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IEEE P802.11k/D3.0, October 2005
(Draft Amendment to IEEE Std 802.11™, 1999 Edition (Reaff 2003), as amended by
IEEE Stds 802.11a™-1999 (Reaff 2003), 802.11b™-1999 (Reaff 2003), 802.11b-1999/Cor 1-2001 (Reaff
2003), 802.11d™-2001 (Reaff 2003), 802.11e™-2005, 802.11g™-2003, 802.11h™-2003, 802.11i™-2004
and 802.11j™-2004)

6 # Draft Amendment to STANDARD FOR Information
7 # Technology - Telecommunications and
8 # Information Exchange Between Systems -
9 # LAN/MAN Specific Requirements -

10 # Part 11: Wireless Medium Access Control (MAC)
11 # and physical layer (PHY) specifications

12 # Amendment 9: Radio Resource Measurement

34 Abstract: This amendment specifies the extensions to IEEE Std 802.11® for Wireless Local Area
35 Networks providing mechanisms for Radio Resource Measurement.

36 Keywords: local area network (LAN)

1 **Introduction**

2 (This introduction is not part of IEEE P802.11k, Draft Amendment to STANDARD FOR
3 Telecommunications and Information Exchange Between Systems -LAN/MAN Specific Requirements -
4 Part 11: Wireless Medium Access Control (MAC) and physical layer (PHY) specifications:
5 Specification for Radio Resource Measurement)

6 To be added later

7 _____

8 *Example*:

9 At the time this supplement to the standard was submitted to Sponsor Ballot, the working group had the
10 following membership:

11
12 **Stuart J. Kerry,** *Chair*   **Al Petrick** and **Harry Worstell,** *Vice Chairs*
13 **Tim Godfrey,** *Secretary*
14
15 **Richard H. Paine,** *Chair Task Group k*
16 **Simon E. M. Barber**, *Editor, 802.11k*
17

18
19 This list to be added upon
20 conclusion of the sponsor
21 ballot.

22 Major contributions were received from the following individuals:

23 Daryl Kaiser	31 Marty Lefkowitz	39 Leo Monteban
24 Joseph Kwak	32 Zhun Zhong	40 Emily Qi
25 Dave Skellern	33 Arun Ayyagari	41 Bernard Aboba
26 Steve Pope	34 Harry Worstell	42 Stephen Wang
27 Mike Moreton	35 Walter Johnson	43 Tim Wilson
28 Byoung-Jo "J" Kim	36 Tim Olson	44 Steve Emeott
29 Simon Black	37 Lars Falk	45 Floyd Simpson
30 Hasse Sinivaara	38 Malik Audeh	46 Peter Ecclesine

47 The following persons were on the balloting committee: (To be provided by IEEE editor at time of
48 publication.)

49

50

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Draft Amendment to STANDARD FOR Telecommunications and Information Exchange Between Systems - LAN/MAN Specific Requirements -

Part 11: Wireless Medium Access Control (MAC) and physical layer (PHY) specifications:

Amendment 7: Radio Resource Measurement

[This amendment is based on IEEE Std 802.11™, 1999 Edition (Reaff 2003), as amended by IEEE Std 802.11a™-1999 (Reaff 2003), 802.11b™-1999 (Reaff 2003), 802.11b™-1999/Cor 1-2001 (Reaff 2003), 802.11d™-2001 (Reaff 2003), 802.11e™-2005, IEEE Std 802.11g™-2003, IEEE Std 802.11h™-2003, IEEE Std 802.11i™-2004 and IEEE Std 802.11j™-2004.]

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 itali**c. Three editing instructions are used: change, delete, and insert. **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 with-out disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. Editorial notes will not be carried over into future editions.

2 Normative references

Insert the following new definition in alphabetical order, renumbering as necessary:

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 new definitions in alphabetical order, renumbering as necessary:

3.95 neighbor AP: Any validated AP that is a potential transition candidate.

3.96 non-serving channel: A channel that is not the operating channel of the BSS of which the STA is a member.

1 **3.97 received channel power indicator (RCPI):** An indication of the total channel power (signal, noise,
2 and interference) of a received 802.11 frame as measured at the currently-in-use receiving antenna
3 connector.

4 **3.98 received signal to noise indicator (RSNI):** An indication of the signal to noise plus interference ratio
5 of a received 802.11 frame. RSNI is defined by the ratio of the received signal power (RCPI-ANPI) over
6 the noise plus interference power (ANPI) as measured at the currently-in-use receiving antenna connector
7 for a received 802.11 frame.

8 **3.99 average noise power indicator (ANPI):** An indication of the average noise plus interference power
9 measured on a channel when NAV is equal to 0 (when virtual CS mechanism indicates idle channel)except
10 during frame transmission or reception.

11 **3.100 serving channel:** The operating channel of the BSS of which the STA is a member.

12 **3.101 location configuration information (LCI):** As defined in IETF RFC 3825, includes latitude,
13 longitude, and altitude, with resolution indicators for each.

14 **3.102 received power indicator (RPI):** An indication of the total channel power (noise and interference)
15 as measured in the current channel at the currently-in-use receiving antenna connector while the STA is
16 neither transmitting nor receiving a frame.

17 **3.103 ap reachablility:** An AP is reachable by a STA if an 802.1X pre-authentication frame sent by the
18 STA to the AP BSSID can be received by the AP.

19 **3.104 validated neighbor:** an AP that has either been explictedly configured as a Neighbor in the MIB, or
20 learned through a mechanism like the Beacon Report and confirmed through trusted mechanisms such as a
21 secure Inter-Access Point Protocol (IAPP).

22 **3.105 serving AP:** The AP which transmits beacons on the serving channel.

23 **3.106 currently in use antenna:** The antenna used for a particular noise or frame measurement. For frame
24 measurements of RCPI, the currently in use antenna is the antenna used to measure the reported RCPI for
25 the body of the frame.

26 # 4. Abbreviations and acronyms

27 *Insert the following new acronym in alphabetical order:*

28 ANPI   average noise power indicator
29 LCI   location configuration information
30 TMPTT   target measurement pilot transmission time
31 RCPI   received channel power indicator
32 RSNI   received signal to noise indicator
33 RFC   request for comments

2

1   **5. General description**

2   **5.2 Components of the IEEE 802.11 architecture**

3   *Insert the following new clause after 5.2.4*

4   **5.2.5 Wireless LAN Radio Measurements**

5   Wireless LAN radio measurements enable applications in the STAs to automatically adjust to the radio
6   environment in which they exist. With wireless LAN radio measurements, stations can make measurements
7   locally as well as request measurements from STAs. The resulting information is then available for both
8   the station and upper layers for any purpose, such as radio resource management.

9   **5.3 Logical Service Interfaces**

10   *Insert the item at the end of the list of architectural services in 5.3 as follows:*
11   a)   Authentication
12   b)   Association
13   c)   Deauthentication
14   d)   Disassociation
15   e)   Distribution
16   f)   Integration
17   g)   Confidentiality
18   h)   Reassociation
19   i)   MSDU delivery
20   j)   DFS
21   k)   TPC
22   l)   Higher-layer timer synchronization (QoS facility only)
23   m)   QoS traffic scheduling (QoS facility only)
24   n)   Radio measurement

25   **5.3.1 Station service (SS)**

26   *Insert the item at the end of the list of station services (SSs) in 5.3.1 as follows:*

27   a)   Authentication
28   b)   Deauthentication
29   c)   Confidentiality
30   d)   MSDU delivery
31   e)   DFS
32   f)   TPC
33   g)   Higher-layer timer synchronization (QoS facility only)
34   h)   QoS traffic scheduling (QoS facility only)
35   i)   Radio measurement

36   **5.4 Overview of the services**

37   *Insert the following sentence at the end of the first paragraph:*

38   One of the services is used for radio measurement.

1   *Insert the following new clause after clause 5.4.5:*

2   **5.4.6 Radio Measurement Service**

3   The Radio Measurement Service provides the following:
4   — Requesting and reporting of radio measurements over the radio interface in supported channels.

5   — Performing radio measurements in supported channels.

6   — Providing an interface for upper layer applications to access radio measurements using MLME
7   primitives and/or MIB access.

8   — Providing information about neighbor APs.

9   **5.5 Relationships between services**

10 *Change item a.2.vi and add item a.2.vii to the list as shown below:*

11 a)   Class 1 frames (permitted from within States 1, 2, and 3):
12   2) Management frames
13   i)   Probe request/response
14   ii) Beacon
15   iii) Authentication: Successful authentication enables a STA to exchange Class 2 frames.
16   Unsuccessful authentication leaves the STA in State 1.
17   iv) Deauthentication: Deauthentication notification when in State 2 or State 3 changes the
18   STA's state to State 1. The STA shall become authenticated again prior to sending Class
19   2 frames.
20   v)   Announcement traffic indication message (ATIM)
21   vi) Spectrum Management Action
22   vii) Radio Measurement Action sent between two STAs in an IBSS

23 *Change the list to add item c.2.ii as shown below:*

24 c)   Class 3 frames (if and only if associated; allowed only from within State 3):
25   2) Management frames
26   i)   Deauthentication: Deauthentication notification when in State 3 implies disassociation as
27   well, changing the STA's state from 3 to 1. The station shall become authenticated again
28   prior to another association.
29   ii) QoS, DLS and Block Ack Action
30   iii) Radio Measurement Action

31 **5.7 Message information contents that support the services**

32 *Insert the following new clause after 5.7.8:*

33 **5.7.9 Radio Measurement**

34 The radio measurement service is supported by the following action message:

35 *Radio Measurement Action*
36   — Message type: Management

37   — Message subtype: Radio Measurement Action

38   — Information items:

39   • Action identification

4

1   • Dialog token

2   • Action dependent information

3   • Direction of message: From STA to STA

7. Frame formats

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7.1 MAC frame formats

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7.1.3 Frame fields

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7.1.3.1 Frame Control field

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7.1.3.1.2 Type and Subtype fields

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9   *Change the contents of Table 1 as shown:*

