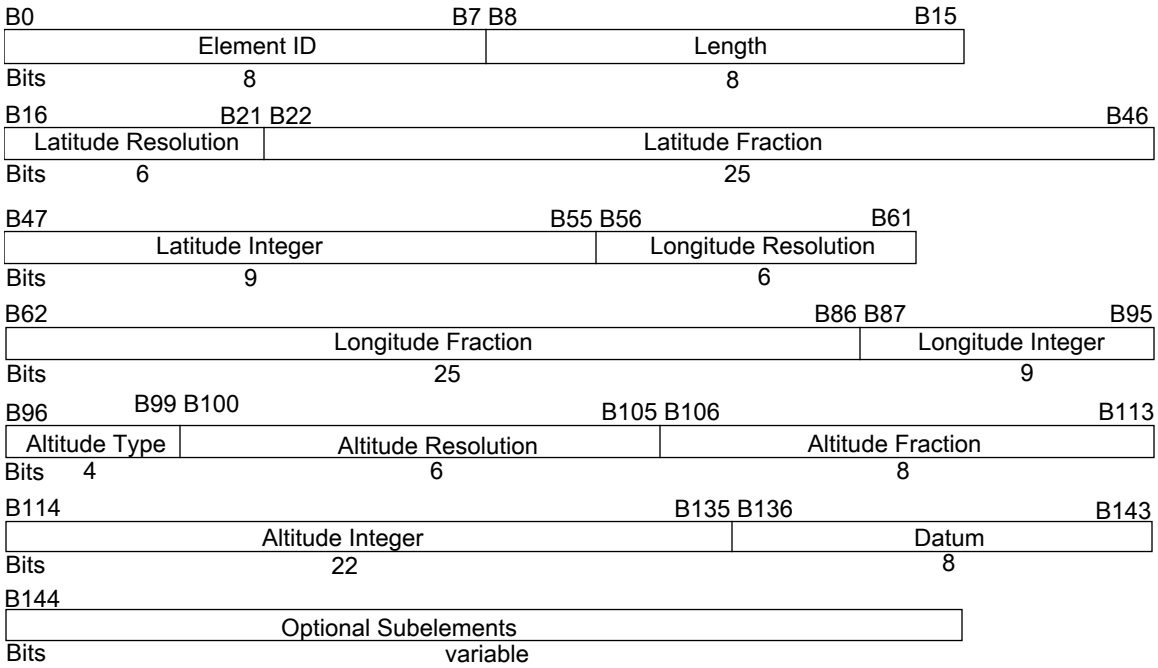


**Figure 7-68m—Measurement Report field format for Location Configuration Information Report**

This structure and information fields are little-endian, per conventions defined in 7.1.1, and are based on the LCI format described in IETF RFC 3825.

The definition of elements within the LCI report are as defined in IETF RFC 3825, 2.1, or as defined herein.

NOTE—An example of fixed/fractional notation, using the longitude of the Sears Tower from IETF RFC 3825, July 2004, p. 13:

> Longitude 87.63602 degrees West (or –87.63602 degrees),
> Using 2s complement, 34 bit fixed point, 25 bit fraction,
> Longitude = 0xf50ba5b97,
> Longitude = 1101010000101110100101101110010111 (big-endian)
> DSE registered location expression for a Longitude resolution of 34-bits:
> Bits 56–61 Longitude resolution = (bit 56) 0 1 0 0 0 1 (bit 61)
> Bits 62–86 Longitude fraction = (bit 62) 1 1 1 0 1 0 0 1 1 1 0 1 1 0 1 0 0 1 0 1 1 1 0 1 0 (bit 86)
> Bits 87–95 Longitude integer = (bit 87) 0 0 0 1 0 1 0 1 1 (bit 95)
>
> The octets in transmission order = E2 E5 96 2E D4.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31h. A Yes in the Extensible column of a subelement listed in Table 7-31h indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

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**Table 7-31h—Optional Subelement IDs for Location Configuration Information Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | Azimuth Report | 2 | Yes |
| 2–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 232 | |
| 222–255 | Reserved | | |

The Azimuth Report subelement is used to report an azimuth. The Azimuth Report subelement is as shown in Figure 7-68n.

| | Subelement ID | Length | Azimuth Report |
|---|---|---|---|
| **Octets:** | 1 | 1 | 2 |

**Figure 7-68n—Azimuth Report subelement format**

The value of the subelement ID is equal to the Azimuth Report value in Table 7-31h.

The value of the Length field in octets is equal to 1.

The Azimuth Report field of an Azimuth Report subelement contains three subfields as shown in Figure 7-68o.

| | B0 B1 | B2 | B3 B6 | B7 B15 |
|---|---|---|---|---|
| | Reserved | Azimuth Type | Azimuth Resolution | Azimuth |
| **Bits:** | 2 | 1 | 4 | 9 |

**Figure 7-68o—Azimuth Report subfield**

Azimuth Type is set to 1 to report the Azimuth of the bearing of the requestor with respect to the responder, and is set to 0 to report the Azimuth of front surface of the reporting STA.

Azimuth Resolution is 4 bits, indicating the number of valid most significant bits in the Azimuth.

Azimuth is a 9-bit unsigned integer value in degrees from True North, of the type defined by the Azimuth Type field.

The Vendor Specific subelement has the same format as the Vendor Specific element (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

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### 7.3.2.22.10 Transmit Stream/Category Measurement Report

The Transmit Stream/Category Measurement applies to TIDs for Traffic Streams associated with TSPECs and also to TIDs for Traffic Categories for QoS traffic without TSPECs. The format of the Measurement Report field corresponding to a Transmit Stream/Category Measurement Report is shown in Figure 7-68p.

| | Actual Measurement Start Time | Measurement Duration | Peer STA Address | Traffic Identifier | Reporting Reason | Transmitted MSDU Count |
|---|---|---|---|---|---|---|
| **Octets:** | 8 | 2 | 6 | 1 | 1 | 4 |

| | MSDU Discarded Count | MSDU Failed Count | MSDU Multiple Retry Count | QoS CF-Polls Lost Count | Average Queue Delay | Average Transmit Delay |
|---|---|---|---|---|---|---|
| **Octets:** | 4 | 4 | 4 | 4 | 4 | 4 |

| | Bin 0 Range | Bin 0 | Bin 1 | Bin 2 | Bin 3 | Bin 4 | Bin 5 | Optional Subelements |
|---|---|---|---|---|---|---|---|---|
| **Octets:** | 1 | 4 | 4 | 4 | 4 | 4 | 4 | variable |

**Figure 7-68p—Measurement Report field format for Transmit Stream/ Category Measurement Report**

Actual Measurement Start Time is set to the TSF at the time at which the measurement started, or for a triggered Transmit Stream/Category Measurement Report, the TSF value at the reporting QoS STA when the trigger condition was met.

Measurement Duration is set to the duration over which the Transmit Stream/Category Measurement Report was measured, expressed in units of TUs. For a triggered Transmit Stream/Category Measurement Report, metrics are reported over a number of transmitted MSDUs rather than a duration, hence Measurement Duration is set to 0; see 11.10.8.8.

The Peer STA Address contains a MAC address indicating the RA for the measured frames.

The Traffic Identifier field contains the TID subfield as shown in Figure 7-62l. The TID subfield indicates the TC or TS for which traffic was measured.

The Reporting Reason field is a bit field indicating the reason that the measuring QoS STA sent the transmit stream/category measurement report. The Reporting Reason field is shown in Figure 7-68q.

| | B0 | B1 | B2 | B3 B7 |
|---|---|---|---|---|
| | Average Trigger | Consecutive Trigger | Delay Trigger | Reserved |
| **Bits:** | 1 | 1 | 1 | 5 |

**Figure 7-68q—Reporting Reason field**


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— The Average Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement Report was generated as a triggered report due to the Average Error trigger.

— The Consecutive Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement Report was generated as a triggered report due to the Consecutive Error trigger.

— The Delay Trigger bit set to 1 indicates that the Transmit Stream/Category Measurement Report was generated as a triggered report due to the delay exceeding the Delay Threshold.

When a Transmit Stream/Category Measurement Report is sent as a direct response to a Transmit Stream/Category Measurement Request and not as a triggered Transmit Stream/Category Measurement Report, all bit fields in the Reporting Reason field are set to 0. This is termed a requested Transmit Stream/Category Measurement Report. Within a triggered Transmit Stream/Category Measurement Report, more than one bit field in the Reporting Reason field can be set to 1 if more than one trigger condition was met.

The Transmitted MSDU Count, MSDU Failed Count, MSDU Discarded Count, MSDU Multiple Retry Count, QoS CF-Polls Lost Count, Average Queue Delay, Average Transmit Delay, and delay histogram fields relate to transmissions to the QoS STA given in the Peer STA Address field. Metrics are reported over the Measurement Duration, or for triggered transmit stream/category measurements, over the Measurement Count. Any counter which increments to a value of $2^{32}-1$ will terminate the measurement.

The Transmitted MSDU Count field contains the number of MSDUs for the TC or the TS specified by the TID that were successfully transmitted.

The MSDU Discarded Count field contains the number of MSDUs for the TC or the TS specified by the TID that were discarded due either to the number of transmit attempts exceeding dot11ShortRetryLimit or dot11LongRetryLimit (as appropriate), or due to the MSDU lifetime having been reached.

The MSDU Failed Count field contains the number of MSDUs for the TC or the TS specified by the TID that were discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit or dot11LongRetryLimit (as appropriate).

The MSDU Multiple Retry Count field contains the number of MSDUs for the TC or the TS specified by the TID that were successfully transmitted after more than one retransmission attempt.

The QoS CF-Polls Lost Count field contains the number of QoS (+)CF-Poll frames that were transmitted where there was no response from the QoS STA. QoS CF-Polls Lost Count are returned only if the reporting QoS STA is an AP and the TID is for a TS. This field is set to 0 when QoS CF-Polls Lost Count is not returned.

Average Queue Delay is the average queuing delay of the frames (MSDUs) that are passed to the MAC for the indicated Peer STA Address and the indicated Traffic Identifier. Queue Delay is expressed in TUs and is measured from the time the MSDU is passed to the MAC until the point at which the first or only fragment begins transmission.

Average Transmit Delay is the average delay of the frames (MSDUs) that are successfully transmitted for the indicated Peer STA Address and TID. Average Transmit Delay is measured from the time the MSDU is passed to the MAC until the point at which the entire MSDU has been successfully transmitted, including receipt of the final ACK from the peer STA if the QoSAck service class is being used. Average Transmit delay is expressed in units of TUs.

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Bin 0 Range field value indicates the delay range of the first bin (Bin 0) of the Transmit Delay Histogram, expressed in units of TUs. It is also used to calculate the delay ranges of the other five bins making up the histogram. The delay range for each bin increases in a binary exponential fashion as follows:

Bin 0 range: $0 \le \text{Delay} < B_0$ = Bin 0 Range field value

Bin i range: $2^{i-1} \times B_0 \le \text{Delay} < 2^i \times B_0$, for $1 \le i \le 4$

Bin 5 range: $16 \times B_0 \le \text{Delay}$

For example, if Bin 0 Range field value is 10 TUs, the bin delay ranges are as defined in Table 7-31i.

**Table 7-31i—Delay Definitions for a Transmit Stream/Category Measurement Report for a Bin 0 Range Field Value of 10 TU**

| Bin | Measured MSDU Transmit Delay (TUs) |
|---|---|
| 0 | Delay < 10 |
| 1 | 10 ≤ Delay < 20 |
| 2 | 20 ≤ Delay < 40 |
| 3 | 40 ≤ Delay < 80 |
| 4 | 80 ≤ Delay < 160 |
| 5 | 160 ≤ Delay |

To compute the value reported in Bin i (i.e., $B_i$ for i = 0, 1...5 of the Transmit Delay Histogram), the STA initializes all bin values to zero. For each MSDU successfully transmitted, the measured MSDU Transmit Delay determines which bin is to be incremented. If the measured delay has a duration time t within Bin i, then Bin i is increased by one. MSDU Transmit Delay is measured from the time the MSDU is passed to the MAC until the point at which the entire MSDU has been successfully transmitted, including receipt of the final ACK from the peer STA if the QoSAck service class is being used. The sum of the values in all six bins is equal to the value reported in the Transmitted MSDU Count.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-31j. A Yes in the Extensible column of a subelement listed in Table 7-31j indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

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**Table 7-31j—Optional Subelement IDs for Transmit Stream/Category Measurement Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 179 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.28 BSS Load element

***Change the third paragraph of 7.3.2.28 and format the formula as follows:***

The Channel Utilization field is defined as the percentage of time, ~~normalized to 255~~ linearly scaled with 255 representing 100%, that the AP sensed the medium was busy, as indicated by either the physical or virtual carrier sense (CS) mechanism. This percentage is computed using the formula,

Channel Utilization = Integer((channel_busy_time/(dot11ChannelUtilizationBeaconIntervals × dot11BeaconPeriod × 1024)) × 255)

where

channel_busy_time is defined to be the number of microseconds during which the CS mechanism, as defined in 9.2.1, has indicated a channel busy indication,

dot11ChannelUtilization-BeaconIntervals represents the number of consecutive beacon intervals during which the channel busy time is measured. The default value of dot11ChannelUtilizationBeaconIntervals is defined in Annex D.

***Insert the following subclauses after 7.3.2.35:***

### 7.3.2.36 AP Channel Report element

The AP Channel Report element contains a list of channels where a STA is likely to find an AP. The format of the AP Channel Report element is shown in Figure 7-95a. See 11.10.15 for details.

| | Element ID | Length | Regulatory Class | Channel List |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | variable |

**Figure 7-95a—AP Channel Report element format**

The Element ID field is equal to the AP Channel Report value in Table 7-26.

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The Length field in octets is variable and depends on the number of channels reported in the Channel List. The minimum value of the length field is 1 (based on a minimum length for the channel list field of 0 octets).

Regulatory Class contains an enumerated value from Annex J, specifying the regulatory class in which the Channel List is valid. An AP Channel Report only reports channels for a single regulatory class. Multiple AP Channel Report elements can be used to report channels in more than one regulatory class.

The Channel List contains a variable number of octets, where each octet describes a single channel number. Channel numbering is dependent on Regulatory Class according to Annex J.

### 7.3.2.37 Neighbor Report element

The format of the Neighbor Report element is shown in Figure 7-95b.

| | Element ID | Length | BSSID | BSSID Informa-tion | Regula-tory Class | Channel Number | PHY Type | Optional Sub-elements |
|---|---|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 6 | 4 | 1 | 1 | 1 | variable |

**Figure 7-95b—Neighbor Report element format**

The Element ID field is equal to the Neighbor Report value in Table 7-26.

The Length field in octets is variable and depends on the number and length of optional subelements. Each Report element describes an AP and consists of BSSID, BSSID Information, Channel Number, Regulatory Class, PHY Type, and can include optional subelements. The minimum value of the Length field is 13 (i.e., with no optional subelements in the Neighbor Report element).

The BSSID is the BSSID of the BSS being reported. The subsequent fields in the Neighbor Report Element pertain to this BSS.

The BSSID Information field can be used to help determine neighbor service set transition candidates. It is four octets in length and contains the subfields as shown in Figure 7-95c.

| | B0 B1 | B2 | B3 | B4 B9 | B10 B31 |
|---|---|---|---|---|---|
| | AP Reachability | Security | Key Scope | Capabilities | Reserved |
| **Bits:** | 2 | 1 | 1 | 6 | 22 |

**Figure 7-95c—BSSID Information field**

The AP Reachability field indicates whether the AP identified by this BSSID is reachable by the STA that requested the Neighbor Report. For example the AP identified by this BSSID is reachable for the exchange of preauthentication frames as described in 8.4.6.1. The values are shown in Table 7-43a.

The Security bit if set to 1 indicates that the AP identified by this BSSID supports the same security provisioning as used by the STA in its current association. If the bit is set to 0 it indicates either that the AP does not support the same security provisioning or that the security information is not available at this time.

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**Table 7-43a—Reachability field**

| Value | Reachability | Usage |
|---|---|---|
| 0 | Reserved | Not used. |
| 1 | Not Reachable | A station sending a preauthentication frame to the BSSID will not receive a response even if the AP indicated by the BSSID is capable of preauthentication. |
| 2 | Unknown | The AP is unable to determine if the value Reachable or Not Reachable is to be returned. |
| 3 | Reachable | The station sending a preauthentication frame to the BSSID can receive a response from an AP that is capable of preauthentication. |

The Key Scope bit, when set, indicates the AP indicated by this BSSID has the same authenticator as the AP sending the report. If this bit is set to 0 it indicates a distinct authenticator or the information is not available.

The Capabilities Subfield contains selected capability information for the AP indicated by this BSSID. The bit fields within this subfield have the same meaning and are set to the equivalent bits within the Capability Information field (see 7.3.1.4) being sent in the beacons by the AP being reported. The format of the Capabilities subfield is as in Figure 7-95d.

| | B4 | B5 | B6 | B7 | B8 | B9 |
|---|---|---|---|---|---|---|
| | Spectrum Management | QoS | APSD | Radio Measurement | Delayed Block Ack | Immediate Block Ack |
| **Bits:** | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 7-95d—Capabilities subfield**

Bits 10–31 are reserved.

Regulatory Class indicates the channel set of the AP indicated by this BSSID. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for the AP indicated by this BSSID. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the last known operating channel of the AP indicated by this BSSID. Channel Number is defined within a Regulatory Class as shown in Annex J.

The PHY Type field indicates the PHY type of the AP indicated by this BSSID. It is an integer value coded according to the value of the dot11PHYType.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-43b. A Yes in the Extensible column of a subelement listed in Table 7-43b indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an

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element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-43b—Optional Subelement IDs for Neighbor Report**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | Reserved | | |
| 1 | TSF Information | 4 | Yes |
| 2 | Condensed Country String | 2 | Yes |
| 3–65 | Reserved | | |
| 66 | Measurement Pilot Transmission Information | 1 to 238 | Subelements |
| 67–69 | Reserved | | |
| 70 | RRM Enabled Capabilities | 4 | Yes |
| 71 | Multiple BSSID | 1 to 238 | Subelements |
| 72–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 238 | |
| 222–255 | Reserved | | |

| | Subelement ID | Length | TSF Offset | Beacon Interval |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 2 | 2 |

**Figure 7-95e—TSF Information subelement format**

The TSF information subelement contains TSF Offset and Beacon Interval subfields as shown in Figure 7-95e.

The value of the TSF Information subelement Length field in octets is 4.

The TSF Offset subfield is 2 octets long and contains the neighbor AP's TSF timer offset. This is the time difference, in TU units, between the serving AP and a neighbor AP. This offset is given modulo the neighbor AP's Beacon Interval and rounded to the nearest TU boundary.

The Beacon Interval field is the beacon interval of the Neighbor AP indicated by this BSSID. This field is defined in 7.3.1.3 and illustrated in Figure 7-21.

The Condensed Country String subelement is set to the first two octets of the value contained in the dot11CountryString MIB attribute. This subelement is present only if the country of the neighbor AP indicated by the BSSID differs from the country of the AP that sent this neighbor report.

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The Measurement Pilot Transmission Information subelement has the same format as the Measurement Pilot Transmission Information element (see 7.3.2.43). The Measurement Pilot Interval subelement is not included if the reported AP is not transmitting Measurement Pilot frames or if the Measurement Pilot Interval of the reported AP is unknown.

The RRM Enabled Capabilities subelement has the same format as the RRM Enabled Capabilities element (see 7.3.2.45).

The Multiple BSSID subelement has the same format as the Multiple BSSID element (see 7.3.2.46). The reference BSSID for the Multiple BSSID subelement is the BSSID field in the Neighbor Report element. This subelement is not present if the neighbor AP is not a member of a Multiple BSSID Set with two or more members or its membership is unknown. (see 11.10.11)

The Vendor Specific subelement has the same format as the Vendor Specific element (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.38 RCPI element

The RCPI element indicates the received frame power level at the receiving STA as shown in Figure 7-95f.

| | Element ID | Length | RCPI |
|---|---|---|---|
| **Octets:** | 1 | 1 | 1 |

**Figure 7-95f—RCPI element format**

The Element ID field is equal to the RCPI value in Table 7-26.

The Length field in octets is set to 1.

The RCPI field contains an RCPI value as specified for certain PHYs in Clause 15, Clause 17, and Clause 18.

### 7.3.2.39 BSS Average Access Delay element

The BSS Average Access Delay element contains the AP Average Access Delay which is a measure of load in the BSS and is available in both QoS APs and non-QoS APs. The element information field is defined in Figure 7-95g.

| | Element ID | Length | AP Average Access Delay |
|---|---|---|---|
| **Octets:** | 1 | 1 | 1 |

**Figure 7-95g—BSS Average Access Delay element format**

The Element ID field is equal to the BSS Average Access Delay value in Table 7-26.

The Length field in octets is set to 1.

The AP Average Access Delay is a scalar indication of the relative level of loading at an AP. A low value indicates more available capacity than a higher value. If the AP is not currently transmitting any DCF or EDCA traffic, the AP Average Access Delay is set to 255. The values between 1 and 252 are a scaled

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representation of the average medium access delay for DCF or EDCA transmitted frames measured from the time the DCF or EDCA MPDU is ready for transmission (i.e., begins CSMA/CA access) until the actual frame transmission start time. Non-QoS APs average the access delays for all DCF transmitted frames. QoS APs average the access delays for all EDCA transmitted frames of all ACs. The AP Average Access Delay values are scaled as follows:

0: Access Delay < 8 μs

1: 8 μs ≤ Access Delay < 16 μs

2 ≤ n ≤ 14: n × 8 μs ≤ Access Delay < (n + 1) × 8 μs

15: 120 μs ≤ Access Delay < 128 μs

16: 128 μs ≤ Access Delay < 144 μs

17 ≤ n ≤ 106: (n × 16) – 128 μs ≤ Access Delay < ((n + 1) × 16) – 128 μs

107: 1584 μs ≤ Access Delay < 1600 μs

108: 1600 μs ≤ Access Delay < 1632 μs

109 ≤ n ≤ 246: (n × 32) – 1856 μs ≤ Access Delay < ((n + 1) × 32) – 1856 μs

247: 6048 μs ≤ Access Delay < 6080 μs

248: 6080 μs ≤ Access Delay < 8192 μs

249: 8192 μs ≤ Access Delay < 12288 μs

250: 12288 μs ≤ Access Delay < 16384 μs

251: 16384 μs ≤ Access Delay < 20480 μs

252: 20480 μs ≤ Access Delay < 24576 μs

253 24576 μs ≤ Access Delay

254: Service unable to access channel

255: Measurement not available

The values 0–253 indicate Average Access Delay when one or more frames were transmitted during the measurement window. The value 254 indicates that DCF or EDCA services are currently unable to access the channel due to continuous carrier sense mechanism deferral and that no frames were transmitted during the measurement window. The AP measures and averages the medium access delay for all transmit frames using the DCF or EDCA over a continuous 30 s measurement window. See 11.10.13 for accuracy requirements.

### 7.3.2.40 Antenna Information element

The Antenna Information element contains the Antenna ID field as shown in Figure 7-95h.

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| | Element ID | Length | Antenna ID |
|---|---|---|---|
| **Octets:** | 1 | 1 | 1 |

**Figure 7-95h—Antenna Information element format**

The Element ID field is equal to the Antenna Information value in Table 7-26.

The Length field in octets is set to 1.

The Antenna ID field contains the identifying number for the relevant antenna(s). When included in a Beacon or Probe Response, the Antenna ID identifies the antenna(s) used to transmit the Beacon or Probe Response frame. When included in a measurement report, the Antenna ID identifies the antenna(s) used for the reported measurement. The valid range for the Antenna ID is 1 through 254. The value 0 indicates that the antenna identifier is unknown. The value 255 indicates that this measurement was made with multiple antennas, i.e., antennas were switched during the measurement duration. In a Beacon Report or Frame Report the Antenna ID always identifies the antenna used to receive the reported beacon or frame. If during frame reception, different antennas are used to receive the preamble and body, the antenna ID identifies the antenna that receives the frame body. In these cases, the value 255 is not used. The value 1 is the only value used for a STA with only one antenna. STAs with more than one antenna will assign Antenna IDs to each antenna and each antenna configuration as consecutive, positive integers starting with 1. Each Antenna ID number represents a unique antenna or unique configuration of multiple antennas characterized by a fixed relative position, a fixed relative direction, and a fixed peak gain for that position and direction.

### 7.3.2.41 RSNI element

The RSNI element contains an RSNI value, as shown in Figure 7-95i.

| | Element ID | Length | RSNI |
|---|---|---|---|
| **Octets:** | 1 | 1 | 1 |

**Figure 7-95i—RSNI element format**

The Element ID field is equal to the RSNI value in Table 7-26.

The Length field in octets is set to 1.

RSNI is in steps of 0.5 dB. RSNI is calculated by the ratio of the received signal power (RCPI-ANPI) to the noise plus interference power (ANPI) using the expression:

$$RSNI = (10 \times \log10((RCPI_{power} - ANPI_{power}) / ANPI_{power})+10) \times 2$$

where $RCPI_{power}$ and $ANPI_{power}$ indicate power domain values for RCPI and ANPI and not dB domain values. RSNI in dB is scaled in steps of 0.5 dB to obtain 8-bit RSNI values, which cover the range from –10 dB to + 117 dB. The value 255 indicates that RSNI is not available. See 11.10.8.4 for details and procedures for measuring ANPI.

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### 7.3.2.42 Measurement Pilot Transmission Information element

The Measurement Pilot Transmission Information element contains a Measurement Pilot Transmission field as shown in Figure 7-95j.

| | Element ID | Length | Measurement Pilot Transmission | Optional Subelements |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | variable |

**Figure 7-95j—Measurement Pilot Transmission Information element format**

The Element ID field is equal to the Measurement Pilot Transmission Information value in Table 7-26.

The Length field in octets is variable and depends on the number and length of optional subelements.

The Measurement Pilot Transmission Field contains the Measurement Pilot Interval as specified in 7.3.1.18.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-43c. A Yes in the Extensible column of a subelement listed in Table 7-43c indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-43c—Optional Subelement IDs for Measurement Pilot Transmission Information**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 255 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.2.43 BSS Available Admission Capacity element

The BSS Available Admission Capacity element contains a list of Available Admission Capacity fields at different User Priorities and Access Categories as shown in Figure 7-95k.

NOTE—The BSS Available Admission Capacity element is helpful for roaming non-AP QoS STAs to select a QoS AP that is likely to accept future admission control requests, but it does not represent a guarantee that the HC will admit these requests.

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| | Element ID | Length | Available Admission Capacity Bitmask | Available Admission Capacity List |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 2 | 2 x (total number of non-zero bits in Available Admission Capacity Bitmask) |

**Figure 7-95k—BSS Available Admission Capacity element format**

The Element ID field is equal to the BSS Available Admission Capacity value in Table 7-26.

The Length field has units of octets and is set to $2 + 2N_{nz}$, where $N_{nz}$ equals the total number of non-zero bits in Available Admission Capacity Bitmask.

The Available Admission Capacity Bitmask field indicates the UP values that have an Available Admission Capacity specified in the Available Admission Capacity List field. The format of the Available Admission Capacity Bitmask is defined in Table 7-43d.

**Table 7-43d—Available Admission Capacity Bitmask definition**

| Bit (s) | Available Admission Capacity Reported |
|---|---|
| 0 | UP 0 |
| 1 | UP 1 |
| 2 | UP 2 |
| 3 | UP 3 |
| 4 | UP 4 |
| 5 | UP 5 |
| 6 | UP 6 |
| 7 | UP 7 |
| 8 | AC 0 |
| 9 | AC 1 |
| 10 | AC 2 |
| 11 | AC3 |
| 12–15 | Reserved |

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Each bit in the Available Admission Capacity Bitmask is set to 1 to indicate that the Available Admission Capacity for the corresponding traffic type is present in the Available Admission Capacity List field. The bit is set to 0 to indicate that the Available Admission Capacity for the corresponding traffic type is not present in the Available Admission Capacity List field.

The Available Admission Capacity List comprises a sequence of Available Admission Capacity fields corresponding respectively to the non-zero bits in the Available Admission Capacity Bitmask field.

The Available Admission Capacity field is 2 octets long and contains an unsigned integer that specifies the amount of medium time available using explicit admission control for the corresponding UP or AC traffic, in units of 32 μs per 1 s. See 11.10.14 for furthers details.

### 7.3.2.44 BSS AC Access Delay element

The BSS AC Access Delay element contains an Access Category Access Delay field, as shown in Figure 7-95l.

| | Element ID | Length | Access Category Access Delay |
|---|---|---|---|
| **Octets:** | 1 | 1 | 4 |

**Figure 7-95l—BSS AC Access Delay element format**

The Element ID field is equal to the BSS AC Access Delay value in Table 7-26.

The Length field in octets is set to 4.

The AC Access Delay field is formatted as four subfields as shown in Figure 7-95m. The AC Access Delay is a scalar indication of the average access delay at a QoS AP for services for each of the indicated Access Categories. If the QoS AP is not currently transmitting any traffic using the indicated AC, the Average Access Delay for that AC is set to 255. The values between 1 and 252 are a scaled representation of the average medium access delay for transmitted frames in the indicated AC measured from the time the EDCA MPDU is ready for transmission (i.e., begins CSMA/CA access) until the actual frame transmission start time. The AC Access Delay values are scaled as follows:

0: Access Delay < 8 μs

1: 8 μs ≤ Access Delay < 16 μs

$2 \le n \le 14$: $n \times 8$ μs ≤ Access Delay < $(n + 1) \times 8$ μs

15: 120 μs ≤ Access Delay < 128 μs

16: 128 μs ≤ Access Delay < 144 μs

$17 \le n \le 106$: $(n \times 16) - 128$ μs ≤ Access Delay < $((n + 1) \times 16) - 128$ μs

107: 1584 μs ≤ Access Delay < 1600 μs

108: 1600 μs ≤ Access Delay < 1632 μs

$109 \le n \le 246$: $(n \times 32) - 1856$ μs ≤ Access Delay < $((n + 1) \times 32) - 1856$ μs

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247: 6048 µs ≤ Access Delay < 6080 µs

248: 6080 µs ≤ Access Delay < 8192 µs

249: 8192 µs ≤ Access Delay < 12 288 µs

250: 12 288 µs ≤ Access Delay < 16 384 µs

251: 16 384 µs ≤ Access Delay < 20 480 µs

252: 20 480 µs ≤ Access Delay < 24 576 µs

253 24 576 µs ≤ Access Delay

254: Service unable to access channel

255: Measurement not available

The values 0–253 indicate Average Access Delay when one or more frames were transmitted during the measurement window. The value 254 indicates that EDCA services are currently unable to access the channel due to continuous carrier sense mechanism deferral to higher priority AC transmissions and that no frames were transmitted during the measurement window. The QoS AP measures and averages the medium access delay for all transmit frames of the indicated AC using EDCA mechanism over a continuous 30 s measurement window. See 11.10.13 for accuracy requirements.

| | Average Access Delay for Best Effort (AC_BE) | Average Access Delay for Background (AC_BK) | Average Access Delay for Video (AC_VI) | Average Access Delay for Voice (AC_VO) |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 |

**Figure 7-95m—Access Category Access Delay subfields**

### 7.3.2.45 RRM Enabled Capabilities Element

The RRM Enabled Capabilities element signals support for radio measurements in a device. The element is shown in Figure 7-95n.

| | Element ID | Length | RRM Enabled Capabilities |
|---|---|---|---|
| **Octets:** | 1 | 1 | 5 |

**Figure 7-95n—RRM Enabled Capabilities element format**

The Element ID field is equal to the RRM Enabled Capabilities value in Table 7-26.

The Length field in octets is set to 5.

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The RRM Enabled Capabilities field is an octet string. Each subfield of this field indicates whether the corresponding capability listed in Table 7-43e is enabled or not.

**Table 7-43e—RRM Enabled Capabilities definition**

| Bit position in the RRM Enabled Capabilities field | Field Name | Notes |
|---|---|---|
| 0 | Link Measurement capability enabled | A STA sets Link Measurement capability enabled bit to 1 when the MIB attribute dot11RRMLinkMeasurementEnabled is true, and is set to 0 otherwise. |
| 1 | Neighbor Report capability enabled | A STA sets Neighbor Report capability enabled bit to 1 when the MIB attribute dot11RRMNeighborReportEnabled is true, and sets it to 0 otherwise. |
| 2 | Parallel Measurements capability enabled | A STA sets Parallel Measurements capability enabled bit to 1 when the MIB attribute dot11RRMParallelMeasurementsEnabled is true, and sets it to 0 otherwise. |
| 3 | Repeated Measurements capability enabled | A STA sets Repeated Measurements capability enabled bit to 1 when the MIB attribute dot11RRMRepeatedMeasurementsEnabled is true, and sets it to 0 otherwise. |
| 4 | Beacon Passive Measurement capability enabled | A STA sets Beacon Passive Measurement capability enabled bit to 1 when the MIB attribute dot11RRMBeaconPassiveMeasurementEnabled is true, and sets it to 0 otherwise. |
| 5 | Beacon Active Measurement capability enabled | A STA sets Beacon Active Measurement capability enabled bit to 1 when the MIB attribute dot11RRMBeaconActiveMeasurementEnabled is true, and sets it to 0 otherwise. |
| 6 | Beacon Table Measurement capability enabled | A STA sets Beacon Table Measurement capability enabled bit to 1 when the MIB attribute dot11RRMBeaconTableMeasurementEnabled is true, and sets it to 0 otherwise. |
| 7 | Beacon Measurement Reporting Conditions capability enabled | A STA sets Beacon Measurement Reporting Conditions capability enabled bit to 1 when the MIB attribute dot11RRMBeaconMeasurementReportingConditionsEnabled is true, and sets it to 0 otherwise. |
| 8 | Frame Measurement capability enabled | A STA sets Frame Measurement capability enabled bit to 1 when the MIB attribute dot11RRMFrameMeasurementEnabled is true, and sets it to 0 otherwise. |
| 9 | Channel Load Measurement capability enabled | A STA sets Channel Load Measurement capability enabled bit to 1 when the MIB attribute dot11RRMChannelLoadMeasurementEnabled is true, and sets it to 0 otherwise. |
| 10 | Noise Histogram Measurement capability enabled | A STA sets Noise Histogram Measurement capability enabled bit to 1 when the MIB attribute dot11RRMNoiseHistogramMeasurementEnabled is true, and sets it to 0 otherwise. |
| 11 | Statistics Measurement capability enabled | A STA sets Statistics Measurement capability enabled bit to 1 when the MIB attribute dot11RRMStatisticsMeasurementEnabled is true, and sets it to 0 otherwise. |

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**Table 7-43e—RRM Enabled Capabilities definition *(continued)***

| Bit position in the RRM Enabled Capabilities field | Field Name | Notes |
|---|---|---|
| 12 | LCI Measurement capability enabled | A STA sets LCI Measurement capability enabled bit to 1 when the MIB attribute dot11RRMLCIMeasurementEnabled is true, and sets it to 0 otherwise. |
| 13 | LCI Azimuth capability enabled | A STA sets LCI Azimuth capability enabled bit to 1 when the MIB attribute dot11RRMLCIAzimuthEnabled is true, and sets it to 0 otherwise. |
| 14 | Transmit Stream/ Category Measurement capability enabled | A STA sets Transmit Stream/Category Measurement capability enabled bit to 1 when the MIB attribute dot11RRMTransmitStreamCategoryMeasurementEnabled is true, and sets it to 0 otherwise. |
| 15 | Triggered Transmit Stream/Category Measurement capability enabled | A STA sets Triggered Transmit Stream/Category Measurement capability enabled bit to 1 when the MIB attribute dot11RRMTriggeredTransmitStreamCategoryMeasurement-Enabled is true, and sets it to 0 otherwise. |
| 16 | AP Channel Report capability enabled | A STA sets AP Channel Report capability enabled bit to 1 when the MIB attribute dot11RRMAPChannelReportEnabled is true, and sets it to 0 otherwise. |
| 17 | RRM MIB capability enabled | A STA sets RRM MIB capability enabled bit to 1 when the MIB attribute dot11RRMMIBEnabled is true, and sets it to 0 otherwise. |
| 18–20 | Operating Channel Max Measurement Duration | A STA sets Operating Channel Max Measurement Duration to equal the value of dot11RRMMaxMeasurementDuration. See 11.10.3. |
| 21–23 | Non-operating Channel Max Measurement Duration | A STA sets Non-operating Channel Max Measurement Duration to equal the value of dot11RRMNonOperatingChannelMaxMeasurementDuration. See 11.10.3. |
| 24–26 | Measurement Pilot capability | A STA sets Measurement Pilot capability to equal the value of dot11RRMMeasurementPilotCapability. See Table 11-11 in 11.10.12. |
| 27 | Measurement Pilot Transmission Information capability enabled | A STA sets Measurement Pilot Transmission Information capability enabled bit to 1 when the MIB attribute dot11RRMMeasurementPilotTransmissionInformationEnabled is true, and sets it to 0 otherwise. |
| 28 | Neighbor Report TSF Offset capability enabled | A STA sets Neighbor Report TSF Offset capability enabled bit to 1 when the MIB attribute dot11RRMNeighborReportTSFOffsetEnabled is true, and sets it to 0 otherwise. |
| 29 | RCPI Measurement capability enabled | A STA sets RCPI Measurement capability enabled bit to 1 when the MIB attribute dot11RRMRCPIMeasurementEnabled is true, and sets it to 0 otherwise. |
| 30 | RSNI Measurement capability enabled | A STA sets RSNI Measurement capability enabled bit to 1 when the MIB attribute dot11RRMRSNIMeasurementEnabled is true, and sets it to 0 otherwise. |

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**Table 7-43e—RRM Enabled Capabilities definition *(continued)***

| Bit position in the RRM Enabled Capabilities field | Field Name | Notes |
|---|---|---|
| 31 | BSS Average Access Delay capability enabled | A STA sets BSS Average Access Delay capability enabled bit to 1 when the MIB attribute dot11RRMBSSAverageAccessDelayEnabled is true, and sets it to 0 otherwise (see NOTE). |
| 32 | BSS Available Admission Capacity capability enabled | A STA sets BSS Available Admission Capacity capability enabled bit to 1 when the MIB attribute dot11RRMBSSAvailableAdmissionCapacityEnabled is true, and sets it to 0 otherwise. |
| 33 | Antenna Information capability enabled | A STA sets Antenna Information capability enabled bit to 1 when the MIB attribute dot11RRMAntennaInformationEnabled is true, and sets it to 0 otherwise. |
| 34–39 | Reserved | |
| NOTE—At a QoS AP dot11RRMBSSAverageAccessDelayEnabled is true indicates that the AP BSS AC Access Delay capability is also enabled. | | |

### 7.3.2.46 Multiple BSSID Element

The format of the Multiple BSSID element is shown in Figure 7-95o.

| | Element ID | Length | MaxBSSID Indicator | Optional Subelements |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | variable |

**Figure 7-95o—Multiple BSSID element format**

The Element ID field is equal to the Multiple BSSID value in Table 7-26.

The value of the Length field is 1 plus the length of the extensions in units of octets.

The Max BSSID Indicator field contains a value assigned to $n$, where $2^n$ is the maximum number of BSSIDs in the multiple BSSID set (see 11.10.11). The actual number of BSSIDs in the multiple BSSID set is not explicitly signalled. The BSSID(i) value corresponding to the ith BSSID in the multiple BSSID set is derived from a reference BSSID (REF_BSSID) as follows:

BSSID(i) = (REF_BSSID modified to set the n LSBs to zero) | ((n LSBs of REF_BSSID) + i) mod $2^n$)

When the Multiple BSSID element is transmitted in a Beacon or Probe Response frame, the reference BSSID is the BSSID of the frame. When the Multiple BSSID element is transmitted as a subelement in a Neighbor Report element, the reference BSSID is the BSSID field in the Neighbor Report element.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

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The Subelement ID field values for the defined optional subelements are shown in Table 7-43f. A Yes in the Extensible column of a subelement listed in Table 7-43f indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-43f—Optional Subelement IDs for Multiple BSSID**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 255 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.3.3 Information Subelements

Subelements are defined to have a common general format consisting of a 1-octet element-specific Subelement ID field, a 1-octet Length field, and a variable-length subelement-specific Data field. Each subelement is assigned a subelement ID that is unique within the containing element or subelement. The Length field specifies the number of octets in the Data field. See Figure 7-95p. Subelements are ordered by non-decreasing Subelement ID. See 9.14.2.

| | Subelement ID | Length | Data |
|---|---|---|---|
| **Octets:** | 1 | 1 | Variable |

**Figure 7-95p—Subelement format**

## 7.4 Action frame format details

***Insert the following subclauses after the end of 7.4.5:***

### 7.4.6 Radio Measurement action details

Several Action frame formats are defined for Radio Measurement purposes. An Action field, in the octet field immediately after the Category field, differentiates the formats. The Action field values associated with each frame format are defined in Table 7-57a.

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**Table 7-57a—Radio Measurement Action field values**

| Action field value | Description |
|---|---|
| 0 | Radio Measurement Request |
| 1 | Radio Measurement Report |
| 2 | Link Measurement Request |
| 3 | Link Measurement Report |
| 4 | Neighbor Report Request |
| 5 | Neighbor Report Response |
| 6–255 | Reserved |

### 7.4.6.1 Radio Measurement Request frame format

The Radio Measurement Request frame uses the Action frame body format. It is transmitted by a STA requesting another STA to make one or more measurements on one or more channels. The format of the frame is shown in Figure 7-101a.

| | Category | Action | Dialog Token | Number of Repetitions | Measurement Request Elements |
|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 2 | variable |

**Figure 7-101a—Radio Measurement Request frame body format**

The Category field is set to the value indicating the Radio Measurement category, as specified in Table 7-24 in 7.3.1.11.

The Action field is set to indicate a Measurement Request according to Table 7-57a in 7.4.6.

The Dialog Token field is set to a non-zero value chosen by the STA sending the radio measurement request to identify the request/report transaction.

The Number of Repetitions field contains the requested number of repetitions for all the Measurement Request elements in this frame. A value of zero in the Number of Repetitions field indicates Measurement Request elements are executed once without repetition. A value of 65 535 in the Number of Repetitions field indicates Measurement Request elements are repeated until the measurement is cancelled or superseded.

The Measurement Request Elements field contains zero or more of the Measurement Request elements described in 7.3.2.21. The number and length of the Measurement Request elements in a Measurement Request frame is limited by the maximum allowed MMPDU size.

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### 7.4.6.2 Radio Measurement Report frame format

The Radio Measurement Report frame uses the Action frame body format. It is transmitted by a STA in response to a Radio Measurement Request frame or by a STA providing a triggered autonomous measurement report. The format of the frame is shown in Figure 7-101b.

| | Category | Action | Dialog Token | Measurement Report Elements |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | variable |

**Figure 7-101b—Radio Measurement Report frame body format**

The Category field is set to indicate the Radio Measurement category according to Table 7-24 in 7.3.1.11.

The Action field is set to indicate a Radio Measurement Report according to Table 7-57a in 7.4.6.

The Dialog Token field is set to the value in the corresponding Radio Measurement Request frame. If the Radio Measurement Report frame is not being transmitted in response to a Radio Measurement Request frame then the Dialog token is set to zero.

The Measurement Report Elements field contains one or more Measurement Report elements described in 7.3.2.22. The number and length of the Measurement Report elements in a single Radio Measurement Report frame is limited by the maximum allowed MMPDU size. Subclause 11.10.5 describes the required behavior for multi-frame Radio Measurement Report frame responses.

### 7.4.6.3 Link Measurement Request Frame Format

The Link Measurement Request frame uses the Action frame body format and is transmitted by a STA to request another STA to respond with a Link Measurement Report frame to enable measurement of link path loss and estimation of link margin. The format of the frame is shown in Figure 7-101c.

| | Category | Action | Dialog Token | Transmit Power Used | Max Trans-mit Power | Optional sub-elements |
|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 1 | 1 | variable |

**Figure 7-101c—Link Measurement Request frame body format**

The Category field is set to the value indicating the Radio Measurement category, as specified in Table 7-24 in 7.3.1.11.

The Action field is set to indicate a Link Measurement Request according to Table 7-57a in 7.4.6.

The Dialog Token field is set to a non-zero value chosen by the STA sending the request to identify the transaction.

The Transmit Power Used field is set to the transmit power used to transmit the frame containing the Link Measurement Request, as described in 7.3.1.20.