Type value b3 b2	Type description	Subtype value b7 b6 b5 b4	Subtype description
00	Management	0101	Probe response
00	Management	0110 ~~0111~~	~~Reserved~~Measurement Pilot
00	Management	0111	Reserved
00	Management	1000	Beacon

7.2 Format of individual frame types

10

7.2.3 Management frames

11

7.2.3.1 Beacon frame format

12

13   *Change the first paragraph, and table 5 as shown:*

14   The frame body of a management frame of subtype Beacon contains the information shown in Table 5. ~~If~~
15   ~~the dot11MultiDomainCapabilityEnabled attribute is true, a STA shall include a Country information~~
16   ~~element in the transmission of Beacon frames. Optionally, the Beacon frame format may also include the~~
17   ~~information described in either or both of orders 12 and 13. If the information in both orders 12 and 13 are~~
18   ~~sent, they shall describe the same hopping pattern. Note that the information described in orders 12 and 13~~
19   ~~also may be contained in the Probe Response frame.~~

20   **Table 5—Beacon frame body**

Order	Information	Notes
11	Country	The Country element shall be present if dot11MultiDomainCapabilityEnabled is true or dot11SpectrumManagementRequired is true or dot11RadioMeasurementEnabled is true

5

14	Power Constraint	Power Constraint element shall be present if dot11SpectrumManagementRequired is true and may be present if dot11RadioMeasurementEnabled is true
18	TPC Report	TPC Report element shall be present if dot11SpectrumManagementRequired is true or dot11RadioMeasurementEnabled is true
24	AP Channel Report	The AP Channel Report element shall be present if dot11RadioMeasurementEnabled is true and there is at least 1 channel to report.
25	BSS Load	The BSS Load information element shall be present if dot11RadioMeasurementEnabled true
26	Antenna Information	The Antenna Information element shall be present if dot11RadioMeasurementEnabled is true.

1   **7.2.3.4 Association Request frame format**

2   *Change the order 6 information field as follows:*

3   **Table 7—Association Request frame body**

Order	Information	Notes
6	Power Capability	Power Capability element shall be present if dot11SpectrumManagementRequired is true or dot11RadioMeasurementEnabled is true

4   **7.2.3.5 Association Response frame format**

5   *Insert a new row into table 8 as shown below:*

6   **Table 8—Association Response frame body**

Order	Information	Notes
8	RCPI	The RCPI information element shall be present if dot11RadioMeasurementEnabled is true. The RCPI value represents the measured RCPI of the corresponding Association Request frame.

7   **7.2.3.6 Reassociation Request frame format**

8   *Change the order 7 information field as follows:*

9   **Table 9—Reassociation Request frame body**

Order	Information	Notes
7	Power Capability	Power Capability element shall be present if dot11SpectrumManagementRequired is true <u>or dot11RadioMeasurementEnabled is true</u>

7.2.3.7 Reassociation Response frame format

Insert new row into table 10 as follows:

Table 10—Reassociation Response frame body

Order	Information	Notes
5	RCPI	The RCPI information element shall be present if dot11RadioMeasurementEnabled is true. The RCPI value represents the measured RCPI of the corresponding Reassociation Request frame.

7.2.3.8 Probe Request frame format

Insert order 4 element into Table 11 as shown below:

Table 11—Probe Request frame body

Order	Information	Notes
4	DS Parameter Set	The DS Parameter Set information element shall be present within Probe Request frames generated by STAs using direct sequence PHYs with dot11RadioMeasurementEnabled set to true.
		The DS Parameter Set information element may be present within Probe Request frames generated by STAs using direct sequence PHYs with dot11RadioMeasurementEnabled set to false.

7.2.3.9 Probe Response frame format

Change the first paragraph as follows:

The frame body of a management frame of subtype Probe Response contains the information shown in Table 12. 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.~~ <u>When a probe response frame is returned in response to a probe request frame which contained a Request information element, any of the requested elements which appear as individual items in the ordering list of table 12 shall appear both in their individual ordered location as specified in table 12 and in the ordered location reserved for the list of requested elements, where the requested elements appear in increasing numerical element ID order.</u>

1 *Change the order 10, 13 and 17 information fields, insert the order 22 and 23 information field and*
2 *change the starting order of the Requested information elements field in Table 12 as follows:*

3 **Table 12—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 included if dot11SpectrumManagementRequired is true and may be present if dot11RadioMeasurementEnabled is true.
17	TPC Report	Shall be included if dot11SpectrumManagementRequired is true or dot11RadioMeasurementEnabled is true.
22	AP Channel Report	Shall be included if dot11RadioMeasurementEnabled is true.
23	BSS Load	Shall be included if dot11RadioMeasurementEnabled is true.
24	Antenna Information	The Antenna Information element shall be present if dot11RadioMeasurementEnabled is true.
22 25-*n*	Requested information elements	Elements requested by the Request information element of the Probe Request frame.

4 *Insert the following clause after clause 7.2.3.9:*

5 **7.2.3.10 Measurement Pilot frame format**

6 The frame body of a management frame of subtype Measurement Pilot contains the information shown in
7 Table k1.

8 **Table k1 – Measurement Pilot frame body**

Order	Information	Notes
1	Timestamp	
2	Measurement Pilot Interval	
3	Beacon Interval	
4	Capability Information	
5	RSN Capabilities	
6	Country String	
7	Max Regulatory Power	
8	Max Transmit Power	
9	Transmit Power Used	
10	Transceiver Noise Floor	
11	DS Parameter Set	The DS Parameter Set information element is present within Measurement Pilot frames generated by STAs using direct sequence PHYs.

1 **7.3 Management frame body components**

2 **7.3.1 Fixed fields**

3 **7.3.1.4 Capability Information field**

4 *Change the contents of Figure 27 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

5 **Figure 27—Capability Information fixed field**

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

7 A STA shall set the Radio Measurement subfield in the Capability Information field to 1 when the MIB
8 attribute dot11RadioMeasurementEnabled is true, otherwise it shall be set to 0.

1   **7.3.1.11 Action field**

2   *Insert the following new row into table 19a and update the reserved value as shown:*

3   **Table 19a—Category values**

Name	Value	See clause
Radio measurement	**5**	**7.4.5**
Reserved	**6**-127	-

4   *Insert the following new clauses:*

5   **7.3.1.18 Country String**

6   The Country String field is 3 octets in length. The STA shall set this field to the value contained in the
7   dot11CountryString attribute. The Country String field is illustrated in Figure k1.

B0   B23

Country String

Octets: 3
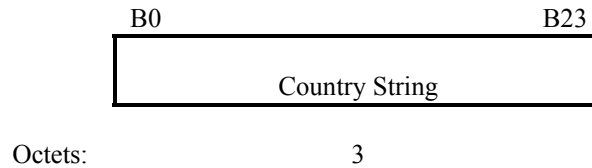
8   **Figure k1—Country String fixed field**

9   **7.3.1.19 Measurement Pilot Interval field**

10   The Measurement Pilot Interval field represents the number of time units (TUs) between target
11   measurement pilot transmission times (TMPTTs). The length of the Measurement Pilot Interval field is 2
12   octets. The Measurement Pilot Interval field is illustrated in Figure k2.

B0   B15

Measurement Pilot Interval

Octets: 2
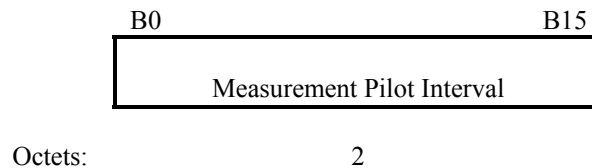
13   **Figure k2—Measurement Pilot Interval fixed field**

14   **7.3.1.20 Max Regulatory Power field**

15   The Max Regulatory Power field is a signed integer and is 1 octet in length. It shall indicate the maximum
16   power, in units of dBm, a STA is allowed by the regulatory authority to transmit on the current channel.
17   The Max Regulatory Power field is illustrated in Figure k3.

B0   B7

Max Regulatory Power

Octets: 1

1   **Figure k3—Max Regulatory Power fixed field**

2 **7.3.1.21 Max Transmit Power field**

3 The Max Transmit Power field is a signed integer and is 1 octet in length. When set by an STA, it provides
4 an upper limit, in units of dBm, on the transmit power as measured at the output of the antenna connector
5 to be used by that STA on the current channel. The value of the Max Transmit Power field shall be less
6 than or equal to the Max Regulatory Power value for the current channel. The Max Transmit Power field is
7 illustrated in Figure k4.

B0   B7
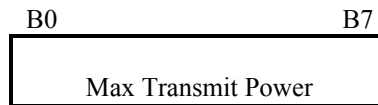
Max Transmit Power

Octets: 1

8   **Figure k4—Max Transmit Power fixed field**

9 **7.3.1.22 Transmit Power Used field**

10 The Transmit Power Used field is a signed integer and is 1 octet in length. It shall be less than or equal to
11 the Max Transmit Power and indicates the actual power used as measured at the output of the antenna
12 connector, in units of dBm, by a STA when transmitting the frame containing the Transmit Power Used
13 field. The Transmit Power Used field is illustrated in Figure k5.

B0   B7

Transmit Power Used
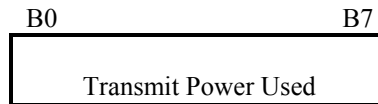
Octets: 1

14   **Figure k5—Transmit Power Used fixed field**

15 **7.3.1.23 Transceiver Noise Floor field**

16 The Transceiver Noise Floor field is a signed integer and is 1 octet in length. It shall indicate the noise
17 floor of the receiver used by the STA transmitting the measurement pilot frame in units of dBm. The
18 transceiver noise floor is referenced to the connector of the currently in-use receiving antenna. The
19 Transceiver Noise Floor field is illustrated in Figure k6.

```
B0                                      B7
┌──────────────────────────────────────────┐
│          Transceiver Noise Floor           │
└──────────────────────────────────────────┘
```
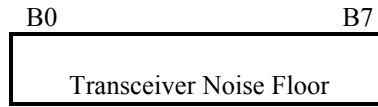
Octets: 1

1   **Figure k6—Transceiver Noise Floor fixed field**

2   **7.3.2 Information Elements**

3   *Insert Element ID 51-53, and TBD into Table 20 and change the Reserved row accordingly:*

4   **Table 20—Element IDs**

Information Element	Element ID
AP Channel Report	51
Neighbor Report	52
RCPI	53
Antenna Information	TBD
Reserved	5154-255

5   **7.3.2.18 TPC Report Element**

6   *Change the last paragraph in this clause as follows:*

7   The TPC Report element is included in TPC Report frames, as described in 7.4.1.4; Link Measurement
8   Report frames as described in 7.4.5.4; Beacon frames, as described in 7.2.3.1; and Probe Response frames,
9   as described in 7.2.3.9. The use of TPC Report elements and frames is described in 11.5.4.