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The Max Transmit Power field provides the upper limit on the transmit power as measured at the output of the antenna connector to be used by the transmitting STA on its operating channel. This field is described in 7.3.1.19. The Max Transmit Power field is a 2's complement signed integer and is 1 octet in length, providing an upper limit, in a dBm scale, on the transmit power as measured at the output of the antenna connector to be used by the transmitting STA on its operating channel. The maximum tolerance for the value reported in Max Transmit Power field is ±5 dB. The value of the Max Transmit Power field is equal to the minimum of the maximum powers at which the STA is permitted to transmit in the operating channel by device capability, policy, and regulatory authority.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-57b. A Yes in the Extensible column of a subelement listed in Table 7-57b indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-57b—Optional Subelement IDs for Link Measurement Request frame**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 255 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.4.6.4 Link Measurement Report Frame Format

The Link Measurement Report frame uses the Action frame body format and is transmitted by a STA in response to a Link Measurement Request frame. The format of the frame is shown in Figure 7-101d.

| | Cate-gory | Action | Dialog Token | TPC Report element | Receive Antenna ID | Transmit Antenna ID | RCPI | RSNI | Optional Sub-elements |
|---|---|---|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | variable |

**Figure 7-101d—Link Measurement Report frame body format**

The Category field is set to indicate the Radio Measurement category according to Table 7-24 in 7.3.1.11.

The Action field is set to indicate a Link Measurement Report according to Table 7-57a in 7.4.6.

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The Dialog Token field is set to the Dialog Token value in the corresponding Link Measurement Request frame.

The TPC Report element is set as described in 7.3.2.18.

The Receive Antenna ID field contains the identifying number for the antenna(s) used to receive the corresponding Link Measurement Request frame. Antenna ID is defined in 7.3.2.40.

The Transmit Antenna ID field contains the identifying number for the antenna(s) used to transmit this Link Measurement Report frame. Antenna ID is defined in 7.3.2.40.

RCPI indicates the received channel power of the corresponding Link Measurement Request frame in a dBm scale, as defined in the RCPI measurement clause for the indicated PHY Type, as described in 7.3.2.38.

RSNI indicates the received signal to noise indication for the corresponding Link Measurement Request frame in a dB scale, as described in 7.3.2.41.

The Optional Subelements field format contains zero or more Subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-57c. A Yes in the Extensible column of a subelement listed in Table 7-57c indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-57c—Optional Subelement IDs for Link Measurement Report frame**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 255 | |
| 222–255 | Reserved | | |

The Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.26). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

### 7.4.6.5 Neighbor Report Request frame format

The Neighbor Report Request frame uses the Action frame body format and is transmitted by a STA requesting information in the Neighbor Report about neighboring APs. The format of the Neighbor Report Request frame body is shown in Figure 7-101e.

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| | Category | Action | Dialog Token | Optional Sub-elements |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | variable |

**Figure 7-101e—Neighbor Report Request frame body format**

The Category field is set to the value indicating the Radio Measurement category, as specified in Table 7-24 in 7.3.1.11.

The Action field is set to the value indicating Neighbor Report Request, as specified in Table 7-57a in 7.4.6.

The Dialog Token field is set to a non-zero value chosen by the STA sending the measurement request to identify the request/report transaction.

The Optional Subelements field format contains zero or more Subelements each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-57d. A Yes in the Extensible column of a subelement listed in Table 7-57d indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

**Table 7-57d—Optional Subelement IDs for Neighbor Report Request frame**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0 | SSID | 0 to 32 | |
| 1–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 255 | |
| 222–255 | Reserved | | |

The SSID and Vendor Specific subelements have the same format as their corresponding elements (see 7.3.2.1 and 7.3.2.26, respectively). Multiple Vendor Specific subelements can be included in the list of Optional Subelements.

An SSID subelement can be included in a Neighbor Report Request frame to indicate a request for a neighbor list for the specified SSID in the SSID Element. The absence of a SSID element indicates neighbor report for the current ESS.

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#### 7.4.6.6 Neighbor Report Response frame format

The Neighbor Report Response frame uses the Action frame body format and is transmitted by a STA in response to a Neighbor Report Request frame. The format of the Neighbor Report Response frame body is shown in Figure 7-101f.

| | Category | Action | Dialog Token | Neighbor Report Elements |
|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | variable |

**Figure 7-101f—Neighbor Report Response frame body format**

The Category field is set to the value indicating the Radio Measurement category, as specified in Table 7-24 in 7.3.1.11.

The Action field is set to the value indicating Neighbor Report Response, as specified in Table 7-57a in 7.4.6.

The Dialog Token field set to the value in the corresponding Neighbor Report Request frame. If the Neighbor Report Response frame is not being transmitted in response to a Neighbor Report Request frame, then the Dialog token is set to zero.

The Neighbor Report Elements field contains the Neighbor Report elements for validated APs described in 7.3.2.37. If the STA has no information in response to the Neighbor Report Request, the Neighbor Report elements are omitted. The number and length of the Neighbor Report Elements in a Neighbor Report frame is limited by the maximum allowed MMPDU size.

### 7.4.7 Public Action details

#### 7.4.7.1 Public Action frames

The Public Action frame is defined to allow inter-BSS and AP to unassociated-STA communications. The defined Public Action frames are listed in Table 7-57e.

**Table 7-57e—Public Action field values**

| Action field value | Description |
|---|---|
| 0–6 | Reserved |
| 7 | Measurement Pilot |
| 8–255 | Reserved |

#### 7.4.7.2 Measurement Pilot frame format

The Measurement Pilot frame uses the Action frame format as shown in Figure 7-101g.

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| | Cate-gory | Action | Con-densed Capability Information | Con-densed Country String | Regula-tory Class | Channel | Measure-ment Pilot Interval | Optional Sub-elements |
|---|---|---|---|---|---|---|---|---|
| **Octets:** | 1 | 1 | 1 | 2 | 1 | 1 | 1 | variable |

**Figure 7-101g—Measurement Pilot frame body format**

The Category field is set to the value indicating the Public category, as specified in Table 7-24 in 7.3.1.11.

The Action field is set to the value indicating Measurement Pilot, as specified in Table 7-57c in 7.4.7.1.

The Condensed Capability Information field contains two subfields as shown in Figure 7-101h.

| | B0 | B1 | B2 B7 |
|---|---|---|---|
| | Spectrum Management | Short Slot Time | Reserved |
| **Bits:** | 1 | 1 | 6 |

**Figure 7-101h—Condensed Capability Information field**

The Spectrum Management subfield is set to 1 if the MIB attribute dot11SpectrumManagementRequired is true; otherwise, it is set to 0.

The Short Slot Time subfield is set to 1 if the MIB attributes dot11ShortSlotTimeOptionImplemented and dot11ShortSlotTimeOptionEnabled are true. Otherwise, the Short Slot Time subfield is set to 0.

The Condensed Country String field is set to the first two octets of the value contained in the dot11CountryString MIB attribute.

Regulatory Class indicates the regulatory class value for the operating channel. Country, Regulatory Class, and Channel Number together specify the channel frequency and spacing for the operating channel. Valid values of Regulatory Class are shown in Annex J.

Channel Number indicates the operating channel. Channel Number is defined within a Regulatory Class as shown in Annex J.

The Measurement Pilot Interval field is set to the value contained in the dot11RRMMeasurementPilotPeriod MIB attribute.

The Optional Subelements field format contains zero or more Subelements each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable length Data field, as shown in Figure 7-95p. Any optional subelements are ordered by non-decreasing Subelement ID.

The Subelement ID field values for the defined optional subelements are shown in Table 7-57f. A Yes in the Extensible column of a subelement listed in Table 7-57f indicates that the Length of the subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is set to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.14.2.

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**Table 7-57f—Optional Subelement IDs for Measurement Pilot frame**

| Subelement ID | Name | Length field (octets) | Extensible |
|---|---|---|---|
| 0–70 | Reserved | | |
| 71 | Multiple BSSID | 1 to 255 | Subelements |
| 72–220 | Reserved | | |
| 221 | Vendor Specific | 1 to 255 | |
| 222–255 | Reserved | | |

The Multiple BSSID and Vendor Specific subelements have the same format as the Multiple BSSID and Vendor Specific elements (see 7.3.2.46 and 7.3.2.36, respectively). Multiple Vendor Specific subelements may be included in the list of Optional Subelements.

# 9. MAC sublayer functional description

## 9.8 Operation across regulatory domains

### 9.8.2 Support for FH PHYs

#### 9.8.2.1 Determination of hopping patterns

***Insert the following sentence at the beginning of the first paragraph of 9.8.2.1:***

The Beacon may contain FH Parameters and/or FH Pattern Table elements. If the Beacon contains both FH Parameters and FH Pattern Table elements, both of these elements shall describe the same hopping pattern. Note that the information returned as a result of a Probe Request frame with a Request information element may include the FH parameters and/or the FH Pattern Table possibly replicating optional elements identified by orders 12 and 13 in Table 7-15.

***Insert the following subclauses after 9.13:***

## 9.14 MAC frame processing

This subclause describes MAC frame and element processing requirements to provide information element and subelement extensibility.

### 9.14.1 Extensible element parsing

Table 7-26 indicates which elements are considered extensible in future revisions of the standard, by placing a Yes in the Extensible column. A STA that receives an extensible element in which the Length field plus two exceeds the value indicated in Table 7-26 shall discard any part of the element beyond the maximum length indicated in this table and shall otherwise process the element as though this truncated element had been received.

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### 9.14.2 Extensible subelement parsing

A subelement has the structure defined in 7.3.3 and is contained within an element or subelement.

A STA that encounters an unknown, unsupported, or reserved subelement ID value contained in an element or subelement, shall ignore the subelement with that subelement ID value, and shall continue to parse any remaining element or subelement body for additional subelements with recognizable subelement ID values.

Subelement information is listed in Tables 7-29a, 7-29c, 7-29f, 7-29i, 7-29k, 7-29m, 7-29n, 7-29p, 7-31a, 7-31c, 7-31d, 7-31e, 7-31g, 7-31h, 7-31j, 7-43b, 7-43c, 7-43f, 7-57b, 7-57c, 7-57d, and 7-57f. These subelement tables indicate which subelements are considered extensible in future revisions of the standard, by placing a Yes in the Extensible column. A STA that receives an extensible subelement in which the Length field exceeds the value indicated in the subelement tables shall discard any part of the subelement beyond the maximum length indicated in the subelement tables and shall otherwise process the subelement as though this truncated subelement had been received.

# 10. Layer management

## 10.3 MLME SAP interface

### 10.3.2 Scan

#### 10.3.2.1 MLME-SCAN.request

#### 10.3.2.1.2 Semantics of the service primitive

***Change the first paragraph as follows:***

The primitive parameters are as follows:

```
MLME-SCAN.request(
                    BSSType,
                    BSSID,
                    SSID,
                    ScanType,
                    ProbeDelay,
                    ChannelList,
                    MinChannelTime,
                    MaxChannelTime,
                    RequestInformation,
                    VendorSpecificInfo
                    )
```

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***Insert the following row to the table above VendorSpecificInfo:***

| Name | Type | Valid range | Description |
|---|---|---|---|
| RequestInformation | As defined in 7.3.2.12 | As defined in 7.3.2.12 | This element can be present when dot11RadioMeasurementEnabled is true and is placed in a Probe Request frame to request that the responding STA include the requested information in the Probe Response frame. |

### 10.3.2.2 MLME-SCAN.confirm

#### 10.3.2.2.2 Semantics of the service primitive

***Change the first paragraph and first table as follows:***

The primitive parameters are as follows:

MLME-SCAN.confirm(
BSSDescriptionSet,
BSSDescriptionFromMeasurementPilotSet,
ResultCode,
VendorSpecificInfo
)

| Name | Type | Valid range | Description |
|---|---|---|---|
| BSSDescriptionSet | Set of BSS-Descriptions | N/A | The BSSDescriptionSet is returned to indicate the results of the scan request. It is a set containing zero or more instances of a BSS-Description. |
| BSSDescriptionFrom-MeasurementPilotSet | Set of BSS Description-From Measurement-Pilots | N/A | The BSSDescriptionFromMeasurementPilot-Set is returned to indicate the results of the scan request derived from Measurement Pilots. It is a set containing zero or more instances of a BSSDescriptionFrom-MeasurementPilot. Present only when the value of dot11RRMMeasurementPilotCapability is greater than 1. |
| ResultCode | Enumeration | SUCCESS, INVALID_ PARAMETERS, NOT_ SUPPORTED | Indicates the result of the MLME-SCAN.confirm. |
| VendorSpecific-Info | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

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***Change the indicated row of the BSSDescription table as follows:***

| Name | Type | Valid range | Description |
|---|---|---|---|
| Country | As defined in the Country element | As defined in the Country element | The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot11MultiDomainCapabilityEnabled is true~~.~~ or when dot11RadioMeasurementEnabled is true. |

***Insert the following rows at the end of the BSSDescription table:***

| Name | Type | Valid range | Description |
|---|---|---|---|
| AP Channel Report | As defined in frame format | As defined in frame format | The values from the AP Channel Report element if such an element was present in the probe response or Beacon frame, else null. |
| BSS Average Access Delay | As defined in frame format | As defined in frame format | The values from the BSS Average Access Delay element if such an element was present in the probe response or Beacon frame, else null. |
| Antenna Information | As defined in frame format | As defined in frame format | The values from the Antenna Information element if such an element was present in the probe response or Beacon frame, else null. |
| BSS Available Admission Capacity | As defined in frame format | As defined in frame format | The values from the BSS Available Admission Capacity element if such an element was present in the probe response or Beacon frame, else null. |
| BSS AC Access Delay | As defined in frame format | As defined in frame format | The values from the BSS AC Access Delay element if such an element was present in the probe response or Beacon frame, else null. |
| Measurement Pilot Transmission Information | As defined in frame format | As defined in frame format | The values from the Measurement Pilot Transmission Information element if such an element was present in the probe response or Beacon frame, else null. |
| Multiple BSSID | As defined in frame format | As defined in frame format | The values from the Multiple BSSID element if such an element was present in the probe response or Beacon frame, else null. |
| RRM Enabled Capabilities | As defined in frame format | As defined in frame format | The values from the RRM Enabled Capabilities element if such an element was present in the probe response or Beacon frame, else null. |
| RCPIMeasurement | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI of the received frame. |


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| Name | Type | Valid range | Description |
|---|---|---|---|
| RSNIMeasurement | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RSNI of the received frame. |
| Requested information elements | Set of information elements | As defined in 7.3.2 | Elements requested by the Request information element of the Probe Request frame. |

***Insert the following paragraph and table at the end of 10.3.2.2.2:***

Each BSSDescriptionFromMeasurementPilot consists of the following elements:

| Name | Type | Valid range | Description |
|---|---|---|---|
| BSSID | MACAddress | N/A | The BSSID of the found BSS. |
| BSS Type | Enumeration | INFRASTRUCTURE | The type of the found BSS. |
| Local Time | Integer | N/A | The value of the STA's TSF timer at the start of reception of the first octet of the timestamp field of the received frame from the found BSS. |
| Condensed Capability Information | As defined in frame format | As defined in frame format | The advertised condensed capabilities of the BSS. |
| Condensed Country String | As defined in frame format | As defined in frame format | Together with the Regulatory Class, the information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. |
| Regulatory Class | As defined in frame format | As defined in frame format | Together with the Condensed Country String, the information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. |
| Channel | As defined in frame format | As defined in frame format | The operating channel of the BSS indicated in the received frame |
| Measurement Pilot Interval | As defined in frame format | As defined in frame format | The Measurement Pilot interval of the BSS indicated in the received frame |
| Multiple BSSID element | As defined in frame format | As defined in frame format | Indicates that the BSS is within a Multiple BSSID Set (see 11.10.11). The range of BSSIDs is determined by the BSSID and Multiple BSSID element. |
| PHY Type | Integer | As defined in Annex D | The dot11PHYType of the received frame. |

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| Name | Type | Valid range | Description |
|---|---|---|---|
| RCPIMeasurement | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI of the received frame. |
| RSNIMeasurement | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RSNI of the received frame. |

### 10.3.6 Associate

#### 10.3.6.2 MLME-ASSOCIATE.confirm

#### 10.3.6.2.2 Semantics of the service primitive

***Change 10.3.6.2.2 as follows:***

The primitive parameters are as follows:

MLME-ASSOCIATE.confirm(
ResultCode,
CapabilityInformation,
AssociationID,
SupportedRates,
EDCAParameterSet,
RCPI.request,
RSNI.request,
RCPI.response,
RSNI.response,
RRMEnabledCapabilities
VendorSpecificInfo
)

| Name | Type | Valid range | Description |
|---|---|---|---|
| ResultCode | Enumeration | SUCCESS, INVALID_PARAMETERS, TIMEOUT, REFUSED_REASON_UNSPECIFIED, REFUSED_NOT_AUTHENTICATED, REFUSED_CAPABILITIES_MISMATCH, REFUSED_EXTERNAL_REASON, REFUSED_AP_OUT_OF_MEMORY, REFUSED_BASIC_RATES_MISMATCH | Indicates the result of the MLME-ASSOCIATE.request. |
| Capability-Information | As defined in frame format | As defined in frame format | Specifies the operational capabilities advertised by the AP. |


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| Name | Type | Valid range | Description |
|---|---|---|---|
| AssociationID | Integer | 1–2007 inclusive | If the association request result was SUCCESS, then AssociationID specifies the association ID value assigned by the AP. |
| Supported-Rates | Set of integers | 2–127 inclusive (for each integer in the set), bit 7 is set to 1 to indicate that a rate is a member of the BBSBasicRateSet. | The set of data rates (in units of 500 kb/s) that are supported by AP, including indication of which rates are part of the BSSBasic-RateSet (according to 7.3.2.22). |
| EDCA-ParameterSet | As defined in frame format | As defined in frame format | Specifies the EDCA parameter set that the STA should use. The parameter shall be present only if the MIB attribute dot11QosOptionImplemented is true. |
| RCPI.request | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Association Request frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurement-Enabled is true. |
| RSNI.request | Integer | As defined in 7.3.2.41 | RSNI at the time the corresponding Association Request frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurement-Enabled is true. |
| RCPI.response | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Association Response frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurement-Enabled is true. |
| RSNI.response | Integer | As defined in 7.3.2.41 | RSNI at the time the corresponding Association Response frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurement-Enabled is true. |
| RRMEnabled-Capabilities | As defined in frame format | As defined in 7.3.2.45 | Specifies the RRM enabled capabilities advertised by the AP. The element is present only when the MIB attribute dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

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### 10.3.6.3 MLME-ASSOCIATE.indication

#### 10.3.6.3.2 Semantics of the service primitive

***Change 10.3.6.3.2 as follows:***

The primitive parameters are as follows:

MLME-ASSOCIATE.indication(
PeerSTAAddress,
CapabilityInformation,
ListenInterval,
SSID,
SupportedRates,
RSN
QoSCapability,
RCPI,
RSNI,
RRMEnabledCapabilities
VendorSpecificInfo
)

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTAAddress | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity from which the association was received. |
| Capability-Information | As defined in frame format | As defined in frame format | Specifies the operational capability definitions provided by the peer MAC entity as part of the association request. |
| ListenInterval | Integer | ≥ 0 | Specifies the listen interval value provided by the peer MAC entity as part of the association request. |
| SSID | Octet string | 0–32 octets | Specifies the SSID provided by the peer MAC entity as part of the association request. |
| SupportedRates | Set of integers | 2–127 inclusive (for each integer in the set) | The set of data rates (in units of 500 kb/s) that are supported by the STA that is requesting association. |
| RSN | RSN information element | As defined in frame format | A description of the cipher suites and AKM suites supported in the BSS. Only one pairwise cipher suite and only one authenticated key suite are allowed in the RSN information element. |
| QoSCapability | As defined in frame format | As defined in frame format | Specifies the parameters within the QoS Capability that are supported by the peer MAC entity. The parameter may be present only if the MIB attribute dot11QosOptionImplemented is true. |

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| Name | Type | Valid range | Description |
|---|---|---|---|
| RCPI | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Association Request frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurementEnabled is true. |
| RSNI | Integer | As defined in 7.3.2.41 | The RSNI value represents the measured RSNI at the time the corresponding Association Request frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurementEnabled is true. |
| RRMEnabled-Capabilities | As defined in frame format | As defined in 7.3.2.45 | Specifies the RRM enabled capabilities advertised by the AP. The element is present only when the MIB attribute dot11RadioMeasurementEnabled is true. |
| VendorSpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

### 10.3.6.4 MLME-ASSOCIATE.response

#### 10.3.6.4.2 Semantics of the service primitive

***Change the first paragraph of 10.3.6.4.2 as follows:***

The primitive parameters are as follows:

```
MLME-ASSOCIATE.response(
                        PeerSTAAddress,
                        ResultCode,
                        CapabilityInformation,
                        AssociationID,
                        EDCAParameterSet,
                        RCPI,
                        RSNI,
                        RRMEnabledCapabilities
                        VendorSpecificInfo
                        )
```

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***Change the table in 10.3.6.4.2 as follows:***

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTAAddress | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity from which the association request was received. |
| ResultCode | Enumeration | SUCCESS, REFUSED_REASON_ UNSPECIFIED, REFUSED_ CAPABILITIES_ MISMATCH, REFUSED_EXTERNAL_ REASON, REFUSED_AP_OUT_OF_ MEMORY, REFUSED_BASIC_ RATES_MISMATCH | Indicates the result response to the association request from the peer MAC entity. |
| Capability-Information | As defined in frame format | As defined in frame format | Specifies the operational capabilities advertised by the AP. |
| AssociationID | Integer | 1-2007 inclusive | If the association request result was SUCCESS, then AssociationID specifies the association ID value assigned to the peer MAC entity by the AP. |
| EDCA-ParameterSet | As defined in frame format | As defined in frame format | Specifies the EDCA parameter set that the STA should use. The parameter shall be present only if the MIB attribute dot11QosOptionImplemented is true. |
| RCPI | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Association Request frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurementEnabled is true. |
| RSNI | Integer | As defined in 7.3.2.41 | The RSNI value represents the measured RSNI at the time the corresponding Association Request frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurementEnabled is true. |
| RRMEnabled-Capabilities | As defined in frame format | As defined in 7.3.2.45 | Specifies the RRM enabled capabilities advertised by the AP. The element is present only when the MIB attribute dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |


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### 10.3.7 Reassociate

### 10.3.7.2 MLME-REASSOCIATE.confirm

***Change 10.3.7.2.2 as follows:***

#### 10.3.7.2.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-REASSOCIATE.confirm(
ResultCode,
CapabilityInformation,
AssociationID,
SupportedRates,
EDCAParameterSet,
RCPI.request,
RSNI.request,
RCPI.response,
RSNI.response,
RRMEnabledCapabilities
VendorSpecificInfo
)

| Name | Type | Valid range | Description |
|---|---|---|---|
| ResultCode | Enumeration | SUCCESS, INVALID_PARAMETERS, TIME-OUT, REFUSED_REASON_ UNSPECIFIED, REFUSED_NOT_ AUTHENTICATED, REFUSED_CAPABILITIES_ MISMATCH, REFUSED_EXTERNAL_REASON, REFUSED_AP_OUT_OF_ MEMORY, REFUSED_BASIC_RATES_ MISMATCH | Indicates the result of the MLME-REASSOCIATE.request. |
| Capability-Information | As defined in frame format | As defined in frame format | Specifies the operational capabilities advertised by the AP. |
| AssociationID | Integer | 1–2007 inclusive | If the association request result was SUCCESS, then AssociationID specifies the association ID value assigned by the AP. |
| Supported-Rates | Set of integers | 2–127 inclusive (for each integer in the set), bit 7 is set to 1 to indicate that a rate is a member of the BBSBasicRateSet. | The set of data rates (in units of 500 kb/s) that are supported by AP, including indication of which rates are part of the BSS BasicRate Set (according to 7.3.2.2). |
| EDCA-ParameterSet | As defined in frame format | As defined in frame format | Specifies the EDCA parameter set that the STA should use. The parameter shall be present only if the MIB attribute dot11Qos-OptionImplemented is true. |

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| Name | Type | Valid range | Description |
|---|---|---|---|
| RCPI.request | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Association Request frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurement-Enabled is true. |
| RSNI.request | Integer | As defined in 7.3.2.41 | RSNI at the time the corresponding Association Request frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurement-Enabled is true. |
| RCPI.response | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Association Response frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurement-Enabled is true. |
| RSNI.response | Integer | As defined in 7.3.2.41 | RSNI at the time the corresponding Association Response frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurement-Enabled is true. |
| RRMEnabled-Capabilities | As defined in frame format | As defined in 7.3.2.45 | Specifies the RRM enabled capabilities advertised by the AP. The element is present only when the MIB attribute dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |


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### 10.3.7.3 MLME-REASSOCIATE.indication

***Change 10.3.7.3.2 as follows:***

#### 10.3.7.3.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-REASSOCIATE.indication(
PeerSTAAddress,
CurrentAPAddress,
CapabilityInformation,
ListenInterval,
SSID,
SupportedRates,
RSN
QoSCapability,
RCPI,
RSNI,
RRMEnabledCapabilities
VendorSpecificInfo
)

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTA-Address | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity from which the reassociation was received. |
| CurrentAP-Address | MACAddress | Any valid individual MAC address | Specifies the address of the AP with which the peer STA is currently associated. |
| Capability-Information | As defined in frame format | As defined in frame format | Specifies the operational capability definitions provided by the peer MAC entity as part of the reassociation request. |
| ListenInterval | Integer | ≥ 0 | Specifies the listen interval value provided by the peer MAC entity as part of the reassociation request. |
| SSID | Octet string | 0–32 octets | Specifies the desired SSID provided by the peer MAC entity as part of the reassociation request. |
| SupportedRates | Set of integers | 2–127 inclusive (for each integer in the set) | The set of data rates (in units of 500 kb/s) that are supported by the STA that is requesting reassociation. |
| RSN | RSN information element | As defined in frame format | A description of the cipher suites and AKM suites supported in the BSS. |
| QoSCapability | As defined in frame format | As defined in frame format | Specifies the parameters within the QoS Capability that are supported by the peer MAC entity. The parameter may be present only if the MIB attribute dot11QosOptionImplemented is true. |

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| Name | Type | Valid range | Description |
|---|---|---|---|
| RCPI | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding Reassociation Request frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurementEnabled is true. |
| RSNI | Integer | As defined in 7.3.2.41 | The RSNI value represents the measured RSNI at the time the corresponding Reassociation Request frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurementEnabled is true. |
| RRMEnabled-Capabilities | As defined in frame format | As defined in 7.3.2.45 | Specifies the RRM enabled capabilities advertised by the AP. The element is present only when the MIB attribute dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

### 10.3.7.4 MLME-REASSOCIATE.response

#### 10.3.7.4.2 Semantics of the service primitive

***Change the first paragraph of 10.3.7.4.2 as follows:***

The primitive parameters are as follows:

MLME-REASSOCIATE.response(
PeerSTAAddress,
ResultCode,
CapabilityInformation,
AssociationID,
EDCAParameterSet,
RCPI,
RSNI,
RRMEnabledCapabilities
VendorSpecificInfo
)

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***Change the table in 10.3.7.4.2 as follows:***

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTAAddress | MACAddress | Any valid individual MAC address | Specifies the address of the peer MAC entity from which the reassociation request was received. |
| ResultCode | Enumeration | SUCCESS, REFUSED_REASON_ UNSPECIFIED, REFUSED_CAPABILITIES_ MISMATCH, REFUSED_EXTERNAL_ REASON, REFUSED_AP_OUT_OF_ MEMORY, REFUSED_BASIC_RATES_ MISMATCH | Indicates the result response to the reassociation request from the peer MAC entity. |
| Capability-Information | As defined in frame format | As defined in frame format | Specifies the operational capabilities advertised by the AP. |
| AssociationID | Integer | 1–2007 inclusive | If the reassociation request result was SUCCESS, then AssociationID specifies the association ID value assigned to the peer MAC entity by the AP. |
| EDCAParameterSet | As defined in frame format | As defined in frame format | Specifies the EDCA parameter set that the STA should use. The parameter shall be present only if the MIB attribute dot11QosOptionImplemented is true. |
| RCPI | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI value represents the measured RCPI of the corresponding reassociation request frame. The element may be present only when the MIB attribute dot11RRMRCPIMeasurementEnabled is true. |
| RSNI | Integer | As defined in 7.3.2.41 | The RSNI value represents the measured RSNI at the time the corresponding reassociation request frame was received. The element may be present only when the MIB attribute dot11RRMRSNIMeasurementEnabled is true. |
| RRMEnabled-Capabilities | As defined in frame format | As defined in 7.3.2.45 | Specifies the RRM enabled capabilities advertised by the AP. The element is present only when the MIB attribute dot11RadioMeasurementEnabled is true. |
| VendorSpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

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***Change the title and first and second paragraphs of 10.3.11 as follows:***

### 10.3.11 ~~Spectrum Management p~~Protocol layer model for spectrum management and radio measurement

The layer management extensions for measurement, TPC, and channel switching assume a certain partition of ~~spectrum management~~ functionality between the MLME and SME. This partitioning assumes that policy decisions (e.g., regarding measurement and channel switching) reside in the SME, while the protocol for measurement, switch timing, and the associated frame exchanges resides within the MLME (see Figure 10-2).

The informative diagrams within this subclause further illustrate the ~~spectrum management~~ protocol layer model adopted. Figure 10-3 and Figure 10-4 depict the measurement process for a peer STA to accept and reject a measurement request, respectively. Figure 10-5 illustrates the TPC adaptation process. Lastly, Figure 10-6 depicts the management process for a channel switch using a Channel Switch Announcement frame.

***Insert the following paragraph after the second paragraph in 10.3.11:***

It should be noted that these diagrams are intended as examples and do not depict all possible protocol scenarios, e.g., a measurement request may result in more than one measurement report frame as described in 11.9.6 and 11.10. Note that when rejecting a radio measurement category request, it is mandatory for a STA to send a measurement report with the Incapable bit set if the STA is permanently unable to make the requested measurement or with the Refused bit set if the STA is refusing the request.


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***Replace Figures 10-3 and 10-4 as follows, to reference Radio Measurement frames:***

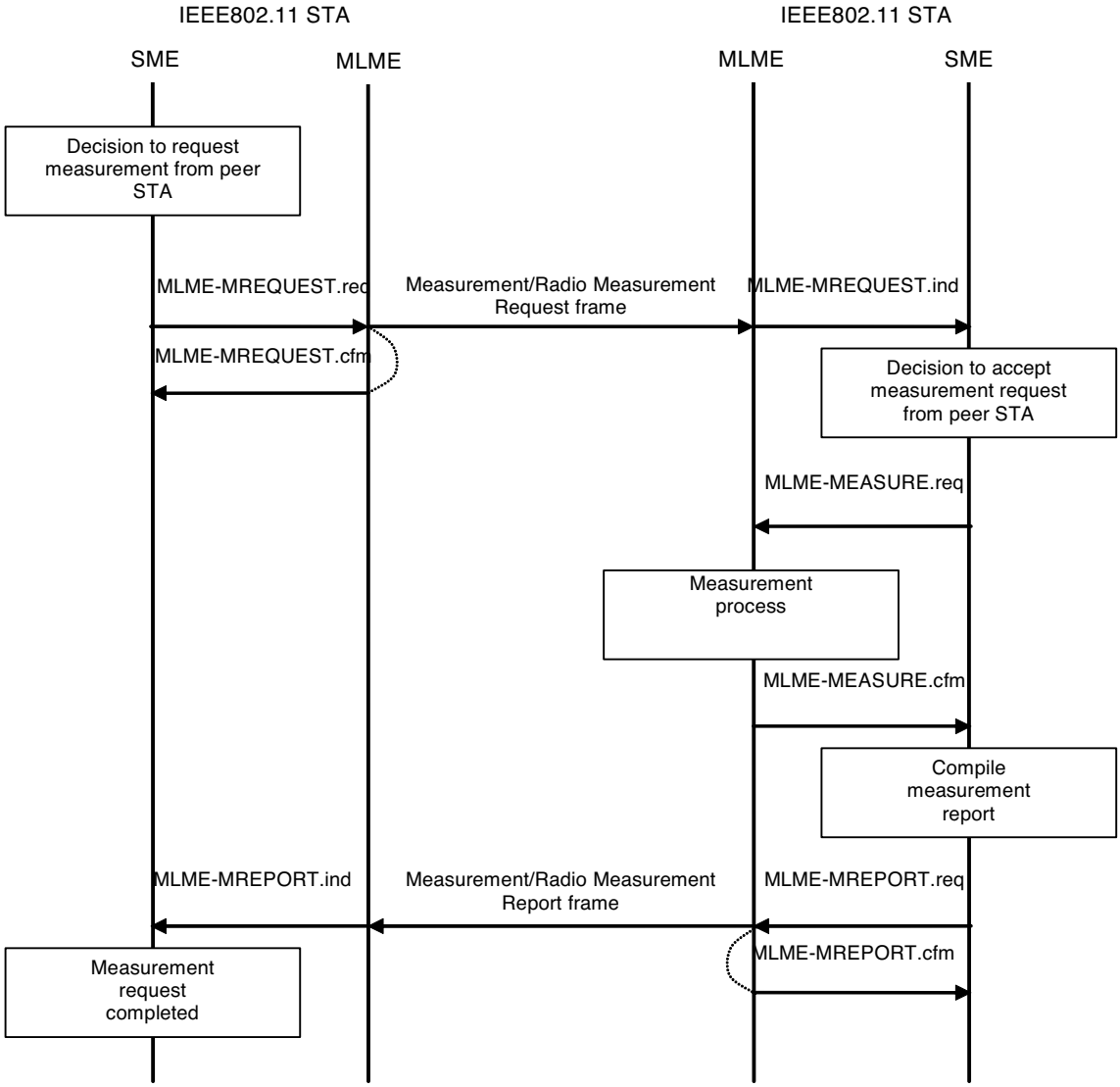


**Figure 10-3—Measurement Request—accepted**

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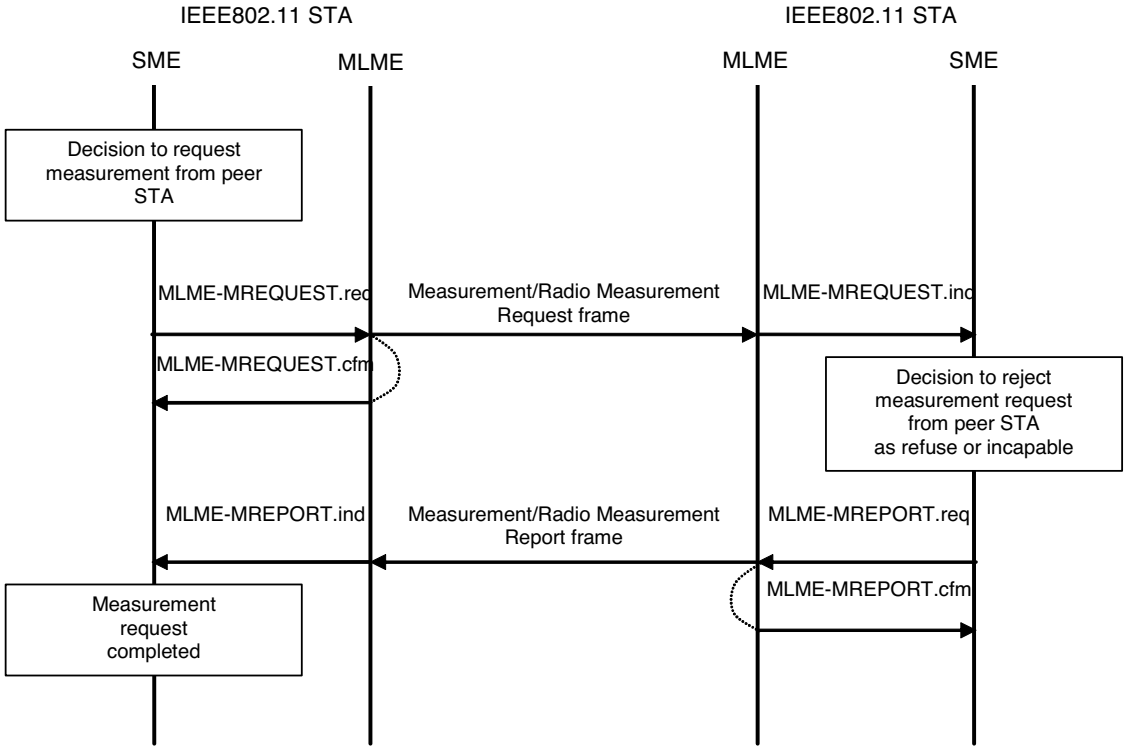


**Figure 10-4—Measurement Request—rejected**

### 10.3.12 Measurement Request

#### 10.3.12.1 MLME-MREQUEST.request

#### 10.3.12.1.2 Semantics of the service primitive

***Change 10.3.12.1.2 as follows:***

The primitive parameters are as follows:

MLME-MREQUEST.request(
Peer MAC Address,
Dialog Token,
Measurement Request Set,
<u>Number of Repetitions,</u>
<u>Measurement Category,</u>
VendorSpecificInfo
)


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| Name | Type | Valid range | Description |
|---|---|---|---|
| Peer MAC Address | MACAddress | Any valid individual or group MAC address | The address of the peer MAC entity to which the measurement request ~~is set~~ will be sent. |
| Dialog Token | Integer | 1–255 | The dialog token to identify the measurement transaction. |
| Measurement Request Set | Set of measurement requests, each as defined in the Measurement Request element format | Set of measurement requests, each as defined in the Measurement Request element format | A set of measurement requests, each containing a Measurement Token, Measurement Request Mode, Measurement Type, and a Measurement Request. |
| Number of Repetitions | Integer | 0–65 535 | The number of times the Measurement Request Set is to be repeated. Shall only be present if Measurement Category is Radio Measurement and if dot11RadioMeasurementEnabled is true. |
| Measurement Category | Enumeration | SPECTRUM MANAGEMENT, or RADIO MEASUREMENT | Indicates whether the Measurement Report Set is a set of Spectrum Management or Radio Measurement measurement requests. Shall only be present if dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

### 10.3.12.3 MLME-MREQUEST.indication

#### 10.3.12.3.2 Semantics of the service primitive

***Change 10.3.12.3.2 as follows:***

The primitive parameters are as follows:

MLME-MREQUEST.indication(
Peer MAC Address,
Dialog Token,
Measurement Request Set,
Number of Repetitions,
Measurement Category,
VendorSpecificInfo
)

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| Name | Type | Valid range | Description |
|---|---|---|---|
| Peer MAC Address | MACAddress | Any valid individual MAC address | The address of the peer MAC entity from which the measurement request was received. |
| Dialog Token | Integer | 1–255 | The dialog token to identify the measurement transaction. |
| Measurement Request Set | Set of measurement requests, each as defined in the Measurement Request element format | Set of measurement requests, each as defined in the Measurement Request element format | A set of measurement requests, each containing a Measurement Token, Measurement Request Mode, Measurement Type, and Measurement Request. |
| Number of Repetitions | Integer | 0–65 535 | The number of times the Measurement Request Set is to be repeated. Shall only be present if Measurement Category is Radio Measurement and if dot11RadioMeasurementEnabled is true. |
| Measurement Category | Enumeration | SPECTRUM MANAGEMENT, or RADIO MEASUREMENT | Indicates whether the Measurement Report Set is a set of Spectrum Management or Radio Measurement measurement requests. Shall only be present if dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

### 10.3.14 Measurement Report

#### 10.3.14.1 MLME-MREPORT.request

#### 10.3.14.1.2 Semantics of the service primitive

***Change 10.3.14.1.2 as follows:***

The primitive parameters are as follows:

MLME-MREPORT.request(
Peer MAC Address,
Dialog Token,
Measurement Report Set,
Measurement Category,
VendorSpecificInfo
)


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| Name | Type | Valid range | Description |
|---|---|---|---|
| Peer MAC Address | MACAddress | Any valid individual MAC address | The address of the peer MAC entity to which the measurement report ~~is set~~ will be sent. |
| Dialog Token | Integer | 0–255 | The Dialog Token to identify the measurement transaction. Set to 0 for an autonomous report. |
| Measurement Report Set | Set of measurement reports each as defined in the Measurement Report element format | Set of measurement reports each as defined in the Measurement Report element format | A set of measurement reports, each containing a Measurement Token, Measurement Report Mode, Measurement Type, and a Measurement Report. |
| Measurement Category | Enumeration | SPECTRUM MANAGEMENT, or RADIO MEASUREMENT | Indicates whether the Measurement Report Set is a set of Spectrum Management or Radio Measurement reports. Shall only be present if dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

### 10.3.14.3 MLME-MREPORT.indication

***Change 10.3.14.3.1 and 10.3.14.3.2 as follows:***

#### 10.3.14.3.1 Function

This primitive indicates that a Measurement Report or Radio Measurement Report frame has been received from a peer entity. This may be in response to an earlier measurement request (e.g., MLME-MREQUEST.request), or can be an autonomous report.

#### 10.3.14.3.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-MREPORT.indication(
                        Peer MAC Address,
                        Dialog Token,
                        Measurement Report Set,
                        Measurement Category,
                        VendorSpecificInfo
                        )
```

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| Name | Type | Valid range | Description |
|---|---|---|---|
| Peer MAC Address | MACAddress | Any valid individual MAC address | The address of the peer MAC entity from which the Measurement Report frame was received. |
| Dialog Token | Integer | 0–255 | The Dialog Token to identify the measurement transaction. Set to 0 for an autonomous report. |
| Measurement Report Set | Set of measurement reports, each as defined in the Measurement Report element format | Set of measurement reports, each as defined in the Measurement Report element format | A set of measurement reports, each containing a Measurement Token, Measurement Report Mode, Measurement Type, and Measurement Report. |
| Measurement Category | Enumeration | SPECTRUM MANAGEMENT, or RADIO MEASUREMENT | Indicates whether the Measurement Report Set is a set of Spectrum Management or Radio Measurement reports. Shall only be present if dot11RadioMeasurementEnabled is true. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

***Insert the following subclauses after 10.3.29.3.4:***

### 10.3.30 Neighbor Report Request

The following MLME primitives support the signaling of Neighbor Report Requests.

#### 10.3.30.1 MLME-NEIGHBORREPREQ.request

##### 10.3.30.1.1 Function

This primitive requests that a Neighbor Report Request frame be sent to the AP with which the STA is associated. It is valid only at a Radio Measurement capable non-AP STA.

##### 10.3.30.1.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-NEIGHBORREPREQ.request(
                                    DialogToken,
                                    SSID
                                    VendorSpecificInfo
                                    )
```

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| Name | Type | Valid range | Description |
|---|---|---|---|
| DialogToken | Integer | 1–255 | The Dialog Token to identify the neighbor report transaction. |
| SSID | As defined in the SSID element | As defined in the SSID element | Optional SSID element to request a neighbor list for a specific SSID. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

#### 10.3.30.1.3 When Generated

This primitive is generated by the SME to request that a Neighbor Report Request frame be sent to the AP with which the STA is associated to request a Neighbor Report.

#### 10.3.30.1.4 Effect of Receipt

On receipt of this primitive, the MLME constructs a Neighbor Report Request Action management frame. The STA then attempts to transmit this to the AP with which it is associated.

### 10.3.30.2 MLME-NEIGHBORREPREQ.confirm

#### 10.3.30.2.1 Function

This primitive reports the result of an attempt to send a Neighbor Report Request frame. It is valid only at a Radio Measurement capable non-AP STA.

#### 10.3.30.2.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-NEIGHBORREPREQ.confirm(
                                        ResultCode,
                                        DialogToken
                                        )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| ResultCode | Enumeration | SUCCESS, INVALID_PARAMETERS, TIMEOUT, TRANSMISSION_FAILURE, UNSPECIFIED_FAILURE | Indicates the result of the corresponding MLME-NEIGHBORREP.request. |
| DialogToken | Integer | 1–255 | The Dialog Token to identify the neighbor report transaction. Set to the value in the corresponding MLME-NEIGHBOR-REPREQ.request. |

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#### 10.3.30.2.3 When Generated

This primitive is generated by the MLME as a result of an MLME-NEIGHBORREPREQ.request and indicates the result of the request to send a Neighbor Report Request frame.

This primitive is generated when the Neighbor Report Request frame is successfully transmitted, the MLME-NEIGHBORREPREQ.request primitive contains invalid parameters, or when a timeout or other failure occurs.

#### 10.3.30.2.4 Effect of Receipt

On receipt of this primitive, the SME evaluates the ResultCode and may use the reported data.

### 10.3.30.3 MLME-NEIGHBORREPREQ.indication

#### 10.3.30.3.1 Function

This primitive indicates that a Neighbor Report Request frame was received from a non-AP STA. It is valid only at a Radio Measurement capable AP.

#### 10.3.30.3.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-NEIGHBORREPREQ.indication(
                                PeerSTAAddress,
                                DialogToken,
                                SSID
                                VendorSpecificInfo
                                )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTA-Address | MACAddress | Any valid individual MAC address | The address of the non-AP STA MAC entity from which a Neighbor Report Request frame was received. |
| DialogToken | Integer | 1–255 | The Dialog Token in the Neighbor Report Request frame that was received. |
| SSID | As defined in the SSID element | As defined in the SSID element | Optional SSID element to request a neighbor list for a specific SSID. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

#### 10.3.30.3.3 When Generated

This primitive is generated by the MLME when a valid Neighbor Report Request frame is received.

#### 10.3.30.3.4 Effect of Receipt

On receipt of this primitive the SME should operate according to the procedure in 11.11.2.

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### 10.3.31 Neighbor Report Response

The following MLME primitives support the signaling of Neighbor Report Responses.

#### 10.3.31.1 MLME-NEIGHBORREPRESP.request

##### 10.3.31.1.1 Function

This primitive requests that a neighbor report response be sent to a non-AP STA. This may be in response to an MLME-NEIGHBORREPREQ.indication primitive or an autonomous request. It is valid only at a Radio Measurement capable AP.

##### 10.3.31.1.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-NEIGHBORREPRESP.request(
                                        PeerSTAAddress,
                                        DialogToken,
                                        NeighborListSet
                                        VendorSpecificInfo
                                        )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTAAddress | MACAddress | Any valid individual MAC address | The address of the non-AP STA MAC entity to which a Neighbor Report Response frame is to be sent. |
| DialogToken | Integer | 0–255 | The Dialog Token to identify the neighbor report transaction. Set to the value received in the corresponding MLME-NEIGHBORREPORTREQ.indication or to 0 for an autonomous report. |
| NeighborListSet | Set of Neighbor List elements each as defined in the Neighbor Report element format | As defined in 7.3.2.37 | A set of Neighbor List elements, each representing a neighboring AP being reported as defined in the Neighbor Report element format. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

##### 10.3.31.1.3 When Generated

This primitive is generated by the SME to request a neighbor report be sent to a non-AP STA. This may be in response to an earlier MLME-NEIGHBORREPREQ.indication or a request to transmit an autonomous report.

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#### 10.3.31.1.4 Effect of Receipt

On receipt of this primitive, the MLME constructs a Neighbor Report Response frame. The STA then attempts to transmit this to the non-AP STA indicated by the PeerSTAAddress parameter.

### 10.3.31.2 MLME-NEIGHBORREPRESP.confirm

#### 10.3.31.2.1 Function

This primitive reports the result of an attempt to send a Neighbor Report Response frame to a peer STA. It is valid only at a Radio Measurement capable AP.

#### 10.3.31.2.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-NEIGHBORREPRESP.confirm(
                                        ResultCode,
                                        DialogToken
                                        )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| ResultCode | Enumeration | SUCCESS, INVALID_PARAMETERS, TRANSMISSION_FAILURE, UNSPECIFIED_FAILURE | Indicates the result of the corresponding MLME-NEIGHBORREPRESP.request. |
| DialogToken | Integer | 0–255 | The Dialog Token to identify the neighbor report transaction. Set to the value in the corresponding MLME-NEIGHBORREPRESP.request. |

#### 10.3.31.2.3 When Generated

This primitive is generated by the MLME as a result of an MLME-NEIGHBORREPRESP.request and indicates the result of the request to send a Neighbor Report Response frame.

This primitive is generated when the Neighbor Report Response frame is successfully transmitted, the MLME-NEIGHBORREPRESP.request primitive contains invalid parameters, or when a timeout or other failure occurs.

#### 10.3.31.2.4 Effect of Receipt

On receipt of this primitive, the SME evaluates the ResultCode.

### 10.3.31.3 MLME-NEIGHBORREPRESP.indication

#### 10.3.31.3.1 Function

This primitive indicates that a neighbor report response has been received. This may be in response to an earlier neighbor report request (MLME-NEIGHBORREPORTREQ.req) or an autonomous report. It is valid only at a Radio Measurement capable non-AP STA.

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#### 10.3.31.3.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-NEIGHBORREPRESP.indication(
                                PeerSTAAddress,
                                DialogToken,
                                NeighborListSet
                                VendorSpecificInfo
                                )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerSTAAddress | MACAddress | Any valid individual MAC address | The address of the AP from which the Neighbor Report Response frame was received. |
| DialogToken | Integer | 0-255 | The Dialog Token received in the Neighbor Report Response frame to identify the neighbor report transaction. |
| NeighborListSet | Set of Neighbor List elements, each as defined in the Neighbor Report information element format | As defined in 7.3.2.37 | A set of Neighbor List elements derived from the MIB table dot11RRMNeighborReportTable, each representing a neighboring AP being reported as defined in the Neighbor Report information element format. |
| Vendor-SpecificInfo | A set of information elements | As defined in 7.3.2.26 | Zero or more information elements. |

#### 10.3.31.3.3 When Generated

This primitive is generated by the MLME when a valid Neighbor Report Response Frame is received.

#### 10.3.31.3.4 Effect of Receipt

On receipt of this primitive, neighbor report data may be available to the SME.

### 10.3.32 Link Measure Request

The following primitives support the measurement of link path loss and the estimation of link margin between peer entities.

#### 10.3.32.1 MLME-LINKMEASURE.request

#### 10.3.32.1.1 Function

This primitive supports the measurement of link path loss and the estimation of link margin between peer entities.

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NOTE—The layer management model used assumes that the handling of a received Link Measurement Request frame is entirely within the MLME. Correspondingly there are no MLME-SME primitives specified for the peer side of a link measurement request transaction.

#### 10.3.32.1.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-LINKMEASURE.request(
                                    PeerMACAddress,
                                    DialogToken,
                                    Transmit Power,
                                    Max Transmit Power
                                    )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| PeerMAC Address | MACAddress | Any valid individual MAC address | The address of the peer MAC entity to which the Link Measure Request shall be sent. |
| DialogToken | Integer | 1–255 | The dialog token to identify the Link Measure transaction. |
| Transmit Power | Integer | As defined in the Link Measurement Request frame format | The transmit power to be used when transmitting the Link Measurement Request frame and included in the frame body. See 7.4.6.3. |
| Max Transmit Power | Integer | As defined in the Link Measurement Request frame format | The maximum transmit power to be used by the transmitting STA on its operating channel. See 7.4.6.4. |

#### 10.3.32.1.3 When Generated

This primitive is generated by the SME to request that a Link Measurement Request frame be sent to the peer entity to request that entity to report transmit power and link margin information.

#### 10.3.32.1.4 Effect of Receipt

On receipt of this primitive, the MLME constructs a Link Measurement Request frame. The STA then attempts to transmit this to the STA indicated in the PeerMACAddress parameter.

### 10.3.32.2 MLME-LINKMEASURE.confirm

#### 10.3.32.2.1 Function

This primitive reports the result of a Link Measurement request.