10   **7.3.2.21 Measurement Request element**

11   *Change clause 7.3.2.21 as follows:*

12   The Measurement Request element contains a request that the receiving STA undertake the specified
13   measurement action. The Measurement Request element is included in spectrum management
14   Measurement Request frames as described in 7.4.1.1, or Radio Measurement Request frames as described
15   in 7.4.5.1. Measurement Types 0, 1 and 2 are defined for spectrum management and shall only be included
16   in spectrum management Measurement Request frames. The use of Measurement Request elements for
17   spectrum management is described in 11.10.6. Measurement Types 3 through 10 and 255 are defined for
18   radio measurement and shall only be included in Radio Measurement Request frames. The use of
19   Measurement Request elements for radio measurement is described in 11.11.

20   The format of the Measurement Request element is shown in Figure 46g.

Element ID	Length	Measurement	Measurement	Measurement	Measurement

		Token	Request Mode (see Figure 46h)	Type	Request
Octets: 1	1	1	1	1	variable
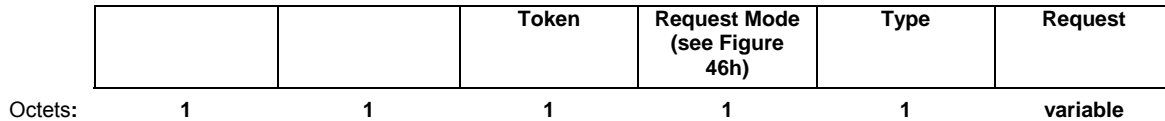
1   **Figure 46g—Measurement Request element format**

Reserved (0) Parallel	Enable	Request	Report	Duration Mandatory	Reserved (0)
Bit: 0	1	2	3	4	45-7

2   **Figure 46h—Measurement Request Mode field**

3 The value of the Length field is variable and depends on the length of the Measurement Request field. The
4 minimum value of the Length field is 3 (based on a minimum length for the Measurement Request field of
5 0 octets)

6 The Measurement Token shall be set to a nonzero number that is unique among the Measurement Request
7 elements sent to each destination MAC address for which a corresponding Measurement Report element
8 has not been received~~in a particular Measurement Request frame~~.

9 The Measurement Request Mode field (shown in Figure 46h) is a bit field with the following bits defined:

10 — The Parallel bit (bit 0) is used to request that a more than one measurement is to be started in
11   parallel. Parallel is set to 1 to request that the measurement should start at the same time as the
12   measurement described by the next Measurement Request element in the same Measurement
13   Request frame. Parallel is set to 0 if the measurements are to be performed in sequence. The Parallel
14   bit shall be set to 0 when Enable is set to 1, in the last or only measurement request element in the
15   frame or when the value of the Measurement Type field is 0, 1, or 2 (Spectrum Management
16   measurements). See 11.11.2.

17 — The Enable bit (bit 1) is used to differentiate between a request to make a measurement and a
18   request to control the measurement requests and autonomous reports generated by the destination
19   STA. Enable is set to 0 when requesting a measurement of the type specified in the Measurement
20   Type field from the destination STA. If Enable is set to 0 Request and Report are reserved and the
21   Measurement Request field contains fields appropriate for the Measurement Type being requested.
22   Enable is set to 1 to request that the destination STA control the sending of measurement requests or
23   autonomous reports of the type indicated in the Measurement Type field to the transmitting STA
24   depending on the values of Request, and Report. If Enable is set to 1 the Measurement Request field
25   is not present. See Table 20a.

26 — The Request bit (bit 2) is only valid if Enable is set to 1. Request is set to 0 to request that the
27   destination STA not issue measurement Requests of Measurement Type to the transmitting STA.
28   Request is set to 1 to indicate that the transmitting STA may accept measurement requests of
29   Measurement Type from the transmitting STA. See Table 20a.

30 — The Report bit (bit 3) is only valid if Enable is set to 1. Report is set to 0 to request that the
31   destination STA not issue autonomous measurement reports of Measurement Type to the
32   transmitting STA. Report is set to 1 to indicate that the transmitting STA will accept automnomous
33   measurement reports of Measurement Type from the transmitting STA. See Table 20a.

34 ~~— Enable bit (bit 1) indicates whether this element is used to request the destination STA to enable or~~
35   ~~disable the sending of measurement requests and autonomous measurement reports of a specified~~

1 ~~type to this STA. The Enable bit shall be set to 1 when the Request bit and Report bit are valid. The~~
2 ~~Enable bit shall be set to 0 when the Request bit and Report bit are invalid.~~

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

8 — ~~Report bit (bit 3) indicates whether the STA receiving the request shall enable or disable~~
9 ~~autonomous measurement reports of the type specified in the Measurement Type field. The Report~~
10 ~~bit shall be set to 1 when enabling an autonomous measurement report. The Report bit shall be set to~~
11 ~~0 when disabling an autonomous measurement report or when the Report bit is invalid (i.e. when~~
12 ~~Enable bit is set to 0 or when the Measurement Type field contains a reserved measurement report~~
13 ~~type value).~~

14 — Duration Mandatory bit (bit 4) indicates whether the measurement duration contained within the
15 Measurement Request should be interpreted as mandatory by the STA receiving the request. A
16 value of 0 shall indicate that the duration requested is a target duration, but the requesting STA shall
17 accept measurement results taken over a shorter duration. A value of 1 shall indicate that the
18 duration requested is a mandatory duration. Duration Mandatory shall be reserved when the value of
19 the Measurement Type field is 0, 1 or 2 (Spectrum Management measurements).

20 — All other bits are reserved and shall be set to 0 on transmission and ignored on reception.

21 The use of the Enable, Request and Report bits is ~~also~~ summarized in Table 20a. See 11.10.6 and 11.11.6
22 for the description of how a STA ~~shall~~ handles requests to enable or disable measurement requests and
23 autonomous reports.

24   **Table 20a—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. When Enable is set to 0, Request and Report bits are reserved and shall be set to 0 on transmission and ignored on reception. ~~When Enable bit set to 0, Request and Report bits are invalid and shall be set to 0~~
~~0~~	~~0~~	~~1~~	~~Not allowed~~Reserved
~~0~~	~~1~~	~~0~~	~~Not allowed~~Reserved
~~0~~	~~1~~	~~1~~	~~Not allowed~~Reserved
1	0	0	The transmitting STA is requesting that the destination STA sends~~it is sent~~ neither measurement requests 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~~ may accept measurement requests and requesting it ~~is~~ not be sent autonomous measurement reports of the type~~s~~ indicated in the Measurement Type field Note: This setting corresponds to the default STA behaviour.
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 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~~ may accept measurement requests and will accept autonomous measurement reports of the type indicated in the Measurement Type field

1
2 The Measurement Type field shall be set to a number that identifies a type of measurement request ~~or a~~
3 ~~measurement report~~. Those Measurement Types that have been allocated for measurement requests are
4 shown in Table 20b ~~and measurement reports are shown in Table 20c (in 7.3.2.20~~7.3.2.22).

5 **Table 20b—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	
Channel load request	3	Radio Resource Measurement
Noise histogram request	4	
Beacon request	5	
Frame request	6	
STA statistics request	7	
LCI request	8	
QoS metrics request	9	
Reserved	~~3~~10-254	N/A
Measurement Pause request	255	Radio Resource Measurement

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

9 When the Enable bit is set to 0 the Measurement Request field contains the specification of the
10 measurement request corresponding to the Measurement Type as described in 7.3.2.21.1 through
11 7.3.2.21.13. When the Enable bit is set to 1, the Measurement Request field is only present when
12 requesting a triggered QoS Metrics measurement.

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

15 The Measurement Request element is included in Spectrum Management Measurement Request frames as
16 described in 7.4.1.1, or Radio Resource Measurement Request frames as described in 7.4.5.1.
17 Measurement Types 0, 1 and 2 are defined for spectrum management and shall only be included in
18 Spectrum Management Measurement Request frames. The use of Measurement Request elements for
19 spectrum management is described in 11.10.6. Measurement Types 3 through 10 and 255 are defined for
20 radio measurement and shall only be included in Radio Resource Measurement Request frames. The use of
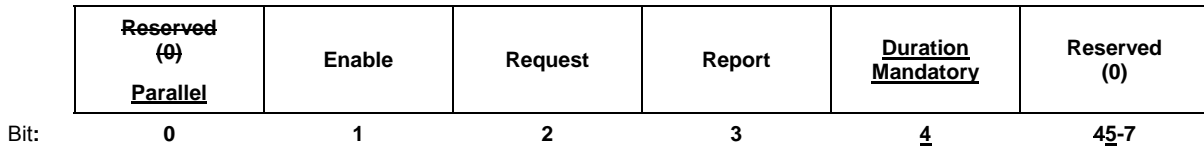21 Measurement Request elements for radio measurement is described in 11.11.

22

1   *Insert the following new clauses after clause 7.3.2.21.3:*

2   **7.3.2.21.4 Channel Load Request**

3   The Measurement Request field corresponding to a Channel Load Request is shown in Figure k7.

Channel Number	Regulatory Class	Randomization Interval	Measurement Duration
1	1	2	2

Octets:
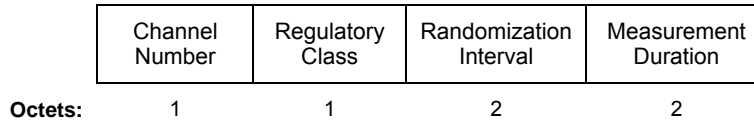
4   **Figure k7—Measurement Request field format for a Channel Load Request**

5   Channel Number indicates the channel number for which the measurement request applies. Channel
6   Number is defined within a Regulatory Class as shown in **Error! Reference source not found.**.

7   Regulatory Class indicates the frequency band for which the measurement request applies. Valid values of
8   Regulatory Class are shown in **Error! Reference source not found.**.

9   Randomization Interval specifies the upper bound of the random delay to be used prior to making the
10   measurement in units of TU. See 11.11.3.

11   The Measurement Duration field shall be set to the preferred duration of the requested measurement,
12   expressed in TUs. If the Duration Mandatory bit is set to 1 in the Measurement Request Mode field this
13   shall be interpreted as a mandatory measurement duration. If the Duration Mandatory bit is set to 0 this
14   shall be interpreted as a target measurement duration. See 11.11.4.

15   **7.3.2.21.5 Noise Histogram Request**

16   The Measurement Request field corresponding to a Noise Histogram Request is shown in Figure k8.

Channel Number	Regulatory Class	Randomization Interval	Measurement Duration
1	1	2	2

Octets:

17   **Figure k8—Measurement Request field format for a Noise Histogram Request**

18   Channel Number indicates the channel number for which the measurement request applies. Channel
19   Number is defined within a Regulatory Class as shown in **Error! Reference source not found.**.

20   Regulatory Class indicates the frequency band for which the measurement request applies. Valid values of
21   Regulatory Class are shown in **Error! Reference source not found.**.

22   Randomization Interval specifies the upper bound of the random delay to be used prior to making the
23   measurement in units of TU. See 11.11.3.

24   The Measurement Duration field shall be set to the preferred duration of the requested measurement,
25   expressed in TUs. If the Duration Mandatory bit is set to 1 in the Measurement Request Mode field this
26   shall be interpreted as a mandatory measurement duration. If the Duration Mandatory bit is set to 0 this
27   shall be interpreted as a target measurement duration. See 11.11.4.

1   **7.3.2.21.6 Beacon Request**

2   The Measurement Request field corresponding to a Beacon Request is shown in Figure k9.

Channel Number	Regulatory Class	Randomization Interval	Measurement Duration	Measurement Mode
Octets: 1	1	2	2	1

BSSID	SSID element	Reporting Condition	Threshhold /Offset (optional)
Octets: 6	2-34	1	1

3   **Figure k9—Measurement Request field format for a Beacon Request**

4   Channel Number indicates the channel number for which the measurement request applies. Channel
5   Number is defined within a Regulatory Class as shown in **Error! Reference source not found.**. A
6   Channel Number of 0 indicates a request to make iterative measurements for all supported channels in the
7   Regulatory Class where the measurement is permitted on the channel and the channel is valid for the
8   current regulatory domain. A Channel Number of 255 indicates a request to make iterative measurements
9   for all supported channels listed in the AP Channel Report for the Regulatory Class. This procedure is
10   described in 11.11.9.1.

11   Regulatory Class indicates the frequency band for which the measurement request applies. Valid values of
12   Regulatory Class are shown in **Error! Reference source not found.**.

13   Randomization Interval specifies the upper bound of the random delay to be used prior to making the
14   measurement in units of TU. See 11.11.3.

15   The Measurement Duration field shall be set to the preferred duration of the requested measurement,
16   expressed in TUs. If the Duration Mandatory bit is set to 1 in the Measurement Request Mode field this
17   shall be interpreted as a mandatory measurement duration. If the Duration Mandatory bit is set to 0 this
18   shall be interpreted as a target measurement duration. See 11.11.4.

19   Measurement Mode indicates the mode to be used for the measurement. The valid measurement modes are
20   listed in Table k2. The procedures for each mode are described in 11.11.9.1.

21   **Table k2—Measurement Mode definitions for Beacon Request element**

Mode	Value
Passive	0
Passive Pilot	1
Active	2
STA Selected	3
Beacon Table	4
Reserved	5-255

1 The BSSID field indicates the BSSID of the particular BSS, or BSSs for which a beacon report is
2 requested. This may be the BSSID of an individual BSS, or may be the broadcast BSSID. The BSSID shall
3 be set to the broadcast BSSID when requesting beacon reports for all BSSs on the channel.

4 The SSID element indicates the ESSs, or IBSSs for which beacon reports are requested. This may be a
5 specific SSID, or may be the zero length SSID, termed the 'wildcard SSID'. The wildcard SSID shall be
6 used when requesting beacon reports for all SSIDs. The SSID element is described in 7.3.2.1. If Passive
7 Pilot Measurement Mode is requested the SSID element shall be the wildcard SSID.

8 The Reporting Condition defines when the measured results are to be reported to the requesting STA. The
9 Reporting Condition values are defined in Table k3. For STAs in an IBSS, the Reporting Condition shall
10 be set to a value in the range 0-4, inclusive. The Reporting Condition shall be set to 0 when the
11 measurement mode is Beacon Table. Procedures for Reporting Conditions are described in 11.11.9.1.

1   **Table k3—Reporting Condition definitions for Beacon Request element**

Condition Description for Repeated Measurement	Reporting Condition
Report to be issued after each measurement.	0
The RCPI level crosses above an absolute threshold.	1
The RCPI level crosses below an absolute threshold.	2
The RSSI level crosses above an absolute threshold.	3
The RSSI level crosses below an absolute threshold.	4
The RCPI level crosses above a threshold defined by an offset from the serving AP's RCPI.	5
The RCPI level crosses below a threshold defined by an offset from the serving AP's RCPI.	6
The RSSI level crosses above a threshold defined by an offset from the serving AP's RSSI.	7
The RSSI level crosses below a threshold defined by an offset from the serving AP's RSSI.	8
The RCPI level enters and remains in a range bound by the serving AP's RCPI and an offset from the serving AP's RCPI.	9
The RSSI level enters and remains in a range bound by the serving AP's RSSI and an offset from the serving AP's RSSI.	10
Reserved	11-255

2   Threshold/Offset provides either the threshold value or the offset value to be used for conditional
3   reporting. Threshold/Offset is not included when the Reporting Condition is 0. For Reporting Conditions 1
4   to 4, the threshold value is an unsigned 8 bit integer having the same units as RCPI. For Reporting
5   Conditions 5, 6, and 9, the offset value is a signed 7 bit integer in the range [-127, +127] in the same units
6   as RCPI. For Reporting Conditions 7, 8 and 10 the offset value is a signed 7 bit integer in the range [-127,
7   +127] in the same units as RSSI.

8   **7.3.2.21.7 Frame Request**

9   The Measurement Request field corresponding to a Frame Request is shown Figure k10.

Channel Number	Regulatory Class	Randomization Interval	Measurement Duration
Octets: 1	1	2	2
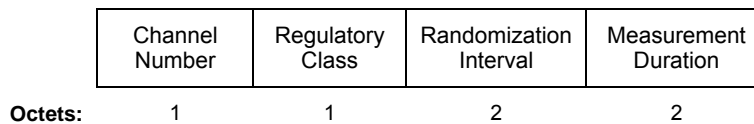
10   **Figure k10—Measurement Request field format for a Frame Request**

11 Channel Number indicates the channel number for which the measurement request applies. Channel
12 Number is defined within a Regulatory Class as shown in **Error! Reference source not found.**.
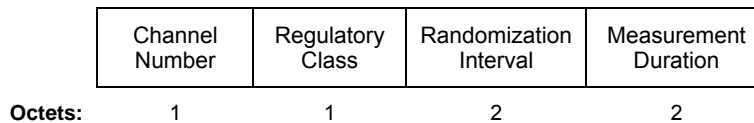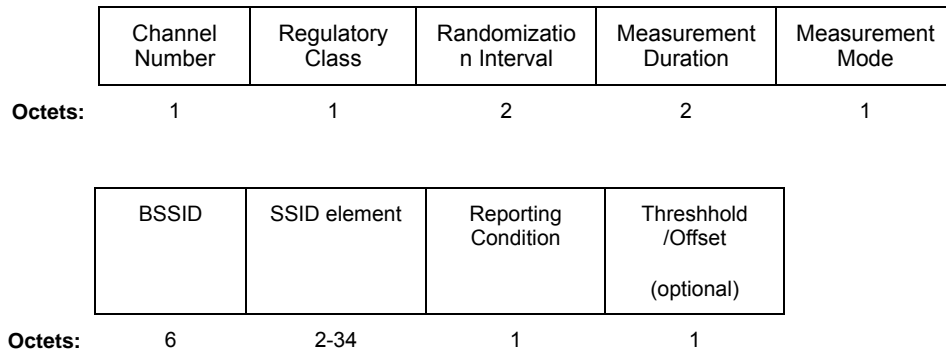
13 Regulatory Class indicates the frequency band for which the measurement request applies. Valid values of
14 Regulatory Class are shown in **Error! Reference source not found.**.

1 Randomization Interval specifies the upper bound of the random delay to be used prior to making the
2 measurement in units of TU. See 11.11.3.

3 The Measurement Duration field shall be set to the preferred duration of the requested measurement,
4 expressed in TUs. If the Duration Mandatory bit is set to 1 in the Measurement Request Mode field this
5 shall be interpreted as a mandatory measurement duration. If the Duration Mandatory bit is set to 0 this
6 shall be interpreted as a target measurement duration. See 11.11.4.

7 ### *7.3.2.21.10 STA Statistics Request*

8 The Measurement Request field corresponding to a STA Statistics Request is shown in Figure k11.

Randomization Interval	Measurement Duration	Group Identity

Octets: 2   2   1
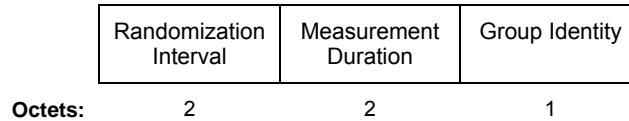
9   **Figure k11—Measurement Request field format for a STA Statistics Request**

10 Randomization Interval specifies the upper bound of the random delay to be used prior to making the
11 measurement in units of TU. See 11.11.3.