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#### 10.3.32.2.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-LINKMEASURE.confirm(
                    ResultCode,
                    DialogToken,
                    TransmitPower,
                    LinkMargin,
                    RCPI.request,
                    RSNI.request,
                    RCPI.report,
                    RSNI.report,
                    ReceiveAntennaID,
                    TransmitAntennaID
                    )
```

| Name | Type | Valid range | Description |
|---|---|---|---|
| ResultCode | Enumeration | SUCCESS, INVALID PARAMETERS, TRANSMISSION_FAILURE, UNSPECIFIED FAILURE | Indicates the result of the corresponding MLME-LINKMEASURE.request. |
| DialogToken | Integer | As defined in the correspond-ing MLME-LINK-MEASURE.request | The Dialog Token to identify the link measurement transaction. |
| TransmitPower | As defined in the TPC Report element | As defined in the TPC Report element | The contents of the Transmit Power field of the received Link Measurement Report frame. Only present if ResultCode = SUCCESS. |
| LinkMargin | As defined in the TPC Report element | As defined in the TPC Report element | The contents of the Link Margin field of the received Link Measurement Report frame. Only present if ResultCode = SUCCESS. |
| RCPI.request | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI level of the corresponding Link Measurement Request frame received at the reporting STA. Only present if ResultCode = SUCCESS. |
| RSNI.request | Integer | As defined in 7.3.2.41 | The RSNI of the corresponding Link Measurement Request frame received at the reporting STA. Only present if ResultCode = SUCCESS |
| RCPI.report | Integer | As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5 | The RCPI level of the corresponding Link Measurement Report frame received at the requesting STA. Only present if ResultCode = SUCCESS. |
| RSNI.report | Integer | As defined in 7.3.2.41 | The RSNI of the corresponding Link Measurement Report frame received at the requesting STA. Only present if ResultCode = SUCCESS |

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| Name | Type | Valid range | Description |
|---|---|---|---|
| Receive Antenna ID | Integer | 0–255 | The Antenna ID corresponding to the antenna on which the Link Measurement Request frame was received at the reporting STA. Antenna ID is defined in 7.3.2.29. |
| Transmit Antenna ID | Integer | 0–255 | The Antenna ID corresponding to the antenna used to transmit the Link Measurement Report frame. Antenna ID is defined in 7.3.2.29. |

#### 10.3.32.2.3 When Generated

This primitive is generated by the MLME as a result of an MLME-LINKMEASURE.request and indicates the results of the request.

This primitive is generated when the MLME-LINKMEASURE.request contains invalid parameters, when a failure occurs, or when the STA receives a Link Measurement Report frame from the requested STA.

#### 10.3.32.2.4 Effect of Receipt

On receipt of this primitive, the SME evaluates the ResultCode and may use the reported data.

# 11. MLME

## 11.1 Synchronization

### 11.1.3 Acquiring synchronization, scanning

***Change the third paragraph and insert a NOTE as follows:***

Upon receipt of the MLME-SCAN.request primitive, a STA shall perform scanning. The SSID parameter indicates the SSID for which to scan. To become a member of a particular ESS using passive scanning, a STA shall scan for Beacon frames containing that ESS's SSID, returning all Beacon frames matching the desired SSID in the BSSDescriptionSet parameter of the corresponding MLME-SCAN.confirm primitive with the appropriate bits in the Capabilities Information field indicating whether the beacon came from an infrastructure BSS or IBSS. If the value of the MIB attribute dot11RRMMeasurementPilotCapability is greater than 1, the STA shall additionally scan for Measurement Pilot frames, returning in the BSSDescriptionFromMeasurementPilotSet parameter all Measurement Pilot frames that equal the requested BSSID of the corresponding MLME-SCAN.request primitive and are not already members of the BSSDescriptionSet. To actively scan, the STA shall transmit Probe request frames containing the desired SSID. Upon completion of scanning, an MLME-SCAN.confirm is issued by the MLME indicating all of the BSS information received.

NOTE—MLME-SCAN.request primitives and resulting Probe Request frames may include a Request information element that can be used to request radio resource measurement information from the scanned BSSs. Requested radio resource measurement information from the scanned BSSs will be included in the Probe Response frames and in the MLME-SCAN.confirm primitive.

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***Change the fifth paragraph as follows:***

Upon receipt of an MLME-SCAN.request with the SSID parameter set to the wildcard SSID, the STA shall passively scan for any Beacon or Measurement Pilot frames, or actively transmit Probe request frames containing the wildcard SSID, as appropriate depending upon the value of ScanMode. Upon completion of scanning, an MLME-SCAN.confirm is issued by the MLME indicating all of the BSS information received.

### 11.1.3.2 Active scanning

#### 11.1.3.2.1 Sending a probe response

***Change the fourth paragraph as follows:***

STAs receiving Probe Request frames shall respond with a probe response when the SSID in the probe request is the wildcard SSID or matches the specific SSID of the STA. Furthermore, a STA with dot11RadioMeasurementEnabled set to true receiving a probe request with a DS Parameter Set element containing a Current Channel field value that is not the same as the value of dot11CurrentChannelNumber shall not respond with a probe response. Probe Response frames shall be sent as directed frames to the address of the STA that generated the probe request. The probe response shall be sent using normal frame transmission rules. An AP shall respond to all probe requests meeting the above criteria. In an IBSS, the STA that generated the last beacon shall be the STA that responds to a probe request.

***Insert the following paragraphs at the end of 11.1.3.2.1:***

Requested Element IDs in the Request information element shall be included in the Probe Response if the responding STA supports it. In an improperly formed Request information element, a STA may ignore the first information element requested that is not ordered properly and all subsequent information elements requested. In the probe response frame, the STA shall return the requested information elements in the same order as requested in the Request information element.

If dot11RadioMeasurementEnabled is true and if the Request element of the Probe Request includes the RCPI element ID, the STA shall include in the Probe Response an RCPI element containing the measured RCPI value of the received Probe Request frame. If no measurement result is available, the RCPI value shall be set to indicate that a measurement is not available.

### 11.1.3.3 Initializing a BSS

***Insert the following sentence at the end of 11.1.3.3:***

A STA shall include a Country information element in the transmission of Beacon frames if either dot11MultiDomainCapabilityEnabled, dot11SpectrumManagementRequired, or dot11RadioMeasurement-Enabled is true. See 7.2.3.1 for the description of a properly formed Beacon frame.

## 11.3 STA authentication and association

***Change item a2vi) and add item a2vii) as follows:***

a) Class 1 frames (permitted from within States 1, 2, and 3):
   2) Management frames
      i) Probe request/response
      ii) Beacon

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iii) Authentication: Successful authentication enables a STA to exchange Class 2 frames. Unsuccessful authentication leaves the STA in State 1.

iv) Deauthentication: Deauthentication notification when in State 2 or State 3 changes the STA's state to State 1. The STA shall become authenticated again prior to sending Class 2 frames. Deauthentication notification when in State 3 implies disassociation as well.

v) Announcement traffic indication message (ATIM)

vi) Public Action~~Spectrum Management Action: Within an IBSS, action frames are Class 1.~~

vii) Within an IBSS, all Action frames

***Change items c2i), c3ii), and c3iii) and to delete item c3iv) as follows:***

c) Class 3 frames (if and only if associated; allowed only from within State 3):

2) Management frames

i) Withinan infrastructure BSS, all Action frames except Public Action frames ~~QoS, DLS, and Block Ack Action~~

3) Control frames

i) Power save (PS)-Poll

ii) Block Ack (BlockAck)~~Action: Within an infrastructure BSS, action frames are Class 3~~

iii) Block Ack Request (BlockAckReq)~~Block Ack (BlockAck)~~

~~iv) Block Ack Request (BlockAckReq)~~

## 11.8 TPC procedures

***Change the fourth paragraph as follows:***

~~For the purposes of TPC, the following statements apply:~~

A STA with dot11SpectrumManagementRequired set to TRUE shall not join ~~operate in~~ a BSS or IBSS unless the Spectrum Management bit is set to 1 in the Capability Information field in Beacon and Probe Response frames or in the Condensed Capability Information field in Measurement Pilot frames received from other STAs in the BSS or IBSS, with the following exceptions:~~.~~

— A STA may operate when the Spectrum Management bit is set to 0 if the STA can determine that it is in a regulatory domain that does not require TPC or can ensure that it will meet regulatory requirements even if TPC is not employed. Potential methods for determining the regulatory domain include receiving a country indication in the beacon frame, Measurement Pilot frame, user confirmation, or configuration information within the device. Potential methods to ensure regulations are met even if TPC is not employed include using a transmit power that is below the legal maximum (including any mitigation factor).

— A STA shall set dot11SpectrumManagementRequired to TRUE before associating with a BSS or IBSS in which the Spectrum Management bit is set to 1 in the Capability Information field in Beacon frames and Probe Response frames or in the Condensed Capability Information field in Measurement Pilot frames received from the BSS or IBSS.

### 11.8.2 Specification of regulatory and local maximum transmit power levels

***Change 11.8.2 as follows:***

A STA shall determine a regulatory maximum transmit power for the current channel. The STA shall use the minimum of the following:


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— Any regulatory maximum transmit power received in a Country element from the AP in its BSS or another STA in its IBSS and

— Any regulatory maximum transmit power for the channel in the current regulatory domain known by the STA from other sources.

A STA shall determine a local maximum transmit power for the current channel~~. The STA shall~~ by selecting ~~use~~ the minimum of the following:

— Any local maximum transmit power received in the combination of a Country element and a Power Constraint element from the AP in its BSS or another STA in its IBSS and

— Any local maximum transmit power for the channel regulatory domain known by the STA from other sources.

Any calculation of the local maximum transmit power for the channel shall ensure the mitigation requirements for the channel in the current regulatory domain can be satisfied. The conservative approach is to set the local maximum transmit power level equal to the regulatory maximum transmit power level minus the mitigation requirement. However, it may be possible to satisfy the mitigation requirement using a higher local maximum transmit power level. A lower local maximum transmit power level may be used for other purposes (e.g., range control, reduction of interference).

The regulatory and local maximum transmit powers may change in a STA during the life of a BSS. However, network stability should be considered when deciding how often or by how much these maximums are changed. The regulatory and local maximum transmit powers shall not change during the life of an IBSS.

An AP in a BSS and a STA in an IBSS shall advertise the regulatory maximum transmit power for that STA's operating channel~~the current channel~~ in Beacon frames and Probe Response frames using a Country element. An AP in a BSS and a STA in an IBSS shall advertise the local maximum transmit power for that STA's operating channel~~the current channel~~ in Beacon frames and Probe Response frames using the combination of a Country element and a Power Constraint element.

Where TPC is being used for radio resource measurement without spectrum management, the inclusion of a Power Constraint element in Beacon and Probe Response frames shall be optional.

***Insert the following subclauses after 11.9.7.2:***

## 11.10 Radio measurement procedures

This subclause describes the radio measurements and the procedures for requesting and reporting radio measurements between STAs. When a STA implements support for one or more of the procedures described in this subclause, it shall set dot11RadioMeasurementEnabled attribute to true. When dot11RadioMeasurementEnabled is true, dot11MultiDomainCapabilityImplemented, dot11MultiDomain-CapabilityEnabled, dot11RegulatoryClassesImplemented, and dot11RegulatoryClasses-Required shall be true.

NOTE—A key issue in radio measurement is network operation and management, considering each STA's service load, power state, and operating conditions. Timely measurement reports may be more important than percentage of wireless capacity or STA capacity used by radio measurements. The measurement requester should consider traffic load and application requirements, regulatory requirements, and specific measurement states from every STA in support of wireless network management. There are no typical scenarios that describe IEEE 802.11 operation in all bands. Off-channel measurements are desirable to gather timely information about which channel to switch BSS operation to, and the noisier the operating environment, the more urgent the need for radio measurements off the serving channel. In any case, the measuring STA can refuse any measurement request.

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### 11.10.1 Measurement on operating and non-operating channels

If a STA supports measurements on non-operating channels, it shall set dot11RRMNon-operatingChannelMeasurementEnabled to true. Measurements on non-operating channels may require the measuring STA to interrupt its data services on the operating channel, switch channels, and make measurements. Measurements on the operating channel may not require the STA to interrupt its data services.

All stations are responsible for maintaining data services and an association or membership with the BSS or IBSS respectively, on the operating channel while performing measurements on non-operating channels.

A STA shall determine the time between successive non-operating channel measurements. This time may be a fixed length, or it may be determined by the STA using application-specific (or other) knowledge.

### 11.10.2 Measurement start time

A Radio Measurement Request frame may contain a single Measurement Request element or a sequence of Measurement Request elements. A STA that accepts the first or only measurement request within a Radio Measurement Request frame shall start the measurement as soon as practical after receiving the request. Subsequent measurement requests in the Radio Measurement Request frame that are accepted shall start as soon as practical after processing the previous request in the frame. Such measurement start times shall be subject to any specified Randomization Interval.

The Radio Measurement category permits a randomization interval to be specified for measurement start times. The intent of this is to avoid traffic storms that could arise with synchronized broadcast and multicast measurements. Prior to making each measurement in the requested sequence, the STA shall calculate a random delay distributed uniformly in the range 0 to the Randomization Interval specified in the measurement request. The STA shall not start the measurement until this delay has expired. Randomization Interval is specified in units of TUs. A Randomization Interval of 0 in a measurement request indicates that no random delay is to be used.

NOTE—It is important that designers recognize the need for statistical independence among the pseudo random number streams among STAs.

A number of repetitions may be specified in the Radio Measurement Request frame. In this case, the measurements in the frame are repeated as detailed further in 11.10.6. Each time a measurement is repeated, the STA shall recalculate the random delay as described above.

When a Measurement Start Time field is present in a measurement report, the measuring STA shall report the value of its TSF timer at the time the measurement started to an accuracy of ±1 TU.

### 11.10.3 Measurement Duration

The values of Request Measurement Duration and Duration Mandatory in the received measurement request and the dot11RRMMaxMeasurementDuration setting in the receiving STA determine if the receiving STA accepts the measurement request and for how long the measurement is performed. dot11RRMMaxMeasurementDuration indicates a measurement duration using the following formula:

$$\text{Maximum Measurement Duration in TUs} = 2^{(\text{dot11RRMMaxMeasurementDuration} - 4)} \times \text{BeaconInterval}$$

Table 11-9 describes how a STA responds to a measurement request depending on the values of dot11RRMMaxMeasurementDuration, Measurement Duration, and Duration Mandatory.

Measurement duration on non-operating channels is defined by dot11RRMNonOperating-ChannelMaxMeasurementDuration. If dot11RRMNonOperatingChannelMax-MeasurementDuration is set

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to 0, the STA does not support RRM measurements on non-operating channels; on receipt of a measurement request frame requesting a measurement on non-operating channels, the STA shall reject the measurement request by returning a Measurement Report with the Incapable bit set in the Measurement Report Mode field. The interpretation rules defined in Table 11-9 also apply for all non-zero values of dot11RRMNonOperatingChannelMaxMeasurementDuration for measurements on non-operating channels.

NOTE— Measurement duration on non-operating channels is subject to further limitations due to maximum off-operating channel time.

If the Duration Mandatory bit is set to 1 in the Measurement Request mode field of a measurement request, the requested STA, if it accepts the request, shall perform the measurement over the Measurement Duration specified in the request. If the STA is unable to commit to making the measurement over the requested duration, it shall refuse the request by sending a measurement report with the refused bit set in the Measurement Report Mode field. The measurement duration in the measurement report will be equal to the requested measurement duration.

If the Duration Mandatory bit is set to 0 in the Measurement Request mode field of a measurement request, the requested STA, if it accepts the request, shall attempt a measurement using the requested duration as a maximum measurement duration, and may report results with an actual measurement duration less than the requested duration. The duration over which the measurement was made will be included in the measurement duration field of the measurement report.

**Table 11-9—Measurement Duration**

| dot11RRMMax-MeasurementDuration | Measurement Duration in the Measurement Request | Duration Manda-tory | Notes |
|---|---|---|---|
| 0 | Any value | 1 | The STA shall perform measurements for the requested measurement duration. |
| 0 | Any value | 0 | The STA may perform measurements for a duration shorter than the requested mea-surement duration |
| Non-zero | Any value | 0 | The STA shall perform measurements for a maximum duration that is equal to the minimum of the requested measurement duration and the dot11RRMMaxMeasurementDuration. |
| Non-zero | Requested measurement duration > Maximum-MeasurementDuration in TUs | 1 | The STA shall reject the measurement request with the Measurement Report Mode set to "refused." |
| Non-zero | Requested measurement duration ≤ Maximum-MeasurementDuration in TUs | 1 | The STA shall perform the measurement for the requested duration. |

Each separate measurement within the Radio Measurement Request frame shall be performed over a continuous measurement duration time period. In Measurement Request frames, the requested Measurement Duration value shall not be set to 0 except for Beacon Request with Measurement Mode set to Beacon Table Mode, Statistics Request, and requests for triggered autonomous measurements.

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### 11.10.4 Station responsibility for conducting measurements

A Radio Measurement-capable STA shall decode and interpret each Radio Measurement Request frame that it receives and shall assess the contents against its capabilities and the impact on its own performance. A measurement request can be refused by the receiving STA by sending a Radio Measurement Report with the refused bit set in the Measurement Report Mode field. The reasons for refusing a measurement request are outside the scope of this standard but may include reduced quality of service, unacceptable power consumption, measurement scheduling conflicts, or other significant factors.

In assessing the performance impact of each measurement request element, a STA may use application-specific knowledge or other knowledge to limit the time it spends away from the operating channel. In doing so, the STA may either:

— Reject any Measurement Request element that has the Duration Mandatory bit set to 1 and has a mandatory measurement duration exceeding the maximum allowed off-operating channel time, or

— Measure for a reduced duration if the Duration Mandatory bit is set to 0.

A STA shall cancel all in-process radio measurements and shall delete all pending, unprocessed radio measurement requests upon receipt of a Disassociation message or upon association or reassociation with a BSSID different from its most recent association.

### 11.10.5 Requesting and reporting of measurements

A STA may perform radio measurements on one or more channels itself or a STA may request STAs in the same BSS or IBSS to perform measurements on its behalf.

A STA advertises its radio measurement capability using the RRM Enabled Capabilities IE. If a STA advertises that it is capable of a measurement, it shall not reject a request for the corresponding measurement by sending a Radio Measurement Report with the Incapable bit set in the Measurement Report Mode field. Measurement requests for radio measurements that the STA has advertised it is not capable of shall be rejected, and the corresponding report shall have the Incapable bit set in the Measurement Report Mode field.

When requesting other STAs to measure one or more channels, a STA shall use a Radio Measurement Request frame containing one or more Measurement Request elements. The measurement request may be sent to an individual or group destination address. The permitted measurement requests are shown in Table 11-10.

**Table 11-10—Allowed measurement requests**

| Service Set | Source of Request | Destination of Request | Receiver Address of Radio Measurement Request Frame |
|---|---|---|---|
| Infrastructure BSS | AP | Non-AP STA | Individual or group |
| | Non-AP STA | AP | Individual only |
| | Non-AP STA | Non-AP STA | Individual only for Direct Link within a BSS served by QoS AP, otherwise not allowed |
| IBSS | Non-AP STA | Non-AP STA | Individual or group |


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The source and destination of a measurement request shall both be a member of the same infrastructure BSS or a member of the same IBSS. Measurement requests with an individual Receiver Address shall only be sent to STAs that have indicated Radio Measurement capability.

The set of requested measurements received in the most recently received Radio Measurement Request frame of highest precedence is active at a STA. The precedence order for measurement requests shall be as follows (highest precedence first):

— Measurement requests received in individually addressed Radio Measurement Request frames
— Measurement requests received in Multicast-group addressed Radio Measurement Request frames
— Measurement requests received in Broadcast addressed Radio Measurement Request frames

The Measurement Request elements shall be processed in sequence by default, with certain Measurement Request elements processed in parallel according to the parallel bit field setting: see 7.3.2.21. A STA shall accept a Measurement Request with the parallel bit field enabled if and only if dot11RRMParallelMeasurenmentEnabled is true; otherwise, the STA shall reject the Measurement Request by returning a Measurement Report with the Incapable bit set in the Measurement Report Mode field.

If dot11RRMParallelMeasurementEnabled is true and if measurement resources are available, the STA processes each element by setting up and making the specified measurement. If measurement resources are not available to perform the requested parallel measurements, the STA shall return a Measurement Report with the Refused bit set in the Measurement Report Mode field.

The Measurement Request elements within a Radio Measurement Request frame may specify multiple measurement types across multiple channels.

A STA may receive another Radio Measurement Request frame while the measurements requested in a previous Radio Measurement Request frame are pending or in progress. If this request is accepted, the set of measurement requests in the new frame supersedes any previous requests received in a Radio Measurement Request frame of the same or lower precedence. The measuring STA shall report the results of any completed measurements and terminate any pending or in-progress measurements. Results from a terminated in-progress measurement may be valid and reported if Duration Mandatory was not set to 1 in the corresponding request. It is permissible for the superseding Radio Measurement Request frame to contain no new measurement requests. This has the effect of cancelling all pending or in-progress measurements of the same or lower priority. If a station receives a Radio Measurement Request frame with lower precedence than the currently active Radio Measurement Request frame, the station shall discard the measurement requests in the new Radio Measurement Request frame. Measurement Request elements that have the Enable bit set to 1 shall be processed in all received Radio Measurement Request frames regardless of these precedence rules.

If a STA receives a spectrum management Measurement Request with Measurement Type equal to 0 (Basic Request), this shall always take priority over any pending or in-progress radio measurements.

A STA that issues a radio measurement request to another STA to perform a measurement on the operating channel may continue to transmit MPDUs and MMPDUs to that STA while the measurement is being processed.

A STA that issues a radio measurement request to another STA to perform a measurement on a non-operating channel is not required to take any special action to suspend traffic to that STA. All stations shall maintain state information such that data services and association or membership with the BSS or IBSS respectively can continue when returning from a non-operating channel measurement.

A single Measurement Request Element may generate a large quantity of measurement report data. The measurement report data may be reported using multiple measurement report elements in multiple

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measurement report frames. The result of each measurement requested in a Measurement Request element shall be reported in one or more Measurement Report elements of type corresponding to the request. Each Measurement Report element returned shall have the same Measurement Token as in the corresponding Measurement Request element, and the same Actual Measurement Start Time field, if present, as in the first returned Measurement Report element. The results of each measurement should be returned without undue delay to the requesting STA.

Measurement Report elements shall be returned to the requesting STA in one or more Radio Measurement Report frames. Each Radio Measurement Report frame shall contain the same Dialog Token field value as the corresponding Radio Measurement Request frame, and the same Actual Measurement Start Time field, if present, as in the first returned Measurement Report element.

When a STA is permanently unable to make a requested measurement, the STA shall respond to such a measurement request received within a unicast Radio Measurement Request frame with a measurement report indicating that it is incapable of completing the measurement request. A STA shall not respond to requests received in broadcast and multicast frames in this manner. Examples of when an incapable response is appropriate are:

— The requested measurement type is not supported.

— The measuring STA cannot support requested parallel measurements due to the requests relating to different channels.

A STA that receives a response with an incapable indication shall not make the same request to the responding STA during the lifetime of the current association, or IBSS membership. This is logically the same as the responding STA using the Enable and Request bits in a measurement request to indicate that it will not accept measurement requests of a certain type. A STA that has indicated an incapable response to a requesting STA may discard further requests of the same type from that STA without responding.

A STA may refuse to make any requested measurement. A STA refusing a measurement request within a unicast Radio Measurement Request frame shall respond with a measurement report indicating that it is refusing the measurement request. A STA shall not respond to measurement requests received in broadcast or multicast Radio Measurement Request frames in this manner.

By default, a STA may send a radio measurement request of any defined measurement type. A STA that receives a Measurement Request element with the Enable bit set to 1 and the Request bit set to 0 shall not issue measurement requests of the Measurement Type type in the request to the STA from which the element was received.

NOTE—Since measurements on non-operating channels interrupt normal operation on the operating channel, the requesting STA should consider each STA's service load, power state, and operating conditions. Since measurements on the operating channel execute concurrently with normal traffic processing, operating channel measurements may be requested more frequently and for longer durations.

### 11.10.6 Repeated measurement request frames

Radio Measurement Request frames contain a field specifying the number of repetitions for the Radio Measurement Request frame.

If the Radio Measurement Request frame includes a non-zero value for the Number of Repetitions and dot11RRMRepeatedMeasurementsEnabled is false, the STA shall reject the measurement request and return a Measurement Report with the Incapable bit set in the Measurement Report Mode field.

If the Radio Measurement Request frame includes a non-zero value for the Number of Repetitions and dot11RRMRepeatedMeasurementsEnabled is true, the STA shall iterate (repeat) the processing of all the Measurement Request elements in the frame as specified by the value in the Number of Repetitions field. A

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value of zero in the Number of Repetitions field indicates Measurement Request elements are executed once without repetition; a value of 1 in the Number of Repetitions field indicates Measurement Request elements are executed twice, one initial execution and one repetition; and so on. When completing the initial processing of the last Measurement Request element in the frame, the STA shall begin processing of the first Measurement Request element in the frame to repeat the frame until the number of iterations reaches the value in the Number of Repetitions field. Measurement Request elements with the Enable bit set to 1 shall be processed once regardless of the value in the Number of Repetitions in the measurement request.

Each repeated measurement result shall include the Measurement Token value as in the corresponding Measurement request element and the Dialog Token value as in the corresponding Radio Measurement Request frame.

Measurement results shall be reported for each repetition of a repeated measurement request subject to any conditional reporting requirement.

STAs responding with incapable or refused indications to measurement requests within a Radio Measurement Request frame with a non-zero value for Number of Repetitions shall only respond once.

### 11.10.7 Triggered Autonomous Reporting

Autonomous reporting is defined for Spectrum Management measurements supporting DFS; see 11.9.6. It allows a STA to report the results of measurements to a peer STA for which there was no explicit measurement request. In this case, the transmission of autonomous reports shall be entirely the decision of the STA at which such reporting has been enabled. An example of this use would be to report a change in conditions at the STA observed as a result of background measurement, e.g., the presence of a radar signal.

In radio measurement, triggered autonomous reporting shall be subject to trigger conditions set by the enabling STA that determine when measurement reports are issued. Triggered autonomous reporting provides a method for conditional reporting during continuous background measurements. An example of the use of triggered autonomous measurement is for reporting problem conditions in continuous, non-invasive statistical monitoring.

Triggered autonomous reporting is defined only for the Transmit Stream/Category Measurement measurement type; see 11.10.8.8.

If dot11RRMTriggeredTransmitStreamCategoryMeasurementEnabled is true, a STA indicates that it wishes to accept triggered autonomous reports by sending a Measurement Request element with the Enable and Report bits set to 1; see 7.3.2.21. The type of measurement is indicated in the Measurement Type field. Trigger conditions that determine when measurement reports are to be generated shall be specified in the Measurement Request field. A Measurement Request element that is being used to control triggered autonomous reporting shall be sent within a Radio Measurement Request frame. Measurement Request elements being used to request measurements may also appear in the same Radio Measurement Request frame. The Radio Measurement Request frame may be sent to a group receiver address to enable triggered autonomous reports at more than one STA.

A STA shall not send autonomous reports for radio measurement types having triggered autonomous reporting enabled without a requested trigger condition having been met.

If a request to enable triggered autonomous reporting is sent to an individual address and the recipient STA does not support measurements of the type indicated or the recipient STA has dot11RRMTriggeredTransmitStreamCategoryMeasurementEnabled set to false, a Measurement Report element shall be returned to the requesting STA with the Incapable bit set. A STA may also refuse to enable triggered autonomous reporting. In this case a Measurement Report element shall be returned to the

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requesting STA with the refused bit set. Such responses shall not be issued if the request to enable triggered autonomous reporting was sent to a group address.

A STA receiving a request to enable triggered autonomous reporting from another STA may send reports of the appropriate type, addressed to the individual address of the STA that sent the enable request. Autonomous reports shall only be sent to the individual addresses of STAs from which a valid enable request has been received and shall only be issued when a requested trigger condition has been met. The Measurement Token in each Measurement Report element and the Dialog Token value in the Measurement Report frame shall both be set to 0 in a triggered autonomous report.

A STA may update the trigger conditions set for triggered autonomous reports by issuing a new Measurement Request element with the Enable and Report bits both set to 1, the Measurement Type field set to the appropriate type and the Measurement Request field indicating the new trigger conditions. A STA disables all triggered autonomous measurement reports by sending a Measurement Request element with the Enable bit set to 1 and the Report bit set to 0; see 7.3.2.21.

A STA in an infrastructure BSS shall cease all triggered autonomous reporting if it disassociates, or re-associates to a different BSS (reassociation to the same BSS shall not affect triggered reporting). A STA in an independent BSS shall cease all triggered autonomous reporting if it leaves the BSS.

Triggered autonomous reporting and requested measurements are independent: a STA may request measurements from another STA even if it has enabled triggered autonomous reporting from that STA. All Measurement Request elements received in Radio Measurement Request frames that have the Enable bit set to 1 shall be processed without regard for the measurement precedence rules for requested measurements in 11.10.5.

### 11.10.8 Specific measurement usage

#### 11.10.8.1 Beacon Report

If a STA accepts a Beacon Request it shall respond with a Radio Measurement Report frame containing Beacon Measurement Reports for all observed BSSs matching the BSSID and SSID in the Beacon Measurement Request, at the level of detail requested in the Reporting Detail. If the Reporting Detail is set to 1 and the optional Request information subelement is included in the Beacon Measurement Request, the corresponding Beacon Measurement Report shall include the list of elements listed in the Request information subelement. The RCPI in the Beacon Report indicates the power level of the received Beacon, Measurement Pilot, or Probe Response frame. For repeated measurements (when the Measurement Request frame contains a non-zero value for the Number of Repetitions field), the transmission of the Beacon Report element may be conditional on the measured RCPI or RSNI value. If the Measurement Request frame contains a 0 value for the Number of Repetitions field, the Beacon Reporting Information subelement shall not be included in the Beacon Request. If the Measurement Request frame contains a non-zero value for the Number of Repetitions field, and if both dot11RRMBeaconMeasurementReportingConditionsEnabled and dot11RRMRepeatedMeasurementsEnabled are true, and if a Beacon Reporting Information subelement is included in a Beacon Request, the STA shall respond with a Beacon Report only if the indicated Beacon Reporting Condition is true. Table 7-29g lists the reporting conditions that are based on the measured RCPI or RSNI levels.

If dot11RRMBeaconPassiveMeasurementEnabled is true and the Measurement Mode in the measurement request is Passive, the measuring STA shall perform the following procedure (or an equivalent procedure) on the requested channel:

a) Set a measurement duration timer.

b) At the end of the measurement duration, process all received Beacons or Probe Response management frames with the requested SSID and BSSID to compile the measurement report. The STA shall

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use the Reporting Detail specified in the measurement request to determine the data to be included in the measurement report. If no Beacons or Probe Responses with the requested SSID and BSSID were received in the measurement duration, then process all Measurement Pilot Frames with the requested BSSID to compile the measurement report. Otherwise, compile an empty Beacon measurement report.

If dot11RRMBeaconPassiveMeasurementEnabled is false and the Measurement Mode in the measurement request is Passive, the measuring STA shall reject the measurement request and return a Beacon Measurement Report with the Incapable bit set in the Measurement Report Mode field.

If dot11RRMBeaconActiveMeasurementEnabled is true and the Measurement Mode in the measurement request is Active, the measuring STA shall perform the following procedure (or an equivalent procedure) on the requested channel:

1) If the channel is not the operating channel, wait for dot11RRMMeasurementProbeDelay, or until a PHY-RXSTART.indication has been received.
2) Using the basic access protocol in 9.2.5.1, send a Probe Request management frame to the broadcast destination address (DA). The BSSID field in the Probe Request shall be set to the BSSID field in the measurement request. The SSID element in the Probe Request shall be set to the SSID element in the measurement request.
3) Set a measurement duration timer.
4) At the end of the measurement duration, process all received Probe Response and Beacon management frames with the requested SSID and BSSID to compile the measurement report. The STA shall use the Reporting Detail specified in the measurement request to determine the data to be included in the measurement report. If no Beacons or Probe Response frames were received in the measurement duration and Measurement Pilot frames with the requested BSSID were received in the measurement duration, then process all these Measurement Pilot Frames to compile the measurement report. Otherwise, compile an empty Beacon measurement report.

If dot11RRMBeaconActiveMeasurementEnabled is false and the Measurement Mode in the measurement request is Active, the measuring STA shall reject the measurement request and return a Beacon Measurement Report with the Incapable bit set in the Measurement Report Mode field.

When more than one Beacon or Probe Response from a BSS is received in the measurement duration, the contents of the Beacon Report shall be based on the latest received. If only Measurement Pilot frames were received in the measurement duration, the contents of the Beacon Report shall be based on the latest Measurement Pilot frame received.

If the BSSID field in the Measurement Request contains a wildcard BSSID, all observed BSSs with the requested SSID shall be reported in a separate Beacon Report element for each BSSID. If the SSID subelement is not included in the Beacon Request, all observed BSSs shall be reported in a separate Beacon Report element for each BSSID. In Active mode, Probe Response frames shall be evaluated regardless of whether or not the Probe Response frame was triggered by the measuring STA's Probe Request.

On accepting an active or passive mode Beacon measurement request with Channel Number set to 0, a STA shall conduct iterative measurements on all supported channels in the specified Regulatory Class where the measurement is permitted on the channel and the channel is valid for the current regulatory domain. Measurements shall be made using the specified Measurement Duration with the time between each consecutive measurement as defined in 11.10.1. Iterative measurements shall cease when all supported channels have been measured. While the STA is processing a Beacon measurement request for iterative channel measurements, the STA may not begin processing the next measurement request in the measurement request frame.

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On accepting an active or passive mode Beacon measurement request with Channel Number set to 255, a STA shall conduct iterative measurements on all supported channels listed in the latest AP Channel Report received from the serving AP and where the measurement is permitted on the channel and the channel is valid for the current regulatory domain. For iterative beacon measurements, the measurement duration applies to the measurement on each channel. Measurements shall be made using the specified Measurement Duration with the time between each consecutive measurement as defined in 11.10.1. Iterative measurements shall cease when all supported channels have been measured. If an AP Channel Report is not available in the STA, the STA shall iteratively conduct measurements on all supported channels in the specified Regulatory Class that are valid for the current regulatory domain. While the STA is processing a Beacon measurement request for iterative channel measurements, the STA may not begin processing the next measurement request in the measurement request frame.

On accepting an active or passive mode Beacon measurement request with optional AP Channel report subelements, a STA shall conduct iterative measurements first on the supported channel(s) indicated by the Regulatory Class and Channel fields in the Beacon Request, and second on the supported channels listed in the AP Channel Report subelementsubelements in the Beacon Request, where the measurement is permitted on the channel and the channel is valid for the current regulatory domain. For iterative beacon measurements, the measurement duration applies to the measurement on each channel. Measurements shall be made using the specified Measurement Duration with the time between each consecutive measurement as defined in 11.10.1. Iterative measurements shall cease when all supported channels have been measured. While the STA is processing a Beacon measurement request for iterative channel measurements, the STA may not begin processing the next measurement request in the measurement request frame.

If dot11RRMBeaconTableMeasurementEnabled is true and the Measurement Mode in the measurement request is Beacon Table, the measuring STA shall return a Beacon Report containing the current contents of any stored beacon information for any supported channel with the requested SSID and BSSID without performing additional measurements. The receiving STA shall ignore the channel and measurement duration specified in the Beacon Request when Beacon Table mode is selected. The beacon information accumulated may be the result of any operation that caused the STA to acquire these results. If the stored beacon information is based on a measurement made by the reporting STA, and if the actual measurement start time, measurement duration, and Parent TSF are available for this measurement, then the beacon report shall include the actual measurement start time, measurement duration, and Parent TSF; otherwise the actual measurement start time, measurement duration, and Parent TSF shall be set to 0. The RCPI and RSNI for that stored beacon measurement may be included in the beacon report; otherwise the beacon report shall indicate that RCPI and RSNI measurements are not available. The channel number, regulatory class, and reported frame information for that stored measurement may be included in the beacon report; otherwise these fields shall be set to 255 in the beacon report. The STA shall use the Reporting Detail specified in the measurement request to determine the data to be included in the measurement report. If the STA has no beacon information available then the STA may either refuse the request or send an empty Beacon Report.

If dot11RRMBeaconTableMeasurementEnabled is false and the Measurement Mode in the measurement request is Beacon Table, the measuring STA shall reject the measurement request and return a Beacon Measurement Report with the Incapable bit set in the Measurement Report Mode field.

For repeated measurements, the Beacon Request element may include a Beacon Reporting Information subelement that determines when the measuring STA is to send a Beacon Report element for a measured Beacon, Measurement Pilot, or Probe Response frame with the requested SSID and BSSID. When the requested Reporting Condition value is non-zero, and dot11RRMBeaconMeasurement-ReportingConditionsEnabled is true, the STA shall create and transmit a Beacon Report element for that measured frame only if the condition indicated in Table 7-29g is true. Otherwise, a Beacon Report element is not created for that measured frame. If multiple Beacons, Measurement Pilots, or Probe Response frames with the requested specific BSSID are received during the measurement duration, the reporting condition shall only be applied to the latest received Beacon, Measurement Pilot, or Probe Response. If multiple Beacons, Measurement Pilots or Probe Response frames are received during the measurement duration

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when a wildcard BSSID is requested, the STA shall generate one Beacon Report element for each BSSID occurring in frames that satisfy the reporting condition; the Beacon Report element shall be based on the latest received Beacon, Measurement Pilot, or Probe Response for that specific BSSID. For reporting conditions 5–10, the serving AP's reference RCPI level and the serving AP's reference RSNI level referred to in Table 7-29g are average values of the RCPI or RSNI of the 16 most recent Beacon frames received from the measuring STA's serving AP. The serving AP's reference RCPI level and the serving AP's reference RSNI level are so averaged to provide a more accurate and stable indication of the signal level from the serving AP. For reporting conditions 5–10, the STA shall use the serving AP's reference RCPI level or reference RSNI level (with offset, if any) to test the measured RCPI or RSNI to determine whether to create and send a Beacon Report element for this measured Beacon, Measurement Pilot, or Probe Response frame.

The STA shall return a Beacon Report with the Incapable bit set in the Measurement Report Mode field in the following cases:

— Reporting Condition in the Beacon Request is non-zero and dot11ReportingConditionsEnabled is false,

— Reporting Condition in the Beacon Request is non-zero and the Number of Repetitions in the Measurement Request frame is zero.

NOTE—Reporting conditions described here for repeated Beacon Request measurements are distinct from the conditions defined elsewhere for triggered measurements.

### 11.10.8.2 Frame Report

If dot11RRMFrameMeasurementEnabled is true, and a station accepts a Frame Request, it shall respond with a Radio Measurement Report frame containing one or more Measurement (Frame) Report elements. (See 7.3.2.22.7.)

If the MAC Address field was included in the Frame Request, a Frame Report Entry where Transmitter Address (TA) matches the MAC address in the Frame Request shall be included in the Frame Report if at least one data or management frame was received with this Transmitter Address during the measurement duration. If the MAC address field was not included in the Frame Request in response to which this Frame Report is being generated, the measuring station shall report all frames correctly received during the measurement duration in one or more Frame Report elements.

If the Frame Request Type of the corresponding Frame Request equals 1, then each Frame Report element contains one Frame Count subelement that contains in turn one or more Frame Report Entries.The measuring station shall count the number of unicast data and management frames received from one transmit address during the measurement duration and shall summarize this traffic in a Frame Report Entry.

Each Frame Report Entry contains the Transmit Address, BSSID, PHY Type, Average RCPI, Last RSNI, Last RCPI, Antenna ID, and Frame Count for the frames counted in this Frame Report Entry.

The reported Average RCPI shall be an average of the RCPI values of frames received and counted in the Frame Report Entry. If there are up to 32 frames, then the Average RCPI indicates the mean of the RCPI of each of the frames. If there are more than 32 frames, then the Average RCPI indicates an exponentially weighted average, initialized by the mean RCPI of the first 32 frames and exponentially updated by new RCPI values. The averaging is calculated as depicted as follows.

If the number of frames correctly received is less than or equal to 32:

Average RCPI = Sum of RCPI values / Number of frames

For 33 correctly received frames and above:

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Average RCPI = (Last Average RCPI × 31 / 32) + (Current frame RCPI / 32)

The Last RCPI shall be the RCPI value of the most recently received frame counted in the Frame Report Entry. The Antenna ID field contains the identifying number for the antenna(s) used to receive the most recently received frame included in this Frame Report Entry as defined in 7.3.2.40. If different antennas are used to receive the frame preamble and the frame body, this Antenna ID shall contain the identifying number for the antenna(s) used to receive the frame body.

If dot11RRMFrameMeasurementEnabled is false, a station shall reject the received Frame Request and shall respond with a Frame Report where the Incapable bit is set in the Measurement Report Mode field.

### 11.10.8.3 Channel Load Report

If dot11RRMChannelLoadMeasurementEnabled is true and a station accepts a Channel Load Request, it shall respond with a Radio Measurement Report frame containing one Measurement (Channel Load) Report element. The Channel Load field is defined as the percentage of time, linearly scaled with 255 representing 100%, the STA sensed the medium was busy, as indicated by either the physical or virtual carrier sense (CS) mechanism. This percentage is computed using the following formula:

Channel Load = Integer((channel busy time/(MeasurementDuration × 1024)) × 255)

where channel busy time is defined to be the number of microseconds during which the CS mechanism, as defined in 9.2.1, has indicated a channel busy indication.

If dot11RRMChannelLoadMeasurementEnabled is false, a station shall reject the received Channel Load Request and shall respond with a Channel Load Report where the Incapable bit is set in the Measurement Report Mode field.

If dot11RRMChannelLoadMeasurementEnabled is true and if a Channel Load Reporting Information subelement is included in a Channel Load Request, the STA shall respond with a Channel Load Report only if the indicated Channel Load Reporting Condition is true.

### 11.10.8.4 Noise Histogram Report

If dot11RRMNoiseHistogramMeasurementEnabled is true and a station accepts a Noise Histogram Request, it shall respond with a Radio Measurement Report frame containing one Measurement (Noise Histogram) Report element. The Noise Histogram Report shall contain the IPI densities observed in the channel for the IPI levels defined in Table 7-31b.

To compute the IPI densities, the STA shall measure the IPI in the specified channel as a function of time over the measurement duration when NAV is equal to 0 (when virtual CS mechanism indicates idle channel) except during frame transmission or reception. The time resolution of the IPI measurements shall be in microseconds. The IPI densities are then computed for each of the nine possible IPI values using:

IPI Density = Integer(255 × ([Duration receiving at IPI value (microseconds)] /
((1024 × [Measurement Duration (TU)]) – [NAVBUSY (microseconds)] – [Ttx (microseconds)] –
[Trx (microseconds)])))

where

Ttx is the frame transmission time during the Measurement Duration

Trx is the frame reception time during the Measurement Duration

NAVBUSY is the total time in microseconds that NAV is non-zero during the Measurement Duration

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The sum of the IPI densities will be approximately 255. If either the NAV is non-zero, or if there is frame transmission, or if there is frame reception throughout the entire measurement duration period, no reportable IPI values will be measured, and all IPI Densities shall be set to 0 in the Measurement Report element.

A STA shall include in the Noise Histogram Report an Average Noise Power Indicator (ANPI) value representing the average noise plus interference power on the measured channel at the antenna connector during the measurement duration. The STA may use Noise Histogram IPI density values to calculate ANPI. The IPI densities in the Noise Histogram Report may be used to calculate an average noise power for the channel during the measurement duration. This calculated average IPI power value may be reported as the value for ANPI. Any equivalent method to measure ANPI may also be used. ANPI power is defined in dBm using the same units and accuracy as defined for RCPI.

ANPI may be calculated over any period and for any received frame. ANPI may be calculated in any period and at any time by filtering all PHY IPI values in a MAC filter to exclude IPI values received when NAV is non-zero. These filtered IPI values represent idle channel noise and may be stored in a first-in-first-out buffer to facilitate ANPI calculation over a fixed number of IPI samples. ANPI may be so calculated upon receipt of any frame and may be used with RCPI to calculate RSNI for any received frame. Any equivalent method to measure ANPI may also be used to calculate RSNI for any received frame.

If dot11RRMNoiseHistogramMeasurementEnabled is false, a station shall reject the received Noise Histogram Measurement Request and shall respond with a Noise Histogram Measurement Report where the Incapable bit is set in the Measurement Report Mode field.

If dot11RRMNoiseHistogramMeasurementEnabled is true and if a Noise Histogram Reporting Information subelement is included in a Noise Histogram Request, the STA shall respond with a Noise Histogram Report only if the indicated Noise Histogram Reporting Condition is true.

### 11.10.8.5 STA Statistics Report

If dot11RRMStatisticsMeasaurementEnabled is true and a station accepts a STA Statistics Request, it shall respond with a Radio Measurement Report frame including one STA Statistics Report element. If the Requested Measurement Duration value is 0, the STA shall report the current values for the requested Statistics Group Data. If the Requested Measurement Duration value is greater than 0, the STA Statistics Report reports the change in the requested Statistics Group Data measured within that non-zero Measurement Duration. The reported change in data value shall be the value of the data at the end of the actual Measurement Duration minus the value of the data at the beginning of the actual Measurement Duration. If a STA accepts a Statistics Request measurement with non-zero, positive Measurement Duration, the STA shall perform the measurement over the requested Measurement Duration without regard to the Duration Mandatory bit in the Measurement Request Mode field. If a STA cannot measure over the requested Measurement Duration, the STA shall refuse the Statistics Request measurement.

If dot11RRMStatisticsMeasaurementEnabled is false, a station shall reject the received Statistics Measurement Request and shall respond with a Statistics Measurement Report where the Incapable bit is set in the Measurement Report Mode field.

### 11.10.8.6 Location Configuration Information Report

If dot11RRMLCIMeasurementEnabled is true, a STA shall reject any LCI Request for location information that is not available and shall respond with a Radio Measurement Report frame including a Radio Measurement Report element with the incapable bit set to 1. If dot11RRMLCIMeasurementEnabled is true and a STA accepts an LCI Request that does not include an Azimuth Request, it shall respond with a Radio Measurement Report frame including one LCI element (LCI Report). If both dot11RRMLCIMeasurementEnabled and dot11RRMLCIAzimuthEnabled are true, and the STA accepts an LCI request that includes an Azimuth Request, it shall respond with a Radio Measurement Report frame

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including one LCI element (LCI Report) that includes the requested Azimuth Report, if available. If dot11RRMLCIAzimuthEnabled is false, a STA shall reject any LCI Request that includes an Azimuth Request and shall respond with a Radio Measurement Report frame including an Radio Measurement Report element with the incapable bit set to 1.

NOTE—IETF RFC 3825, 2.1, defines formats and information fields for reporting physical location to sub-centimeter resolution. The fixed-point values have integer and fractional parts, which together represent Latitude, Longitude and Altitude to a maximum resolution of 34-, 34-, and 30-bits respectively. A Latitude report with 24-bit resolution would be reporting with a precision of about 3.18 m in Latitude at the equator. The physical location and azimuth MIB information of the STA may be set by administrative means.

The Datum value shall be 1 (World Geodetic System 1984), unless another datum is required for operation in the regulatory domain.

If the Altitude Type is 2 (Floors of Altitude), the value reported shall be as required for operation in the regulatory domain.

An LCI request shall indicate a location request for the requesting STA or the reporting STA by setting the LCI request Location Subject field to indicate a Local or Remote request, respectively. Local LCI Measurement Request is used by the requesting STA to obtain its own location by asking “Where am I?”. Remote LCI Measurement Request is used by requesting STA to obtain location of reporting STA by asking “Where are you?”.

If the STA receiving an LCI request lacks the means to report the requested location to the requested resolution, then the LCI Report shall have that corresponding Latitude, Longitude, Altitude, or Azimuth resolution set to the known value; otherwise Latitude, Longitude, Altitude, and Azimuth fields shall be reported to their requested resolutions, with the remaining less significant bits set to zero.

If the STA receiving an LCI request has no location information about the requested LCI Subject physical location or requested Azimuth, it shall set the Incapable bit in the Measurement Report Mode field. The method by which the physical location and azimuth information in the LCI Report is generated is outside the scope of this standard.

NOTE—A STA that requested a “Local” LCI and received an LCI Report with the Incapable bit set may alternatively make a “Remote” LCI request to obtain the reporting STA’s physical location. A STA that requested an LCI including an Azimuth Request, and received an LCI Report with the Incapable bit set may alternatively request the LCI with no Azimuth requested.

If dot11RRMLCIMeasurementEnabled is false, a station shall reject the received LCI Measurement Request and shall respond with a LCI Report where the Incapable bit is set in the Measurement Report Mode field.

### 11.10.8.7 Measurement Pause

A Measurement Pause is used within a Measurement Request frame to provide a time delay between the processing of two other Measurement Request Elements within the sequence of Measurement Request Elements in that frame.

If a STA accepts a Measurement Pause Request it shall delay processing of the next measurement request in the Measurement Request frame. If the Measurement Pause Request is the last Request Element in a repeated Measurement Request frame, the STA shall delay processing the first Request Element in the Measurement Request frame for the next repeat. In each case the delay shall be no less than the Pause Time value specified in the Measurement Pause Request.

NOTE—A requesting STA obtains information on a measuring STA’s radio measurement capability by observing the RRM Capability Enabled IE in the Association Request/Response or the Reassociation Request/Response. One or more of these frames are received prior to the requesting STA transmitting a Measurement Pause request and hence the requesting STA has enough information to determine if the measuring STA is capable of processing a Measurement

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Pause request or not. In addition, when a measurement report is returned by the measuring STA, the Actual Measurement Start Time(s) in the report(s) can indicate if the requested measurement pause was performed.

A Measurement Pause shall not be sent as the only Request Element in a Measurement Request frame. A Measurement Pause shall not be included as the last Request Element in a Measurement Request frame that has the Number of Repetitions field set to 0.

A measurement pause cannot be processed in parallel to other measurements. If the Parallel bit is set in the Measurement Request element immediately prior to a Measurement Pause, an incapable response shall be returned even if dot11RRMParallelMeasurementsEnabled is true.

There is no measurement report associated with a Measurement Pause Request.

### 11.10.8.8 Transmit Stream/Category Measurement Report

The Transmit Stream/Category Measurement applies to TIDs for Traffic Streams associated with TSPECs and also to TIDs for Traffic Categories for QoS traffic without TSPECs.

If dot11RRMTransmitStreamCategoryMeasurementEnabled is true, a QoS STA receiving a Transmit Stream/Category Measurement Request shall respond with a Radio Measurement Report frame containing one Measurement (Transmit Stream/Category Measurement) Report element. If the traffic stream (TS) that is corresponding to the Traffic Identifier is deleted, either by a DELTS Action Frame or by disassociation, the STA shall cease sending Radio Measurement Reports.

If dot11RRMTransmitStreamCategoryMeasurementEnabled is false, a STA shall reject the received Transmit Stream/Category Measurement Request and shall respond with a Transmit Stream/Category Measurement Report where the Incapable bit is set in the Measurement Report Mode field.

The transmit stream/category measurement shall be made on traffic that is transmitted from the measuring QoS STA to the peer QoS STA and TID indicated in the request. The Peer STA Address may be the MAC address of the QoS STA from which the Measurement Request was sent, the MAC address of another QoS STA within the BSS, or the broadcast address. This enables a QoS AP to query Transmit Stream/Category Measurement metrics for DLS links. A broadcast address shall only be used with a TID corresponding to a TC and shall mean that measurement is to be made on all traffic for the specified TC. Depending on policy, a QoS AP may not permit transmit stream/category measurement requests for traffic to other QoS STAs in the BSS. In this case the QoS AP shall respond with an incapable indication.

If, during the course of a Transmit Stream/Category Measurement, any counter that is included in the Transmit Stream/Category Measurement Report increments to a value of $2^{32}-1$, the Transmit Stream/Category Measurement shall terminate, and the Transmit Stream/Category Measurement Report shall indicate the shortened, actual measurement duration.

If the measurement request included multiple transmit stream/category measurement requests for multiple TIDs, the corresponding measurement report shall include a transmit stream/category measurement report for each unique TID in the request that has been admitted. If the measurement request is for a TID that has not been admitted yet, a report is generated only after the TID becomes admitted.

The requesting and reporting STAs must be QoS STAs. A non-QoS STA receiving a Transmit Stream/Category Measurement Request shall reject the request with indication of incapable.

A QoS STA may request that a measuring QoS STA send a transmit stream/category measurement report when the number of TID-specified MSDUs are discarded or delayed reaches a specified threshold. This is termed a triggered transmit stream/category measurement and shall be requested by setting the Enable and Report bits to 1 within a Measurement Request Element containing the Transmit Stream/Category

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Measurement Type. The Measurement Request field shall contain a Transmit Stream/Category Measurement Request with the trigger conditions specified in the Triggered Reporting subelement. One or more trigger conditions may be set with specified thresholds. See 7.3.2.21.10.

Depending on policy, a QoS AP may not permit the establishment of triggered transmit stream/category measurement. Such a QoS AP receiving a triggered transmit stream/category measurement request shall give an incapable indication. The number of simultaneous triggered transmit stream/category measurements supported at a QoS STA is outside the scope of the standard. A STA shall respond to further requests with a refused indication if the number of simultaneous triggered QoS measurements supported by the STA is reached.

If dot11RRMTriggeredTransmitStreamCategoryMeasurementEnabled is true, a QoS STA shall accept a triggered Transmit Stream/Category Measurement and shall reject it otherwise. A QoS STA accepting a triggered QoS measurement shall measure the requested TC or TS. If a trigger condition occurs, the measuring QoS STA shall send a Transmit Stream/Category Measurement Report to the requesting QoS STA. The measuring QoS STA shall not send further triggered QoS reports until the Trigger Timeout period specified in the request has expired or new trigger conditions have been requested. Measurement of transmit stream/category metrics shall continue during the reporting timeout period. Reporting shall resume following the Trigger Timeout period, or immediately following the acceptance of new trigger conditions.

If a non-AP QoS STA receives a Transmit Stream/Category Measurement Request for a TC, or TS that is already being measured using a triggered transmit stream/category measurement, the triggered traffic stream measurement shall be suspended for the duration of the requested traffic stream measurement. When triggered measurement resumes, the traffic stream metrics shall be reset.

Traffic stream metrics reported in a triggered transmit stream/category measurement report shall be the values accumulated over the number of transmitted MSDUs prior to the trigger event given in the Measurement Count field of the transmit stream/category measurement request that established the trigger condition. It is possible that a consecutive or delay trigger event occurs after acceptance of a triggered transmit stream/category measurement but before the number of MSDUs in Measurement Count have been transmitted. In this case the report shall be the values accumulated since measurement started. The measurement count value appears in the Transmitted MSDU Count field of a triggered transmit stream/ category measurement report. Measurement duration shall not be used in triggered QoS measurement and the Measurement Duration field in both the Measurement Request and any Measurement Report shall be set to 0.

The Measurement Start Time field of a triggered transmit stream/category measurement report shall contain the value of the QoS STA TSF timer at the time the trigger condition occurred to an accuracy of 1 TU.

Once accepted by a measuring QoS STA, a triggered QoS measurement continues to be active until:

— The relevant TS is deleted,

— The measuring non-AP QoS STA or non-AP QoS STA that requested the measurement disassociates or successfully reassociates, or

— The measurement is terminated by the requesting QoS STA.

All triggered QoS measurements shall be terminated at a measuring QoS STA by receiving a triggered transmit stream/category measurement request with the Enable bit set to 1 and the Report bit set to 0. A triggered QoS measurement request with no trigger conditions specified in the Trigger Conditions field shall terminate a triggered QoS measurement for the TC or TS specified in the request. A QoS STA requesting a triggered QoS measurement may update the trigger conditions by sending a triggered transmit stream/ category measurement request specifying the new trigger conditions.

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### 11.10.9 Usage of the Neighbor Report

A Neighbor Report is sent by an AP and it contains information on validated AP's that are members of ESSs requested in the Neighbor Report Request. A Neighbor Report may not be exhaustive either by choice, or due to the fact that there may be neighbor APs not known to the AP. The Neighbor Report contents are derived from the NeighborListSet parameter of the MLME-NEIGHBORREPRESP.request. The mechanism by which the contents of this table are determined is outside the scope of this amendment, but it may include information from measurement reports received from the STA's within the BSS, information obtained via a management interface, or the DS.

NOTE—The purpose of the Neighbor Report is to enable the STA to optimize aspects of neighbor service set transition and ESS operation. A Neighbor Report element contains information on APs that the STA may use as candidates for a service set transition. Since the information in the Neighbor Report may be stale, it should be considered advisory; information obtained by the report recipient through a scan or other sources may also be considered, possibly overriding information in the Neighbor Report. For example, where information contained within a Neighbor Report is contradicted by information in the Measurement Pilot, Beacon, or Probe Response, that response information should take precedence.

#### 11.10.9.1 Requesting a Neighbor Report

A STA requesting a Neighbor Report from an AP shall send a Neighbor Report Request frame to its associated AP.

#### 11.10.9.2 Receiving a Neighbor Report

If dot11RRMNeighborReportEnabled is true, an AP receiving a Neighbor Report Request shall respond with a Neighbor Report Response frame containing zero or more Neighbor Report elements. If an SSID element is specified in the corresponding Neighbor Report Request frame, the Neighbor Report element(s) shall only contain information concerning neighbor APs that are members of the current ESS identified by the SSID element contained within the Neighbor Report Request. If the SSID element is omitted, the Neighbor Report element(s) shall contain information concerning neighbor APs that belong to the same ESS as the requesting STA. If the wildcard SSID element is specified in the corresponding Neighbor Request frame, the Neighbor Report element(s) shall contain information concerning all neighbor APs. If there are no neighbor APs available the AP shall send a Neighbor Report Response frame with no Neighbor Report elements.

If dot11RRMNeighborReportEnabled is false in an AP receiving a Neighbor Report Request, it shall ignore the request and return a Neighbor Report with the Incapable bit set in the Measurement Report Mode field.

A STA receiving a neighbor report element with an unknown subelement identifier shall ignore the unknown subelement and continue to process remaining subelements. A STA receiving a neighbor report element containing a Vendor Specific subelement with an unknown OUI should ignore this vendor specific subelement and shall continue to process any remaining Vendor Specific subelements.

A serving AP shall include a TSF information field in the Neighbor Report element only if it is able to guarantee an accumulated error of 1.5 TU or better on the TSF Offset subfield.

### 11.10.10 Link Measurement

A STA may use a Link Measurement Request frame to request another STA to respond with a Link Measurement Report frame containing a TPC report element. If dot11RRMLinkMeasurementEnabled is true, a STA receiving a Link Measurement Request frame shall respond with a Link Measurement Report frame containing a TPC Report element indicating the power used to transmit the Link Measurement Report. The Link Measurement Report also contains antenna ID and signal quality (RCPI and RSNI).

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If dot11RRMLinkMeasurementEnabled is false in an AP receiving a Link Measurement Request, it shall ignore the request and return a Link Measurement Report with the Incapable bit set in the Measurement Report Mode field.

### 11.10.11 Multiple BSSID Set

A Multiple BSSID Set is characterized as follows:

— All members of the set use a common regulatory class, channel, and antenna connector.

— The set has a maximum size of $2^n$ for at least one n, where $1 \leq n \leq 46$.

— Members of the set have the same 48-n MSBs in their BSSIDs.

— All BSSIDs within the Multiple BSSID Set are assigned in a way that they are not available as STA MAC addresses for STAs using a different regulatory class, channel or antenna connector.

NOTE—For example, if the APs within BSSs with BSSIDs 16, 17, and 27 share the regulatory class, channel and antenna connector, and the range of STA MAC addresses from 16–31 inclusive are not assigned to other STAs using a different antenna connector, then the BSSIDs 16, 17, and 27 are members of a Multiple BSSID set. The set is described by n = 4 ($2^n$ = 16) with BSSIDs in the range 0x00000000001X. The set may not be described by n = 8 for instance since at least one of the BSSIDs in the range 0x0000000000XX may be used as a BSSID by an AP that does not share the same regulatory class, channel, and antenna connector.

When the Multiple BSSID set contains two or more members, the transmission of Measurement Pilots is constrained as described in 11.10.12.

A Multiple BSSID element, with or without optional subelements, indicates that all APs within the indicated range of BSSIDs transmit using a common class, channel, and antenna connector.

### 11.10.12 Measurement Pilot generation and usage

The Measurement Pilot frame is a compact Action frame transmitted pseudo-periodically by an AP at a small interval relative to a Beacon Interval. The Measurement Pilot frame provides reduced information relative to a Beacon frame to allow for the required small interval. The purpose of the Measurement Pilot frame is to assist a STA with the following functions:

— Rapid discovery of the existence of a BSS via passive scanning

— Rapid collection of neighbor AP signal strength measurements via passive scanning

— Enable transmission of a Probe Request

The value of dot11RRMMeasurementPilotCapability in a STA determines the level of support for Measurement Pilot at the STA. Table 11-11 describes permitted values for dot11RRMMeasurement-PilotCapability and what it signifies.

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**Table 11-11—Measurement Pilot Capability definition**

| Device function | dot11RRM-MeasurementPilot Capability | Notes |
|---|---|---|
| AP and non-AP STA | 0 | The STA does not support Measurement Pilots. If the STA is an AP, it does not generate MPs and if the device is a non-AP STA, it ignores the MPs it receives |
| AP and non-AP STA | 1 | The STA supports Measurement Pilots. If the STA is an AP, it can transmit MPs, and if the device is a non-AP STA, it can receive the MPs and can use the information contained in MPs. |
| Non-AP STA | 2 | The non-AP STA is making use of the MPs it receives or would receive if they were being transmitted. |
| Non-AP STA | 3–7 | Reserved |
| AP | | The AP STA is transmitting MPs and using the information contained in them, and the AP is actively transmitting MPs with MP interval set to a value within the range as shown below.<br><br>MP Interval with respect to Beacon Interval: |
| | 2 | > 3% and < 5% of Beacon Interval |
| | 3 | ≥ 5% and < 10% |
| | 4 | ≥ 10% and < 15% |
| | 5 | ≥ 15% and < 20% |
| | 6 | ≥ 20% and < 25% |
| | 7 | ≥ 25% and < 50% |

### 11.10.12.1 Measurement Pilot generation by an AP

The AP shall determine if it is a member of a Multiple BSSID Set with two or more members. If so, at most one AP of the Multiple BSSID Set shall have its MIB attribute dot11RRMMeasurementPilotCapability set to a value between 2 and 7. How this occurs is out of scope of this standard.

If dot11RRMMeasurementPilotCapability is set to a value between 2 and 7, the following statements apply:

— If the AP is a member of a Multiple BSSID Set with two or more members, then the BSSIDs of all members of the Multiple BSSID Set shall be indicated in the Beacon and Probe Response frames by the Multiple BSSID subelement.

— The AP shall maintain a Measurement Pilot generation function, which transmits Measurement Pilot frames at a basic rate according to the dot11RRMMeasurementPilotPeriod attribute within the AP.

— The AP defines a series of TMPTTs exactly dot11RRMMeasurementPilotPeriod apart. A TMPTT arrives when the AP's local TSF timer (in μs) modulo the Measurement Pilot Interval equals zero.

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— At each TMPTT, the AP shall schedule a Measurement Pilot as the next frame for transmission ahead of other queued frames using the AC_VO EDCA parameters unless the TMPTT satisfies:

$$TBTT - dot11RRMMeasurementPilotPeriod/2 \leq TMPTT < TBTT + dot11RRMMeasurementPilotPeriod/2$$

for any TBTT of members of the Multiple BSSID Set, in which case the AP shall not generate the Measurement Pilot. This is illustrated in Figure 11-18. How the AP determines the TBTTs of members of the Multiple BSSID Set is out of scope of this standard.

**Figure 11-18—Example of Measurement Pilot Scheduling**

In case the medium is determined by the carrier-sense mechanism (see 9.2.1) to be unavailable at the TMPTT, the AP shall delay the actual transmission of a Measurement Pilot according to the basic medium access rules specified in Clause 9 for a maximum period of one dot11RRMMeasurement-PilotPeriod and drop the delayed Measurement Pilot at the next TMPTT. In this way, a continuously busy medium will cause multiple successive Measurement Pilots to be delayed, then dropped. An AP shall transmit Measurement Pilots to the broadcast address. An AP shall not retransmit or buffer Measurement Pilots as part of the PSP mechanisms.

— If the AP is a member of a Multiple BSSID Set with two or more members, then the BSSIDs of all members of the Multiple BSSID Set shall be indicated in the Measurement Pilot using the Multiple BSSID subelement.

NOTE 1—APs are advised to enable Measurement Pilots judiciously due to the possibility of excessive medium time being consumed by Measurement Pilots from multiple overlapping APs. For instance dot11RRMMeasurementPilot-TransmissionInformationEnabled can be set to false:

a) When enabling Measurement Pilots would cause:
   1) More than 10% of the medium time at the AP to be consumed by beacons and Measurement Pilots transmitted by any source, or
   2) More than 5% of the medium time at the AP to be consumed by Measurement Pilots transmitted by any source.
b) When STAs are not expected to be using Measurement Pilots. How this is determined is out of the scope of this standard, but may depend upon many STAs setting the Measurement Pilot Capability field in the Supported RRM Capabilities Enabled bitmask element to 0 or 1 upon association at any member of the Multiple BSSID Set recently or at similar times in the past.
c) When all members of the Multiple BSSID Set are within ESSs that contain one BSS only.
d) When the AP's operating regulatory domain is not subject to DFS regulations.
e) When the AP's operating regulatory domain is subject to DFS regulations but compliance with the regulations is impaired by Measurement Pilots.
f) When the number of channels valid for the AP's operating regulatory domain or frequency band is small.
g) When no members of the Multiple BSSID Set are located at ingress or egress points of an ESS, so are less useful for roaming between an IEEE 802.11 ESS and other networks.

NOTE 2—For efficient use of the medium, it is recommended that Measurement Pilots not be sent using a Clause 15 or Clause 18 PHY.

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### 11.10.12.2 Measurement Pilot usage by a STA

Whenever testing a requested BSSID for equality against the BSSID of a Measurement Pilot, the following statements apply:

— If the Measurement Pilot does not contain the Multiple BSSID element, then equality shall be true if the requested BSSID equals the BSSID of the Measurement Pilot frame, and otherwise false.

— If the Measurement Pilot contains the Multiple BSSID element, and the requested BSSID is a non-wildcard BSSID, then equality shall be true if the requested BSSID equals any BSSID indicated by the Multiple BSSID element present in the Measurement Pilot, and otherwise false.

— If the Measurement Pilot contains the Multiple BSSID element, and the requested BSSID is the wild-card BSSID, then equality shall be true.

NOTE—STAs are advised that due to considerations such as those noted in the prior subclause, APs may not transmit Measurement Pilots at all times or in all bands.

### 11.10.13 Access Delay Measurement

Access delay measurements are AP MAC layer measurements of average medium access delay for transmitted frames measured from the time the MPDU is ready for transmission (i.e., begins CSMA/CA access) until the actual frame transmission start time. Access delay measurement results are included in the BSS Average Delay element and in the BSS AC Access Delay element.

For the BSS Average Delay measurement, the AP shall measure and average the medium access delay for all transmit frames using the DCF or EDCA over a continuous 30 s measurement window. For the BSS AC Access Delay measurement, the QoS AP shall measure and average the medium access delay for all transmit frames of the indicated AC (see Figure 7-95k) using EDCA mechanism over a continuous 30 s measurement window. The accuracy for the average medium access delay shall be ± 100 µs or better when averaged over at least 200 frames. Accuracy is not defined for measurements averaged over less than 200 frames.

### 11.10.14 BSS Available Admission Capacity

BSS Available Admission Capacity provides a means for an AP to advertise admission capacity available for explicit admission control in any UP or AC. This information may assist STAs in making service set transition decisions.

The transmitted BSS Available Admission Capacity value represents a proportion of time on the wireless medium scaled linearly in units of 32 µs/s from 0 (0% available time) to 31 250 (100% available time). If an AP transmits a BSS Load element, the values for any transmitted BSS Available Admission Capacity values shall be less than or equal to the current BSS Load value. If an AP transmits a BSS Available Admission Capacity element, the transmitted values should be current or recently calculated. The AP recalculates Available Admission Capacity values according to local policy. An Available Admission Capacity value of 0 transmitted in the BSS Available Admission Capacity element indicates that no admission capacity is available at the calculation time and that no explicit admissions will be granted by the AP for that UP or AC unless additional capacity becomes available. An AP that receives a TSPEC admission request for medium time that is less than or equal to the current available admission capacity for the requested UP or AC local policy may apply additional local policy before admitting the requested TSPEC.

NOTE 1—Available Admission Capacity values are dynamic in a BSS and the transmitted values cannot always reflect the actual values currently used by the AP for explicit admission control. Thus an AP should recalculate the Available Admission Capacity values regularly or after changes in the environment or the admitted capacity.

NOTE 2—STAs are advised that requesting admission for any TSPEC at an UP or AC that requires more medium time than is reported as available for the requested UP or AC is possible yet unlikely to be successful.

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### 11.10.15 AP Channel Report

The AP Channel Report element contains a list of channels in a regulatory class where a STA is likely to find an AP, excluding the AP transmitting the AP Channel Report. An AP Channel Report element only includes channels that are valid for the regulatory domain in which the AP transmitting the element is operating and consistent with the Country element in the frame in which it appears. One AP Channel Report element is included in the Beacon frame for each regulatory domain, which includes channels on which a STA is likely to find an AP.

The contents of the AP Channel Report elements may be compiled from the list of unique regulatory/ channel pairs found in the Neighbor Report. The contents of the AP channel report may be configured or obtained by other means beyond the scope of this standard.

# 12. PHY service specification

## 12.3 Detailed PHY service specifications

### 12.3.4 Basic service and options

### 12.3.4.3 PHY-SAP service primitives parameters

***Change row 4 and insert 2 rows into Table 12-3 as follows:***

**Table 12-3—PHY-SAP service primitive parameters**

| Parameter | Associated primitive | Value |
|---|---|---|
| RXVECTOR | PHY-RXSTART.indication<br>PHY-RXEND.indication | A set of parameters |
| IPI-STATE | PHY-CCARESET.request<br>PHY-CCARESET.confirm | IPI-ON, IPI-OFF |
| IPI-REPORT | PHY-CCA.indication<br>PHY-CCARESET.confirm | A set of IPI values for the preceding time interval |

### 12.3.5 PHY-SAP detailed service specification

### 12.3.5.8 PHY-CCARESET.request

***Change the following subclauses as shown:***

### 12.3.5.8.1 Function

This primitive is a request by the MAC sublayer to the local PHY entity to reset the CCA state machine and to turn IPI reporting on and off by means of the IPI-STATE parameter.

### 12.3.5.8.2 Semantics of the service primitive

The semantics of the primitives are as follows:

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PHY-CCARESET.request(IPI-STATE)

~~This primitive has no parameters.~~

The IPI-STATE parameter shall be present if dot11RadioMeasurementEnabled is true. The IPI-STATE parameter can be one of two values: IPI-ON or IPI-OFF. The parameter value is IPI-ON when the MAC sublayer is requesting the PHY entity to report IPI values when the PHY is neither receiving nor transmitting an MPDU. IPI-ON turns on IPI reporting in the PHY entity. IPI-OFF turns off IPI reporting in the PHY entity.

#### 12.3.5.8.3 When generated

This primitive is generated by the MAC sublayer for the local PHY entity at the end of a NAV timer. This request can be used by some PHY implementations that may synchronize antenna diversity with slot timings.

#### 12.3.5.8.4 Effect of receipt

The effect of receipt of this primitive by the PHY entity is to reset the PLCP CS/CCA timers to the state appropriate for the end of a received frame. If IPI-STATE parameter is set to IPI-ON, the PHY entity collects IPI values when it is not transmitting or receiving and provides those values to the MAC sublayer using the IPI-REPORT parameter.

### 12.3.5.9 PHY-CCARESET.confirm

***Change the following subclauses as shown:***

#### 12.3.5.9.1 Function

This primitive is issued by the PHY to the local MAC entity to confirm that the PHY has reset the CCA state machine and to provide observed IPI values when IPI reporting is turned on.

#### 12.3.5.9.2 Semantics of the service primitive

The semantics of the primitives are as follows:

PHY-CCARESET.confirm(IPI-STATE, IPI-REPORT)

~~This primitive has no parameters.~~

The IPI-STATE parameter shall be present if dot11RadioMeasurementEnabled is true. The IPI-STATE parameter can be one of two values: IPI-ON or IPI-OFF. The IPI-STATE value shall be set to the value of IPI-STATE received by the PHY entity in the most recent PHY-CCARESET.request.

The IPI-REPORT parameter shall be present if dot11RadioMeasurementEnabled is true and if IPI reporting was turned on prior to the receipt of the latest PHY-CCARESET.request. The IPI-REPORT parameter provides a set of IPI values for a time interval. The set of IPI values are recent values observed by the PHY entity since the generation of the most recent PHY-TXEND.confirm, PHY-RXEND.indication, PHY-CCARESET.confirm, or PHY_CCA.indication, whichever occurred latest.

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### 12.3.5.10 PHY-CCA.indication

***Change the following subclauses as shown:***

#### 12.3.5.10.1 Function

This primitive is an indication by the PHY to the local MAC entity of the current state of the medium~~.~~ and to provide observed IPI values when IPI reporting is turned on.

#### 12.3.5.10.2 Semantics of the service primitive

The primitive provides the following parameter:

PHY-CCA.indication (STATE, IPI-REPORT)

The STATE parameter can be one of two values: BUSY or IDLE. The parameter value is BUSY if the channel assessment by the PHY determines that the channel is not available. Otherwise, the value of the parameter is IDLE.

The IPI-REPORT parameter shall be present if dot11RadioMeasurementEnabled is true and if IPI reporting has been turned on by the IPI-STATE parameter. The IPI-REPORT parameter provides a set of IPI values for a time interval. The set of IPI values may be used by the MAC sublayer for Radio Measurement purposes. The set of IPI values are recent values observed by the PHY entity since the generation of the most recent PHY-TXEND.confirm, PHY-RXEND.indication, PHY-CCARESET.confirm, or PHY_CCA.indication, whichever occurred latest.

### 12.3.5.11 PHY-RXSTART.indication

#### 12.3.5.11.2 Semantics of the service primitive

***Change the second paragraph as follows:***

The RXVECTOR represents a list of parameters that the PHY provides the local MAC entity upon receipt of a valid PLCP header~~.~~ or upon receipt of the last PSDU data bit in the received frame. This vector may contain both MAC and MAC management parameters. The required parameters are listed in 12.3.4.4.

### 12.3.5.12 PHY-RXEND.indication

#### 12.3.5.12.2 Semantics of the service primitive

***Change the first two paragraphs as shown:***

The primitive provides the following parameters:

PHY-RXEND.indication (RXERROR, RXVECTOR)

***Insert the following paragraph after the list at the end of the subclause:***

The RXVECTOR represents a list of parameters that the PHY provides the local MAC entity upon receipt of a valid PLCP header or upon receipt of the last PSDU data bit in the received frame. RXVECTOR is an included parameter only when dot11RadioMeasurementEnabled is true. This vector may contain both MAC and MAC management parameters. The required parameters are listed in 12.3.4.4.

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# 15. DSSS PHY specification for the 2.4 GHz band designated for ISM applications

## 15.2 DSSS PLCP sublayer

### 15.2.7 Receive PLCP

***Change the second and fifth paragraphs of 15.2.7 as shown:***

The receive PLCP is shown in Figure 15-8.

In order to receive data, PHY-TXSTART.request shall be disabled so that the PHY entity is in the receive state. Further, through station management via the PLME, the PHY is set to the appropriate channel and the CCA method is chosen. Other receive parameters such as RSSI, RCPI, signal quality (SQ), and indicated DATARATE may be accessed via the PHY-SAP.

Upon receiving the transmitted energy, according to the selected CCA mode, the PMD_ED shall be enabled (according to 15.4.8.4) as the RSSI reaches the ED_THRESHOLD and/or PMD_CS shall be enabled after code lock is established. These conditions are used to indicate activity to the MAC via PHY-CCA.indicate according to 15.4.8.4. PHY-CCA.indicate(BUSY) shall be issued for energy detection (ED) and/or code lock prior to correct reception of the PLCP frame. The PMD primitives PMD_SQ and PMD_RSSI are issued to update the RSSI and SQ parameters reported to the MAC.

After PHY-CCA.indicate is issued, the PHY entity shall begin searching for the SFD field. Once the SFD field is detected, CRC-16 processing shall be initiated and the PLCP IEEE 802.11 SIGNAL, IEEE 802.11 SERVICE and LENGTH fields are received. The CRC-16 FCS shall be processed. If the CRC-16 FCS check fails, the PHY receiver shall return to the RX IDLE state as depicted in Figure 15-9. Should the status of CCA return to the IDLE state during reception prior to completion of the full PLCP processing, the PHY receiver shall return to the RX IDLE state.

If the PLCP Header reception is successful (and the SIGNAL field is completely recognizable and supported), a PHY-RXSTART.indicate(RXVECTOR) shall be issued. The RXVECTOR associated with this primitive includes the SIGNAL field, the SERVICE field, the MPDU length in octets (calculated from the LENGTH field in microseconds), the antenna used for receive (RX_ANTENNA), RSSI, RCPI, and SQ.

***Replace Figure 15-8, adding RXVECTOR as parameter in PHY_RXEND.Ind, as shown:***

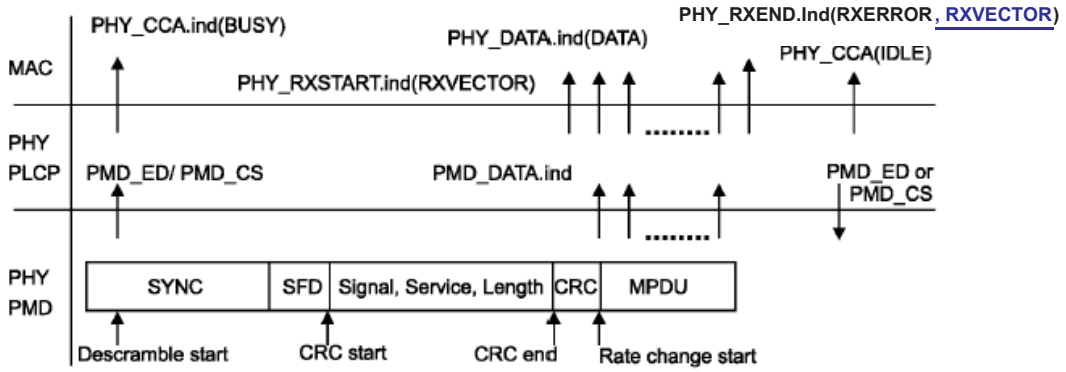


**Figure 15-8—Receive PLCP**

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## 15.4 DSSS PMD sublayer

### 15.4.4 Basic service and options

#### 15.4.4.2 PMD_SAP peer-to-peer service primitive parameters

***Insert a row and Note at the end of Table 15-4 as follows:***

**Table 15-4— DSSS PMD_SAP peer-to-peer service primitives**

| Parameter | Associated primitive | Value |
|---|---|---|
| RCPI<br>(See NOTE) | RXVECTOR | 0–255 |
| NOTE—RCPI is present only when dot11RadioMeasurementEnabled is true. | | |

#### 15.4.4.3 PMD_SAP sublayer-to-sublayer service primitives

***Insert a row at the end of Table 15-5 as follows:***

**Table 15-5—PMD_SAP sublayer-to-sublayer service primitives**

| Primitive | Request | Indicate | Confirm | Response |
|---|---|---|---|---|
| PMD_RCPI | | X | — | — |

#### 15.4.4.4 PMD_SAP service primitive parameters

***Insert a row at the end of Table 15-6 and change the column heading as follows:***

**Table 15-6—List of parameters for the PMD primitives**

| Parameter | Associated primitive | Value |
|---|---|---|
| RCPI | PMD-RCPI.indicate | 0–255 |

### 15.4.5 PMD_SAP detailed service specification

***Insert the following subclauses after 15.4.5.15.4:***

#### 15.4.5.16 PMD_RCPI.indicate

#### 15.4.5.16.1 Function

This optional primitive, generated by the PMD sublayer, provides the received channel power indicator (RCPI) to the PLCP and MAC.

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#### 15.4.5.16.2 Semantics of the service primitive

The primitive shall provide the following parameter:

PMD_RCPI.indicate(RCPI).

The RCPI shall be a measure of the channel power received by the DSSS PHY. RCPI indications are supported as defined in 15.4.8.5.

#### 15.4.5.16.3 When generated

This primitive shall be generated by the PMD when the DSSS PHY is in the receive state. It shall be continuously available to the PLCP, which in turn provides the parameter to the MAC entity.

#### 15.4.5.16.4 Effect of receipt

This parameter shall be provided to the PLCP layer for information only. The RCPI may be used in conjunction with RSNI to measure input signal quality.

### 15.4.8 PMD receiver specifications

***Insert the following subclause after 15.4.8.4:***

#### 15.4.8.5 Received Channel Power Indicator Measurement

The RCPI indicator is a measure of the received RF power in the selected channel for a received frame. This parameter shall be a measure by the PHY sublayer of the received RF power in the channel measured over the entire received frame or by other equivalent means that meet the specified accuracy. RCPI shall be a monotonically increasing, logarithmic function of the received power level defined in dBm. The allowed values for the RCPI parameter shall be an 8-bit value in the range from 0 through 220, with indicated values rounded to the nearest 0.5 dB as follows:

0: Power ≤ – 110 dBm

1: Power = – 109.5 dBm

2: Power = – 109.0 dBm

and so on where

RCPI = int{(Power in dBm + 110) × 2} for 0 dbm > Power > – 110 dBm

220: Power ≥ – 0 dBm

221–254: Reserved

255: Measurement not available

RCPI shall equal the received RF power within an accuracy of ±5 dB (95% confidence interval) within the specified dynamic range of the receiver. The received RF power shall be determined assuming a receiver noise equivalent bandwidth equal to the channel bandwidth multiplied by 1.1.

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# 17. Orthogonal frequency division multiplexing (OFDM) PHY specification for the 5 GHz band

## 17.2 OFDM PHY specific service parameter list

### 17.2.3 RXVECTOR parameters

***Insert two rows and a Note at the end of Table 17-2 as follows:***

**Table 17-2—RXVECTOR parameters**

| Parameter | Associated primitive | Value |
|---|---|---|
| RCPI<br>(see NOTE) | PHY-RXSTART.indicate (RXVECTOR)<br>PHY-RXEND.indicate (RXVECTOR) | 0–255 |
| ANT_STATE<br>(see NOTE) | PHY-RXSTART.indicate (RXVECTOR)<br>PHY-RXEND.indicate (RXVECTOR) | 0–255 |
| NOTE—Parameter is present only when dot11RadioMeasurementEnabled is true. | | |

***Insert the following subclause after 17.2.3.4:***

#### 17.2.3.5 RXVECTOR RCPI

The allowed values for the RCPI parameter are in the range from 0 through 255, as defined in 17.3.10.6. This parameter is a measure by the PHY of the received channel power. RCPI indications of 8 bits are supported. RCPI shall be measured over the entire received frame or by other equivalent means that meet the specified accuracy.

## 17.3 OFDM PLCP sublayer

### 17.3.10 PMD receiver specifications

***Insert the following subclause after 17.3.10.5:***

#### 17.3.10.6 Received Channel Power Indicator Measurement

The RCPI indicator is a measure of the received RF power in the selected channel for a received frame. This parameter shall be a measure by the PHY sublayer of the received RF power in the channel measured over the entire received frame or by other equivalent means that meet the specified accuracy. RCPI shall be a monotonically increasing, logarithmic function of the received power level defined in dBm. The allowed values for the RCPI parameter shall be an 8-bit value in the range from 0 through 220, with indicated values rounded to the nearest 0.5 dB as follows:

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0: Power ≤ – 110 dBm

1: Power = – 109.5 dBm

2: Power = – 109.0 dBm

and so on where

RCPI = int{(Power in dBm +110) × 2} for 0 dbm > Power > – 110 dBm

220: Power ≥ – 0 dBm

221–254: Reserved

255: Measurement not available

RCPI shall equal the received RF power within an accuracy of ±5 dB (95% confidence interval) within the specified dynamic range of the receiver. The received RF power shall be determined assuming a receiver noise equivalent bandwidth equal to the channel bandwidth multiplied by 1.1.

### 17.3.12 Receive PLCP

***Change the first paragraph of 17.3.12 as follows:***

The receive PLCP is shown in Figure 17-16. In order to receive data, PHY-TXSTART.request shall be disabled so that the PHY entity is in the receive state. Further, through station management (via the PLME) the PHY is set to the appropriate frequency. Other receive parameters, such as RSSI, RCPI, and indicated DATARATE, may be accessed via the PHY-SAP.

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***Replace Figure 17-16, to insert the RXVECTOR parameter in PHY_RXEND.ind, as shown:***

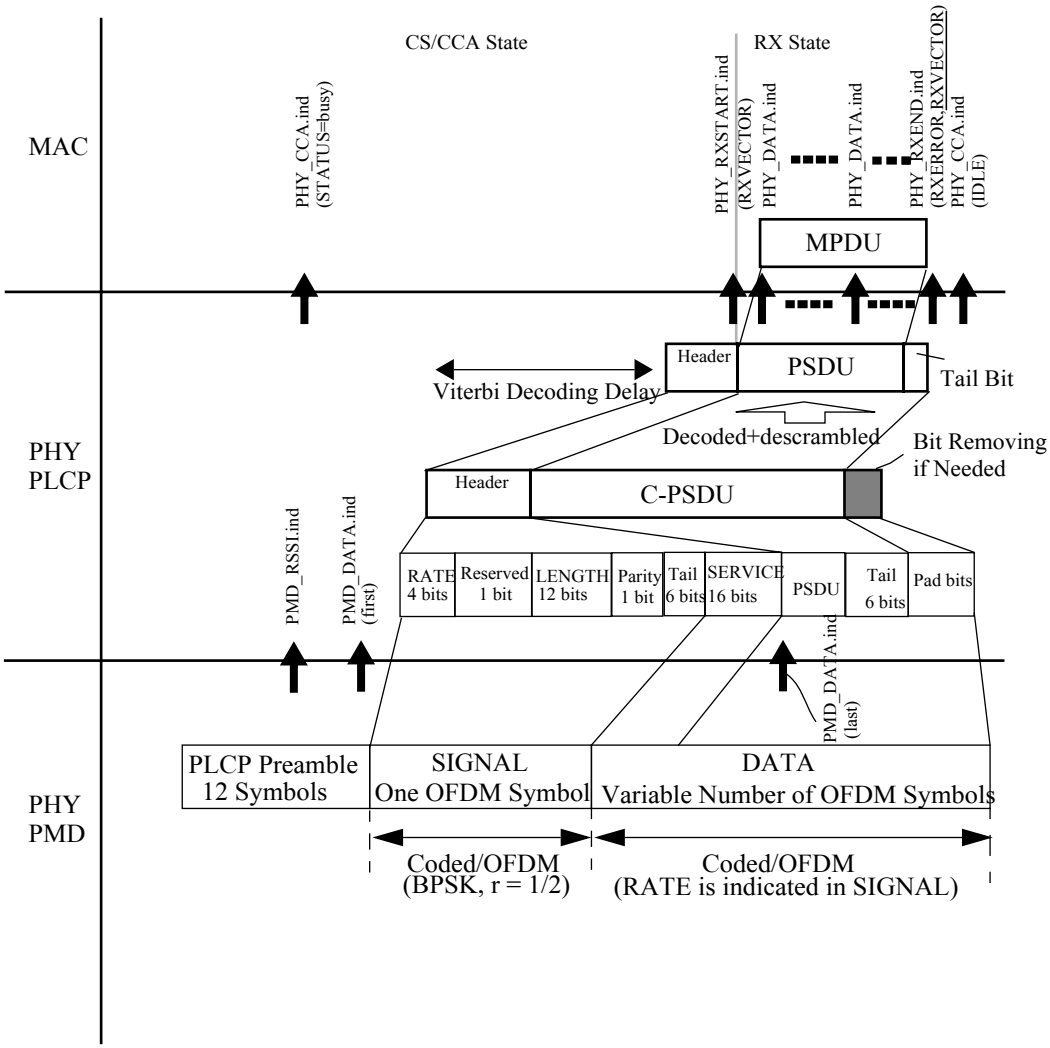


**Figure 17-16—Receive PLCP**

## 17.5 OFDM PMD sublayer

### 17.5.4 Basic service and options

#### 17.5.4.2 PMD_SAP sublayer-to-sublayer service primitives

***Insert a row at the end of Table 17-17 as follows:***

**Table 17-17—PMD_SAP sublayer-to-sublayer service primitives**

| Primitive | Request | Indicate | Confirm | Response |
|---|---|---|---|---|
| PMD_RCPI | — | X | — | — |


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### 17.5.4.3 PMD_SAP service primitive parameters

***Insert a row at the end of Table 17-18 as follows:***

**Table 17-18—List of parameters for the PMD primitives**

| Parameter | Associated primitive | Value (20 MHz channel spacing) | Value (10 MHz channel spacing) | Value (5 MHz channel spacing) |
|---|---|---|---|---|
| RCPI | PMD_RCPI.indicate | 0–255 | 0–255 | 0–255 |

### 17.5.5 PMD_SAP detailed service specification

***Insert the following subclauses after 17.5.5.7.4:***

### 17.5.5.8 PMD_RCPI.indicate

#### 17.5.5.8.1 Function

This primitive, generated by the PMD sublayer, provides the RCPI to the PLCP and MAC entity.

#### 17.5.5.8.2 Semantics of the service primitive

The primitive shall provide the following parameter:
PMD_RCPI.indicate(RCPI).

The RCPI shall be a measure of the channel power received by the OFDM PHY. RCPI indications of 8 bits are supported, as defined in 17.3.10.6.

#### 17.5.5.8.3 When generated

This primitive shall be generated by the PMD when the OFDM PHY is in the receive state. It shall be continuously available to the PLCP, which in turn provides the parameter to the MAC entity.

#### 17.5.5.8.4 Effect of receipt

This parameter shall be provided to the PLCP layer for information only. The RCPI may be used in conjunction with RSSI to measure input signal quality.

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# 18. High Rate direct sequence spread spectrum (HR/DSSS) PHY specification

## 18.2 High Rate PLCP sublayer

### 18.2.6 Receive PLCP

***Change the third and fourth paragraphs of 18.2.6 as shown:***

The receive PLCP is shown in Figure 18-9. In order to receive data, the PHY-TXSTART.request shall be disabled so that the PHY entity is in the receive state. Further, through station ~~STA~~ management via the PLME, the PHY shall be set to the appropriate channel and the CCA method chosen. Other receive parameters, such as RSSI, RCPI, SQ, and indicated DATARATE, may be accessed via the PHY-SAP.

Upon receiving the transmitted energy, according to the selected CCA mode, the PMD_ED shall be enabled (according to 18.4.8.4) as the RSSI reaches the ED_THRESHOLD, and/or PMD_CS shall be enabled after code lock is established. These conditions are used to indicate activity to the MAC via PHY-CCA.indicate, according to 18.4.8.4. PHY-CCA.indicate(BUSY) shall be issued for ED and/or code lock prior to correct reception of the PLCP header. The PMD primitives, PMD_SQ, ~~and~~ PMD_RSSI, and PMD_RCPI, are issued to update the SQ, RSSI, and ~~SQ~~RCPI parameters reported to the MAC.

***Change item e) in the list following the sixth paragraph of 18.2.6 as follows:***

a) The SIGNAL field
b) The SERVICE field
c) The PSDU length in octets (calculated from the LENGTH field in microseconds and the DATARATE in Mbit/s, in accordance with the formula in 18.2.3.5)
d) RXPREAMBLE_TYPE (which is an enumerated type taking on values SHORTPREAMBLE or LONGPREAMBLE)
e) ~~The antenna used for receive (RX_ANTENNA)~~ANT_STATE (the antenna used for receive), RSSI, RCPI, and SQ


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***Replace Figure 18-9, to insert a RXVECTOR parameter in PHY_RXEND.ind, as shown:***

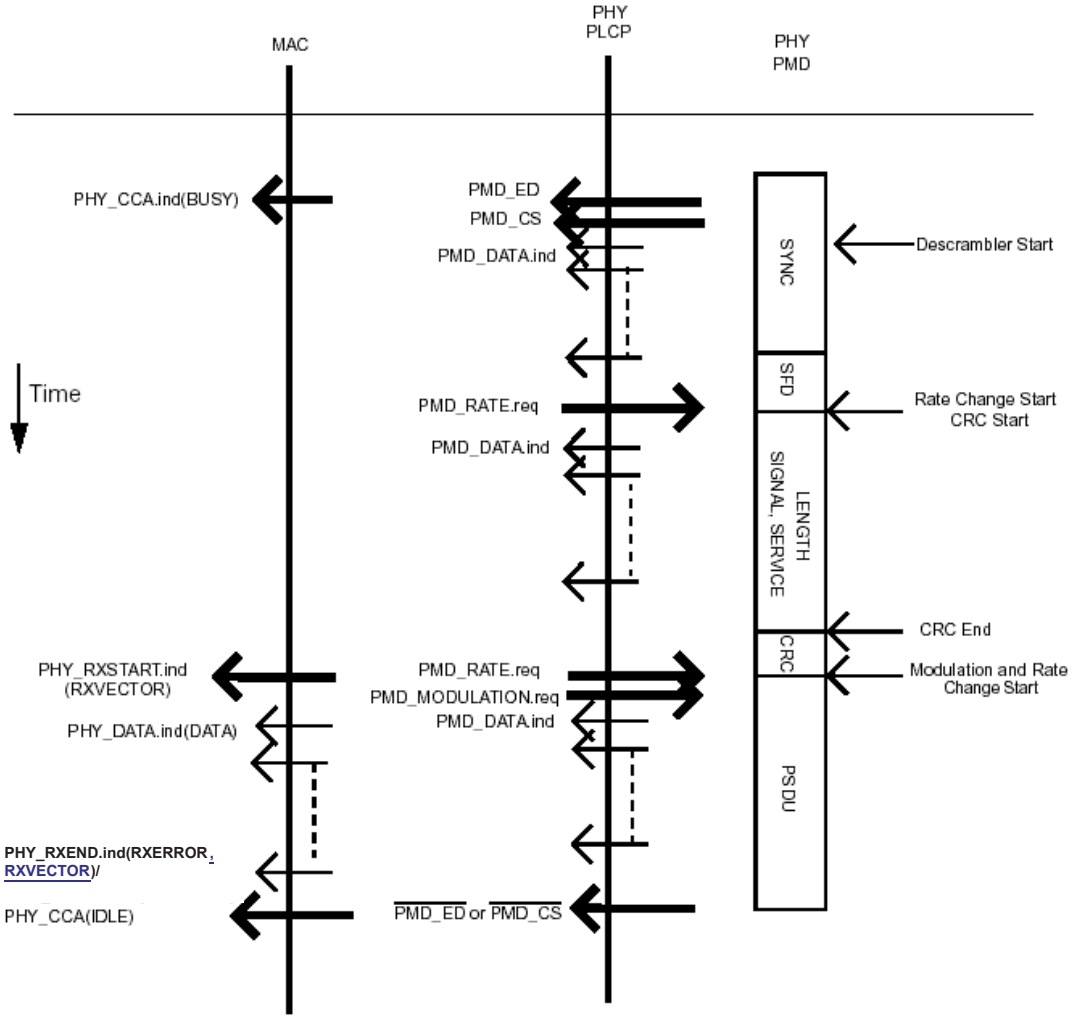


**Figure 18-9—Receive PLCP**

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## 18.3 High Rate PLME

### 18.3.5 Vector descriptions

***Insert the following rows and Note at the end of Table 18-6 as follows:***

**Table 18-6—Parameter vectors**

| Parameter | Associated vector | Value |
|---|---|---|
| ANT_STATE | RXVECTOR | 1–256 |
| RSSI | RXVECTOR | 0–8 bits of RSSI |
| RCPI<br>(see NOTE) | RXVECTOR | 0–255 |
| SQ | RXVECTOR | 0–8 bits of SQ |
| NOTE—RCPI is present only when dot11RadioMeasurementEnabled is true. | | |

## 18.4 High Rate PMD sublayer

### 18.4.4 Basic service and options

#### 18.4.4.2 PMD_SAP sublayer-to-sublayer service primitives

***Insert a row at the end of Table 18-8 as follows:***

**Table 18-8—PMD_SAP sublayer-to-sublayer service primitives**

| Primitive | Request | Indicate | Confirm | Response |
|---|---|---|---|---|
| PMD_RCPI | — | X | — | — |

### 18.4.5 PMD_SAP detailed service specification

***Insert the following subclauses at the end of 18.4.5.15.4:***

#### 18.4.5.16 PMD_RCPI.indicate

##### 18.4.5.16.1 Function

This optional primitive, generated by the PMD sublayer, provides the RCPI to the PLCP and MAC.

##### 18.4.5.16.2 Semantics of the service primitive

The primitive shall provide the following parameter:

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| Parameter | Associated primitive | Value | Description |
|---|---|---|---|
| RCPI | PMD_RCPI.indicate | 0–255 | The RCPI is a measure of the received power by the High Rate PHY as defined in 18.4.8.5. |

#### 18.4.5.16.3 When generated

This primitive shall be generated by the PMD when the High Rate PHY is in the receive state when dot11RadioMeasurementEnabled is true. It is continuously available to the PLCP, which in turn provides the parameter to the MAC entity.

#### 18.4.5.16.4 Effect of receipt

This parameter shall be provided to the PLCP layer for information only. The RCPI may be used in conjunction with RSNI to measure input signal quality.

### 18.4.8 PMD receiver specifications

***Insert the following subclause at the end of 18.4.8.4:***

#### 18.4.8.5 Received Channel Power Indicator Measurement

The RCPI indicator is a measure of the received RF power in the selected channel for a received frame. This parameter shall be a measure by the PHY sublayer of the received RF power in the channel measured over the entire received frame or by other equivalent means that meet the specified accuracy. RCPI shall be a monotonically increasing, logarithmic function of the received power level defined in dBm. The allowed values for the RCPI parameter shall be an 8-bit value in the range from 0 through 220, with indicated values rounded to the nearest 0.5 dB as follows:

0: Power ≤ – 110 dBm

1: Power = – 109.5 dBm

2: Power = – 109.0 dBm

and so on where

RCPI = int{(Power in dBm +110) × 2} for 0 dbm > Power > – 110 dBm

220: Power ≥ – 0 dBm

221–254: Reserved

255: Measurement not available

RCPI shall equal the received RF power within an accuracy of ±5 dB (95% confidence interval) within the specified dynamic range of the receiver. The received RF power shall be determined assuming a receiver noise equivalent bandwidth equal to the channel bandwidth multiplied by 1.1.

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# 19. Extended Rate PHY specification

## 19.2 PHY specific service parameter list

***Insert a row at the end of Table 19-2 as follows:***

**Table 19-2—RXVECTOR parameters**

| Parameter | Value |
|---|---|
| RCPI | The RCPI is a measure of the received channel power and is included when dot11RadioMeasurementEnabled is true. The 8-bit RCPI value is described in 17.2.3.5 and 18.4.5.16. |

## 19.9 Extended rate PMD sublayer

### 19.9.4 Basic service and options

#### 19.9.4.2 PMD_SAP sublayer-to-sublayer service primitives

***Insert a row at the end of Table 19-9 as follows:***

**Table 19-9—PMD_SAP sublayer-to-sublayer service primitives**

| Primitive | Request | Indicate | Confirm | Response |
|---|---|---|---|---|
| PMD_RCPI | — | X | — | — |

#### 19.9.4.3 PMD_SAP service primitive parameters

***Insert a row at the end of Table 19-10 as follows:***

**Table 19-10—List of parameters for the PMD primitives**

| Parameter | Associated primitive | Value | Description |
|---|---|---|---|
| RCPI | PMD_RCPI.indicate | 0–255 | The RCPI is a measure of the received channel power. See 19.9.5.14. |

### 19.9.5 PMD_SAP detailed service specification

#### 19.9.5.13 PMD_ED.indicate

***Insert the following subclause after 19.9.5.13:***


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#### 19.9.5.14 PMD_RCPI.indicate

This primitive is the same as that defined in 17.5.5.8 and 18.4.5.16, including the parameter RCPI. This primitive is used for radio measurement purposes and to aid in link optimization algorithms such as roaming decisions.

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# Annex A

(informative)

# Protocol Implementation Conformance Statement (PICS) proforma

## A.4 PICS proforma—IEEE Std 802.11-2007

### A.4.3 IUT configuration

***Insert a row at the end of the table:***

| Item | IUT configuration | References | Status | Support |
|---|---|---|---|---|
| * CF13 | Is Radio Resource Measurement supported? | 7.3.1.4, 11.10 | (CF6 AND CF11):O | Yes ☐ No ☐ |

***Insert a subclause after A.4.16:***

### A.4.17 Radio Resource Management extensions

| Item | Protocol Capability | References | Status | Support |
|---|---|---|---|---|
| | Are the following Radio Resource Measurement capabilities supported? | | | |
| RRM1 | Radio Measurement Capability | 7.3.1.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM2 | Action frame protocol for measurements | 7.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM2.1 | Radio Measurement Request frame | 7.4.6.1 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM2.2 | Radio Measurement Report frame | 7.4.6.2 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM2.3 | Link Measurement Request frame | 7.4.6.3 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM2.4 | Link Measurement Report frame | 7.4.6.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM2.5 | Neighbor Report Request | | | |


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| Item | Protocol Capability | References | Status | Support |
|---|---|---|---|---|
| RRM2.5.1 | Generate and transmit Neighbor Report Request | 7.4.6.5 | (CF13 AND CF2):M | Yes ☐ No ☐ N/A ☐ |
| RRM2.5.2 | Receive and process Neighbor Report Request | 7.4.6.5 | (CF13 AND CF1):M | Yes ☐ No ☐ N/A ☐ |
| RRM2.6 | Neighbor Report Response | | | |
| RRM2.6.1 | Generate and transmit Neighbor Report Response | 7.4.6.6, 7.3.2.37 | (CF13 AND CF1):M | Yes ☐ No ☐ N/A ☐ |
| RRM2.6.2 | Receive and process Neighbor Report Response | 7.4.6.6, 7.3.2.37 | (CF13 AND CF2):M | Yes ☐ No ☐ N/A ☐ |
| RRM3 | General protocol for requesting and reporting of measurements | 7.3.2.21, 7.3.2.22, 11.10, 11.10.5 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.1 | Parallel Measurements | 7.3.2.21, 11.10.5, 7.3.2.22 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.2 | Use of Enable, Request and Report bits to enable/ disable measurement requests and triggered autonomous reports Measurement Requests | 7.3.2.21, 11.10.7, 11.10.5 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.3 | Enable Autonomous Report | 7.3.2.21, 11.10.7 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.4 | Duration Mandatory | 7.3.2.21, 11.10.3 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.5 | Incapable Indication | 7.3.2.22 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.6 | Refused Indication | 7.3.2.22, 11.10.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.7 | Repeated Measurement | 7.4.6.1, 11.10.6 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM3.8 | Measurement Pause | 7.3.2.21.11, 11.10.8.7 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM4 | Beacon Measurement Type | 11.10, 11.10.8.1 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM4.1 | Beacon Request | 7.3.2.21.6 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM4.2 | Passive Measurement mode | 7.3.2.21.6, 11.10.8.1 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM4.3 | Active Measurement mode | 7.3.2.21.6, 11.10.8.1 | CF13:M | Yes ☐ No ☐ N/A ☐ |

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| Item | Protocol Capability | References | Status | Support |
|---|---|---|---|---|
| RRM4.4 | Beacon table mode | 7.3.2.21.6, 11.10.8.1 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM4.5 | Reporting Conditions | 7.3.2.21.6 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM4.6 | Beacon Report | 7.3.2.22.6 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM4.7 | Reporting Detail | 7.3.2.21.6, 7.3.2.22.6, 7.3.2.36 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| * RRM5 | Frame Measurement Type | 11.10, 11.10.8.2 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM5.1 | Frame Request | 7.3.2.21.7 | (CF13 AND RRM5):M | Yes ☐ No ☐ N/A ☐ |
| RRM5.2 | Frame Report | 7.3.2.22.7 | (CF13 AND RRM5):M | Yes ☐ No ☐ N/A ☐ |
| RRM6 | Channel Load Measurement Type | 11.10, 11.10.8.3 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM6.1 | Channel Load Request | 7.3.2.21.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM6.2 | Channel Load Report | 7.3.2.22.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM7 | Noise Histogram Measurement Type | 11.10, 11.10.8.4 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM7.1 | Noise Histogram Request | 7.3.2.21.5 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM7.2 | Noise Histogram Report | 7.3.2.22.5 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM8 | STA Statistics Measurement Type | 11.10, 11.10.8.5 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM8.1 | STA Statistics Request | 7.3.2.21.8 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM8.2 | STA Statistics Report | 7.3.2.22.8 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9 | LCI Measurement Type | 11.10, 11.10.8.6 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9.1 | LCI Request | 7.3.2.21.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9.1.1 | Location Subject | 7.3.2.21.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9.1.2 | Latitude Requested Resolution | 7.3.2.21.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9.1.3 | Longitude Requested Resolution | 7.3.2.21.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9.1.4 | Altitude Requested Resolution | 7.3.2.21.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM9.2 | LCI Report | 7.3.2.22.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |


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| Item | Protocol Capability | References | Status | Support |
|---|---|---|---|---|
| RRM9.3 | Azimuth | 11.10, 11.10.8.6 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM9.3.1 | Azimuth Request | 7.3.2.21.9 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM9.3.2 | Azimuth Response | 7.3.2.22.9 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| *RRM10 | Transmit Stream/ Category Measurement Type | 11.10, 11.10.8.8 | (CF13 AND CF12):O | Yes ☐ No ☐ N/A ☐ |
| RRM10.1 | Transmit Stream/ Category Measurement Request | 7.3.2.21.10 | RRM10:M | Yes ☐ No ☐ N/A ☐ |
| RRM10.2 | Transmit Stream/ Category Measurement Report | 7.3.2.22.10 | RRM10:M | Yes ☐ No ☐ N/A ☐ |
| RRM10.3 | Triggered Transmit Stream/Category Measurement Report | 7.3.2. 22.10, 11.10.8.8 | RRM10:O | Yes ☐ No ☐ N/A ☐ |
| RRM11 | AP Channel Report | 7.3.2.9, 7.3.2.36 | (CF13 AND CF1):M | Yes ☐ No ☐ N/A ☐ |
| RRM11.1 | Generate and transmit AP Channel Report | 7.2.3.1, 7.2.3.9, 7.3.2.36 | (CF13 AND CF1):M | Yes ☐ No ☐ N/A ☐ |
| RRM11.2 | Receive and process AP Channel Report | 7.2.3.1, 7.2.3.9, 7.3.2.36 | (CF13 AND CF2):M | Yes ☐ No ☐ N/A ☐ |
| RRM12 | Neighbor Report Procedure | 11.10, 11.10.9 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM12.1 | Neighbor Report Procedure | 11.10.9.1, 11.10.9.2 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM12.2 | TSF Offset in Neighbor Report | 7.3.2.37, 11.10.9.2 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM13 | RCPI Measurement | | | |
| RRM13.1 | RCPI Measurement for DSSS PHY at 2.4 GHz | 15.4.8.5 | (CF13 AND CF4):M | Yes ☐ No ☐ N/A ☐ |
| RRM13.2 | RCPI Measurement for OFDM PHY at 5 GHz | 17.2.3.5, 17.3.10.6, 17.5.4.3, 17.5.5.8 | (CF13 AND CF6):M | Yes ☐ No ☐ N/A ☐ |
| RRM13.3 | RCPI Measurement for HR DSSS PHY at 2.4 GHz | 18.4.5.16, 18.4.8.5 | (CF13 AND CF7):M | Yes ☐ No ☐ N/A ☐ |
| RRM13.4 | RCPI Measurement for Extended Rate PHY at 2.4 Ghz | 19.9.5.14 | (CF13 AND CF9):M | Yes ☐ No ☐ N/A ☐ |

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| Item | Protocol Capability | References | Status | Support |
|---|---|---|---|---|
| RRM14 | RCPI Measurement during Active Scanning | | | |
| RRM14.1 | Respond with RCPI information element when requested | 11.1.3.2.2 | (CF13 AND CF12 AND CF1):M | Yes ☐ No ☐ N/A ☐ |
| RRM14.2 | Measurement of RCPI on Probe Request frames | 11.1.3.2.2 | (CF13 AND CF12 AND CF1):O | Yes ☐ No ☐ N/A ☐ |
| RRM15 | RSNI Measurement | 7.3.2.41 | (CF13 AND RRM13):M | Yes ☐ No ☐ N/A ☐ |
| RRM16 | TPC Information in Beacon and Probe Response frames | | | |
| RRM16.1 | Country and TPC Report elements included in Beacon and Probe Response frames | 7.2.3.1, 7.2.3.9, 7.3.2.9, 7.3.2.18, 11.12 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM16.2 | Power Constraint element included in Beacon and Probe Response frames | 7.2.3.1, 7.2.3.9, 7.3.2.15 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM17 | Power Capability elements in Association and Reassociation frames | 7.2.3.4, 7.2.3.5, 11.9.1 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM18 | Management Information Base | | | |
| RRM18.1 | dot11RadioResourceMeasurement | Annex D | (CF13 AND CF1):M | Yes ☐ No ☐ N/A ☐ |
| RRM18.2 | dot11SMTRRMRequest | Annex Q | (CF13 AND CF1):O | Yes ☐ No ☐ N/A ☐ |
| RRM18.3 | dot11SMTRRMReport | Annex Q | (CF13 AND CF1):O | Yes ☐ No ☐ N/A ☐ |
| RRM18.4 | dot11SMTRRMConfig | Annex Q | (CF13 AND CF1):O | Yes ☐ No ☐ N/A ☐ |
| RRM19 | Measurement Pilot Frame | 7.3.1.18, 7.3.2.46, 10.3.30, 11.8, 11.10.11, 11.10.12 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM20 | BSS Average Access Delay elements included in Beacon and Probe Response frames | 7.2.3.1, 7.2.3.9, 7.3.2.39 | (CF1AND CF13):M | Yes ☐ No ☐ N/A ☐ |


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| Item | Protocol Capability | References | Status | Support |
|---|---|---|---|---|
| RRM21 | Antenna Information elements included in Beacon and Probe Response frames | 7.2.3.1, 7.2.3.9, 7.3.2.40 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM22 | Measurement Pilot Transmission Information element and Multiple BSSID element, if required, included in Probe Response frame | 7.2.3.9, 7.3.2.42, 7.3.2.46 | CF13:O | Yes ☐ No ☐ N/A ☐ |
| RRM23 | Quiet interval | | | |
| RRM23.1 | AP-defined Quiet Interval | 7.2.3.1, 7.2.3.9, 7.3.2.23, 11.9.2 | (CF1 AND CF13):M | Yes ☐ No ☐ N/A ☐ |
| RRM23.2 | STA-defined Quiet Interval | 7.2.3.1, 7.2.3.9, 7.3.2.23, 11.9.2 | (CF2 AND CF13):M | Yes ☐ No ☐ N/A ☐ |
| RRM23.3 | STA support for Quiet Interval | 7.2.3.1, 7.2.3.9, 7.3.2.23, 11.9.2 | CF13:M | Yes ☐ No ☐ N/A ☐ |
| RRM24 | BSS Available Admission Capacity | 7.3.2.43 | (CF1 AND CF12 AND CF13):M | Yes ☐ No ☐ N/A ☐ |
| RRM25 | BSS AC Access Delay | 7.2.3.1, 7.2.3.9, 7.3.2.44 | (CF1 AND CF12 AND CF13):M | Yes ☐ No ☐ N/A ☐ |

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# Annex D

(normative)

# ASN.1 encoding of the MAC and PHY MIB

***In the IMPORTS section, insert the following import statement below the ifIndex statement:***