12 The Measurement Duration field shall be set to the duration of the requested measurement in TUs. The
13 Measurement, if accepted, shall be performed over the requested duration without regard to the Duration
14 Mandatory bit in the Measurement Request Mode field. If a measurement over the requested duration is not
15 possible, the request shall be refused. A Measurement Duration of 0 shall be used to request current values
16 of the requested STA statistics group. A non-zero value of Measurement Duration indicates a request for
17 the change in value (increases or decreases) in the statistics of the specified statistics group measured over
18 the specified Measurement Duration.

19 Group Identity indicates the requested statistics group according to Table k4.

20   **Table k4—Group Identity for a STA Statistics Request**

Statistics Group Name	Group Identity
STA Counters from dot11CountersTable	0
BSS Load as described in 7.3.2.29	1
Reserved	2 – 255

21 ### 7.3.2.21.11 Location Configuration Indication (LCI) Request

22 The Measurement Request field corresponding to an LCI request is shown in Figure k12.

Location Subject	Latitude Accuracy	Longitude Accuracy	Altitude Accuracy

Octets: 1   1   1   1
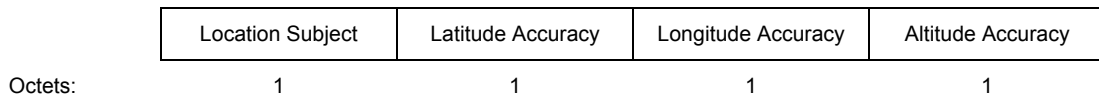
23   **Figure k12—LCI Request field format**

1   The Location Subject field of a LCI request is a single octet. See Table k5.

2   **Table k5—Location subject definition**

Value	Location Subject
0	Local
1	Remote
2-255	Reserved

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

5   Latitude accuracy is the number of valid bits requested in the fixed-point value of Latitude. Values above
6   34 (decimal) are undefined and reserved.

7   Longitude accuracy is the number of valid bits requested in the fixed-point value of Longitude. Values
8   above 34 (decimal) are undefined and reserved.

9   Altitude accuracy is the number of valid bits requested in the Altitude. Values above 30 (decimal) are
10   undefined and reserved.

11   **7.3.2.21.12 Measurement Pause Request**

12   The Measurement Request field corresponding to a Measurement Pause Request is shown in Figure k13.
13   The Measurement Pause Request cannot be processed in parallel with any other Measurement Request.
14   Parallel measurement request processing, as specified in the Measurement Request Mode field description
15   in section 7.3.2.21, does not apply to the Measurement Pause Request. See 11.11.9.9.

```
                              ┌──────────────┐
                              │  Pause Time  │
                              └──────────────┘
               Octets:              2
```
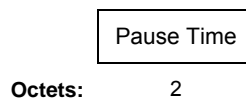
16   **Figure k13—Measurement Pause Request field format**

17   The Pause Time field consists of a 16 bit unsigned integer number representing the time period for which
18   measurements are suspended or paused. The time unit for the Pause Time field is 10 TU. Measurement
19   Pause Requests are used to provide time delays between the execution times of measurement request
20   elements in a Measurement Request Frame.

21   **7.3.2.21.13 QoS Metrics Request**

22   The Measurement Request field corresponding to a QoS Metrics Request is shown in Figure k14. A
23   response to a QoS Metrics Request is a QoS Metrics Report.

Randomization Interval	Measurement Duration	Peer QSTA Address	Traffic Identifier	Bin 0 Range
2	2	6	1	1

Octets:

1   **Figure k14—Measurement Request field format for a QoS Metrics Request**

2   Randomization Interval shall be set to the desired maximum random delay in the measurement start time,
3   expressed in TUs. The use of Randomization Interval is described in 11.11.3. Randomization Interval is
4   not used and shall be set to 0 when requesting a triggered QoS metrics measurement.

5   The Measurement Duration shall be set equal to the duration of the requested measurement, expressed in
6   TUs. When setting up a triggered QoS measurement, Measurement Duration is not used and shall be set to
7   0.

8   The Peer QSTA Address shall contain the 6 byte MAC address in the Address 1 field of the measured Data
9   frames.

10   Traffic Identifier shall indicate the TC or TS for which traffic is to be measured. Values 0 through 15 are
11   defined. Values 16-255 are reserved.

12   Bin 0 Range shall indicate the delay range of the first bin (Bin 0) of the Transmit Delay Histogram,
13   expressed in TUs. It is also used to calculate the delay ranges of the other 5 bins making up the histogram.
14   The delay range for each bin shall increase in a binary exponential fashion as described in 7.3.2.22.13.

15   The Triggered Reporting field is used to specify measurement trigger thresholds. It is only present if setting
16   up triggered QoS metrics reporting – see 11.11.9.10. The Triggered Reporting field is as shown in Figure
17   k15.

Trigger Condition	Average Error Threshold	Consecutive Error Threshold	Delay Threshold	Measurement Count	Trigger Timeout
1	1	1	1	1	1

Octets:

18   **Figure k15—Triggered Reporting Field**

19   Trigger Condition is a bit-field that specifies reporting triggers when requesting a triggered QoS metrics
20   measurement. The format of Trigger Condition is shown in Figure k16.

B0	B1	B2	B3 B7
Average	Consecutive	Delay	Reserved
1	1	1	5

Bits:

21   **Figure k16—Trigger Condition field**

22

1 — Average is set to 1 to request that a QoS Metrics Report be generated when the number of
2 MSDUs for the TC, or TS given by the Traffic Identifier that are discarded over the moving
3 average number of transmitted MSDUs specified in Measurement Count is equal to the value
4 given in Average Error Threshold. MSDUs discarded due to the number of transmit attempts
5 exceeding dot11ShortRetryLimit or dot11LongRetryLimit, or due to the MSDU lifetime having
6 been reached shall be counted.

7 — Consecutive is set to 1 to request that a QoS Metrics Report be generated when the number of
8 MSDUs for the TC, or TS given by the Traffic Identifier that are discarded in succession is equal
9 to the value given in Consecutive Error Threshold. MSDUs discarded due to the number of
10 transmit attempts exceeding the appropriate retry limit, or due to the MSDU lifetime having been
11 reached shall be counted.

12 — Delay is set to 1 to request that a QoS Metrics Report be generated when the number of
13 consecutive MSDUs for the TC, or TS given by the Traffic Identifier that experience a transmit
14 delay greater than or equal to the lower bound of the bin of the Transmit Delay Histogram
15 specified by the value in Delayed MSDU Range equals the value given in Delayed MSDU Count.

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

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

20 The Delay Threshold field contains two subfields as shown in Figure k17.

B0	B1	B2	B7
Delayed MSDU Range		Delayed MSDU Count	

Bits:	2	6
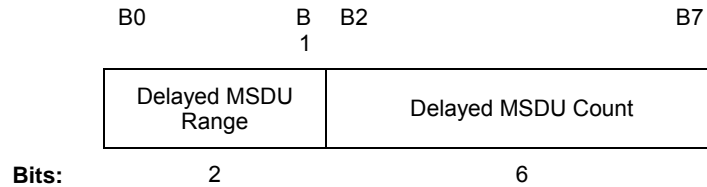
21   **Figure k17—Delay Threshold subfield**

22 Delayed MSDU Range contains a value representing the MSDU transmit delay at or above which an
23 MSDU will be counted towards the Delayed MSDU Count threshold. Delayed MSDU Range is encoded as
24 a value representing the lower bound of a bin in the Transmit Delay Histogram as shown in Table k6.

25   **Table k6—Delayed MSDU Range Definitions**

23

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 in the Average Error Threshold and in place of measurement duration in determining the scope of the reported results when a report is triggered – see 11.11.9.10.

The Trigger Timeout field contains a value in units of 100TU during which a measuring STA shall not generate further triggered QoS metrics reports after a trigger condition has been met. See 11.11.9.10.

7.3.2.22 Measurement Report element

Change clause 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 13.

Element ID	Length	Measurement Token	Measurement Report Mode	Measurement Type	Measurement Report
Octets: 1	1	1	1	1	variable

Figure 13—Measurement Report element format

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

Figure 14—Measurement Report Mode field

The value of the Length field 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 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 shall be set to 0.

The Measurement Report Mode field (shown in Figure 14) is used to indicate the reason for a failed measurement request. The Measurement Report Mode is a bit field with the following bits defined:

1 — Late bit (bit 0) indicates whether this STA is unable to carry out a measurement request because it
2   received the request after the requested measurement time. The Late bit shall be set equal to 1 to
3   indicate the request was too late. The Late bit shall be set to 0 to indicate the request was received in
4   time for the measurement to be executed. The Late bit only applies to spectrum management
5   measurement and shall be set to 0 in all measurement report elements for radio resource
6   measurement types (see Table 20c).

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

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

16 — All other bits are reserved and shall be set to 0 on transmission and ignored on reception.

17 Not more than one bit shall be set within a Measurement Report Mode field. All bits within the
18 Measurement Mode field shall be set to 0 if the results of a successful measurement request, or an
19 autonomous measurement are being reported.

20 The Measurement Type field shall be set to a number that identifies the measurement report. Those
21 Measurement Types that have been allocated are shown in Table 20c.

22 The Measurement Report field shall be null not be present when the Late bit is set to 1, the Incapable bit is
23 set to 1 or the Refused bit is set to 1. Otherwise, it shall contain the specification of thea measurement
24 report, as described in 7.3.2.20.17.3.2.22.1 through 7.3.2.20.37.3.2.22.10.

25   **Table 20c—Measurement Type definitions for measurement reports**

Name	Measurement Type	Measurement Use
Basic report	0	Spectrum Management
Clear Channel Assessment (CCA) report	1	
Receive power indication (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	
QoS metrics request	9	
Reserved	310-255	N/A

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

1   The Measurement Report element is included in Spectrum Management Measurement Report frames as
2   described in 7.4.1.2, or Radio Resource Measurement Report frames as described in 7.4.5.2. Measurement
3   Types 0, 1 and 2 are used for spectrum management and shall only be included in spectrum management
4   Measurement Report frames. All other Measurement Types are used for radio resource measurement and
5   shall only be included in Radio Resource Measurement Report frames. The use of Measurement Report
6   elements and frames for spectrum management is described in 11.6.6. The use of Measurement Report
7   elements and frames for radio measurement is described in 11.7.

8   *Insert the following new clauses after clause 7.3.2.22.3:*

9   **7.3.2.22.4 Channel Load Report**

10   The format of the Measurement Report field corresponding to a Channel Load Report is shown in Figure
11   k18.

Channel Number	Regulatory Class	Actual Measurement Start Time	Measurement Duration	Channel Load
1	1	8	2	1

Octets:

12   **Figure k18—Measurement Request field format for a Channel Load Report**

13   Channel Number indicates the channel number for which the measurement report applies. Channel Number
14   is defined within a Regulatory Class as shown in **Error! Reference source not found.**.

15   Regulatory Class indicates the frequency band for which the measurement report applies. Valid values of
16   Regulatory Class are shown in **Error! Reference source not found.**.

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

19   Measurement Duration shall be set equal to the duration over which the Channel Load Report was
20   measured, expressed in TUs.

21   Channel Load shall contain the proportion of measurement duration for which the measuring STA
22   determined the channel to be busy. The Channel Load value is defined as Integer(256*[channel busy time
23   (microseconds)]/(1024 * [measurement duration (TU)])). Channel busy time shall be the time during which
24   either the physical carrier sense or NAV indicated channel busy, as defined in 9.2.1.

25   **7.3.2.22.5 Noise Histogram Report**

26   The format of the Measurement Report field of a Noise Histogram Report is shown in Figure k19.

Channel Number	Regulatory Class	Actual Measurement Start Time	Measurement Duration	Antenna ID	ANPI
1	1	8	2	1	1

Octets:

RPI 0 Density	RPI 1 Density	RPI 2 Density	RPI 3 Density	RPI4 Density	RPI 5 Density	RPI 6 Density	RPI 7 Density	RPI 8 Density
1	1	1	1	1	1	1	1	1

Octets:

1   **Figure k19—Measurement Report field format for a Noise Histogram Report**

2   Channel Number indicates the channel number for which the measurement report applies. Channel Number
3   is defined within a Regulatory Class as shown in **Error! Reference source not found.**.

4   Regulatory Class indicates the frequency band for which the measurement report applies. Valid values of
5   Regulatory Class are shown in **Error! Reference source not found.**.

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

8   Measurement Duration shall be set equal to the duration over which the Noise Histogram Report was
9   measured, expressed in TUs.

10   Antenna ID shall be set to the identifying number for the antenna used for this measurement. Antenna ID is
11   defined in 7.3.2.29.

12   ANPI shall be set to the average noise plus interference power value measured during the indicated
13   Measurement Duration while the indicated channel is idle as described in 11.11.9.4.

14   The Noise Histogram Report shall contain the RPI densities, as defined in 11.11.9.4, observed in the
15   channel for the nine RPI levels defined in Table k7.

16   **Table k7—RPI Definitions for a Noise Histogram Report**

RPI	RPI Level (dBm)
0	RPI $\leq$ 92
1	-92 < RPI $\leq$ -87
2	-87 < RPI $\leq$ -82
3	-82 < RPI $\leq$ -77
4	-77 < RPI $\leq$ -72
5	-72 < RPI $\leq$ -67
6	-67 < RPI $\leq$ -62
7	-62 < RPI $\leq$ -57
8	-57 < RPI

7.3.2.22.6 Beacon Report

The format of the Measurement Report field corresponding to a Beacon Report is shown in Figure k20.

Channel Number	Regulatory Class	Actual Measurement Start Time	Measurement Duration	Reported Frame Information	RCPI	RSNI

Octets: 1   1   8   2   1   1   1

BSSID	Antenna ID	Parent TSF	Reported Frame Body

Octets: 6   1   4   variable
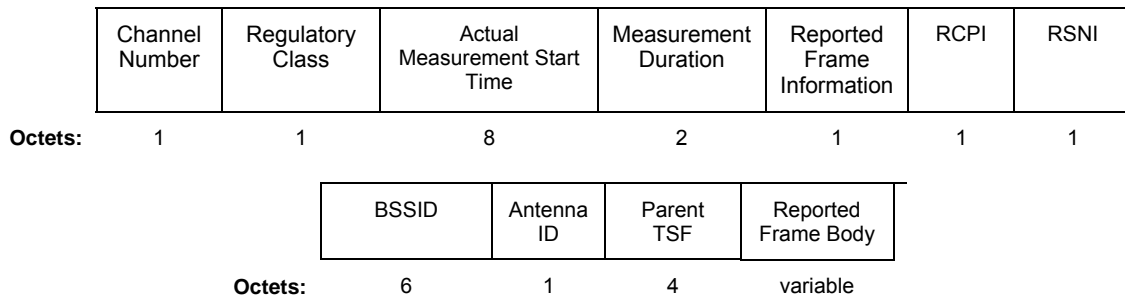
Figure k20—Measurement Report field format for a Beacon Report

Channel Number indicates the channel number for which the measurement report applies. Channel Number is defined within a Regulatory Class as shown in **Error! Reference source not found.**.

Regulatory Class indicates the frequency band for which the measurement report applies. Valid values of Regulatory Class are shown in **Error! Reference source not found.**.

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

Measurement Duration shall be set equal to the duration over which the Beacon Report was measured, expressed in TUs.

The Reported Frame Information field contains two subfields as shown in Figure k21.

B0	B6	B7
Condensed PHY Type		Reported Frame Type

Bits: 7   1
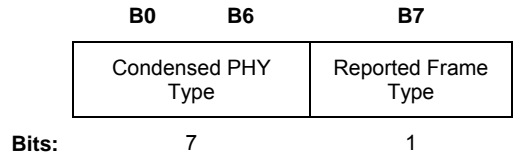
1   **Figure k21—Reported Frame Information Field**

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

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

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

9 RSNI indicates the received signal to noise indication for the beacon or probe response frame in dBm, as
10 described in 7.3.2.31.

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

13 The Antenna ID field contains the identifying number for the antenna used for this measurement. If
14 different antennas are used to receive the beacon preamble and the beacon frame body, this Antenna ID
15 shall contain the identifying number for the antenna used to receive the beacon frame body. Antenna ID is
16 defined in 7.3.2.29.

17 The Parent TSF field shall contain the lower 4-octets of the measuring STA's TSF timer value at the time
18 the Beacon, Measurement Pilot or Probe Response frame being reported was received.

19 The Reported Frame Body field contains the frame body of the reported Beacon, Measurement Pilot, or
20 Probe Response frame. All fixed fields and information elements are included in the order they appeared in
21 the reported frame. TIM elements shall be truncated such that only the first 4 octets of the element are
22 reported. If the Reported Frame Body would cause the Measurement Report element to exceed the
23 maximum information element size then the Reported Frame Body shall be truncated.

24 **7.3.2.22.7 Frame Report**

25 The format of the Measurement Report field corresponding to a Frame Report is shown in Figure k22.

Zero or more entries

Channel Number	Regulatory Class	Actual Measurement Start Time	Measurement Duration	Frame Report Entry

Octets: 1   1   8   2   n x 16
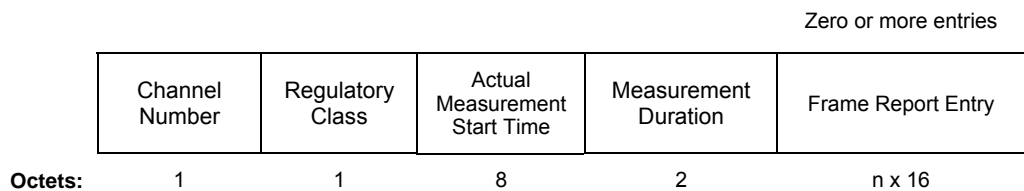
26   **Figure k22—Measurement Report field format for a Frame Report**

1 Channel Number indicates the channel number for which the measurement report applies. Channel Number
2 is defined within a Regulatory Class as shown in **Error! Reference source not found.**.

3 Regulatory Class indicates the frequency band for which the measurement report applies. Valid values of
4 Regulatory Class are shown in **Error! Reference source not found.**.

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

7 Measurement Duration shall be set equal to the duration over which the Frame Report was measured,
8 expressed in TUs.

9 The format of the Frame Report Entry is shown in Figure k23.

Transmit Address	BSSID	PHY Type	Average RCPI	RSNI	Last RCPI	Antenna ID	Number of Unicast Data Frames
Octets: 6	6	1	1	1	1	1	1

10   **Figure k23—Frame Report Entry format**

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

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

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

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

18 RSNI indicates the received signal to noise indication of the received frame in dBm, as described in
19 7.3.2.31. This field shall be the RSNI value for the most recently received frame.

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

22 The Antenna ID field contains the identifying number for the antenna used to receive the most recently
23 measured frame in this Frame Report entry. Antenna ID is defined in 7.3.2.29.

24 Number of Unicast Data Frames is a count of the unicast data and management frames received with the
25 indicated Transmit Address and BSSID during the measurement duration. The value 255 shall indicate a
26 count of 255 or more.

27 **7.3.2.22.10 STA Statistics Report**

28 The format of the Measurement Report field of a STA Statistics Report is shown in Figure k24.

Measurement Duration	Statistics Group Data
Octets: 2	Variable

29   **Figure k24—Measurement Report field format for a STA Statistics Report**

1 The Measurement Duration shall be set equal to the duration over which the change in Statistics Group
2 Data was measured and reported, expressed in TUs. A Measurement Duration value of 0 indicates a report
3 of the current values of the Statistice Group Data.

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

7 Statistics Group Data shall contain the requested statistics from the MIB related to the interface on which
8 the request was received according to Table k8. Units used for reporting a statistic or change in statistic
9 shall be the same units used for the statistic in the MIB. If the requested Statistics Group Data is not
10 defined for the measuring STA, the STA shall return Statistics Group Data with all octets set to 255.