```
InterfaceIndex FROM IF-MIB;
```

***Change the Station Management (SMT) Attributes section following Major Sections of the MIB as shown:***

```
--*********************************************************************
--* Major sections
--*********************************************************************

-- Station Management (SMT) Attributes
   -- DEFINED "AS The SMT object class provides the necessary support
   -- at the station to manage the processes in the station such that
   -- the station may work cooperatively as part of an IEEE 802.11
   -- network."

   dot11smt OBJECT IDENTIFIER ::= { ieee802dot11 1 }

   -- dot11smt GROUPS
   -- dot11StationConfigTable                              ::= { dot11smt 1 }
   -- dot11AuthenticationAlgorithmTable                    ::= { dot11smt 2 }
   -- dot11WEPDefaultKeysTable                             ::= { dot11smt 3 }
   -- dot11WEPKEYMappingsTable                             ::= { dot11smt 4 }
   -- dot11PrivacyTable                                    ::= { dot11smt 5 }
   -- dot11SMTnotification                                 ::= { dot11smt 6 }
   -- dot11MultiDomainCapabilityTable                      ::= { dot11smt 7 }
   -- dot11SpectrummanagementTable                         ::= { dot11smt 8 }
   -- dot11RSNAConfigTable                                 ::= { dot11smt 9 }
   -- dot11RSNAConfigPairwiseCiphersTable                  ::= { dot11smt 10 }
   -- dot11RSNAConfigAuthenticationSuitesTable             ::= { dot11smt 11 }
   -- dot11RSNAStatsTable                                  ::= { dot11smt 12 }
   -- dot11RegulatoryClassesTable                          ::= { dot11smt 13 }
   -- dot11RadioResourceManagement                         ::= { dot11smt 14 }
```

***Change the MAC Attributes section following the Major Sections of the MIB as follows:***

```
-- MAC Attributes
   -- DEFINED AS "The MAC object class provides the necessary support
   -- for the access control, generation, and verification of frame
   -- check sequences (FCSs), and proper delivery of valid data to
   -- upper layers."

   dot11mac OBJECT IDENTIFIER ::= { ieee802dot11 2 }

   -- MAC GROUPS
   -- reference IEEE Std 802.1f-1993
    -- dot11OperationTable                                 ::= { dot11mac 1 }
    -- dot11CountersTable                                  ::= { dot11mac 2 }
    -- dot11GroupAddressesTable                            ::= { dot11mac 3 }
    -- dot11EDCATable                                      ::= { dot11mac 4 }
    -- dot11QAPEDCATable                                   ::= { dot11mac 5 }
    -- dot11QosCountersTable                               ::= { dot11mac 6 }
    -- dot11PeerStatsTable                                 ::= { dot11mac 7 }
```


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***Change the Textual conventions from 802 definitions section of Major Sections of the MIB as follows:***

```
-- ********************************************************************
-- * Textual conventions from 802 definitions
-- ********************************************************************

        WEPKeytype ::= OCTET STRING (SIZE (5))
        TSFType ::= OCTET STRING (SIZE (8))
```

***Change the Dot11StationConfigEntry section of the dotStationConfig TABLE as follows:***

```
Dot11StationConfigEntry ::=
        SEQUENCE {dot11StationID                                    MacAddress,
         dot11MediumOccupancyLimit                                  INTEGER,
         dot11CFPollable                                            TruthValue,
         dot11CFPPeriod                                             INTEGER,
         dot11CFPMaxDuration                                        INTEGER,
         dot11AuthenticationResponseTimeOut                         Unsigned32,
         dot11PrivacyOptionImplemented                              TruthValue,
         dot11PowerManagementMode                                   INTEGER,
         dot11DesiredSSID                                           OCTET STRING,
         dot11DesiredBSSType                                        INTEGER,
         dot11OperationalRateSet                                    OCTET STRING,
         dot11BeaconPeriod                                          INTEGER,
         dot11DTIMPeriod                                            INTEGER,
         dot11AssociationResponseTimeOut                            Unsigned32,
         dot11DisassociateReason                                    INTEGER,
         dot11DisassociateStation                                   MacAddress,
         dot11DeauthenticateReason                                  INTEGER,
         dot11DeauthenticateStation                                 MacAddress,
         dot11AuthenticateFailStatus                                INTEGER,
         dot11AuthenticateFailStation                               MacAddress,
         dot11SpectrumManagementImplemented                         TruthValue,
         dot11SpectrumManagementRequired                            TruthValue,
         dot11MultiDomainCapabilityImplemented                      TruthValue,
         dot11MultiDomainCapabilityEnabled                          TruthValue,
         dot11CountryString                                         OCTET STRING,
         dot11RSNAOptionImplemented                                 TruthValue,
         dot11RSNAPreauthenticationImplemented                      TruthValue
         dot11RegulatoryClassesImplemented                          TruthValue
         dot11RegulatoryClassesRequired                             TruthValue
         dot11QosOptionImplemented                                  TruthValue,
         dot11ImmediateBlockAckOptionImplemented                    TruthValue,
         dot11DelayedBlockAckOptionImplemented                      TruthValue,
         dot11DirectOptionImplemented                               TruthValue,
         dot11APSDOptionImplemented                                 TruthValue,
         dot11QAckOptionImplemented                                 TruthValue,
         dot11QBSSLoadOptionImplemented                             TruthValue,
         dot11QueueRequestOptionImplemented                         TruthValue,
         dot11TXOPRequestOptionImplemented                          TruthValue,
         dot11MoreDataAckOptionImplemented                          TruthValue,
         dot11AssociateinNQBSS                                      TruthValue,
         dot11DLSAllowedInQBSS                                      TruthValue,
         dot11DLSAllowed                                            TRuthValue,
         dot11AssociateStation                                      MacAddress,
         dot11AssociateID                                           INTEGER,
         dot11AssociateFailStation                                  MacAddress,
         dot11AssociateFailStatus                                   INTEGER,
         dot11ReassociateStation                                    MacAddress,
         dot11ReassociateID                                         INTEGER,
         dot11ReassociateFailStation                                MacAddress,
         dot11ReassociateFailStatus                                 INTEGER,
         dot11RadioMeasurementCapable                               TruthValue,
         dot11RadioMeasurementEnabled                               TruthValue,
         dot11RRMMeasurementProbeDelay                              INTEGER,
         dot11RRMMeasurementPilotPeriod                             INTEGER,
         dot11RRMLinkMeasurementEnabled                             TruthValue,
         dot11RRMNeighborReportEnabled                              TruthValue,
         dot11RRMParallelMeasurementsEnabled                        TruthValue,
         dot11RRMRepeatedMeasurementsEnabled                        TruthValue,
```

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```
        dot11RRMBeaconPassiveMeasurementEnabled                    TruthValue,
        dot11RRMBeaconActiveMeasurementEnabled                     TruthValue,
        dot11RRMBeaconTableMeasurementEnabled                      TruthValue,
        dot11RRMBeaconMeasurementReportingConditionsEnabled        TruthValue,
        dot11RRMFrameMeasurementEnabled                            TruthValue,
        dot11RRMChannelLoadMeasurementEnabled                      TruthValue,
        dot11RRMNoiseHistogramMeasurementEnabled                   TruthValue,
        dot11RRMStatisticsMeasurementEnabled                       TruthValue,
        dot11RRMLCIMeasurementEnabled                              TruthValue,
        dot11RRMLCIAzimuthEnabled                                  TruthValue,
        dot11RRMTransmitStreamCategoryMeasurementEnabled           TruthValue,
        dot11RRMTriggeredTransmitStreamCategoryMeasurementEnabled  TruthValue,
        dot11RRMAPChannelReportEnabled                             TruthValue,
        dot11RRMMIBEnabled                                         TruthValue,
        dot11RRMMaxMeasurementDuration                             Unsigned32,
        dot11RRMNonOperatingChannelMaxMeasurementDuration          Unsigned32,
        dot11RRMMeasurementPilotTransmissionInformationEnabled     TruthValue,
        dot11RRMMeasurementPilotCapability                         Unsigned32,
        dot11RRMNeighborReportTSFOffsetEnabled                     TruthValue,
        dot11RRMRCPIMeasurementEnabled                             TruthValue,
        dot11RRMRSNIMeasurementEnabled                             TruthValue,
        dot11RRMBSSAverageAccessDelayEnabled                       TruthValue,
        dot11RRMBSSAvailableAdmissionCapacityEnabled               TruthValue,
        dot11RRMAntennaInformationEnabled                          TruthValue }
```

***Insert the following elements at the end of the dot11StationConfig TABLE after dot11DLSAllowed OBJECT-TYPE:***

```
dot11AssociateStation OBJECT-TYPE
             SYNTAX MacAddress
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the MAC address from the Address 1 field of the
               most recently transmitted association response frame. If no association
               response
               frame has been transmitted, the value of this attribute shall be 0."
       ::= { dot11StationConfigEntry 43 }

dot11AssociateID OBJECT-TYPE
             SYNTAX INTEGER(0..2007)
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the Association ID from the most recently trans-
               mitted association response frame. If no association response frame has
               been transmitted, the value of this attribute shall be 0."
       ::= { dot11StationConfigEntry 44 }

dot11AssociateFailStation OBJECT-TYPE
             SYNTAX MacAddress
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the MAC address from the Address 1 field of the
               most recently transmitted failed association response frame. If no failed
               association response frame has been transmitted, the value of this
               attribute shall be 0."
       ::= { dot11StationConfigEntry 45 }

dot11AssociateFailStatus OBJECT-TYPE
             SYNTAX INTEGER(0..65535)
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the most recently transmitted Status Code in a
               failed association response frame. If no failed association response frame
               has been transmitted, the value of this attribute shall be 0."
       ::= { dot11StationConfigEntry 46 }
```

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```
dot11ReassociateStation OBJECT-TYPE
             SYNTAX MacAddress
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the MAC address from the Address 1 field of the
               most recently transmitted reassociation response frame. If no reassocia-
               tion response frame has been transmitted, the value of this attribute
               shall be 0."
       ::= { dot11StationConfigEntry 47 }

dot11ReassociateID OBJECT-TYPE
             SYNTAX INTEGER(0..2007)
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the Association ID from the most recently trans-
               mitted reassociation response frame. If no reassociation response frame
               has been transmitted, the value of this attribute shall be 0."
       ::= { dot11StationConfigEntry 48 }

dot11ReassociateFailStation OBJECT-TYPE
             SYNTAX MacAddress
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the MAC address from the Address 1 field of the
               most recently transmitted failed reassociation response frame. If no
               failed reassociation response frame has been transmitted, the value of
               this attribute shall be 0."
       ::= { dot11StationConfigEntry 49 }

dot11ReassociateFailStatus OBJECT-TYPE
             SYNTAX INTEGER(0..65535)
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute indicates the most recently transmitted Status Code in a
               failed reassociation response frame. If no failed reassociation response
               frame has been transmitted, the value of this attribute shall be 0."
       ::= { dot11StationConfigEntry 50 }

dot11RadioMeasurementCapable OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that the station implementation is
               capable of supporting Radio Measurement. Otherwise it is not capable of
               performing Radio Measurement. The default value of this attribute is
               FALSE."
       ::= { dot11StationConfigEntry 51 }

dot11RadioMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that one or more of the Radio
               Resource Measurement Enabled Capabilities MIB attributes
               (dot11RRMxxxEnabled), listed in 7.3.2.45, are set to TRUE. A STA may use
               the defined Radio Measurement procedures if this attribute is TRUE. The
               default value of this attribute is FALSE."
       ::= { dot11StationConfigEntry 52 }

dot11RRMMeasurementProbeDelay OBJECT-TYPE
             SYNTAX INTEGER
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "The value of ProbeDelay to be used when making a beacon type measurement
```

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```
                with measurement mode active when dot11RRMActiveBeaconMeasurementEnabled
                is TRUE."
        ::= { dot11StationConfigEntry 53 }

dot11RRMMeasurementPilotPeriod OBJECT-TYPE
             SYNTAX INTEGER (1..255)
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute shall specify the number of TUs that a station shall use
               for scheduling Measurement Pilot transmissions. This value is transmitted
               in Measurement Pilot frames. The default period is 25% of
               dot11BeaconPeriod."
        ::= { dot11StationConfigEntry 54 }

dot11RRMLinkMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Link Measurement is enabled.
               FALSE indicates the station has no Link Measurement capability or that the
               capability is present but is disabled. The default value of this attribute
               is FALSE."
        ::= { dot11StationConfigEntry 55 }

dot11RRMNeighborReportEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Neighbor Report is enabled. FALSE
               indicates the station has no Neighbor Report capability or that the capa-
               bility is present but is disabled. The default value of this attribute is
               FALSE."
        ::= { dot11StationConfigEntry 56 }

dot11RRMParallelMeasurementsEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Parallel Measurements is enabled.
               FALSE indicates the station has no Parallel Measurements capability or
               that the capability is present but is disabled. The default value of this
               attribute is FALSE."
        ::= { dot11StationConfigEntry 57 }

dot11RRMRepeatedMeasurementsEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Repeated Measurments is enabled.
               FALSE indicates the station has no Repeated Measurments capability or that
               the capability is present but is disabled. The default value of this
               attribute is FALSE."
        ::= { dot11StationConfigEntry 58 }

dot11RRMBeaconPassiveMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Beacon Passive Measurement is
               enabled. FALSE indicates the station has no Beacon Passive Measurement
               capability or that the capability is present but is disabled. The default
```

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```
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 59 }

dot11RRMBeaconActiveMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Beacon Active Measurement is
                enabled. FALSE indicates the station has no Beacon Active Measurement
                capability or that the capability is present but is disabled. The default
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 60 }

dot11RRMBeaconTableMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Beacon Table Measurement is
                enabled. FALSE indicates the station has no Beacon Table Measurement capa-
                bility or that the capability is present but is disabled. The default
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 61 }

dot11RRMBeaconMeasurementReportingConditionsEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Beacon Measurement Reporting Con-
                ditions is enabled. FALSE indicates the station has no Beacon Measurement
                Reporting Conditions capability or that the capability is present but is
                disabled. The default value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 62 }

dot11RRMFrameMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Frame Measurement is enabled.
                FALSE indicates the station has no Frame Measurement capability or that
                the capability is present but is disabled. The default value of this
                attribute is FALSE."
        ::= { dot11StationConfigEntry 63 }

dot11RRMChannelLoadMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Channel Load Measurement is
                enabled. FALSE indicates the station has no Channel Load Measurement capa-
                bility or that the capability is present but is disabled. The default
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 64 }

dot11RRMNoiseHistogramMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Noise Histogram Measurement is
                enabled. FALSE indicates the station has no Noise Histogram Measurement
                capability or that the capability is present but is disabled. The default
```

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```
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 65 }

dot11RRMStatisticsMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Statistics Measurement is
               enabled. FALSE indicates the station has no Statistics Measurement capa-
               bility or that the capability is present but is disabled. The default
               value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 66 }

dot11RRMLCIMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for LCI Measurement is enabled. FALSE
               indicates the station has no LCI Measurement capability or that the capa-
               bility is present but is disabled. The default value of this attribute is
               FALSE."
        ::= { dot11StationConfigEntry 67 }

dot11RRMLCIAzimuthEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for LCI Azimuth Measurement is
               enabled. FALSE indicates the station has no LCI Azimuth Measurement capa-
               bility or that the capability is present but is disabled. The default
               value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 68 }

dot11RRMTransmitStreamCategoryMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Transmit Stream/Category Measure-
               ment is enabled. FALSE indicates the station has no Transmit Stream/Cate-
               gory Measurement capability or that the capability is present but is
               disabled. The default value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 69 }

dot11RRMTriggeredTransmitStreamCategoryMeasurementEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Triggered Transmit Stream/Cate-
               gory Measurement is enabled. FALSE indicates the station has no Triggered
               Transmit Stream/Category Measurement capability or that the capability is
               present but is disabled. The default value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 70 }

dot11RRMAPChannelReportEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for AP CHannel Report is enabled.
               FALSE indicates the station has no AP CHannel Report capability or that
               the capability is present but is disabled. The default value of this
```

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```
                attribute is FALSE."
        ::= { dot11StationConfigEntry 71 }

dot11RRMMIBEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for RRM MIB is enabled. FALSE indi-
               cates the station has no RRM MIB capability or that the capability is
               present but is disabled. The default value of this attribute is FALSE. See
               RRM MIB details in Annex Q."
        ::= { dot11StationConfigEntry 72 }

dot11RRMMaxMeasurementDuration OBJECT-TYPE
             SYNTAX Unsigned32(0 .. 7)
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute indicates the maximum measurement duration for operating
               channel measurements, where

               Max Measurement Duration in TUs = 2<superscript>
               (dot11RRMMaxMeasurementDuration - 4)</superscript> * BeaconInterval

               Further details are provided in 11.10.3"
        ::= { dot11StationConfigEntry 73 }

dot11RRMNonOperatingChannelMaxMeasurementDuration OBJECT-TYPE
             SYNTAX Unsigned32(0 .. 7)
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute indicates the maximum measurement duration for non-operat-
               ing channel measurements, where

               Non-OpMax Measurement Duration in TUs = 2<superscript>
               (dot11RRMNonOperatingChannelMaxMeasurementDuration - 4)
               </superscript> * BeaconInterval

               Further details are provided in 11.10.3"
        ::= { dot11StationConfigEntry 74 }

dot11RRMMeasurementPilotTransmissionInformationEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
               TRUE and that the station capability for Measurement Pilot Transmission
               Information is enabled. FALSE indicates the station has no Measurement
               Pilot Transmission Information capability or that the capability is
               present but is disabled. The default value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 75 }

dot11RRMMeasurementPilotCapability OBJECT-TYPE
             SYNTAX Unsigned32(0 .. 7)
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
               "This attribute indicates the station capability for Measurement Pilot. 0
               indicates the station has no Measurement Pilot capability or that the
               capability is present but is disabled. Capability values 1-7 are defined
               in Table 11-11 The default value of this attribute is 0."
        ::= { dot11StationConfigEntry 76 }

dot11RRMNeighborReportTSFOffsetEnabled OBJECT-TYPE
             SYNTAX TruthValue
             MAX-ACCESS read-write
             STATUS current
             DESCRIPTION
```

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```
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Neighbor Report TSF Offset is
                enabled. FALSE indicates the station has no Neighbor Report TSF Offset
                capability or that the capability is present but is disabled. The default
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 77 }

dot11RRMRCPIMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for RCPI Measurement is enabled.
                FALSE indicates the station has no RCPI Measurement capability or that the
                capability is present but is disabled. The default value of this attribute
                is FALSE."
        ::= { dot11StationConfigEntry 78 }

dot11RRMRSNIMeasurementEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for RSNI Measurement is enabled.
                FALSE indicates the station has no RSNI Measurement capability or that the
                capability is present but is disabled. The default value of this attribute
                is FALSE."
        ::= { dot11StationConfigEntry 79 }

dot11RRMBSSAverageAccessDelayEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for BSS Average Access Delay is
                enabled. FALSE indicates the station has no BSS Average Access Delay capa-
                bility or that the capability is present but is disabled. The default
                value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 80 }

dot11RRMBSSAvailableAdmissionCapacityEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for BSS Availabele Admission Capac-
                ity is enabled. FALSE indicates the station has no BSS Availabele Admis-
                sion Capacity capability or that the capability is present but is
                disabled. The default value of this attribute is FALSE."
        ::= { dot11StationConfigEntry 81 }

dot11RRMAntennaInformationEnabled OBJECT-TYPE
              SYNTAX TruthValue
              MAX-ACCESS read-write
              STATUS current
              DESCRIPTION
                "This attribute, when TRUE, indicates that dot11RadioMeasurementEnabled is
                TRUE and that the station capability for Antenna Information is enabled.
                FALSE indicates the station has no Antenna Information capability or that
                the capability is present but is disabled. The default value of this
                attribute is FALSE."
        ::= { dot11StationConfigEntry 82 }
```

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***In the dot11SMTnotification Objects section, insert the following after dot11AuthenticateFail NOTIFICATION-TYPE:***

```
dot11Associate NOTIFICATION-TYPE
        OBJECTS { ifIndex, dot11AssociateStation, dot11AssociateID}
        STATUS current
        DESCRIPTION
               "The associate notification shall be sent when the STA sends an Associa-
               tion Response frame with a status code equal to 'successful.' The value of
               the notification shall include the MAC address of the MAC to which the
               Association Response frame was sent and the Association ID. ifIndex - Each
               802.11 interface is represented by an ifEntry. Interface tables in this
               MIB module are indexed by ifIndex."
       ::= { dot11SMTnotification 0 4 }

dot11AssociateFailed NOTIFICATION-TYPE
        OBJECTS { ifIndex, dot11AssociateFailStatus,
        dot11AssociateFailStation }
        STATUS current
        DESCRIPTION
               "The associate failed notification shall be sent when the STA sends an
               Association Response frame with a status code other than 'successful.' The
               value of the notification shall include the MAC address of the MAC to
               which the Association Response frame was sent and the reason for the asso-
               ciation failure. ifIndex - Each 802.11 interface is represented by an
               ifEntry. Interface tables in this MIB module are indexed by ifIndex."
       ::= { dot11SMTnotification 0 5 }

dot11Reassociate NOTIFICATION-TYPE
        OBJECTS { ifIndex, dot11ReassociateStation, dot11ReassociateID}
        STATUS current
        DESCRIPTION
               "The reassociate notification shall be sent when the STA sends an Reasso-
               ciation Response frame with a status code equal to 'successful.' The value
               of
               the notification shall include the MAC address of the MAC to which the
               Reassociation Response frame was sent and the Reassociation ID. ifIndex -
               Each 802.11 interface is represented by an ifEntry. Interface tables in
               this MIB module are indexed
               by ifIndex."
       ::= { dot11SMTnotification 0 6 }

dot11ReassociateFailed NOTIFICATION-TYPE
        OBJECTS { ifIndex, dot11ReassociateFailStatus,
        dot11ReassociateStation }
        STATUS current
        DESCRIPTION
               "The reassociate failed notification shall be sent when the STA sends an
               Reassociation Response frame with a status code other than 'successful.'
               The value of the notification shall include the MAC address of the
               MAC to which the Reassociation Response frame was sent and the reason for
               the reassociation failure. ifIndex - Each 802.11 interface is represented
               by an ifEntry. Interface tables in this MIB module are indexed
               by ifIndex."
       ::= { dot11SMTnotification 0 7 }
```

***In the dot11Counters TABLE section, change Dot11CountersEntry as follows:***

```
Dot11CountersEntry ::=
       SEQUENCE { dot11TransmittedFragmentCount                  Counter32,
                  dot11MulticastTransmittedFrameCount            Counter32,
                  dot11FailedCount                               Counter32,
                  dot11RetryCount                                Counter32,
                  dot11MultipleRetryCount                        Counter32,
                  dot11FrameDuplicateCount                       Counter32,
                  dot11RTSSuccessCount                           Counter32,
                  dot11RTSFailureCount                           Counter32,
                  dot11ACKFailureCount                           Counter32,
                  dot11ReceivedFragmentCount                     Counter32,
                  dot11MulticastReceivedFrameCount               Counter32,
```

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```
                  dot11FCSErrorCount                              Counter32,
                  dot11TransmittedFrameCount                      Counter32,
                  dot11WEPUndecryptableCount                      Counter32,
                  dot11QoSDiscardedFragmentCount                  Counter32,
                  dot11AssociatedStationCount                     Counter32,
                  dot11QoSCFPollsReceivedCount                    Counter32,
                  dot11QoSCFPollsUnusedCount                      Counter32,
                  dot11QoSCFPollsUnusableCount                    Counter32,
                  dot11QoSCFPollsLostCount                        Counter32 }
```

***Insert the following attribute definition at the end of the dot11CountersEntry attributes:***

```
dot11QoSCFPollsLostCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This counter shall increment for each QoS (+)CF-Poll that has been issued
                where there was no response from the QoS STA."
        ::= { dot11CountersEntry 20 }
```

***Change the dot11Compliance MODULE-COMPLIANCE section of Compliance Statements as follows:***

```
dot11Compliance MODULE-COMPLIANCE
        STATUS current
        DESCRIPTION
                "The compliance statement for SNMPv2 entities that implement
                The IEEE 802.11 MIB."
      MODULE -- this module
      MANDATORY-GROUPS {
      dot11SMTbase67, dot11MACbase2, dot11CountersGroup2,
      dot11SmtAuthenticationAlgorithms, dot11ResourceTypeID,
      dot11PhyOperationComplianceGroup }
```

***Change the OPTIONAL-GROUPS section of Compliance Statements as follows:***

```
-- OPTIONAL-GROUPS { dot11SMTprivacy, dot11MACStatistics,
-- dot11PhyAntennaComplianceGroup, dot11PhyTxPowerComplianceGroup,
-- dot11PhyRegDomainsSupportGroup,
-- dot11PhyAntennasListGroup, dot11PhyRateGroup,
-- dot11SMTbase3, dot11MultiDomainCapabilityGroup,
-- dot11PhyFHSSComplianceGroup2, dot11RSNAadditions,
-- dot11RegulatoryClassesGroup, dot11Qosadditions,
-- dot11RRMCompliance }
--
::= { dot11Compliances 1 }
```

***Insert the following at the end of the Groups – units of conformance section as shown:***

```
-- ******************************************************************
-- * Compliance Statements - RRM
-- ******************************************************************
dot11RRMCompliance MODULE-COMPLIANCE
        STATUS current
        DESCRIPTION
                "The compliance statement for SNMPv2 entities that implement the IEEE
                802.11 MIB for Measurement Services."
        MODULE -- this module
        MANDATORY-GROUPS {
                dot11SMTRRMRequest,
                dot11SMTRRMReport,
                dot11SMTRRMConfig
                                }
        -- OPTIONAL-GROUPS { }
        ::= { dot11Compliances 3 }
```

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***Deprecate the dot11SMTbase6 section in Groups – units of conformance by changing text as follows:***

```
dot11SMTbase6 OBJECT-GROUP
        OBJECTS{ dot11MediumOccupancyLimit,
                dot11CFPollable,
                dot11CFPPeriod,
                dot11CFPMaxDuration,
                dot11AuthenticationResponseTimeOut,
                dot11PrivacyOptionImplemented,
                dot11PowerManagementMode,
                dot11DesiredSSID,
                dot11DesiredBSSType,
                dot11OperationalRateSet,
                dot11BeaconPeriod,
                dot11DTIMPeriod,
                dot11AssociationResponseTimeOut,
                dot11DisassociateReason,
                dot11DisassociateStation,
                dot11DeauthenticateReason,
                dot11DeauthenticateStation,
                dot11AuthenticateFailStatus,
                dot11AuthenticateFailStation,
                dot11MultiDomainCapabilityImplemented,
                dot11MultiDomainCapabilityEnabled,
                dot11CountryString,
                dot11SpectrumManagementImplemented,
                dot11SpectrumManagementRequired,
                dot11RSNAOptionImplemented,
                dot11RegulatoryClassesImplemented,
                dot11RegulatoryClassesRequired,
                dot11QosOptionImplemented,
                dot11ImmediateBlockAckOptionImplemented,
                dot11DelayedBlockAckOptionImplemented,
                dot11DirectOptionImplemented,
                dot11APSDOptionImplemented,
                dot11QAckOptionImplemented,
                dot11QBSSLoadOptionImplemented,
                dot11QueueRequestOptionImplemented,
                dot11TXOPRequestOptionImplemented,
                dot11MoreDataAckOptionImplemented,
                dot11AssociateinNQBSS,
                dot11DLSAllowedinQBSS,
                dot11DLSAllowed }
        STATUS ~~current~~deprecated
        DESCRIPTION
                "The SMTbase6 object class provides the necessary support at the STA to
                manage the processes in the STA such that the STA may work cooperatively
                as a part of an IEEE 802.11 network."
        ::= { dot11Groups 34 }
```

***Insert a SMTbase7 section in Groups – units of conformance as follows:***

```
dot11SMTbase7 OBJECT-GROUP
        OBJECTS{ dot11MediumOccupancyLimit,
                dot11CFPollable,
                dot11CFPPeriod,
                dot11CFPMaxDuration,
                dot11AuthenticationResponseTimeOut,
                dot11PrivacyOptionImplemented,
                dot11PowerManagementMode,
                dot11DesiredSSID,
                dot11DesiredBSSType,
                dot11OperationalRateSet,
                dot11BeaconPeriod,
                dot11DTIMPeriod,
                dot11AssociationResponseTimeOut,
                dot11DisassociateReason,
                dot11DisassociateStation,
                dot11DeauthenticateReason,
                dot11DeauthenticateStation,
                dot11AuthenticateFailStatus,
```

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```
        dot11AuthenticateFailStation,
        dot11MultiDomainCapabilityImplemented,
        dot11MultiDomainCapabilityEnabled,
        dot11CountryString,
        dot11SpectrumManagementImplemented,
        dot11SpectrumManagementRequired,
        dot11RSNAOptionImplemented,
        dot11RegulatoryClassesImplemented,
        dot11RegulatoryClassesRequired,
        dot11QosOptionImplemented,
        dot11ImmediateBlockAckOptionImplemented,
        dot11DelayedBlockAckOptionImplemented,
        dot11DirectOptionImplemented,
        dot11APSDOptionImplemented,
        dot11QAckOptionImplemented,
        dot11QBSSLoadOptionImplemented,
        dot11QueueRequestOptionImplemented,
        dot11TXOPRequestOptionImplemented,
        dot11MoreDataAckOptionImplemented,
        dot11AssociateinNQBSS,
        dot11DLSAllowedinQBSS,
        dot11DLSAllowed,
        dot11AssociateStation,
        dot11AssociateID,
        dot11AssociateFailStation,
        dot11AssociateFailStatus,
        dot11ReassociateStation,
        dot11ReassociateID,
        dot11ReassociateFailStation,
        dot11ReassociateFailStatus,
        dot11RadioMeasurementCapable,
        dot11RadioMeasurementEnabled,
        dot11RRMMeasurementProbeDelay,
        dot11RRMMeasurementPilotPeriod,
        dot11RRMLinkMeasurementEnabled,
        dot11RRMNeighborReportEnabled,
        dot11RRMParallelMeasurementsEnabled,
        dot11RRMRepeatedMeasurementsEnabled,
        dot11RRMBeaconPassiveMeasurementEnabled,
        dot11RRMBeaconActiveMeasurementEnabled,
        dot11RRMBeaconTableMeasurementEnabled,
        dot11RRMBeaconMeasurementReportingConditionsEnabled,
        dot11RRMFrameMeasurementEnabled,
        dot11RRMChannelLoadMeasurementEnabled,
        dot11RRMNoiseHistogramMeasurementEnabled,
        dot11RRMStatisticsMeasaurementEnabled,
        dot11RRMLCIMeasurementEnabled,
        dot11RRMLCIAzimuthEnabled,
        dot11RRMTransmitStreamCategoryMeasurementEnabled,
        dot11RRMTriggeredTransmitStreamCategoryMeasurementEnabled,
        dot11RRMAPChannelReportEnabled,
        dot11RRMMIBEnabled,
        dot11RRMMaxMeasurementDuration,
        dot11RRMNonOperatingChannelMaxMeasurementDuration,
        dot11RRMMeasurementPilotTransmissionInformationEnabled,
        dot11RRMMeasurementPilotCapability,
        dot11RRMNeighborReportTSFOffsetEnabled,
        dot11RRMRCPIMeasurementEnabled,
        dot11RRMRSNIMeasurementEnabled,
        dot11RRMBSSAverageAccessDelayEnabled,
        dot11RRMBSSAvailableAdmissionCapacityEnabled,
        dot11RRMAntennaInformationEnabled}
        STATUS current
DESCRIPTION
        "The SMTbase7 object class provides the necessary support at the STA to
        manage the processes in the STA such that the STA may work cooperatively
        as a part of an IEEE 802.11 net-work, when the STA is capable of multi-
        domain operation. This object group should be implemented when the multi-
        domain capability option is implemented."
::= { dot11Groups 36 }
```

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# Annex I

(informative)

# Regulatory classes

## I.1 External regulatory references

***Change Table I.1 as follows:***

**Table I.1—Regulatory requirement list**

| Geographic area | Approval standards | Documents | Approval authority |
|---|---|---|---|
| Europe | European Conference of Postal and Telecommunications (CEPT) Administrations and its Electronic Communications Committee (ECC). Also, European Radiocommunications Office, European Telecommunications Standards Institute (ETSI). | ECC DEC (04) 08, ETSI EN 301 893, ETS 300-328 [B6] | CEPT |

***Change Table I.2 as follows:***

**Table I.2—Emissions limits sets**

| Emissions limits set | United States | Europe | Japan |
|---|---|---|---|
| 4 Part 15 License Exempt bands | FCC 47CFR [B8], Section 15.247 | ~~Reserved~~ ETS 300-328 [B6] | ~~Reserved~~ MPHPT EO Articles 7, 49.20 |

***Insert a row after 9 public safety, under Behavior limits set, and change the last row of Table I.3 as follows:***

**Table I.3—Behavior limits sets**

| Behavior limits set | United States | Europe | Japan |
|---|---|---|---|
| 10 Part 15 License Exempt bands | FCC 47CFR [B8], Section 15.247 | ETS 300-328 [B6] | MPHPT EO Article 49.20 |
| ~~10~~ 11–255 | Reserved | Reserved | Reserved |

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***Insert a row in Table I.4 as follows:***

**Table I.4—Transmit power level by regulatory domain**

| Frequency band (GHz) | United States (Maximum output power with up to 6 dBi antenna gain) (mW) | Europe (EIRP) |
|---|---|---|
| 2.400–2.4835 | 1 000 with antenna gain per FCC 47CFR, Section 15.247(b)(4)(i) | 100 mW |

***Insert a second and third row in Table I.6 as follows:***

**Table I.6—Japanese transmit power levels by regulatory domain**

| Frequency band (GHz) | Regulatory type | Japan |
|---|---|---|
| 2.400–2.497 | Nomadic access, unlicensed | < 10 mW/MHz EIRP |
| 5.25–5.35 | Unlicensed | < 10 mW/MHz EIRP |


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# Annex J

(normative)

# Country information element and regulatory classes

***Change paragraphs 10–12 as shown:***

The regulatory classes specified for ~~4.9 GHz and 5 GHz~~ operation in the USA are enumerated in Table J.1.

The regulatory classes specified for ~~5 GHz~~ operation in Europe are enumerated in Table J.2.

The regulatory classes specified for ~~4.9 GHz and 5 GHz~~ operation in Japan are enumerated in Table J.3.

***Change the title and row 5, insert a row after row 11, and change the last row of Table J.1 as follows:***

**Table J.1—Regulatory classes ~~for 4.9 Ghz and 5 GHz bands~~ in the United States**

| Regulatory class | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel set | Transmit power limit (mW) | Emissions limits set | Behavior limits set |
|---|---|---|---|---|---|---|
| 5 | 5 | 20 | 149, 153, 157, 161, 165 | 1000 | 4 | 10 |
| 12 | 2.407 | 25 | 1–11 | 1000 | 4 | 10 |
| ~~12~~13–255 | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |

***Change the title, insert a row, and change the last row of Table J.2 as shown:***

**Table J.2—Regulatory classes ~~for 5 GHz bands~~ in Europe**

| Regulatory class | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel set | Transmit power limit (mW) | Emissions limits set | Behavior limits set |
|---|---|---|---|---|---|---|
| 4 | 2.407 | 25 | 1–13 | 100 | 4 | 10 |
| ~~4~~5–255 | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |

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***Change the title, insert three rows, and change the last row of Table J.3 as shown:***

**Table J.3—Regulatory classes ~~for 4.9 GHz and 5 GHz bands~~ in Japan**

| Regulatory class | Channel starting frequency (GHz) | Channel spacing (MHz) | Channel set | Transmit power limit (mW) | Emissions limits set | Behavior limits set |
|---|---|---|---|---|---|---|
| 30 | 2.407 | 25 | 1–13 | 23 | 4 | 6, 10 |
| 31 | 2.414 | 25 | 14 | 23 | 4 | 6, 10 |
| 32 | 5.0 | 20 | 52, 56, 60, 64 | 22 | 1 | 1, 2, 6, |
| ~~30~~ 33–255 | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |


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***Insert the following annex as shown:***

# Annex Q

(normative)

# ASN.1 encoding of the RRM MIB

```
-- ********************************************************************
-- * IEEE 802.11 RRM MIB
-- ***************************************************************
-- * The primary interface to the Radio Resource Measurements is meant to be
-- * real-time information obtained through the request/response mechanisms of
-- * RRM.  A secondary interface to the measurements is through retention of
-- * information in the MIB.  The information, meant to be retained for later
-- * access, includes the MIB entries of Annex Q.  Non-SNMP requests for infor-
-- * mation are obtained via object IDs (OIDs) through the NDIS or “wireless”
-- * interfaces in the operating systems.  SNMP requests for information are
-- * obtained via SNMP SETs and GETs.



-- ********************************************************************
-- * Radio Resource Measurement
-- ********************************************************************


dot11RadioResourceMeasurement OBJECT IDENTIFIER ::= { dot11smt 14 }
-- *********************************************************************
-- *  dot11RRMRequest and dot11RRMReport Usage
-- *
-- * The dot11RRMRequest and dot11RRMReport portions of the RRM MIB
-- * provide access to the Radio Measurement service. By performing
-- * SET operations on the various dot11RRMRequest MIB objects,
-- * radio measurements may be initiated directly on the local STA or
-- * on any peer station within the same BSS. Subsequently, by
-- * performing GET operations on the various dot11RRMReport MIB
-- * objects the results of the requested measurements may be
-- * retrieved.
-- *
-- * In the diagram below, a radio measurement could be initiated
-- * for STA x by performing a MIB.set operation on the RRM MIB of
-- * STA x and specifying the MAC address of STA x in
-- * dot11RRMRqstTargetAdd. Additionally, it is possible to have STA x
-- * request a measurement from STA y by performing a MIB.set operation
-- * on the SME MIB of STA x and specifying the MAC address of STA y in
-- * dot11RRMRqstTargetAdd. In both cases the result of the measurements
-- * can be retrieved by performing a MIB.get operation on the RRM MIB
-- * of STA x upon completion of the measurement.
```

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```
-- *
-- *
-- *       MIB.Set                                          MIB.Set
-- *         or                                               or
-- *       MIB.Get                                          MIB.Get
-- *    +--------|---------+                           +--------|---------+
-- *    | SME    |         |                           | SME    |         |
-- *    |       \ /        |                           |       \ /        |
-- *    |   +---------+    |                           |   +---------+    |
-- *    |   | RRM MIB |    |                           |   | RRM MIB |    |
-- *    |   |         |    |                           |   |         |    |
-- *    |   |         |    |                           |   |         |    |
-- *    |   +---------+    |                           |   +---------+    |
-- *    |                  |                           |                  |
-- *    |   / \            |                           |   / \            |
-- *    |    |   MREQUEST  |                           |    |   MREQUEST  |
-- *    +----+-------------+                           +----+-------------+
-- *    |    |   MREPORT   |                           |    |   MREPORT   |
-- *    |   \ /  MEASURE   |     Action Frames         |   \ /  MEASURE   |
-- *    |                  | <--Measurement Request--> |                  |
-- *    |                  | <--Measurement Report---> |                  |
-- *    | MLME             |                           | MLME             |
-- *    +------------------+                           +------------------+
-- *        STA x                                 STA y
-- *
-- *
-- * Each STA maintains a single dot11RRMRequestTable in the SME MIB
-- * used to initiate RM Measurement Requests. Each dot11RRMRequestEntry
-- * in the table represents an individual Measurement Request that
-- * makes up a complete Measurement Request Action frame.
-- * Multiple Measurement Requests may be concatenated into a single
-- * Measurement Request Action frame by setting the same
-- * dot11RRMRqstToken value into multiple dot11RRMRequestEntrys.
-- *
-- * Each row, dot11RRMRequestEntry, of the dot11RRMRequestTable
-- * provides read-create access for the initiation of a measurement
-- * request. The dot11RRMRequestNextIndex object can be used to
-- * determine which is the next row available. Each row corresponding to
-- * one measurement in the sequence is created with a dot11RRMRqstRowStatus
-- * set to notInService. Once the dot11RRMRequestEntry(s) have been
-- * created for a desired measurement sequence the corresponding
-- * dot11RRMRqstRowStatus(s) objects are set to active to indicate that
-- * the SME can trigger the appropriate MLME primitives. Upon processing
-- * the request, the SME returns the corresponding dot11RRMRqstRowStatus(s)
-- * object to notInService and are now available for additional
-- * measurement requests.
-- *
-- * After a radio measurement is complete the RRM populates the RRMReport
-- * objects with the results of the measurement. Each STA maintains a set
-- * of RRMReport tables, one for each corresponding measurement type. The
-- * results of the entire measurement sequence are spread across the tables
-- * based on what types of measurements were requested. Each xxxReportEntry
-- * within a xxxReportTable contains a xxxRprtRqstToken that corresponds
-- * to the original dot11RRMRqstToken in the measurement request. So the
-- * results of the measurement can be collected by searching the appropriate
-- * xxxReportTables and retrieve any reports with the matching request
-- * token.

-- ************************************************************************

-- ************************************************************************
-- * Radio Resource Measurement Requests
-- ************************************************************************
dot11RRMRequest OBJECT IDENTIFIER ::= { dot11RadioResourceMeasurement 1 }

-- ************************************************************************
-- * dot11RRMRequest TABLE
-- ************************************************************************
dot11RRMRequestNextIndex OBJECT-TYPE
        SYNTAX Unsigned32(0..65535)
        MAX-ACCESS read-only
        STATUS current
```

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```
        DESCRIPTION
                "Identifies a hint for the next value of dot11RRMRqstIndex to be used in a
                row creation attempt for dot11RRMRequestTable. If no new rows can be cre-
                ated for some reason, such as memory, processing requirements, etc, the
                SME shall set this attribute to 0. It shall update this attribute to a
                proper value other than 0 as soon as it is capable of receiving new mea-
                surement requests. The nextIndex is not necessarily sequential nor mono-
                tonically increasing."
        ::= { dot11RRMRequest 1 }

dot11RRMRequestTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11RRMRequestEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "This group contains the current list of requests for RRM reports to be
                issued and have been issued until removed. A network manager adds a RRM
                request by creating a row with createAndWait row status and then filling
                in the request parameters/attributes. The request becomes active to be
                issued when the row status is set to Active. The columnar objects or
                attributes other than the rowStatus shall not be written if the rowStatus
                is Active. The request rows can be deleted, if commanded by a network man-
                ager via changing the value of dot11RRMRqstRowStatus to Destroy. This may
                leave orphaned rows if a manager crashes and forgets which rows are being
                used by it. One recommended way to manage orphaned or finished rows is to
                delete rows if their dot11RRMRqstRowStatus remains other than Active for
                longer than a period (recommend at least 5 minutes, RFC 2579). Or another
                recommended way is to delete older rows as needed based on their
                dot11RRMRqstTimeStamp values. This can be done by the agent as well as the
                manager. "
        ::= { dot11RRMRequest 2 }

dot11RRMRequestEntry OBJECT-TYPE
        SYNTAX Dot11RRMRequestEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11RRMRequestTable Indexed by dot11RRMRqstIndex."
                INDEX { dot11RRMRqstIndex }
        ::= { dot11RRMRequestTable 1 }

Dot11RRMRequestEntry ::=
        SEQUENCE {
                dot11RRMRqstIndex                                   Unsigned32,
                dot11RRMRqstRowStatus                               RowStatus,
                dot11RRMRqstToken                                   OCTET STRING,
                dot11RRMRqstRepetitions                             INTEGER,
                dot11RRMRqstIfIndex                                 InterfaceIndex,
                dot11RRMRqstType                                    INTEGER,
                dot11RRMRqstTargetAdd                               MacAddress,
                dot11RRMRqstTimeStamp                               TimeTicks,
                dot11RRMRqstChanNumber                              INTEGER,
                dot11RRMRqstRegulatoryClass                         INTEGER,
                dot11RRMRqstRndInterval                             Unsigned32,
                dot11RRMRqstDuration                                Unsigned32,
                dot11RRMRqstParallel                                TruthValue,
                dot11RRMRqstEnable                                  TruthValue,
                dot11RRMRqstRequest                                 TruthValue,
                dot11RRMRqstReport                                  TruthValue,
                dot11RRMRqstDurationMandatory                       TruthValue,
                dot11RRMRqstBeaconRqstMode                          INTEGER,
                dot11RRMRqstBeaconRqstDetail                        INTEGER,
                dot11RRMRqstFrameRqstType                           INTEGER,
                dot11RRMRqstBssid                                   MacAddress,
                dot11RRMRqstSSID                                    OCTET STRING,
                dot11RRMRqstBeaconReportingCondition                INTEGER,
                dot11RRMRqstBeaconThresholdOffset                   INTEGER,
                dot11RRMRqstSTAStatRqstGroupID                      INTEGER,
                dot11RRMRqstLCIRqstSubject                          INTEGER,
                dot11RRMRqstLCILatitudeResolution                   INTEGER,
                dot11RRMRqstLCILongitudeResolution                  INTEGER,
                dot11RRMRqstLCIAltitudeResolution                   INTEGER,
```

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```
                dot11RRMRqstLCIAzimuthType                          INTEGER,
                dot11RRMRqstLCIAzimuthResolution                    INTEGER,
                dot11RRMRqstPauseTime                               INTEGER,
                dot11RRMRqstTransmitStreamPeerQSTAAddress           MacAddress,
                dot11RRMRqstTransmitStreamTrafficIdentifier         INTEGER,
                dot11RRMRqstTransmitStreamBin0Range                 INTEGER,
                dot11RRMRqstTrigdQoSAverageCondition                TruthValue,
                dot11RRMRqstTrigdQoSConsecutiveCondition            TruthValue,
                dot11RRMRqstTrigdQoSDelayCondition                  TruthValue,
                dot11RRMRqstTrigdQoSAverageThreshold                INTEGER,
                dot11RRMRqstTrigdQoSConsecutiveThreshold            INTEGER,
                dot11RRMRqstTrigdQoSDelayThresholdRange             INTEGER,
                dot11RRMRqstTrigdQoSDelayThreshold                  INTEGER,
                dot11RRMRqstTrigdQoSMeasurementCount                INTEGER,
                dot11RRMRqstTrigdQoSTimeout                         INTEGER,
                dot11RRMRqstChannelLoadReportingCondition           INTEGER,
                dot11RRMRqstChannelLoadReference                    INTEGER,
                dot11RRMRqstNoiseHistogramReportingCondition        INTEGER,
                dot11RRMRqstAnpiReference                           INTEGER,
                dot11RRMRqstAPChannelReport                         OCTET STRING,
                dot11RRMRqstSTAStatPeerSTAAddress                   MacAddress,
                dot11RRMRqstFrameTransmitterAddress                 MacAddress,
                dot11RRMRqstVendorSpecific                          OCTET STRING }

dot11RRMRqstIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for RRM Request elements in dot11RRMRequestTable, greater than 0."
        ::= { dot11RRMRequestEntry 1 }

dot11RRMRqstRowStatus OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The Row Status column of the current row, used for tracking status of an
                individual request. When this attribute is set to Active, AND a measure-
                ment request can be unambiguously created based on the parameters in the
                row, then the MLME may proceed to issue the request to its intended tar-
                gets when appropriate. If not, this attribute may be set to Not-ready
                immediately to indicate parametric errors. However, it is the network man-
                agers
                responsibility to correct the error. If the request is successfully issued
                to the target STA, then the rowStatus is set to notInService."
        REFERENCE
                "Clause 7.3.2.21"
        ::= { dot11RRMRequestEntry 2 }

dot11RRMRqstToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates a unique string to identify a group of rows to
                be issued as parallel or sequential measurements. To guarantee the unique-
                ness of this token across multiple network managers, it is recommended
                that this token be prefixed with the IP address of the network manager
                creating this row. This token is not necessarily equivalent to the mea-
                surement tokens in RRM request frames. If this attribute is an empty
                string, then this row of request is independent from other requests."
        DEFVAL { "" }
        ::= { dot11RRMRequestEntry 3 }

dot11RRMRqstRepetitions OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the requested number of repetitions for all the
                measurement request elements in this frame.  A value of zero in the Num-
```

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```
                ber of Repetitions field indicates measurement request elements are exe-
                cuted once without repetition."
        ::= { dot11RRMRequestEntry 4 }

dot11RRMRqstIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The ifIndex for this row of RRM Request to be issued on."
        ::= { dot11RRMRequestEntry 5 }

dot11RRMRqstType OBJECT-TYPE
        SYNTAX INTEGER {
                channelLoad(3),
                noiseHistogram(4),
                beacon(5),
                frame(6),
                staStatistics(7),
                lci(8),
                transmitStream(9),
                pause(255)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the measurement type of this RRM request row."
        ::= { dot11RRMRequestEntry 6 }

dot11RRMRqstTargetAdd OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The MAC address of STA for this row of RRM Request is to be issued to. If
                this attribute matches the MAC address of the dot11RRMRqstIfIndex, then
                measurement request is for this STA itself to carry out."
        ::= { dot11RRMRequestEntry 7 }

dot11RRMRqstTimeStamp OBJECT-TYPE
        SYNTAX TimeTicks
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the SysUpTime Value the last time when the
                dot11RRMRqstRowStatus is set to active or when this row is created the
                first time. This attribute shall be set by this STA or AP automatically,
                not by an SNMP manager."
        ::= { dot11RRMRequestEntry 8 }

dot11RRMRqstChanNumber OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The target STA channel number on which to perform the measurements indi-
                cated in this request. The Channel Number is only defined within the indi-
                cated Regulatory Class for this measurement request. This attribute is
                ignored if dot11RRMRqstType = STA statistics Request, LCI Request, Trans-
                mit Stream/Category Measurement, or Measurement Pause. However, even in
                that case, the manager should set this attribute to the current channel
                for this interface, so that the row can be set to active when ready with
                all attributes indicated."
        ::= { dot11RRMRequestEntry 9 }

dot11RRMRqstRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this measurement request.
                Country, Regulatory Class and Channel Number together specify the channel
```

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```
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
        REFERENCE
                "Annex J"
        ::= { dot11RRMRequestEntry 10 }

dot11RRMRqstRndInterval OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the upper bound of the random delay to be used
                prior to making the measurement, expressed in units of TUs. See 11.10.2.
                This attribute is ignored if dot11RRMRqstType = STA statistics Request,
                LCI Request, Transmit Stream/Category Measurement or Measurement Pause."
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 11 }

dot11RRMRqstDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the preferred or mandatory measurement duration
                for this Measurement Request. This attribute is ignored if
                dot11RRMRqstType = LCI Request or Measurement Pause."
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 12 }

dot11RRMRqstParallel OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the parallel bit for this Measurement Request
                element. Default is FALSE which means the measurement shall be performed
                in sequence. This attribute, when TRUE, indicates that this measurement
                should start at the same time as the measurement described by the next
                Measurement Request element in the next row if the next row indicates the
                same value for dot11RRMRqstToken. The default value of this attribute is
                FALSE."
        ::= { dot11RRMRequestEntry 13 }

dot11RRMRqstEnable OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the enable bit for this Measurement Request ele-
                ment. The default value of this attribute is FALSE."
        ::= { dot11RRMRequestEntry 14 }

dot11RRMRqstRequest OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the request bit for this Measurement Request
                element. This attribute, when TRUE, indicates that this STA shall accept
                measurement requests from the target STA. The default value of this
                attribute is FALSE."
        ::= { dot11RRMRequestEntry 15 }

dot11RRMRqstReport OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the report bit for this Measurement Request ele-
                ment. This attribute, when TRUE, indicates that the target STA may enable
```

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```
                autonomous measurement reports to the requesting STA. The default value of
                this attribute is FALSE."
        ::= { dot11RRMRequestEntry 16 }

dot11RRMRqstDurationMandatory OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration mandatory bit for theis Measure-
                ment Request element. This attribute, when TRUE, indicates that the indi-
                cated Measurement Duration is a mandatory duration for this measurement.
                This attribute, when FALSE, indicates that the indicated Measurement Dura-
                tion is a maximum duration for this measurement. The default value of this
                attribute is FALSE."
        ::= { dot11RRMRequestEntry 17 }

dot11RRMRqstBeaconRqstMode OBJECT-TYPE
        SYNTAX INTEGER {
                passive(0),
                active(1),
                beaconTable(2)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the Measurement Mode for this Beacon Request
                element. This attribute is only valid if the dot11RRMRqstType is 5, indi-
                cating a beacon request, and is ignored otherwise."
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 18 }

dot11RRMRqstBeaconRqstDetail OBJECT-TYPE
        SYNTAX INTEGER {
                noBody(0),
                fixedFieldsAndRequestedElements(1),
                allBody(2)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                " dot11RRMRqstBeaconRqstDetail indicates the Reporting Detail for Beacon
                Request element. This attribute is only valid if the dot11RRMRqstType is 5,
                indicating a beacon request, and is ignored otherwise."
        DEFVAL { 2 }
        ::= { dot11RRMRequestEntry 19 }

dot11RRMRqstFrameRqstType OBJECT-TYPE
        SYNTAX INTEGER {
                frameCountRep(1)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                " dot11RRMRqstFrameRqstType indicates the Frame Request Type for Frame
                Request element. This attribute is only valid if the dot11RRMRqstType is 6,
                indicating a frame request, and is ignored otherwise."
        DEFVAL { 2 }
        ::= { dot11RRMRequestEntry 20 }

dot11RRMRqstBssid OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "BSSID indicates the BSSID of the particular AP for which this measurement
                is requested. The BSSID shall be set to the wildcard BSSID when the mea-
                surement is to be performed on any AP(s) on the indicated channel. This
                attribute is only valid if the dot11RRMRqstType is 5, indicating a beacon
                request, and is ignored otherwise."
        DEFVAL { 'FFFFFFFFFFFF'H }
```

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```
        ::= { dot11RRMRequestEntry 21 }

dot11RRMRqstSSID OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..32))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the SSID for the measurement. Zero length MIB
                element for SSID indicates the wildcard SSID. The SSID shall be set to the
                wildcard SSID when the measurement is to be performed on all ESSs/IBSSs on
                the indicated channel. This attribute is only valid if the
                dot11RRMRqstType is 5, indicating a beacon request, and is ignored other-
                wise."
        DEFVAL { ''H }
        ::= { dot11RRMRequestEntry 22 }

dot11RRMRqstBeaconReportingCondition OBJECT-TYPE
        SYNTAX INTEGER {
                afterEveryMeasurement(0),
                rcpiAboveAbsoluteThreshold(1),
                rcpiBelowAbsoluteThreshold(2),
                rsniAboveAbsoluteThreshold(3),
                rsniBelowAbsoluteThreshold(4),
                rcpiAboveOffsetThreshold(5),
                rcpiBelowOffsetThreshold(6),
                rsniAboveOffsetThreshold(7),
                rsniBelowOffsetThreshold(8),
                rcpiInBound(9),
                rsniInBound(10)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates when the Beacon Measurement results are to be
                reported to the requesting STA. This attribute is only valid if the
                dot11RRMRqstType is 5, indicating a beacon request, and is ignored other-
                wise."
        REFERENCE
                "IEEE 802.11, Table 7-29d—Reporting Condition values for Beacon Request
                element"
        DEFVAL {0}
        ::= { dot11RRMRequestEntry 23 }

dot11RRMRqstBeaconThresholdOffset OBJECT-TYPE
        SYNTAX INTEGER
        UNITS "0.5 dB"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Threshold/Offset provides either the threshold value or the offset value
                to be used for conditional reporting. For indicated Reporting Conditions
                1-4, the integer range is (0..255). For indicated Reporting Conditions 5-
                10, the integer range is (-127..+127). This attribute is only valid if the
                dot11RRMRqstType is 5, indicating a beacon request, and is ignored other-
                wise."
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 24 }

dot11RRMRqstSTAStatRqstGroupID OBJECT-TYPE
        SYNTAX INTEGER {
                dot11CountersTable(0),
                dot11MacStatistics(1),
                dot11QosCountersTableforUP0(2),
                dot11QosCountersTableforUP1(3),
                dot11QosCountersTableforUP2(4),
                dot11QosCountersTableforUP3(5),
                dot11QosCountersTableforUP4(6),
                dot11QosCountersTableforUP5(7),
                dot11QosCountersTableforUP6(8),
                dot11QosCountersTableforUP7(9),
                bSSAverageAccessDelays(10)
                }
```

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```
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The attribute indicates the group identity for this Measurement Request
                element. This attribute is only valid if the dot11RRMRqstType is 7, indi-
                cating a statistics request, and is ignored otherwise."
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 25 }

dot11RRMRqstLCIRqstSubject OBJECT-TYPE
        SYNTAX INTEGER {
                local(0),
                remote(1)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The attribute indicates the subject of the LCI measurement request. This
                attribute is only valid if the dot11RRMRqstType is 8, indicating an LCI
                request, and is ignored otherwise."
                DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 26 }

dot11RRMRqstLCILatitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute is 6 bits indicating the number of valid
                bits in the fixed-point value of Latitude of the LCI measurement
                request. This attribute is only valid if the dot11RRMRqstType is 8, indi-
                cating an LCI request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 27 }

dot11RRMRqstLCILongitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute is 6 bits indicating the number of valid
                bits in the fixed-point value of Longitude of the LCI measurement
                request. This attribute is only valid if the dot11RRMRqstType is 8, indi-
                cating an LCI request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 28 }

dot11RRMRqstLCIAltitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute is 6 bits indicating the number of valid
                bits in the fixed-point value of Altitude of the LCI measurement
                request. This attribute is only valid if the dot11RRMRqstType is 8, indi-
                cating an LCI request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 29 }

dot11RRMRqstLCIAzimuthType OBJECT-TYPE
        SYNTAX INTEGER {
                frontSurfaceofSta(0),
                radioBeam(1)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The attribute indicates the azimuth reference for the LCI Azimuth
                measurement request. This attribute is only valid if the dot11RRMRqstType
                is 8, indicating an LCI request, and is ignored otherwise."
        DEFVAL{ 0 }
        ::= { dot11RRMRequestEntry 30 }

dot11RRMRqstLCIAzimuthResolution OBJECT-TYPE
        SYNTAX INTEGER (0..15)
```