11   **Table k8—Group Identity for a STA Statistics Report**

Group Identity Requested	Statistics Returned
0	dot11CountersGroup for the Interface on which the STA Statistics Request was received (with the exception of WEPUndecryptableCount) dot11TransmittedFragmentCount (Counter32), dot11MulticastTransmittedFrameCount (Counter32), dot11FailedCount (Counter32), dot11RetryCount (Counter32), dot11MultipleRetryCount (Counter32), dot11FrameDuplicateCount (Counter32), dot11RTSSuccessCount (Counter32), dot11RTSFailureCount (Counter32), dot11ACKFailureCount (Counter32) dot11ReceivedFragmentCount (Counter32), dot11MulticastReceivedFrameCount (Counter32), dot11FCSErrorCount (Counter32), dot11TransmittedFrameCount (Counter32)
1	dot11BSS Load Group: dot11STAStatisticsAPServiceLoad (INTEGER), dot11STAStatisticsAverageAccessDelayBestEffort (INTEGER), dot11STAStatisticsAverageAccessDelayBackGround (INTEGER), dot11STAStatisticsAverageAccessDelayVIdeo (INTEGER), dot11STAStatisticsAverageAccessDelayVOice (INTEGER), dot11STAStatisticsStationCount (INTEGER), dot11STAStatisticsChannelUtilization (INTEGER)
2 – 255	None

12 The format of the Measurement Report field for dot11Counters Group is shown in Figure k25.

dot11Transmitted FragmentCount	dot11Multicast TransmittedFrame Count	dot11FailedCount	dot11RetryCount	dot11MultipleRetry Count

Octets: 4   4   4   4   4

dot11FrameDuplicate Count	dot11RTSSuccess Count	dot11RTSFailure Count	dot11ACKFailure Count	dot11Received FragmentCount

Octets: 4   4   4   4   4

dot11Multicast ReceivedFrame Count	dot11FCSErrorCount	dot11Transmitted FrameCount

Octets: 4   4   4

1   **Figure k25—Measurement Report field format for dot11Counters Group**

2   The format of the Measurement Report field for dot11BSSLoad Group is shown in Figure k26.

dot11STAStatistics APServiceLoad	dot11STAStatistics AverageAccess DelayBestEffort	dot11STAStatistics AverageAccess DelayBackGround	dot11STAStatistics AverageAccess DelayVIdeo	dot11STAStatistics AverageAccess DelayVOice

Octets: 4   1   1   1   1

dot11STAStatistics StationCount	dot11STAStatistics ChannelUtilization

Octets: 2   1
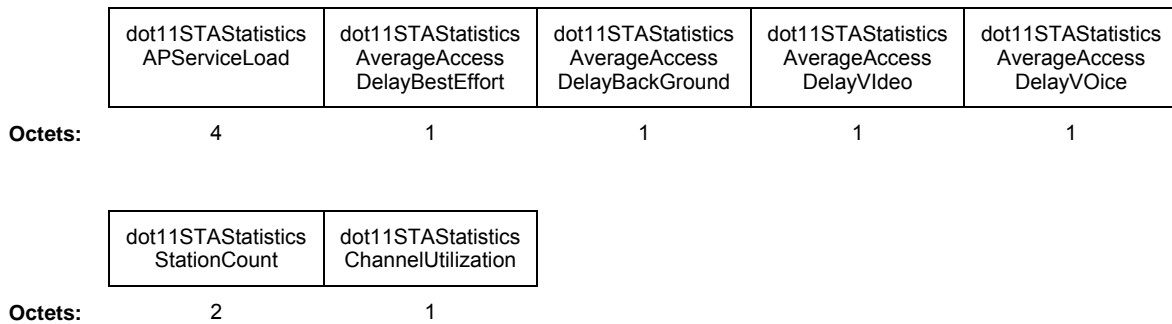
3   **Figure k26—Measurement Report field format for dot11BSSLoad Group**

4   **7.3.2.22.11 Location Configuration Information Report element**

5   A Location Configuration Information report includes latitude, longitude and altitude information. The LCI
6   report format is shown in Figure k27. This format is based on that described in IETF RFC 3825, "Dynamic
7   Host Configuration Protocol Option for Coordinate-based Location Configuration Information" and the
8   length shall be 16 octets. Fields within the LCI report shall be as defined in RFC3825 section 2.1.
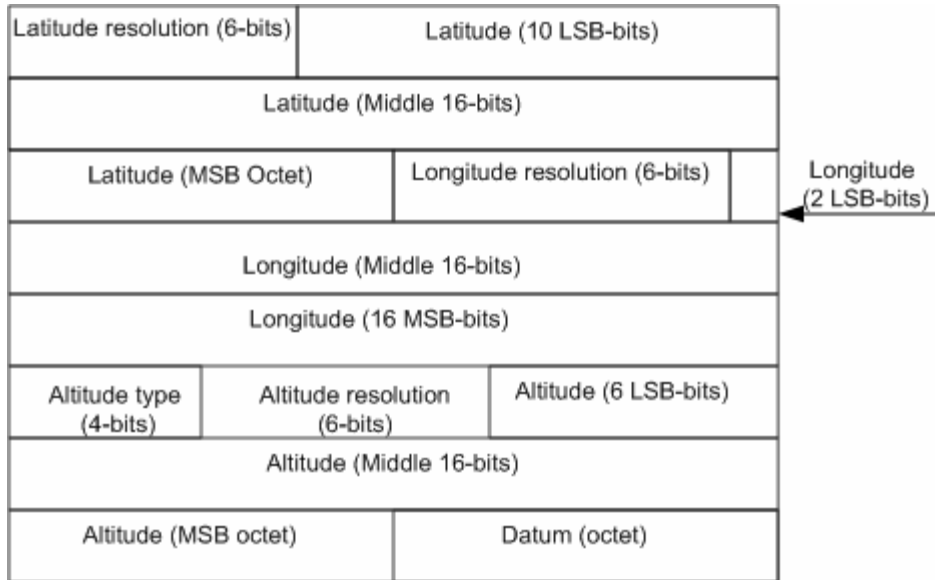
Figure k27—Location Configuration Information

3 An LCI report with Latitude resolution, Longitude resolution and Altitude resolution set to zero shall
4 indicate that the requested location cannot be reported with the requested accuracy.

5 The Datum value shall be 1 (WGS 84), unless another datum is required for operation in the regulatory
6 domain.

7 If the Altitude Type is 2 (Floors of Altitude), the value reported shall be as required for operation in the
8 regulatory domain.

9 **7.3.2.22.13 QoS Metrics Report**

10 The format of the Measurement Report field corresponding to a QoS Metrics Report is shown in Figure
11 k28.

Actual Measurement Start Time	Measurement Duration	Peer QSTA Address	Traffic Identifier	Reporting Reason
8	2	6	1	1

Octets:

12

Transmitted MSDU Count	MSDU Discarded Count	MSDU Failed Count	MSDU Multiple Retry Count	QoS CFPolls Lost Count	Average Queue Delay	Average Transmit Delay
4	4	4	4	4	4	4

Octets:

13

33

Bin 0 Range	Bin 0 Count	Bin 1 Count	Bin 2 Count	Bin 3 Count	Bin 4 Count	Bin 5 Count
Octets: 1	4	4	4	4	4	4
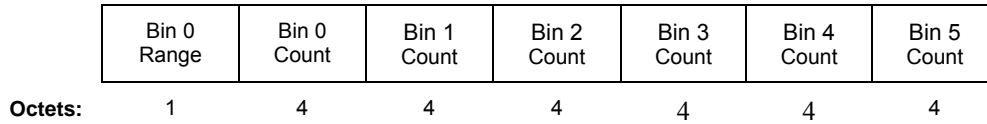
1   **Figure k28—Measurement Report field format for Transmit Delay Metric Report**

2   Actual Measurement Start Time shall be set equal to the TSF at the time at which the measurement started,
3   or for a triggered QoS metrics report the TSF value at the reporting QSTA when the trigger condition was
4   met.

5   Measurement Duration shall be set equal to the duration over which the QoS Metrics Report was measured,
6   expressed in TUs. For a triggered QoS Metrics Report, metrics are reported over a number of transmitted
7   MSDUs rather than a duration, hence Measurement Duration shall be set to 0 – see 11.11.9.10.

8   The Peer QSTA Address shall contain the 6 byte MAC address in the Address 1 field of the measured Data
9   frames.

10   Traffic Identifier shall indicate the TC or TS for which traffic is to be measured. Values 0 through 15 are
11   defined. Values 16-255 are reserved.

12   The Reporting Reason field is a bit field indicating the reason that the measuring QSTA sent the Transmit
13   QoS metrics report. The Reporting Reason field is shown in Figure k29.

B0	B1	B2	B3 B7
Average Trigger	Consecutive Trigger	Delay Trigger	Reserved
Bits: 1	1	1	5
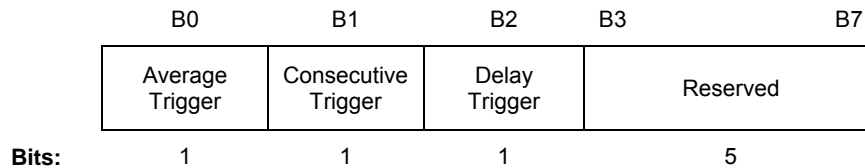
14   **Figure k29—Reporting Reason field**

15   — The Average Trigger bit set to 1 indicates that the Transmit QoS Metrics Report was generated as
16   a triggered report due to the Average Error trigger.

17   — The Consecutive Trigger bit set to 1 indicates that the Transmit QoS Metrics Report was
18   generated as a triggered report due to the Consecutive Error trigger.

19   — The Delay Trigger bit set to 1 indicates that the Transmit QoS Metrics Report was generated as a
20   triggered report due to the Delay Error trigger.

21   In a requested Transmit QoS Metrics Report, all bit fields in the Reporting Reason field are set to 0. More
22   than one bit field in the Reporting Reason field may be set to 1 if more than one trigger condition was met.