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```
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute is 4 bits indicating the number of valid
                bits in the fixed-point value of Azimuth of the LCI Azimuth
                measurement request. This attribute is only valid if the dot11RRMRqstType
                is 8, indicating an LCI request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 31 }

dot11RRMRqstPauseTime OBJECT-TYPE
        SYNTAX INTEGER (0..65535)
        UNITS "10 TUs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute is a 16 bit unsigned integer number
                representing the time period for which measurements are
                suspended or paused. Measurement Pause Requests are used to
                provide time delays between the execution times of measurement
                request elements in a Measurement Request Frame. This attribute is only
                valid if the dot11RRMRqstType is 255, indicating an pause request, and is
                ignored otherwise."
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 32 }

dot11RRMRqstTransmitStreamPeerQSTAAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the peer STA address to be measured for a Trans-
                mit Stream/Category Measurement measurement. This attribute is only valid
                if the dot11RRMRqstType is 9, indicating a transmit stream/category
                request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 33 }

dot11RRMRqstTransmitStreamTrafficIdentifier OBJECT-TYPE
        SYNTAX INTEGER(0..16)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the TC, or TS to be measured for a Transmit
                Stream/Category Measurement measurement. This attribute is only valid if
                the dot11RRMRqstType is 9, indicating a transmit stream/category request,
                and is ignored otherwise."
        ::= { dot11RRMRequestEntry 34 }

dot11RRMRqstTransmitStreamBin0Range OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the delay range for bin 0 of the transmit delay
                histogram. This attribute is only valid if the dot11RRMRqstType is 9,
                indicating a transmit stream/category request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 35 }

dot11RRMRqstTrigdQoSAverageCondition OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute, when TRUE, indicates a request for triggered reporting
                with trigger based on the number of discarded MSDUs reaching the
                dot11RRMRqstTrigdQoSAverageThreshold when averaged over
                dot11RRMRqstTrigdQoSMEasurementCount consecutive MSDUs. This attribute is
                only valid if the dot11RRMRqstType is 9, indicating a transmit stream/cat-
                egory request, and is ignored otherwise. The default value of this
                attribute is FALSE."
        ::= { dot11RRMRequestEntry 36 }

dot11RRMRqstTrigdQoSConsecutiveCondition OBJECT-TYPE
```

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```
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute, when TRUE, indicates a request for triggered reporting
                with trigger based on the consecutive number of MSDUs discarded reaching
                dot11RRMRqstTrigdQoSConsecutiveThreshold. This attribute is only valid if
                the dot11RRMRqstType is 9, indicating a transmit stream/category request,
                and is ignored otherwise. The default value of this attribute is FALSE."
        ::= { dot11RRMRequestEntry 37 }

dot11RRMRqstTrigdQoSDelayCondition OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute, when TRUE, indicates a request for triggered reporting
                with trigger based on the consecutive number of MSDUs that experience a
                transmit delay greater than dot11RRMRqstTrigdQoSDelayThresholdRange reach-
                ing dot11RRMRqstTrigdQoSDelayThreshold. This attribute is only valid if
                the dot11RRMRqstType is 9, indicating a transmit stream/category request,
                and is ignored otherwise. The default value of this attribute is FALSE."
        ::= { dot11RRMRequestEntry 38 }

dot11RRMRqstTrigdQoSAverageThreshold OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the trigger threshold for triggered Transmit
                Stream/Category Measurement based on average MSDUs discarded. Trigger
                occurs if the number of MSDUs discarded over the moving average number of
                transmitted MSDUs in dot11RRMRqstTrigdQoSMeasurementCount reaches this
                threshold. This attribute is only valid if the dot11RRMRqstType is 9,
                indicating a transmit stream/category request, and is ignored otherwise."
        DEFVAL { 10 }
        ::= { dot11RRMRequestEntry 39 }

dot11RRMRqstTrigdQoSConsecutiveThreshold OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the trigger threshold for triggered Transmit
                Stream/Category Measurement based on consecutive MSDUs discarded. Trigger
                occurs if the consecutive number of MSDUs discarded reaches this thresh-
                old. This attribute is only valid if the dot11RRMRqstType is 9, indicat-
                ing a transmit stream/category request, and is ignored otherwise."
        DEFVAL { 5 }
        ::= { dot11RRMRequestEntry 40 }

dot11RRMRqstTrigdQoSDelayThresholdRange OBJECT-TYPE
        SYNTAX INTEGER (0..3)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the minimum transmit delay for delayed MSDU
                counts. Trigger occurs if the a consecutive number of MSDUs experience a
                transmit delay greater than or equal to the lower bound of the bin of the
                Transmit Delay Histogram given by the value of this attribute + 2, e.g. if
                this attribute is 1 the lower bound of bin 3. This attribute is only valid
                if the dot11RRMRqstType is 9, indicating a transmit stream/category
                request, and is ignored otherwise."
        DEFVAL { 1 }
        ::= { dot11RRMRequestEntry 41 }

dot11RRMRqstTrigdQoSDelayThreshold OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Tis attribute indicates the number of consecutive delayed MSDUs needed
```

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```
                for trigger. Trigger occurs if the consecutive number of MSDUs that expe-
                rience a transmit delay greater than dot11RRMRqstQoSDelayThresholdRange
                reaches this value. This attribute is only valid if the dot11RRMRqstType
                is 9, indicating a transmit stream/category request, and is ignored other-
                wise."
        DEFVAL { 20 }
        ::= { dot11RRMRequestEntry 42 }

dot11RRMRqstTrigdQoSMeasurementCount OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of MSDUs to be used as a moving aver-
                age count in the average error threshold and in determining the scope of
                the reported Transmit Stream/Category measurement in a triggered measure-
                ment report. This attribute is only valid if the dot11RRMRqstType is 9,
                indicating a transmit stream/category request, and is ignored otherwise."
        DEFVAL { 100 }
        ::= { dot11RRMRequestEntry 43 }

dot11RRMRqstTrigdQoSTimeout OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        UNITS "100 TUs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the timeout interval during which a measuring
                STA shall not generate further triggered Transmit Stream/Category measure-
                ment reports after a trigger condition has been met and a report gener-
                ated. This attribute is only valid if the dot11RRMRqstType is 9,
                indicating a transmit stream/category request, and is ignored otherwise."
        DEFVAL { 20 }
        ::= { dot11RRMRequestEntry 44 }

dot11RRMRqstChannelLoadReportingCondition OBJECT-TYPE
        SYNTAX INTEGER {
                afterEveryMeasurement(0),
                chanLoadAboveReference(1),
                chanLoadBelowReference(2),
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates when the Channel Load Measurement results are to
                be reported to the requesting STA. This attribute is only valid if the
                dot11RRMRqstType is 3, indicating a channel load request, and is ignored
                otherwise."
        REFERENCE
                "IEEE 802.11, Table 7-29b—Reporting Condition values for Channel Load
                Request element"
        DEFVAL {0}
        ::= { dot11RRMRequestEntry 45 }

dot11RRMRqstChannelLoadReference OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        UNITS "1/255"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel load reporting condition reference
                value. The measured Channel Load is compared to this reference value and a
                report is issued if the reporting condition is satisfied. The reference
                value is in the same units as Channel Load and represents the fractional
                time of the measurement duration during which the STA determined the chan-
                nel to be busy. This attribute is only valid if the dot11RRMRqstType is 3,
                indicating a channel load request, and is ignored otherwise."
        DEFVAL { 5 }
        ::= { dot11RRMRequestEntry 46 }

dot11RRMRqstNoiseHistogramReportingCondition OBJECT-TYPE
        SYNTAX INTEGER {
```

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```
                afterEveryMeasurement(0),
                aNPIAboveReference(1),
                aNPIBelowReference(2),
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates when the Noise Histogram Measurement results are
                to be reported to the requesting STA. This attribute is only valid if the
                dot11RRMRqstType is 4, indicating a noise histogram request, and is
                ignored otherwise."
        REFERENCE
                "IEEE 802.11, Table 7-29b—Reporting Condition values for Channel Load
                Request element"
        DEFVAL {0}
        ::= { dot11RRMRequestEntry 47 }

dot11RRMRqstAnpiReference OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        UNITS "0.5 dbm"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the noise histogram reporting condition ANPI
                reference value. The measured ANPI is compared to this reference value and
                a report is issued if the indicated reporting condition is satisfied.
                ANPIval = Int[(ANPIpower in dBm + 110)*2], for ANPI in the range -110 dBm
                to 0 dBm. ANPIval = 220 for ANPI > 0 dBm. ANPIval = 255 when ANPI is not
                available. This attribute is only valid if the dot11RRMRqstType is 4,
                indicating a noise histogram request, and is ignored otherwise."
        DEFVAL { 5 }
        ::= { dot11RRMRequestEntry 48 }

dot11RRMRqstAPChannelReport OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the specific channels to be used for the
                requested beacon measurements. Zero length is the null default for this
                attribute. Each octet indicates a different channel within the indicated
                Regulatory Class. This list of channels is the Channel List in the AP
                Channel Report element described in 7.3.2.36. This attribute is only valid
                if the dot11RRMRqstType is 5, indicating a beacon request, and is ignored
                otherwise."
        DEFVAL { ''H }
        ::= { dot11RRMRequestEntry 49 }

dot11RRMRqstSTAStatPeerSTAAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the peer STA address to be measured for a sta-
                tistics request. This attribute is only valid if the dot11RRMRqstType is
                7, indicating a statistics request, and is ignored otherwise."
        ::= { dot11RRMRequestEntry 50 }

dot11RRMRqstFrameTransmitterAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the Trasnmitter Address (TA) of the frames to be
                counted in this frame request. This attribute is only valid if the
                dot11RRMRqstType is 6, indicating a frame request, and is ignored other-
                wise."
        ::= { dot11RRMRequestEntry 51 }

dot11RRMRqstVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
```

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```
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement request element. Zero
                length is the null default for this attribute.  This attribute is valid
                for all requests."
        DEFVAL { ''H }
        ::= { dot11RRMRequestEntry 52 }

-- ********************************************************************
-- * End of dot11RRMRequest TABLE
-- ********************************************************************

-- ******************************************************************
-- * Radio Resource Measurement Reports
-- * Report tables contain measurement reports received by this STA or
-- * results of measurements performed by this STA.
-- ******************************************************************
dot11RRMReport OBJECT IDENTIFIER ::= { dot11RadioResourceMeasurement 2 }

-- ******************************************************************
-- * dot11ChannelLoadReport TABLE
-- ******************************************************************
        dot11ChannelLoadReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11ChannelLoadReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains the current list of Channel Load reports that have been
                received by the MLME. The report tables shall be maintained as FIFO to
                preserve freshness, thus the rows in this table can be deleted for memory
                constraints or other implementation constraints determined by the vendor.
                New rows shall have different RprtIndex values than those deleted within
                the range limitation of the index. One easy way is to monotonically
                increase RprtIndex for new reports being written in the table."
        ::= { dot11RRMReport 1 }

dot11ChannelLoadReportEntry OBJECT-TYPE
        SYNTAX Dot11ChannelLoadReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11ChannelLoadReportTable Indexed by
                dot11ChannelLoadRprtIndex."
        INDEX { dot11ChannelLoadRprtIndex }
        ::= { dot11ChannelLoadReportTable 1 }

Dot11ChannelLoadReportEntry ::=
        SEQUENCE {
                dot11ChannelLoadRprtIndex                       Unsigned32,
                dot11ChannelLoadRprtRqstToken                   OCTET STRING,
                dot11ChannelLoadRprtIfIndex                     InterfaceIndex,
                dot11ChannelLoadMeasuringSTAAddr                MacAddress,
                dot11ChannelLoadRprtChanNumber                  INTEGER,
                dot11ChannelLoadRprtRegulatoryClass             INTEGER,
                dot11ChannelLoadRprtActualStartTime             TSFType,
                dot11ChannelLoadRprtMeasurementDuration         Unsigned32,
                dot11ChannelLoadRprtChannelLoad                 INTEGER,
                dot11ChannelLoadRprtVendorSpecific              OCTET STRING,
                dot11ChannelLoadRprtMeasurementMode             INTEGER }

dot11ChannelLoadRprtIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for Channel Load Report elements in dot11ChannelLoadReportTable,
                greater than 0."
        ::= { dot11ChannelLoadReportEntry 1 }

dot11ChannelLoadRprtRqstToken OBJECT-TYPE
        SYNTAX OCTET STRING
```

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```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the request token that was indicated in the Mea-
                surement request that generated this measurement report. This should be an
                exact match to the original dot11RRMRqstToken attribute. Note that there
                may be  multiple entries in the table that match this value since a sin-
                gle request may generate multiple measurement reports."
        ::= { dot11ChannelLoadReportEntry 2 }

dot11ChannelLoadRprtIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The ifIndex for this row of ChannelLoad Report has been received on."
        ::= { dot11ChannelLoadReportEntry 3 }

dot11ChannelLoadMeasuringSTAAddr OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of the measuring STA for this row of Channel Load
                report."
        ::= { dot11ChannelLoadReportEntry 4 }

dot11ChannelLoadRprtChanNumber OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel number used for this Channel Load
                Report. The Channel Number is only defined within the indicated Regula-
                tory Class for this measurement report."
        ::= { dot11ChannelLoadReportEntry 5 }

dot11ChannelLoadRprtRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this measurement report.
                Country, Regulatory Class and Channel Number together specify the channel
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
        REFERENCE
                "Annex J"
        ::= { dot11ChannelLoadReportEntry 6 }

dot11ChannelLoadRprtActualStartTime OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TSF value at the time when the
                measurement started."
        ::= { dot11ChannelLoadReportEntry 7 }

dot11ChannelLoadRprtMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration over which the ChannelLoad Report
                was measured."
        ::= { dot11ChannelLoadReportEntry 8 }

dot11ChannelLoadRprtChannelLoad OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "1/255"
```

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```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Channel Load shall contain the fractional duration over which the measur-
                ing STA determined the channel to be busy during the measurement dura-
                tion."
        REFERENCE
                "Clause 7.3.2.22.4"
        ::= { dot11ChannelLoadReportEntry 9 }

dot11ChannelLoadRprtVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11ChannelLoadReportEntry 10 }

dot11ChannelLoadRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                success(0),
                incapableBit(1),
                refusedBit(2),
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11ChannelLoadReportEntry 11 }

-- ******************************************************************
-- * End of dot11ChannelLoadReport TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11NoiseHistogramReport TABLE
-- ******************************************************************
dot11NoiseHistogramReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11NoiseHistogramReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains the current list of Noise Histogram reports that have been
                received by the MLME. The report tables shall be maintained as FIFO to
                preserve freshness, thus the rows in this table can be deleted for memory
                constraints or other implementation constraints determined by the vendor.
                New rows shall have different RprtIndex values than those deleted within
                the range limitation of the index. One easy way is to monotonically
                increase RprtIndex for new reports being written in the table."
        ::= { dot11RRMReport 2 }

dot11NoiseHistogramReportEntry OBJECT-TYPE
        SYNTAX Dot11NoiseHistogramReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11NoiseHistogramReportTable Indexed by
                dot11NoiseHistogramRprtIndex."
        INDEX { dot11NoiseHistogramRprtIndex }
        ::= { dot11NoiseHistogramReportTable 1 }

Dot11NoiseHistogramReportEntry ::=
        SEQUENCE {
                dot11NoiseHistogramRprtIndex                        Unsigned32,
```

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```
                dot11NoiseHistogramRprtRqstToken                    OCTET STRING,
                dot11NoiseHistogramRprtIfIndex                      InterfaceIndex,
                dot11NoiseHistogramMeasuringSTAAddr                 MacAddress,
                dot11NoiseHistogramRprtChanNumber                   INTEGER,
                dot11NoiseHistogramRprtRegulatoryClass              INTEGER,
                dot11NoiseHistogramRprtActualStartTime              TSFType,
                dot11NoiseHistogramRprtMeasurementDuration          Unsigned32,
                dot11NoiseHistogramRprtAntennaID                    INTEGER,
                dot11NoiseHistogramRprtANPI                         INTEGER,
                dot11NoiseHistogramRprtIPIDensity0                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity1                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity2                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity3                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity4                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity5                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity6                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity7                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity8                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity9                  INTEGER,
                dot11NoiseHistogramRprtIPIDensity10                 INTEGER,
                dot11NoiseHistogramRprtVendorSpecific               OCTET STRING,
                dot11NoiseHistogramRprtMeasurementMode              INTEGER}

dot11NoiseHistogramRprtIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for Noise Histogram elements in dot11NoiseHistogramReportTable,
                greater than 0."
        ::= { dot11NoiseHistogramReportEntry 1 }

dot11NoiseHistogramRprtRqstToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the request token that was indicated in the
                measurement request that generated this measurement report. This should be
                an exact match to the original dot11RRMRqstToken attribute. Note that
                there
                may be multiple entries in the table that match this value since a single
                request may generate multiple measurement reports."
        ::= { dot11NoiseHistogramReportEntry 2 }

dot11NoiseHistogramRprtIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The ifIndex for this row of Noise Histogram Report has been received
                on. "
        ::= { dot11NoiseHistogramReportEntry 3 }

dot11NoiseHistogramMeasuringSTAAddr OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of the measuring STA for this row of Noise Histogram
                report."
        ::= { dot11NoiseHistogramReportEntry 4 }

dot11NoiseHistogramRprtChanNumber OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel number used for this Noise Histo-
                gram Report. The Channel Number is only defined within the indicated Regu-
                latory Class for this measurement report."
        ::= { dot11NoiseHistogramReportEntry 5 }
```

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```
dot11NoiseHistogramRprtRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this measurement report.
                Country, Regulatory Class and Channel Number together specify the channel
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
        REFERENCE
                "Annex J"
        ::= { dot11NoiseHistogramReportEntry 6 }

dot11NoiseHistogramRprtActualStartTime OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TSF value at the time when the
                measurement started."
        ::= { dot11NoiseHistogramReportEntry 7 }

dot11NoiseHistogramRprtMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration over which the Noise Histogram
                Report was measured."
        ::= { dot11NoiseHistogramReportEntry 8 }

dot11NoiseHistogramRprtAntennaID OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the identifying number for the antenna used for
                this measurement. The value 0 indicates that the antenna identifier is
                unknown.  'The value 255 indicates that the measurement was made with
                multiple antennas or that the antenna ID is unknown. that the antenna
                identifier is unknown. The value 255 indicates that this measurement was
                made with multiple antennas. The value 1 is used for a STA with only one
                antenna.  STAs with more than one antenna shall assign Antenna IDs to
                each antenna as consecutive, ascending numbers. Each  Antenna ID number
                represents a unique antenna characterized by a fixed relative position,
                a fixed relative direction and a peak gain for that position and
                direction."
        ::= { dot11NoiseHistogramReportEntry 9 }

dot11NoiseHistogramRprtANPI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "0.5 dBm"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the ANPI for this Noise Histogram measurement.
                Average Noise Power Indicator (ANPI) value represents
                the average noise plus interference power on the measured channel at the
                antenna connector during the measurement duration To calculate ANPI, the
                STA shall measure and use IPI in the indicated channel when NAV is equal
                to 0 (when virtual CS mechanism indicates idle channel) except during
                frame transmission or reception."
        ::= { dot11NoiseHistogramReportEntry 10 }

dot11NoiseHistogramRprtIPIDensity0 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
```


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```
                with measured power satisfying the condition: Power <= -92dBm."
        ::= { dot11NoiseHistogramReportEntry 11 }

dot11NoiseHistogramRprtIPIDensity1 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -92dBm < Power <= -89dBm."
        ::= { dot11NoiseHistogramReportEntry 12 }

dot11NoiseHistogramRprtIPIDensity2 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -89dBm < Power <= -86dBm."
        ::= { dot11NoiseHistogramReportEntry 13 }

dot11NoiseHistogramRprtIPIDensity3 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -86dBm < Power <= -83dBm."
        ::= { dot11NoiseHistogramReportEntry 14 }

dot11NoiseHistogramRprtIPIDensity4 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -83dBm < Power <= -80dBm."
        ::= { dot11NoiseHistogramReportEntry 15 }

dot11NoiseHistogramRprtIPIDensity5 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -80dBm < Power <= -75dBm."
        ::= { dot11NoiseHistogramReportEntry 16 }

dot11NoiseHistogramRprtIPIDensity6 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -75dBm < Power <= -70dBm."
        ::= { dot11NoiseHistogramReportEntry 17 }

dot11NoiseHistogramRprtIPIDensity7 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -70dBm < Power <= -65dBm."
        ::= { dot11NoiseHistogramReportEntry 18 }

dot11NoiseHistogramRprtIPIDensity8 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
```

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```
                with measured power satisfying the condition: -65dBm < Power <= -60dBm."
        ::= { dot11NoiseHistogramReportEntry 19 }

dot11NoiseHistogramRprtIPIDensity9 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -60dBm < Power <= -55dBm."
        ::= { dot11NoiseHistogramReportEntry 20 }

dot11NoiseHistogramRprtIPIDensity10 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the measured IPI density for non-802.11 signals
                with measured power satisfying the condition: -55dBm < Power."
        ::= { dot11NoiseHistogramReportEntry 21 }

dot11NoiseHistogramRprtVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11NoiseHistogramReportEntry 22 }

dot11NoiseHistogramRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                    success(0),
                    incapableBit(1),
                    refusedBit(2),
                   }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11NoiseHistogramReportEntry 23 }

-- ******************************************************************
-- * End of dot11NoiseHistogramReport TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11BeaconReport TABLE
-- ******************************************************************
dot11BeaconReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11BeaconReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains the current list of Beacon reports that have been received
                by the MLME. The report tables shall be maintained as FIFO to preserve
                freshness, thus the rows in this table can be deleted for memory con-
                straints or other implementation constraints determined by the vendor. New
                rows shall have different RprtIndex values than those deleted within the
                range limitation of the index. One easy way is to monotonically increase
                RprtIndex for new reports being written in the table."
        ::= { dot11RRMReport 3 }

        dot11BeaconReportEntry OBJECT-TYPE
        SYNTAX Dot11BeaconReportEntry
```


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```
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11BeaconReportTable Indexed by dot11BeaconRprtIndex."
        INDEX { dot11BeaconRprtIndex }
        ::= { dot11BeaconReportTable 1 }

Dot11BeaconReportEntry ::=
        SEQUENCE {
                dot11BeaconRprtIndex                                Unsigned32,
                dot11BeaconRprtRqstToken                            OCTET STRING,
                dot11BeaconRprtIfIndex                              InterfaceIndex,
                dot11BeaconMeasuringSTAAddr                         MacAddress,
                dot11BeaconRprtChanNumber                           INTEGER,
                dot11BeaconRprtRegulatoryClass                      INTEGER,
                dot11BeaconRprtActualStartTime                      TSFType,
                dot11BeaconRprtMeasurementDuration                  Unsigned32,
                dot11BeaconRprtPhyType                              INTEGER,
                dot11BeaconRprtReportedFrameType                    INTEGER,
                dot11BeaconRprtRCPI                                 INTEGER,
                dot11BeaconRprtRSNI                                 INTEGER,
                dot11BeaconRprtBSSID                                MacAddress,
                dot11BeaconRprtAntennaID                            INTEGER,
                dot11BeaconRprtParentTSF                            TSFType,
                dot11BeaconRprtReportedFrameBody                    OCTET STRING,
                dot11BeaconRprtVendorSpecific                       OCTET STRING,
                dot11BeaconRprtMeasurementMode                      INTEGER}

dot11BeaconRprtIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for Beacon Report elements in dot11BeaconReportTable, greater than
                0."
        ::= { dot11BeaconReportEntry 1 }

dot11BeaconRprtRqstToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the request token that was indicated in the mea-
                surement request that generated this measurement report. This should be an
                exact match to the original dot11RRMRqstToken attribute. Note that there
                may be multiple entries in the table that match this value since a single
                request may generate multiple measurement reports."
        ::= { dot11BeaconReportEntry 2 }

dot11BeaconRprtIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The ifIndex for this row of Beacon Report has been received on."
        ::= { dot11BeaconReportEntry 3 }

dot11BeaconMeasuringSTAAddr OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of the measuring STA for this row of Beacon report."
        ::= { dot11BeaconReportEntry 4 }

dot11BeaconRprtChanNumber OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel number used for this Beacon Report.
                The Channel Number is only defined within the indicated Regulatory Class
```

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```
                for this measurement report."
        ::= { dot11BeaconReportEntry 5 }

dot11BeaconRprtRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this measurement report.
                Country, Regulatory Class and Channel Number together specify the channel
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
         REFERENCE
             "Annex J"
        ::= { dot11BeaconReportEntry 6 }

dot11BeaconRprtActualStartTime OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TSF value at the time when the
        measurement started."
        ::= { dot11BeaconReportEntry 7 }

dot11BeaconRprtMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration over which the Beacon Report was
                measured."
        ::= { dot11BeaconReportEntry 8 }

dot11BeaconRprtPhyType OBJECT-TYPE
        SYNTAX INTEGER {
                fhss(1),
                dsss(2),
                irbaseband(3),
                ofdm(4),
                hrdsss(5),
                erp(6)
                }
        UNITS "dot11PHYType"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the PHY Type for this row of Beacon Report."
        ::= { dot11BeaconReportEntry 9 }

dot11BeaconRprtReportedFrameType OBJECT-TYPE
        SYNTAX INTEGER {
                beaconOrProbeResponse(0),
                measurementPilot(1)
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the frame type reported in
                dot11BeaconRprtReportedFrameBody"
        ::= { dot11BeaconReportEntry 10 }


dot11BeaconRprtRCPI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "0.5 dBm"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the received channel power of the beacon or
                probe response frame in dBm, as defined in the RCPI measurement clause
```


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```
                for the indicated PHY Type. RCPIval = Int[(RCPIpower in dBm + 110)*2], for
                RCPI in the range -110 dBm to 0 dBm. RCPIval = 220 for RCPI > 0 dBm.
                RCPIval = 255 when RCPI is not available."
        ::= { dot11BeaconReportEntry 11 }

dot11BeaconRprtRSNI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "0.5 dB"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the received signal to noise ratio of the bea-
                con or probe response frame in dB. RSNI is the received signal to noise
                plus interference ratio derived from the measured RCPI for the received
                frame and from the measured ANPI for the channel used to receive the
                frame. RSNI is calculated by the ratio of  the received signal power (RCPI
                - ANPI) over the noise plus interference power (ANPI) where
                RSNI = [(ratio(dB) + 10) * 2], for ratios in the range -10dB to +118dB.
                "
        ::= { dot11BeaconReportEntry 12 }

dot11BeaconRprtBSSID OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the BSSID of the beacon for this row of
                Beacon Report."
        ::= { dot11BeaconReportEntry 13 }

dot11BeaconRprtAntennaID OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the identifying number for the antenna used
                for this measurement. The value 0 indicates that the antenna identifier is
                unknown.  The value 255 indicates that this measurement was made with mul-
                tiple antennas. The value 1 is used for a STA with only one antenna.  STAs
                with more than one antenna shall assign Antenna IDs to each antenna as
                consecutive, ascending numbers. Each Antenna ID number represents a unique
                antenna characterized by a fixed relative position, a fixed relative
                direction and a peak gain for that position and direction."
        ::= { dot11BeaconReportEntry 14 }

dot11BeaconRprtParentTSF OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TSF value of the serving measuring STA’s TSF
                value at the time the measuring STA received the beacon or probe response
                frame."
        ::= { dot11BeaconReportEntry 15 }

dot11BeaconRprtReportedFrameBody OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..100))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the fixed fields and information elements from
                the frame body of the Beacon, Measurement Pilot or Probe Response frame
                being received. All reported TIM elements are truncated to 4 octets."
        ::= { dot11BeaconReportEntry 16 }

dot11BeaconRprtVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement report element. Zero
```

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```
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11BeaconReportEntry 17 }

dot11BeaconRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                success(0),
                incapableBit(1),
                refusedBit(2),
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11BeaconReportEntry 18 }

-- ******************************************************************
-- * End of dot11BeaconReport TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11FrameReport TABLE
-- ******************************************************************
dot11FrameReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11FrameReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
        "Group contains the current list of Frame reports that have been received by
                the MLME. The report tables shall be maintained as FIFO to preserve fresh-
                ness, thus the rows in this table can be deleted for memory constraints or
                other implementation constraints determined by the vendor. New rows shall
                have different RprtIndex values than those deleted within the range limi-
                tation of the index. One easy way is to monotonically increase RprtIndex
                for new reports being written in the table."
        ::= { dot11RRMReport 4 }

dot11FrameReportEntry OBJECT-TYPE
        SYNTAX Dot11FrameReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11FrameReportTable Indexed by dot11FrameRprtIndex."
        INDEX { dot11FrameRprtIndex }
        ::= { dot11FrameReportTable 1 }

Dot11FrameReportEntry ::=
        SEQUENCE {
                dot11FrameRprtIndex                                Unsigned32,
                dot11FrameRprtIfIndex                              InterfaceIndex,
                dot11FrameRprtRqstToken                            Unsigned32,
                dot11FrameRprtChanNumber                           INTEGER,
                dot11FrameRprtRegulatoryClass                      INTEGER,
                dot11FrameRprtActualStartTime                      TSFType,
                dot11FrameRprtMeasurementDuration                  Unsigned32,
                dot11FrameRprtTransmitSTAAddress                   MacAddress,
                dot11FrameRprtBSSID                                MacAddress,
                dot11FrameRprtPhyType                              INTEGER,
                dot11FrameRprtAvgRCPI                              INTEGER,
                dot11FrameRprtRSNI                                 INTEGER,
                dot11FrameRprtLastRCPI                             INTEGER,
                dot11FrameRprtAntennaID                            INTEGER,
                dot11FrameRprtNumberFrames                         INTEGER,
                dot11FrameRprtVendorSpecific                       OCTET STRING,
                dot11FrameRptMeasurementMode                       INTEGER}

dot11FrameRprtIndex OBJECT-TYPE
```

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```
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for Frame Report elements in dot11FrameReportTable, greater than
                0."
        ::= { dot11FrameReportEntry 1 }

dot11FrameRprtIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The ifIndex for this row of Frame Report has been received on."
        ::= { dot11FrameReportEntry 2 }

dot11FrameRprtRqstToken OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Index for Frame Request elements in dot11FrameRequestTable that corre-
                sponds to this row of frame report. Since a single frame request can gen-
                erate multiple rows in the frame report table, one per BSSID, this
                dot11FrameRprtRqstToken indicates which request this particular row indi-
                cates. If this row of report is received without a particular
        request, this attribute should be 0"
        ::= { dot11FrameReportEntry 3 }

dot11FrameRprtChanNumber OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel number used for this Frame Report.
                The Channel Number is only defined within the indicated Regulatory Class
                for this measurement report."
        ::= { dot11FrameReportEntry 4 }

dot11FrameRprtRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this measurement report.
                Country, Regulatory Class and Channel Number together specify the channel
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
        REFERENCE
                "Annex J"
        ::= { dot11FrameReportEntry 5 }

dot11FrameRprtActualStartTime OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TSF value at the time when measurement
                started."
        ::= { dot11FrameReportEntry 6 }

dot11FrameRprtMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration over which the Frame Report
                was measured, expressed in units of TUs."
        ::= { dot11FrameReportEntry 7 }

dot11FrameRprtTransmitSTAAddress OBJECT-TYPE
        SYNTAX MacAddress
```

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```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of STA for this row of Frame report that it has been
                received from."
        ::= { dot11FrameReportEntry 8 }

dot11FrameRprtBSSID OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the BSSID of the STA that transmitted this
                frame."
        ::= { dot11FrameReportEntry 9 }

dot11FrameRprtPhyType OBJECT-TYPE
        SYNTAX INTEGER {
                fhss(1),
                dsss(2),
                irbaseband(3),
                ofdm(4),
                hrdsss(5),
                erp(6)
                }
        UNITS "dot11PHYType"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the PHY used for frame reception in this row of
                the frame report."
        ::= { dot11FrameReportEntry 10 }

dot11FrameRprtAvgRCPI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "0.5 dBm"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the average value for the received channel power
                of all the frames received and counted in this Frame Report Entry, in dBm,
                as defined in the RCPI measurement clause for the indicated PHY Type.
                RCPIval = Int[(RCPIpower in dBm + 110)*2], for RCPI in the range -110 dBm
                to 0 dBm. RCPIval = 220 for RCPI > 0 dBm. RCPIval = 255 when RCPI is not
                available."
        ::= { dot11FrameReportEntry 11 }

dot11FrameRprtRSNI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "0.5 dB"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the received signal to noise ratio of the
                received frame in dBm. RSNI is the received signal to noise plus interfer-
                ence ratio derived from the RCPI for the received frame and from the most
                recent ANPI value measured on the channel used to receive the frame. RSNI
                may be calculated by the ratio of  the received signal power (RCPI - ANPI)
                over the noise plus interference power (ANPI) where RSNI = [(ratio(dB) +
                10) * 2],  for  ratios in the range -10dB to +118dB.  Other measurement
                techniques are allowed."
        ::= { dot11FrameReportEntry 12 }

dot11FrameRprtLastRCPI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the received channel power of the most recently
                measured frame in this Frame Report entry, in dBm, as defined in the RCPI
                measurement clause for the indicated PHY Type.
                RCPIval = Int[(RCPIpower in dBm + 110)*2], for RCPI in the range -110 dBm
```

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```
                to 0 dBm. RCPIval = 220 for RCPI > 0 dBm. RCPIval = 255 when RCPI is not
                available."
                ::= { dot11FrameReportEntry 13 }

dot11FrameRprtAntennaID OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the identifying number for the antenna used for
                this measurement. The value 0 indicates that the antenna identifier is
                unknown.  The value 255 indicates that this measurement was made with mul-
                tiple antennas. The value 1 is used for a STA with only one antenna.  STAs
                with more than one antenna shall assign Antenna IDs to each antenna as
                consecutive, ascending numbers. Each  Antenna ID number represents a
                unique antenna characterized by a fixed relative position, a fixed rela-
                tive direction and a peak gain for that position and direction."
        ::= { dot11FrameReportEntry 14 }

dot11FrameRprtNumberFrames  OBJECT-TYPE
        SYNTAX INTEGER(0..65535)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of received frames in the measure-
                ment Report Frame for this row of Frame Report."
        ::= { dot11FrameReportEntry 15 }

dot11FrameRprtVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11FrameReportEntry 16 }

dot11FrameRptMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                success(0),
                incapableBit(1),
                refusedBit(2),
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11FrameReportEntry 17 }

-- ******************************************************************
-- * End of dot11FrameReport TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11STAStatisticsReport TABLE
-- ******************************************************************
dot11STAStatisticsReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11STAStatisticsReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains the current list of STA Statistics reports that have been
                received by the MLME. The report tables shall be maintained as FIFO to
                preserve freshness, thus the rows in this table can be deleted for memory
                constraints or other implementation constraints determined by the vendor.
```

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```
                New rows shall have different RprtIndex values than those deleted within
                the range limitation of the index. One easy way is to monotonically
                increase RprtIndex for new reports being written in the table."
        ::= { dot11RRMReport 5 }

dot11STAStatisticsReportEntry OBJECT-TYPE
        SYNTAX Dot11STAStatisticsReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11STAStatisticsReportTable Indexed by
                dot11STAStatisticsReportIndex."
        INDEX { dot11STAStatisticsReportIndex }
        ::= { dot11STAStatisticsReportTable 1 }

Dot11STAStatisticsReportEntry ::=
        SEQUENCE {
                dot11STAStatisticsReportIndex                       Unsigned32,
                dot11STAStatisticsReportToken                       OCTET STRING,
                dot11STAStatisticsIfIndex                           InterfaceIndex,
                dot11STAStatisticsSTAAddress                        MacAddress,
                dot11STAStatisticsMeasurementDuration               Unsigned32,
                dot11STAStatisticsGroupID                           INTEGER,
                dot11STAStatisticsTransmittedFragmentCount          Counter32,
                dot11STAStatisticsMulticastTransmittedFrameCount    Counter32,
                dot11STAStatisticsFailedCount                       Counter32,
                dot11STAStatisticsRetryCount                        Counter32,
                dot11STAStatisticsMultipleRetryCount                Counter32,
                dot11STAStatisticsFrameDuplicateCount               Counter32,
                dot11STAStatisticsRTSSuccessCount                   Counter32,
                dot11STAStatisticsRTSFailureCount                   Counter32,
                dot11STAStatisticsACKFailureCount                   Counter32,
                dot11STAStatisticsQosTransmittedFragmentCount       Counter32,
                dot11STAStatisticsQosFailedCount                    Counter32,
                dot11STAStatisticsQosRetryCount                     Counter32,
                dot11STAStatisticsQosMultipleRetryCount             Counter32,
                dot11STAStatisticsQosFrameDuplicateCount            Counter32,
                dot11STAStatisticsQosRTSSuccessCount                Counter32,
                dot11STAStatisticsQosRTSFailureCount                Counter32,
                dot11STAStatisticsQosACKFailureCount                Counter32,
                dot11STAStatisticsQosReceivedFragmentCount          Counter32,
                dot11STAStatisticsQosTransmittedFrameCount          Counter32,
                dot11STAStatisticsQosDiscardedFrameCount            Counter32,
                dot11STAStatisticsQosMPDUsReceivedCount             Counter32,
                dot11STAStatisticsQosRetriesReceivedCount           Counter32,
                dot11STAStatisticsReceivedFragmentCount             Counter32,
                dot11STAStatisticsMulticastReceivedFrameCount       Counter32,
                dot11STAStatisticsFCSErrorCount                     Counter32,
                dot11STAStatisticsTransmittedFrameCount             Counter32,
                dot11STAStatisticsAPAverageAccessDelay              INTEGER,
                dot11STAStatisticsAverageAccessDelayBestEffort      INTEGER,
                dot11STAStatisticsAverageAccessDelayBackground      INTEGER,
                dot11STAStatisticsAverageAccessDelayVideo           INTEGER,
                dot11STAStatisticsAverageAccessDelayVoice           INTEGER,
                dot11STAStatisticsStationCount                      INTEGER,
                dot11STAStatisticsChannelUtilization                INTEGER,
                dot11STAStatisticsVendorSpecific                    OCTET STRING,
                dot11STAStatisticsRprtMeasurementMode               INTEGER}

dot11STAStatisticsReportIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for STA Statistics Report elements in
                dot11STAStatisticsReportTable, greater than 0."
        ::= { dot11STAStatisticsReportEntry 1 }

dot11STAStatisticsReportToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-only
        STATUS current
```

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```
        DESCRIPTION
                "This attribute indicates the token that was indicated in the measurement
                request that generated this measurement report. This should be an exact
                match to the original dot11RRMRqstToken attribute. Note that there may be
                multiple entries in the table that match this value since a single request
                may generate multiple measurement reports."
        ::= { dot11STAStatisticsReportEntry 2 }

dot11STAStatisticsIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Identifies the Interface that this row of STA Statistics Report has been
                received on"
        ::= { dot11STAStatisticsReportEntry 3 }

dot11STAStatisticsSTAAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of the STA that returned this STA Statistics Report."
        ::= { dot11STAStatisticsReportEntry 4 }

dot11STAStatisticsMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration over which the STA Statistics was
                measured.  A zero value for this attribute indicates that the reported
                statistics are a current snapshot of the statistics variables.  A non-zero
                value for this attribute indicates that the reported statistics contain
                the difference in the corresponding statistics variables over the indi-
                cated duration."
        ::= { dot11STAStatisticsReportEntry 5 }

dot11STAStatisticsGroupID OBJECT-TYPE
        SYNTAX INTEGER {
                dot11CountersTable(0),
                dot11MacStatistics(1),
                dot11QosCountersTableforUP0(2),
                dot11QosCountersTableforUP1(3),
                dot11QosCountersTableforUP2(4),
                dot11QosCountersTableforUP3(5),
                dot11QosCountersTableforUP4(6),
                dot11QosCountersTableforUP5(7),
                dot11QosCountersTableforUP6(8),
                dot11QosCountersTableforUP7(9),
                bSSAverageAccessDelays(10)
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the value of dot11RRMRqstSTAStatRqstGroupID
                returned from the STA in this STA Statistics Report."
        DEFVAL { 0 }
        ::= { dot11STAStatisticsReportEntry 6 }

dot11STAStatisticsTransmittedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11TransmittedFragmentCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 0, and is ignored other-
```

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```
                wise."
        ::= { dot11STAStatisticsReportEntry 7 }

dot11STAStatisticsMulticastTransmittedFrameCount OBJECT-TYPE SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11MulticastTransmittedFrameCount returned from the
                STA in this STA Statistics Report. If
                dot11STAStatisticsMeasurementDuration indicates a non-zero value, this
                attribute indicates the difference in the referenced dot11 variable over
                the indicated duration. This attribute is only valid if the
                dot11STAStatisticsGroupID is 0, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 8 }

dot11STAStatisticsFailedCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11FailedCount returned from the STA in this STA Sta-
                tistics Report. If dot11STAStatisticsMeasurementDuration indicates a non-
                zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 0, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 9 }

dot11STAStatisticsRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11RetryCount returned from the STA in this STA Sta-
                tistics Report. If dot11STAStatisticsMeasurementDuration indicates a non-
                zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 1, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 10 }

dot11STAStatisticsMultipleRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11MultipleRetryCount returned from the STA in this
                STA Statistics Report. If dot11STAStatisticsMeasurementDuration indicates
                a non-zero value, this attribute indicates the difference in the refer-
                enced dot11 variable over the indicated duration. This attribute is only
                valid if the dot11STAStatisticsGroupID is 1, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 11 }

dot11STAStatisticsFrameDuplicateCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11FrameDuplicateCount returned from the STA in this
                STA Statistics Report. If dot11STAStatisticsMeasurementDuration indicates
                a non-zero value, this attribute indicates the difference in the refer-
                enced dot11 variable over the indicated duration. This attribute is only
                valid if the dot11STAStatisticsGroupID is 1, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 12 }

dot11STAStatisticsRTSSuccessCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
```

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```
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11RTSSuccessCount returned from the STA in this STA
                Statistics Report. If dot11STAStatisticsMeasurementDuration indicates a
                non-zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 1, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 13 }

dot11STAStatisticsRTSFailureCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11RTSFailureCount returned from the STA in this STA
                Statistics Report. If dot11STAStatisticsMeasurementDuration indicates a
                non-zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 1, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 14 }

dot11STAStatisticsACKFailureCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11ACKFailureCount returned from the STA in this STA
                Statistics Report. If dot11STAStatisticsMeasurementDuration indicates a
                non-zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 1, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 15 }

dot11STAStatisticsQosTransmittedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosTransmittedFragmentCount returned from the STA
                in this STA Statistics Report. If dot11STAStatisticsMeasurementDuration
                indicates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 16 }

dot11STAStatisticsQosFailedCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosFailedCount returned from the STA in this STA
                Statistics Report. If dot11STAStatisticsMeasurementDuration indicates a
                non-zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 2-9, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 17 }

dot11STAStatisticsQosRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosRetryCount returned from the STA in this STA
                Statistics Report. If dot11STAStatisticsMeasurementDuration indicates a
                non-zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
```

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```
                if the dot11STAStatisticsGroupID is 2-9, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 18 }

dot11STAStatisticsQosMultipleRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosMultipleRetryCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
::= { dot11STAStatisticsReportEntry 19 }

dot11STAStatisticsQosFrameDuplicateCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosFrameDuplicateCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 20 }

dot11STAStatisticsQosRTSSuccessCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosRTSSuccessCount returned from the STA in this
                STA Statistics Report. If dot11STAStatisticsMeasurementDuration indicates
                a non-zero value, this attribute indicates the difference in the refer-
                enced dot11 variable over the indicated duration. This attribute is only
                valid if the dot11STAStatisticsGroupID is 2-9, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 21 }

dot11STAStatisticsQosRTSFailureCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosRTSFailureCount returned from the STA in this
                STA Statistics Report. If dot11STAStatisticsMeasurementDuration indicates
                a non-zero value, this attribute indicates the difference in the refer-
                enced dot11 variable over the indicated duration. This attribute is only
                valid if the dot11STAStatisticsGroupID is 2-9, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 22 }

dot11STAStatisticsQosACKFailureCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosACKFailureCount returned from the STA in this
                STA Statistics Report. If dot11STAStatisticsMeasurementDuration indicates
                a non-zero value, this attribute indicates the difference in the refer-
                enced dot11 variable over the indicated duration. This attribute is only
                valid if the dot11STAStatisticsGroupID is 2-9, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 23 }

dot11STAStatisticsQosReceivedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
```

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```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosReceivedFragmentCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 24 }

dot11STAStatisticsQosTransmittedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosTransmittedFrameCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 25 }

dot11STAStatisticsQosDiscardedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosDiscardedFrameCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 26 }

dot11STAStatisticsQosMPDUsReceivedCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosMPDUsReceivedCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 27 }

dot11STAStatisticsQosRetriesReceivedCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11QosRetriesReceivedCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 2-9, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 28 }

dot11STAStatisticsReceivedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
```

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```
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11ReceivedFragmentCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 0, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 29 }

dot11STAStatisticsMulticastReceivedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11MulticastReceivedFrameCount returned from the STA
                in this STA Statistics Report. If dot11STAStatisticsMeasurementDuration
                indicates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 0, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 30 }

dot11STAStatisticsFCSErrorCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11FCSErrorCount returned from the STA in this STA
                Statistics Report. If dot11STAStatisticsMeasurementDuration indicates a
                non-zero value, this attribute indicates the difference in the referenced
                dot11 variable over the indicated duration. This attribute is only valid
                if the dot11STAStatisticsGroupID is 0, and is ignored otherwise."
        ::= { dot11STAStatisticsReportEntry 31 }

dot11STAStatisticsTransmittedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11TransmittedFrameCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 0, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 32 }

dot11STAStatisticsAPAverageAccessDelay OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of the AP Average Access Delay (AAD)  returned from the
                STA in this STA Statistics Report. If
                dot11STAStatisticsMeasurementDuration indicates a non-zero value, this
                attribute indicates the difference in the referenced access delay value
                over the indicated duration. This attribute is only valid if the
                dot11STAStatisticsGroupID is 10, and is ignored otherwise."
        REFERENCE
                "IEEE 802.11  Clause 7.3.2.39"
        ::= { dot11STAStatisticsReportEntry 33 }

dot11STAStatisticsAverageAccessDelayBestEffort OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
```

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```
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of the Average Access Delay (AAD) for the Best Effort
                Access Category returned from the STA in this STA Statistics Report. If
                dot11STAStatisticsMeasurementDuration indicates a non-zero value, this
                attribute indicates the difference in the referenced access delay value
                over the indicated duration. This attribute is only valid if the
                dot11STAStatisticsGroupID is 10, and is ignored otherwise."
        REFERENCE
                "IEEE 802.11  Clause 7.3.2.44"
        ::= { dot11STAStatisticsReportEntry 34 }

dot11STAStatisticsAverageAccessDelayBackground OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of the Average Access Delay (AAD) for the Background
                Access Category returned from the STA in this STA Statistics Report. If
                dot11STAStatisticsMeasurementDuration indicates a non-zero value, this
                attribute indicates the difference in the referenced access delay value
                over the indicated duration. This attribute is only valid if the
                dot11STAStatisticsGroupID is 10, and is ignored otherwise."
        REFERENCE
                "IEEE 802.11 Clause 7.3.2.44"
        ::= { dot11STAStatisticsReportEntry 35 }

dot11STAStatisticsAverageAccessDelayVideo OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of the Average Access Delay (AAD) for the Video Access
                Category returned from the STA in this STA Statistics Report. If
                dot11STAStatisticsMeasurementDuration indicates a non-zero value, this
                attribute indicates the difference in the referenced access delay value
                over the indicated duration. This attribute is only valid if the
                dot11STAStatisticsGroupID is 10, and is ignored otherwise."
        REFERENCE
                "IEEE 802.11  Clause 7.3.2.44"
        ::= { dot11STAStatisticsReportEntry 36 }

dot11STAStatisticsAverageAccessDelayVoice OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of the Average Access Delay (AAD) for the Voice Access
                Category returned from the STA in this STA Statistics Report. If
                dot11STAStatisticsMeasurementDuration indicates a non-zero value, this
                attribute indicates the difference in the referenced access delay value
                over the indicated duration. This attribute is only valid if the
                dot11STAStatisticsGroupID is 10, and is ignored otherwise."
        REFERENCE
                "IEEE 802.11  Clause 7.3.2.44"
        ::= { dot11STAStatisticsReportEntry 37 }

dot11STAStatisticsStationCount OBJECT-TYPE
        SYNTAX INTEGER (0..65535)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of dot11AssociatedStationCount returned from the STA in
                this STA Statistics Report. If dot11STAStatisticsMeasurementDuration indi-
                cates a non-zero value, this attribute indicates the difference in the
                referenced dot11 variable over the indicated duration. This attribute is
                only valid if the dot11STAStatisticsGroupID is 10, and is ignored other-
                wise."
        ::= { dot11STAStatisticsReportEntry 38 }
```

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```
dot11STAStatisticsChannelUtilization OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        UNITS "1/255"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "If dot11STAStatisticsMeasurementDuration is zero, this attribute indi-
                cates the value of the Channel Utilization returned from the STA in this
                STA Statistics Report. If dot11STAStatisticsMeasurementDuration indicates
                a non-zero value, this attribute indicates the difference in the Channel
                Utilization value over the indicated duration. The Channel Utilization is
                the time fraction during which the AP sensed the channel busy. This
                attribute is only valid if the dot11STAStatisticsGroupID is 10, and is
                ignored otherwise."
        REFERENCE
                "IEEE 802.11  Clause 7.3.2.28"
        ::= { dot11STAStatisticsReportEntry 39 }

dot11STAStatisticsVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11STAStatisticsReportEntry 40 }

dot11STAStatisticsRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                    success(0),
                    incapableBit(1),
                    refusedBit(2),
                   }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11STAStatisticsReportEntry 41 }

-- ******************************************************************
-- * End of dot11STAStatisticsReport TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11LCIReport TABLE
-- ******************************************************************
dot11LCIReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11LCIReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains the current list of LCI reports that have been received by
                the MLME. The report tables shall be maintained as FIFO to preserve fresh-
                ness, thus the rows in this table can be deleted for memory constraints or
                other implementation constraints determined by the vendor. New rows shall
                have different RprtIndex values than those deleted within the range limi-
                tation of the index. One easy way is to monotonically increase RprtIndex
                for new reports being written in the table."
        ::= { dot11RRMReport 6 }

dot11LCIReportEntry OBJECT-TYPE
        SYNTAX Dot11LCIReportEntry
        MAX-ACCESS not-accessible
        STATUS current
```


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```
        DESCRIPTION
                "An entry in the dot11LCIReportTable
        Indexed by dot11LCIReportIndex."
        INDEX { dot11LCIReportIndex }
        ::= { dot11LCIReportTable 1 }

Dot11LCIReportEntry ::=
        SEQUENCE {
                dot11LCIReportIndex                                     Unsigned32,
                dot11LCIReportToken                                     OCTET STRING,
                dot11LCIIfIndex                                         InterfaceIndex,
                dot11LCISTAAddress                                      MacAddress,
                dot11LCILatitudeResolution                              INTEGER,
                dot11LCILatitudeInteger                                 INTEGER,
                dot11LCILatitudeFraction                                INTEGER,
                dot11LCILongitudeResolution                             INTEGER,
                dot11LCILongitudeInteger                                INTEGER,
                dot11LCILongitudeFraction                               INTEGER,
                dot11LCIAltitudeType                                    INTEGER,
                dot11LCIAltitudeResolution                              INTEGER,
                dot11LCIAltitudeInteger                                 INTEGER,
                dot11LCIAltitudeFraction                                INTEGER,
                dot11LCIDatum                                           INTEGER,
                dot11LCIAzimuthType                                     INTEGER,
                dot11LCIAzimuthResolution                               INTEGER,
                dot11LCIAzimuth                                         Integer32,
                dot11LCIVendorSpecific                                  OCTET STRING,
                dot11LCIRprtMeasurementMode                             INTEGER}

dot11LCIReportIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for LCI Report elements in dot11LCIReportTable, greater than 0."
        ::= { dot11LCIReportEntry 1 }

dot11LCIReportToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the token that was indicated in the measurement
                request that generated this measurement report. This should be an exact
                match to the original dot11RRMRqstToken attribute. Note that there may be
                multiple entries in the table that match this value since a single request
                may generate multiple measurement reports."
        ::= { dot11LCIReportEntry 2 }

dot11LCIIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Identifies the Interface that this row of LCI Report has been received
                on"
        ::= { dot11LCIReportEntry 3 }

dot11LCISTAAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of the STA that returned this LCI Report."
        ::= { dot11LCIReportEntry 4 }

dot11LCILatitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the latitude resolution as 6 bits indicating the
```

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```
                number of valid bits in the fixed-point value of Latitude. This field is
                derived from IETF RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 5 }

dot11LCILatitudeInteger OBJECT-TYPE
        SYNTAX INTEGER (-359..359)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the latitude as a 34 bit fixed point value con-
                sisting of 9 bits of integer and 25 bits of fraction.  This field con-
                tains the 9 bits of integer portion of Latitude. This field is derived
                from IETF RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 6 }

dot11LCILatitudeFraction OBJECT-TYPE
        SYNTAX INTEGER (-16777215..16777215)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the latitude as a 34 bit fixed point value con-
                sisting of 9 bits of integer and 25 bits of fraction.  This field con-
                tains the 25 bits of fraction portion of Latitude. This field is derived
                from IETF RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 7 }


dot11LCILongitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the longitude resolution as 6 bits indicating
                the number of valid bits in the fixed-point value of Longitude. This field
                is derived from IETF RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 8 }

dot11LCILongitudeInteger OBJECT-TYPE
        SYNTAX INTEGER (-359..359)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the longitude as a 34 bit fixed point value con-
                sisting of 9 bits of integer and 25 bits of fraction.  This field con-
                tains the 9 bits of integer portion of Longitude. This field is derived
                from IETF RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 9 }

dot11LCILongitudeFraction OBJECT-TYPE
        SYNTAX INTEGER (-16777215..16777215)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the longitude as a 34 bit fixed point value con-
                sisting of 9 bits of integer and 25 bits of fraction.  This field con-
                tains the 25 bits of fraction portion of Longitude. This field is derived
                from IETF RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 10 }

dot11LCIAltitudeType OBJECT-TYPE
        SYNTAX INTEGER {
        meters(1),
        floors(2) }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the altitude Type as four bits encoding the type
                of altitude. Codes defined are:meters : in 2s-complement fixed-point 22-
                bit integer part with 8-bit fraction floors : in 2s-complement fixed-point
                22-bit integer part with 8-bit fraction. This field is derived from IETF
                RFC-3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 11 }
```

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```
dot11LCIAltitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the altitude resolution as 6 bits indicating the
                number of valid bits in the altitude. This field is derived from IETF RFC-
                3825, and is accessed big-endian."
        ::= { dot11LCIReportEntry 12 }

dot11LCIAltitudeInteger OBJECT-TYPE
        SYNTAX INTEGER (-2097151..2097151)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the altitude as a 30 bit value defined by the
                Altitude type field. The field is encoded as a 2s-complement fixed-point
                22-bit integer Part with 8-bit fraction.  This field contains the fixed-
                point Part of Altitude. This field is derived from IETF RFC-3825, and is
                accessed big-endian."
        ::= { dot11LCIReportEntry 13 }

dot11LCIAltitudeFraction OBJECT-TYPE
        SYNTAX INTEGER (-127..127)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the altitude as a 30 bit value defined by the
                Altitude type field. The field is encoded as a 2s-complement fixed-point
                22-bit integer Part with 8-bit fraction.  This field contains the frac-
                tion part of Altitude. This field is derived from IETF RFC-3825, and is
                accessed big-endian."
        ::= { dot11LCIReportEntry 14 }

dot11LCIDatum OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the datum as an eight-bit value encoding the
                horizontal and vertical references used for the coordinates given in this
                LCI."
        ::= { dot11LCIReportEntry 15 }

dot11LCIAzimuthType OBJECT-TYPE
        SYNTAX INTEGER {
                frontSurfaceOfSTA(0),
                radioBeam(1) }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the azimuth Type as a one bit attribute encod-
                ing the type of Azimuth. Codes defined are: front surface of STA : in 2s-
                complement fixed-point 9-bit integer; and radio beam : in 2s-complement
                fixed-point 9-bit integer"
        ::= { dot11LCIReportEntry 16 }

dot11LCIAzimuthResolution OBJECT-TYPE
        SYNTAX INTEGER (0..15)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the azimuth Resolution as 4 bits indicating the
                number of valid bits in the azimuth."
        ::= { dot11LCIReportEntry 17 }

dot11LCIAzimuth OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
```

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```
                "This attribute indicates the azimuth as a 9 bit value defined by the Azi-
                muth Type field.The field is encoded as a 2s-complement fixed-point 9-bit
                integer horizontal angle in degrees from True North."
        ::= { dot11LCIReportEntry 18 }

dot11LCIVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific sub-
                elements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11LCIReportEntry 19 }

dot11LCIRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                    success(0),
                    incapableBit(1),
                    refusedBit(2),
                   }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11LCIReportEntry 20 }

-- ******************************************************************
-- * End of dot11LCIReport TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11TransmitStreamReport TABLE
-- ******************************************************************

dot11TransmitStreamReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11TransmitStreamReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains the current list of Transmit Delay Metrics reports that
                have been received by the MLME. The report tables shall be maintained as
                FIFO to preserve freshness, thus the rows in this table can be deleted for
                memory constraints or other implementation constraints determined by the
                vendor. New rows shall have different RprtIndex values than those deleted
                within the range limitation of the index. One easy way is to monotoni-
                cally increase RprtIndex for new reports being written in the table."
        ::= { dot11RRMReport 7 }

dot11TransmitStreamReportEntry OBJECT-TYPE
        SYNTAX Dot11TransmitStreamReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11TransmitStreamReportTable Indexed by
                dot11TransmitStreamRprtIndex."
        INDEX { dot11TransmitStreamRprtIndex }
        ::= { dot11TransmitStreamReportTable 1 }

Dot11TransmitStreamReportEntry ::=
        SEQUENCE {
                dot11TransmitStreamRprtIndex                        Unsigned32,
                dot11TransmitStreamRprtRqstToken                    OCTET STRING,
                dot11TransmitStreamRprtIfIndex                      InterfaceIndex,
                dot11TransmitStreamMeasuringSTAAddr                 MacAddress,
                dot11TransmitStreamRprtActualStartTime              TSFType,
```

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```
                dot11TransmitStreamRprtMeasurementDuration          Unsigned32,
                dot11TransmitStreamRprtPeerSTAAddress               MacAddress,
                dot11TransmitStreamRprtTID                          INTEGER,
                dot11TransmitStreamRprtAverageQueueDelay            Integer32,
                dot11TransmitStreamRprtAverageTransmitDelay         Integer32,
                dot11TransmitStreamRprtTransmittedMSDUCount         Integer32,
                dot11TransmitStreamRprtMSDUDiscardedCount           Integer32,
                dot11TransmitStreamRprtMSDUFailedCount              Integer32,
                dot11TransmitStreamRprtMultipleRetryCount           Integer32,
                dot11TransmitStreamRprtCFPollsLostCount             Integer32,
                dot11TransmitStreamRprtBin0Range                    INTEGER,
                dot11TransmitStreamRprtDelayHistogram               OCTET STRING,
                dot11TransmitStreamRprtReason                       INTEGER,
                dot11TransmitStreamRprtVendorSpecific               OCTET STRING,
                dot11TransmitStreamRprtMeasurementMode              INTEGER}

dot11TransmitStreamRprtIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for Transmit Delay Metrics Report elements in
                dot11TransmitStreamReportTable, greater than 0."
        ::= { dot11TransmitStreamReportEntry 1 }

dot11TransmitStreamRprtRqstToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the request token that was indicated in the mea-
                surement request that generated this measurement report. This should be an
                exact match to the original dot11RRMRqstToken attribute. Note that there
                may be multiple entries in the table that match this value since a single
                request may generate multiple measurement reports."
        ::= { dot11TransmitStreamReportEntry 2 }

dot11TransmitStreamRprtIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The InterfaceIndex for this row of TransmitTransmitStream Report has been
                received on."
        ::= { dot11TransmitStreamReportEntry 3 }

dot11TransmitStreamMeasuringSTAAddr OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "The MAC address of the measuring STA for this row of Transmit Delay Met-
                rics report."
        ::= { dot11TransmitStreamReportEntry 4 }

dot11TransmitStreamRprtActualStartTime OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TSF value at the time when the measurement
                started or for a triggered Transmit Stream/Category Measurement report the
                TSF value at the reporting QoS STA when the trigger condition was met."
        ::= { dot11TransmitStreamReportEntry 5 }

dot11TransmitStreamRprtMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the duration over which the Transmit Delay Met-
```

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```
                rics Report was measured. For a triggered Transmit Stream/Category Mea-
                surement Report, metrics are reported over a number of transmitted MSDUs
                rather than a duration, hence Measurement Duration shall be set to 0."
        ::= { dot11TransmitStreamReportEntry 6 }

dot11TransmitStreamRprtPeerSTAAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
        "The MAC address present in the Address 1 filed of the measured
                data frames for this row of Transmit Transmit Stream/Category Measurement
                report."
        ::= { dot11TransmitStreamReportEntry 7 }

dot11TransmitStreamRprtTID OBJECT-TYPE
        SYNTAX INTEGER(0..16)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the TC or TS for which traffic is to be mea-
                sured. Values 0 through 15 are defined. Values 16-255 are reserved."
        ::= { dot11TransmitStreamReportEntry 8 }

dot11TransmitStreamRprtAverageQueueDelay OBJECT-TYPE
        SYNTAX Integer32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the average delay of the frames (MSDUs) that are
                passed to the MAC during the measurement duration for the indicated desti-
                nation and the indicated Traffic Identifier. Queue Delay shall be mea-
                sured from the time the MSDU is passed to the MAC until the transmission
                starts and shall be expressed in units of TUs."
        ::= { dot11TransmitStreamReportEntry 9 }

dot11TransmitStreamRprtAverageTransmitDelay OBJECT-TYPE
        SYNTAX Integer32
        UNITS "TUs"
                MAX-ACCESS read-only
                STATUS current
                DESCRIPTION
                "This attribute indicates the average delay of the frames (MSDUs) that are
                successfully transmitted during the measurement duration for the indi-
                cated destination and the indicated Traffic Identifier. Delay shall be
                measured from the time the MSDU is passed to the MAC until ACK is received
                from the intermediate destination."
        ::= { dot11TransmitStreamReportEntry 10}

dot11TransmitStreamRprtTransmittedMSDUCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of MSDUs to the peer STA for the TC,
                or TS given by the Traffic Identifier successfully transmitted in the mea-
                surement duration"
        ::= {dot11TransmitStreamReportEntry 11}

dot11TransmitStreamRprtMSDUDiscardedCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of MSDUs to the peer STA for the TC,
                or TS given by the Traffic Identifier discarded due either to the number
                of transmit attempts exceeding dot11ShortRetryLimit or dot11LongRetryLimit
                as appropriate, or due to the MSDU lifetime having been reached"
        ::= {dot11TransmitStreamReportEntry 12}

dot11TransmitStreamRprtMSDUFailedCount OBJECT-TYPE
```

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```
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of MSDUs to the peer STA for the TC,
                or TS given by the Traffic Identifier discarded during the measurement
                duration due to the number of transmit attempts exceeding
                dot11ShortRetryLimit or dot11LongRetryLimit as appropriate."
        ::= {dot11TransmitStreamReportEntry 13}

dot11TransmitStreamRprtMultipleRetryCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of MSDUs for the TC, or TS given by
                the Traffic Identifier that are successfully transmitted after more than
                one retransmission attempt."
        ::= {dot11TransmitStreamReportEntry 14}

dot11TransmitStreamRprtCFPollsLostCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the number of QoS (+)CF-Poll frames transmitted
                to the peer STA where there was no response from the QoS STA."
        ::= {dot11TransmitStreamReportEntry 15}

dot11TransmitStreamRprtBin0Range OBJECT-TYPE
        SYNTAX INTEGER
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the delay range for Bin 0 of the delay histo-
                gram."
        ::= { dot11TransmitStreamReportEntry 16 }

dot11TransmitStreamRprtDelayHistogram OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE (6))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the histogram of delay of the frames (MSDUs)
                that are successfully transmitted during the measurement duration for the
                indicated Traffic Identifier and the indicated destination. Delay shall be
                measured from the time the MSDU is passed to the MAC until the ACK is
                received from the intermediate destination and shall be expressed in units
                of TUs. "
        ::= { dot11TransmitStreamReportEntry 17 }

dot11TransmitStreamRprtReason OBJECT-TYPE
        SYNTAX INTEGER {
                averageError(0),
                consecutiveError(1),
                delayError(2),
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the Reason field indicating the reason that the
                measuring QoS STA sent the Transmit Stream/Category measurement report."
        DEFVAL { 0 }
        ::= { dot11TransmitStreamReportEntry 18 }

dot11TransmitStreamRprtVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific
```

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```
                subelements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11TransmitStreamReportEntry 19 }

dot11TransmitStreamRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                success(0),
                incapableBit(1),
                refusedBit(2),
                }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This attribute indicates the outcome status for the measurement request
                which generated this measurement report; status is indicated using the
                following reason codes: 1 indicates this STA is incapable of generating
                the report, 2 indicates this STA is refusing to generate the report, 0
                indicates the STA successfully carried out the measurement request."
        DEFVAL { 0 }
        ::= { dot11TransmitStreamReportEntry 20 }

-- ********************************************************************
-- * End of dot11TransmitStreamReport TABLE
-- ********************************************************************

-- ********************************************************************
-- * Radio Resource Measurement Configuration Information
-- ********************************************************************
dot11RRMConfig OBJECT IDENTIFIER ::= { dot11RadioResourceMeasurement 3 }

-- ********************************************************************
-- * dot11APChannelReport TABLE
-- ********************************************************************
dot11APChannelReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11APChannelReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "AP Channel Report information, in tabular form."
        ::= { dot11RRMConfig 1 }

dot11APChannelReportEntry OBJECT-TYPE
        SYNTAX Dot11APChannelReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the dot11APChannelReportTable. Each entry in the table is
                indexed by dot11APChannelReportIndex."
        INDEX { dot11APChannelReportIndex }
        ::= { dot11APChannelReportTable 1 }

Dot11APChannelReportEntry ::=
        SEQUENCE {
                dot11APChannelReportIndex                           Unsigned32,
                dot11APChannelReportIfIndex                         InterfaceIndex,
                dot11APChannelReportRegulatoryClass                 INTEGER,
                dot11APChannelReportChannelList                     OCTET STRING}

dot11APChannelReportIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Index for AP channel report entry in dot11APChannelReportTable, greater
                than 0."
        ::= { dot11APChannelReportEntry 1 }

dot11APChannelReportIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-create
        STATUS current
```

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```
        DESCRIPTION
                "The ifIndex this row of AP channel report entry belongs to."
        ::= { dot11APChannelReportEntry 2 }

dot11APChannelReportRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this AP Channel Report.
                Country, Regulatory Class and Channel Number together specify the channel
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
        REFERENCE
                "Annex J"
        ::= { dot11APChannelReportEntry 3 }

dot11APChannelReportChannelList OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute lists the specific channels in this AP Channel Report.
                Zero length is the null default for this attribute. Each octet indicates a
                different channel within the indicated Regulatory Class. This list of
                channels is the Channel List in the AP Channel Report element described in
                7.3.2.36. "
        DEFVAL { ''H }
        ::= { dot11APChannelReportEntry 4 }

-- ******************************************************************
-- * End of dot11APChannelReportTable TABLE
-- ******************************************************************

-- ******************************************************************
-- * dot11RRMNeighborReport TABLE
-- ******************************************************************
dot11RRMNeighborReportNextIndex OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Identifies the next available index for managing the Neighbor Report
                table. If this attribute is 0, it indicates that the Neighbor Report fea-
                ture is not configurable via SNMP, or the table is full and new rows can-
                not be accepted."
        ::= { dot11RRMConfig 2 }

dot11RRMNeighborReportTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11RRMNeighborReportEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Group contains pertinent information on a collection of BSSID's that are
                candidates to which STA's can roam. The rows are created using createAnd-
                Wait method and fill in the attributes. When the rowStatus is set to
                active, the row can be included in Neighbor Report IEs. If there is an
                error, the rowStatus shall be set to notReady by SME. Since this table
                contains all Neighbor Report IE entries for all interfaces enabled with
                the Neighbor Report feature, it is possible to have too many entries for
                one interface, while still remaining under the MaxTableSize. In that situ-
                ation, SME shall only include Neighbor Report entries with lower
                dot11RRMNeighborReportIFIndex up to the maximum possible number of entries
                for a particular interface identified by ifIndex. SME shall set the row-
                Status to notInService for those rows that cannot be included in the
                Neighbor Report element for that interface."
        ::= { dot11RRMConfig 3 }

dot11RRMNeighborReportEntry OBJECT-TYPE
        SYNTAX Dot11RRMNeighborReportEntry
        MAX-ACCESS not-accessible
        STATUS current
```

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```
        DESCRIPTION
                "An entry in the dot11RRMNeighborReportTable"
        INDEX { dot11RRMNeighborReportIndex }
        ::= { dot11RRMNeighborReportTable 1 }

Dot11RRMNeighborReportEntry ::=
        SEQUENCE {
                dot11RRMNeighborReportIndex                        Unsigned32,
                dot11RRMNeighborReportIfIndex                      InterfaceIndex,
                dot11RRMNeighborReportBSSID                        MacAddress,
                dot11RRMNeighborReportAPReachability               INTEGER,
                dot11RRMNeighborReportSecurity                     TruthValue,
                dot11RRMNeighborReportCapSpectrumMgmt              TruthValue,
                dot11RRMNeighborReportCapQoS                       TruthValue,
                dot11RRMNeighborReportCapAPSD                      TruthValue,
                dot11RRMNeighborReportCapRRM                       TruthValue,
                dot11RRMNeighborReportCapDelayBlockAck             TruthValue,
                dot11RRMNeighborReportCapImmediateBlockAck         TruthValue,
                dot11RRMNeighborReportKeyScope                     TruthValue,
                dot11RRMNeighborReportRegulatoryClass              INTEGER,
                dot11RRMNeighborReportChannelNumber                INTEGER,
                dot11RRMNeighborReportPhyType                      INTEGER,
                dot11RRMNeighborReportNeighborTSFInfo              OCTET STRING,
                dot11RRMNeighborReportPilotInterval                Unsigned32,
                dot11RRMNeighborReportPilotMultipleBSSID           OCTET STRING,
                dot11RRMNeighborReportRRMEnabledCapabilities       OCTET STRING,
                dot11RRMNeighborReportVendorSpecific               OCTET STRING,
                dot11RRMNeighborReportRowStatus                    RowStatus}

dot11RRMNeighborReportIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Index for Neighbor Report configuration table in
                dot11RRMNeighborReportTable, greater than 0."
        ::= { dot11RRMNeighborReportEntry 1 }

dot11RRMNeighborReportIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The ifIndex for this row of Neighbor Report entry belongs to."
        ::= { dot11RRMNeighborReportEntry 2 }

dot11RRMNeighborReportBSSID OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This attribute indicates the BSSID of the AP described by this row of
                Neighbor Report."
        ::= { dot11RRMNeighborReportEntry 3 }

dot11RRMNeighborReportAPReachability OBJECT-TYPE
        SYNTAX INTEGER {
                notReachable(1),
                unknown(2),
                reachable(3)
                }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the reachability of the AP represented by the
                dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 4 }

dot11RRMNeighborReportSecurity OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
```


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```
        DESCRIPTION
                "This attribute, when TRUE, indicates that the neighbor AP identified by
                this BSSID supports the same security provisioning as used by the AP which
                provided this neighbor report. This attribute, when False,  indicates
                either that the neighbor AP identified by this BSSID does not support the
                same security provisioning or that the security information for this
                neighbor AP is not available at this time."
        ::= { dot11RRMNeighborReportEntry 5 }

dot11RRMNeighborReportCapSpectrumMgmt OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the spectrum management capability of the AP
                represented by dot11NeighborReportBSSID."
            ::= { dot11RRMNeighborReportEntry 6 }

dot11RRMNeighborReportCapQoS OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This attribute indicates the QoS capability of the AP represented by
                dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 7 }

dot11RRMNeighborReportCapAPSD OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the APSD capability of the AP represented by
                dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 8 }

dot11RRMNeighborReportCapRRM OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the RRM capability of the AP represented by
                dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 9 }

dot11RRMNeighborReportCapDelayBlockAck OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the Delayed BlockAck capability of the AP repre-
                sented by dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 10 }

dot11RRMNeighborReportCapImmediateBlockAck OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the Immediate BlockAck capability of the AP rep-
                resented by dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 11 }

dot11RRMNeighborReportKeyScope OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute, when TRUE, indicates the neighbor AP identified by this
                BSSID has the same authenticator as the AP which provided this neighbor
                report. This attribute, when FALSE, indicates that the the neighbor AP
                identified by this BSSID has a different authenticator or that authentica-
```

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```
                tor information is not available."
        ::= { dot11RRMNeighborReportEntry 12 }

dot11RRMNeighborReportRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the channel set for this Neighbor Report entry.
                Country, Regulatory Class and Channel Number together specify the channel
                frequency and spacing for this measurement request. Valid values of Regu-
                latory Class are shown in Annex J."
        REFERENCE
                "Annex J"
        ::= { dot11RRMNeighborReportEntry 13 }

dot11RRMNeighborReportChannelNumber OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the current operating channel of the AP repre-
                sented by the dot11NeighborReportBSSID. The Channel Number is only defined
                within the indicated Regulatory Class for this Neighbor Report entry."
        ::= { dot11RRMNeighborReportEntry 14 }

dot11RRMNeighborReportPhyType OBJECT-TYPE
        SYNTAX INTEGER {
                fhss(1),
                dsss(2),
                irbaseband(3),
                ofdm(4),
                hrdsss(5),
                erp(6)
                }
        UNITS "dot11PHYType"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the PHY Type of the neighbor AP identified by
                this BSSID."
        ::= { dot11RRMNeighborReportEntry 15 }

dot11RRMNeighborReportNeighborTSFInfo OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE (6))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates TSF timing information for the neighbor AP iden-
                tified by this BSSID. The TSF timing information includes the TSF Offset
                and the Beacon Interval, as defined in clause 7.3.2.37."
        ::= { dot11RRMNeighborReportEntry 16 }

dot11RRMNeighborReportPilotInterval OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates Measurement Pilot Interval for the neighbor AP
                identified by this BSSID, as defined in clause 7.3.1.18."
        ::= { dot11RRMNeighborReportEntry 17 }

dot11RRMNeighborReportPilotMultipleBSSID OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(1))
        UNITS "BSSID LSBs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates n, where 2^n is the maximum number of BSSIDs in
                the multiple BSSID set, as described in clause 11.10.11."
        ::= { dot11RRMNeighborReportEntry 18 }
```

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```
dot11RRMNeighborReportRRMEnabledCapabilities OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(7))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute indicates the detailed enabled capabilities of the AP rep-
                resented by the dot11NeighborReportBSSID, as defined in clause 7.3.2.45."
        REFERENCE
                "IEEE 802.11 — Clause 7.3.2.45"
        ::= { dot11RRMNeighborReportEntry 19 }

dot11RRMNeighborReportVendorSpecific OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This attribute provides an envelope for any optional vendor specific
                subelements which may be included in a measurement report element. Zero
                length is the null default for this attribute."
        DEFVAL { ''H }
        ::= { dot11RRMNeighborReportEntry 20 }

dot11RRMNeighborReportRowStatus OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Contains the row status of the Neighbor Report, essentially used for
                indicating whether the row has all valid attributes filled in. Then set to
                active to be used in Neighbor Report information elements. If any parame-
                ter is invalid, the SME shall set this attribute back to notReady. It is
                the responsibility of the manager to correct the parameters."
        ::= { dot11RRMNeighborReportEntry 21 }

-- ******************************************************************
-- * End of dot11RRMNeighborReport TABLE
-- ******************************************************************


dot11SMTRRMRequest OBJECT-GROUP
        OBJECTS { dot11RRMRqstIndex,
                dot11RRMRqstRowStatus,
                dot11RRMRqstToken,
                dot11RRMRqstRepetitions,
                dot11RRMRqstIfIndex,
                dot11RRMRqstType,
                dot11RRMRqstTargetAdd,
                dot11RRMRqstTimeStamp,
                dot11RRMRqstChanNumber,
                dot11RRMRqstRegulatoryClass,
                dot11RRMRqstRndInterval,
                dot11RRMRqstDuration,
                dot11RRMRqstParallel,
                dot11RRMRqstEnable,
                dot11RRMRqstRequest,
                dot11RRMRqstReport,
                dot11RRMRqstDurationMandatory,
                dot11RRMRqstBeaconRqstMode,
                dot11RRMRqstBeaconRqstDetail,
                dot11RRMRqstFrameRqstType,
                dot11RRMRqstBssid,
                dot11RRMRqstSSID,
                dot11RRMRqstBeaconReportingCondition,
                dot11RRMRqstBeaconThresholdOffset,
                dot11RRMRqstSTAStatRqstGroupID,
                dot11RRMRqstLCIRqstSubject,
                dot11RRMRqstLCILatitudeResolution,
                dot11RRMRqstLCILongitudeResolution,
                dot11RRMRqstLCIAltitudeResolution,
                dot11RRMRqstLCIAzimuthType,
                dot11RRMRqstLCIAzimuthResolution,
```

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```
                dot11RRMRqstPauseTime,
                dot11RRMRqstTransmitStreamPeerQSTAAddress,
                dot11RRMRqstTransmitStreamTrafficIdentifier,
                dot11RRMRqstTransmitStreamBin0Range,
                dot11RRMRqstTrigdQoSAverageCondition,
                dot11RRMRqstTrigdQoSConsecutiveCondition,
                dot11RRMRqstTrigdQoSDelayCondition,
                dot11RRMRqstTrigdQoSAverageThreshold,
                dot11RRMRqstTrigdQoSConsecutiveThreshold,
                dot11RRMRqstTrigdQoSDelayThresholdRange,
                dot11RRMRqstTrigdQoSDelayThreshold,
                dot11RRMRqstTrigdQoSMeasurementCount,
                dot11RRMRqstTrigdQoSTimeout,
                dot11RRMRqstChannelLoadReportingCondition,
                dot11RRMRqstChannelLoadReference,
                dot11RRMRqstNoiseHistogramReportingCondition,
                dot11RRMRqstAnpiReference,
                dot11RRMRqstAPChannelReport,
                dot11RRMRqstSTAStatPeerSTAAddress,
                dot11RRMRqstFrameTransmitterAddress,
                dot11RRMRqstVendorSpecific }
        STATUS current
        DESCRIPTION
                "The S M T R R M Request package is a set of attributes that shall be present
                if the STA supports the Radio Measurement service."
        ::= { dot11Groups 37 }

dot11SMTRRMReport OBJECT-GROUP
        OBJECTS {   dot11ChannelLoadRprtIndex,
                dot11ChannelLoadRprtRqstToken,
                dot11ChannelLoadRprtIfIndex,
                dot11ChannelLoadMeasuringSTAAddr,
                dot11ChannelLoadRprtChanNumber,
                dot11ChannelLoadRprtRegulatoryClass,
                dot11ChannelLoadRprtActualStartTime,
                dot11ChannelLoadRprtMeasurementDuration,
                dot11ChannelLoadRprtChannelLoad,
                dot11ChannelLoadRprtVendorSpecific,
                dot11ChannelLoadRprtMeasurementMode,
                dot11NoiseHistogramRprtIndex,
                dot11NoiseHistogramRprtRqstToken,
                dot11NoiseHistogramRprtIfIndex,
                dot11NoiseHistogramMeasuringSTAAddr,
                dot11NoiseHistogramRprtChanNumber,
                dot11NoiseHistogramRprtRegulatoryClass,
                dot11NoiseHistogramRprtActualStartTime,
                dot11NoiseHistogramRprtMeasurementDuration,
                dot11NoiseHistogramRprtAntennaID,
                dot11NoiseHistogramRprtANPI,
                dot11NoiseHistogramRprtIPIDensity0,
                dot11NoiseHistogramRprtIPIDensity1,
                dot11NoiseHistogramRprtIPIDensity2,
                dot11NoiseHistogramRprtIPIDensity3,
                dot11NoiseHistogramRprtIPIDensity4,
                dot11NoiseHistogramRprtIPIDensity5,
                dot11NoiseHistogramRprtIPIDensity6,
                dot11NoiseHistogramRprtIPIDensity7,
                dot11NoiseHistogramRprtIPIDensity8,
                dot11NoiseHistogramRprtIPIDensity9,
                dot11NoiseHistogramRprtIPIDensity10,
                dot11NoiseHistogramRprtVendorSpecific,
                dot11NoiseHistogramRprtMeasurementMode,
                dot11BeaconRprtIndex,
                dot11BeaconRprtRqstToken,
                dot11BeaconRprtIfIndex,
                dot11BeaconMeasuringSTAAddr,
                dot11BeaconRprtChanNumber,
                dot11BeaconRprtRegulatoryClass,
                dot11BeaconRprtActualStartTime,
                dot11BeaconRprtMeasurementDuration,
                dot11BeaconRprtPhyType,
                dot11BeaconRprtReportedFrameType,
```

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```
dot11BeaconRprtRCPI,
dot11BeaconRprtRSNI,
dot11BeaconRprtBSSID,
dot11BeaconRprtAntennaID,
dot11BeaconRprtParentTSF,
dot11BeaconRprtReportedFrameBody,
dot11BeaconRprtVendorSpecific,
dot11BeaconRprtMeasurementMode,
dot11FrameRprtIndex,
dot11FrameRprtIfIndex,
dot11FrameRprtRqstToken,
dot11FrameRprtChanNumber,
dot11FrameRprtRegulatoryClass,
dot11FrameRprtActualStartTime,
dot11FrameRprtMeasurementDuration,
dot11FrameRprtTransmitSTAAddress,
dot11FrameRprtBSSID,
dot11FrameRprtPhyType,
dot11FrameRprtAvgRCPI,
dot11FrameRprtRSNI,
dot11FrameRprtLastRCPI,
dot11FrameRprtAntennaID,
dot11FrameRprtNumberFrames,
dot11FrameRprtVendorSpecific,
dot11FrameRptMeasurementMode,
dot11STAStatisticsReportIndex,
dot11STAStatisticsReportToken,
dot11STAStatisticsIfIndex,
dot11STAStatisticsSTAAddress,
dot11STAStatisticsMeasurementDuration,
dot11STAStatisticsGroupID,
dot11STAStatisticsTransmittedFragmentCount,
dot11STAStatisticsMulticastTransmittedFrameCount,
dot11STAStatisticsFailedCount,
dot11STAStatisticsRetryCount,
dot11STAStatisticsMultipleRetryCount,
dot11STAStatisticsFrameDuplicateCount,
dot11STAStatisticsRTSSuccessCount,
dot11STAStatisticsRTSFailureCount,
dot11STAStatisticsACKFailureCount,
dot11STAStatisticsQosTransmittedFragmentCount,
dot11STAStatisticsQosFailedCount,
dot11STAStatisticsQosRetryCount,
dot11STAStatisticsQosMultipleRetryCount,
dot11STAStatisticsQosFrameDuplicateCount,
dot11STAStatisticsQosRTSSuccessCount,
dot11STAStatisticsQosRTSFailureCount,
dot11STAStatisticsQosACKFailureCount,
dot11STAStatisticsQosReceivedFragmentCount,
dot11STAStatisticsQosTransmittedFrameCount,
dot11STAStatisticsQosDiscardedFrameCount,
dot11STAStatisticsQosMPDUsReceivedCount,
dot11STAStatisticsQosRetriesReceivedCount,
dot11STAStatisticsReceivedFragmentCount,
dot11STAStatisticsMulticastReceivedFrameCount,
dot11STAStatisticsFCSErrorCount,
dot11STAStatisticsTransmittedFrameCount,
dot11STAStatisticsAPAverageAccessDelay,
dot11STAStatisticsAverageAccessDelayBestEffort,
dot11STAStatisticsAverageAccessDelayBackGround,
dot11STAStatisticsAverageAccessDelayVIdeo,
dot11STAStatisticsAverageAccessDelayVOice,
dot11STAStatisticsStationCount,
dot11STAStatisticsChannelUtilization,
dot11STAStatisticsVendorSpecific,
dot11STAStatisticsRprtMeasurementMode,
dot11LCIReportIndex,
dot11LCIReportToken,
dot11LCIIfIndex,
dot11LCISTAAddress,
dot11LCILatitudeResolution,
dot11LCILatitude,
```

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```
                dot11LCILatitudeFraction,
                dot11LCILongitudeResolution,
                dot11LCILongitude,
                dot11LCILongitudeFraction,
                dot11LCIAltitudeType,
                dot11LCIAltitudeResolution,
                dot11LCIAltitude,
                dot11LCIAltitudeFraction,
                dot11LCIDatum,
                dot11LCIAzimuthType,
                dot11LCIAzimuthResolution,
                dot11LCIAzimuth,
                dot11LCIRprtVendorSpecific,
                dot11LCIRprtMeasurementMode,
                dot11TransmitStreamRprtIndex,
                dot11TransmitStreamRprtRqstToken,
                dot11TransmitStreamRprtIfIndex,
                dot11TransmitStreamMeasuringSTAAddr,
                dot11TransmitStreamRprtActualStartTime,
                dot11TransmitStreamRprtMeasurementDuration,
                dot11TransmitStreamRprtPeerSTAAddress,
                dot11TransmitStreamRprtTID,
                dot11TransmitStreamRprtAverageQueueDelay,
                dot11TransmitStreamRprtAverageTransmitDelay,
                dot11TransmitStreamRprtTransmittedMSDUCount,
                dot11TransmitStreamRprtMSDUDiscardedCount,
                dot11TransmitStreamRprtMSDUFailedCount,
                dot11TransmitStreamRprtMultipleRetryCount,
                dot11TransmitStreamRprtCFPollsLostCount,
                dot11TransmitStreamRprtBin0Range,
                dot11TransmitStreamRprtDelayHistogram,
                dot11TransmitStreamRprtReason,
                dot11TransmitStreamRprtVendorSpecific,
                dot11TransmitStreamRprtMeasurementMode
                 }
        STATUS current
        DESCRIPTION
                "The SMTRRMReport package is a set of attributes that shall be present
                if the STA supports the Radio Measurement service."
        ::= { dot11Groups 38 }

dot11SMTRRMConfig OBJECT-GROUP
        OBJECTS { dot11APChannelReportIndex,
                dot11APChannelReportIfIndex,
                dot11APChannelReportRegulatoryClass,
                dot11APChannelReportChannelList,
                dot11RRMNeighborReportIndex,
                dot11RRMNeighborReportIfIndex,
                dot11RRMNeighborReportBSSID,
                dot11RRMNeighborReportReachability,
                dot11RRMNeighborReportSecurity,
                dot11RRMNeighborReportCapSpectrumMgmt,
                dot11RRMNeighborReportCapQoS,
                dot11RRMNeighborReportCapAPSD,
                dot11RRMNeighborReportCapRRM,
                dot11RRMNeighborReportCapDelayBlockAck,
                dot11RRMNeighborReportCapImmediateBlockAck,
                dot11RRMNeighborReportKeyScope,
                dot11RRMNeighborReportChannelNumber,
                dot11RRMNeighborReportRegulatoryClass,
                dot11RRMNeighborReportPhyType,
                dot11RRMNeighborReportNeighborTSFInfo,
                dot11RRMNeighborReportPilotPeriod,
                dot11RRMNeighborReportPilotMultipleBSSID,
                dot11RRMNeighborReportRRMEnabledCapabilities,
                dot11RRMNeighborReportVendorSpecific,
                dot11RRMNeighborReportRowStatus }
        STATUS current
        DESCRIPTION
                "The SMTRRMConfig package is a set of attributes that shall be present
                if the STA supports the Radio Measurement service."
        ::= { dot11Groups 39 }
```

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