23   The Transmitted MSDU Count, MSDU Failed Count, MSDU Discarded Count, MSDU Multiple Retry
24   Count, QoS CFPolls Lost Count, Average Queue Delay, Average Transmit Delay, and delay histogram
25   fields relate to transmissions to the QSTA given in the Peer QSTA Address field. Metrics shall be reported
26   over the measurement duration, or for triggered QoS metrics, over the measurement count.

34

1   The Transmitted MSDU Count field contains the number of MSDUs for the TC, or TS given by the Traffic
2   Identifier successfully transmitted.

3   The MSDU Discarded Count field contains the number of MSDUs for the TC, or TS given by the Traffic
4   Identifier discarded due either to the number of transmit attempts exceeding dot11ShortRetryLimit or
5   dot11LongRetryLimit as appropriate, or due to the MSDU lifetime having been reached.

6   The MSDU Failed Count field contains the number of MSDUs for the TC, or TS given by the Traffic
7   Identifier discarded due to the number of transmit attempts exceeding dot11ShortRetryLimit or
8   dot11LongRetryLimit as appropriate.

9   The MSDU Multiple Retry Count field contains the number of MSDUs for the TC, or TS given by the
10 Traffic Identifier that are successfully transmitted after more than one retransmission attempt.

11 The QoS CFPolls Lost Count field contains the number of QoS (+)CF-Poll frames transmitted where there
12 was no response from the QSTA. QoS CFPolls Lost Count shall only be returned if the reporting QSTA is
13 a QAP and the Traffic Identifier is for TS. If unused QoS CFPolls Lost count shall be set to 0.

14 Average Queue Delay shall be the average queuing delay of the frames (MSDUs) that are passed to the
15 MAC for the indicated Peer QSTA Address and the indicated Traffic Identifier. Queue Delay shall be
16 measured from the time the MSDU is passed to the MAC until the point at which the first, or only fragment
17 is ready for transmission and shall be expressed in TUs.

18 Average Transmit Delay shall be the average delay of the frames (MSDUs) that are successfully
19 transmitted for the indicated Peer QSTA Address and the indicated Traffic Identifier. Delay shall be
20 measured from the time the MSDU is passed to the MAC until the point at which the entire MSDU has
21 been successfully transmitted, including receipt of the final ACK from the peer QSTA if the QoSAck
22 service class is being used. Average Transmit delay shall be expressed in TUs.

23 Bin 0 Range shall indicate the delay range of the first bin (Bin 0) of the Transmit Delay Histogram,
24 expressed in TUs. It is also used to calculate the delay ranges of the other 5 bins making up the histogram.
25 The delay range for each bin shall increase in a binary exponential fashion as follows:

26   B0 duration: $0 \leq \text{Delay} < B_0$,   for i = 0;

27   Bi duration: $2^{i-1} * B_0 \leq \text{Delay} < 2^i * B_0$ for 1 < i < 5

28 If Bin 0 Range is 10ms, the bin durations should be defined in Table k9.

29   **Table k9—Delay Definitions for a Transmit QoS Report**

Bin	Measured Delay (TUs)
0	Delay <10
1	$10 \leq$ Delay < 20
2	$20 \leq$ Delay <40
3	$40 \leq$ Delay <80
4	$80 \leq$ Delay <160
5	Delay $\geq$ 160

1 To compute the value reported in Bin i, Bi, $0 \leq i < 5$, of the Transmit Delay Histogram, the STA initializes
2 all bin counts to zero. For each MSDU successfully transmitted, the measured Transmit Delay determines
3 which bin count is to be incremented. If the measured delay has a duration time t within Bin i, then the
4 frame count in Bin i is increased by one, up to a ceiling value of 2^{32}-1. Transmit Delay shall be measured
5 from the time the MSDU is passed to the MAC until the point at which the entire MSDU has been
6 successfully transmitted, including receipt of the final ACK from the peer QSTA if the QoSAck service
7 class is being used. During the QoS Metrics Measurement, a histogram is generated that represents the
8 distribution of Transmit Delay.

9 *Insert the following new clauses adjusting the clause numbers as necessary:*

10 **7.3.2.26 AP Channel Report element**

11 The AP Channel Report element contains a list of channels where a STA is likely to find an AP. The
12 format of the AP Channel Report element is shown in Figure k30.

Element ID	Length	Regulatory Class	Channel List
Octets: 1	1	1	variable

13   **Figure k30—AP Channel Report element format**

14 The Element ID field shall be equal to the AP Channel Report value in Table 20.

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

17 Regulatory Class shall contain an enumerated value from **Error! Reference source not found.**, specifying
18 the frequency band in which the Channel List is valid. An AP Channel Report shall only report channels
19 for a single frequency band. Multiple AP Channel report elements may be used to report channels in more
20 than one frequency band.

21 The Channel List shall contain a variable number of octets, where each octet describes a single channel
22 number. Channel numbering shall be dependent on Regulatory Class according to **Error! Reference
23 source not found.**.

24 The AP Channel Report contents shall be derived from dot11APChannelReportTable. An AP Channel
25 report shall only include channels that are valid for the regulatory domain in which the AP transmitting the
26 element is operating and consistent with the Country element in the frame in which it appears.

1   **7.3.2.27 Neighbor Report element**

2   The format of the Neighbor Report element is shown in Figure k31.

Zero or more, one
for each neighbor

Element ID	Length	Neighbor List

Octets: 1   1   Variable
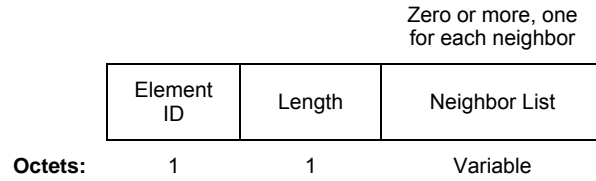
3   **Figure k31—Neighbor Report element format**

4   The Element ID field is equal to the Neighbor Report value in Table 20.

5   The value of Length field is dependent on the number of Neighbor List Entries representing the
6   neighboring APs being reported. Each entry describes an AP and consists of BSSID, BSSID Information,
7   Channel Number, Regulatory Class, PHY Options, and optionally may include the TSF offset fields. The
8   minimum value of the Length field is 0 (i.e., with no neighbor APs in the Neighbor Report element).

9   The Neighbor List comprises of zero or more Neighbor List Entries. See Figure k32.

BSSID	BSSID information	Channel Number	Regulatory Class	PHY Options	TSF offset (optional)

Octets: 6   2   1   1   1   4
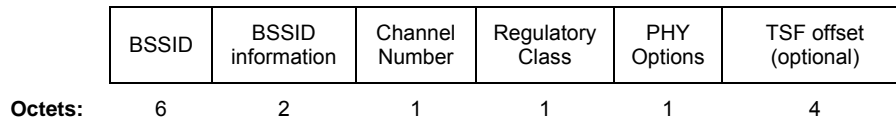
10   **Figure k32—Neighbor list entry format**

11   The BSSID is the BSSID of the BSS being reported. The subsequent fields in the Neighbor List Entry
12   pertain to this BSS.

13   The BSSID Information field may be used to help determine neighbor BSS transition candidates. It shall be
14   two octets in length and shall contain the subfields as shown in Figure k33.

B0   B1   B2   B3   B4   B9   B10   B15

AP Reachability	Security	Key Scope	Capabilities	Reserved

Bits: 2   1   1   6   6
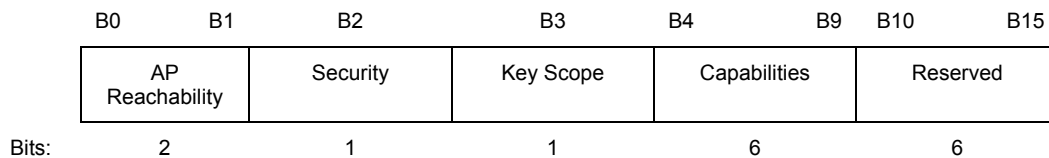
15   **Figure k33—BSSID information field**

16   The AP Reachability field indicates whether the AP identified by this BSSID is reachable by the STA that
17   requested the Neighbor Report for the exchange of preauthentication frames as described in clause 8.4.6.1.
18   The values are shown in Table k10.

37

1   **Table k10—Reachability field**

Value	Reachability	Usage
0	Reserved	n/a
1	Not Reachable	A station sending a preauthentication frame to the BSSID will not receive a response even if the AP represented 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.

2   The Security bit, if set, indicates that the AP identified by this BSSID supports all of the security
3   capabilities of the AP with which the STA is currently associated. If the bit is not set, it indicates that either
4   the capabilities do not match or the information is not available to the AP at this time.

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

8   The Capabilities Subfield contains selected capability information for the AP represented by this BSSID.
9   The bit fields within this subfield shall have the same meaning and be set equal to the equivalent bits
10 within the Capability Information field being sent in the beacons by the AP being reported. The format of
11 the Capabilities subfield is as in Figure k34.

	B4	B5	B6	B7	B8	B9
	Spectrum Management	QoS	APSD	Radio Mesaurement	Delayed Block Ack	Immediate Block Ack
Bits:	1	1	1	1	1	1
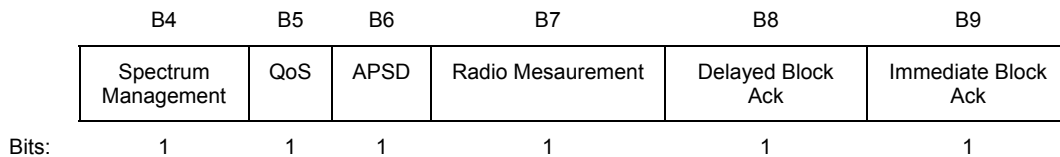
12   **Figure k34—Capabilities Subfield**

13 Bits 10 – 15 are reserved and shall be set to 0 on transmission and ignored on reception.

14 Channel Number indicates the current operating channel of the AP represented by the BSSID in this
15 neighbor list entry.

16 Regulatory Class contains an enumerated value from **Error! Reference source not found.** specifying the
17 frequency band in which the Current Channel is valid.

18 The PHY Options field contains the Condensed PHY type and TSF offset Flag as shown in the Figure k35.

B0   B6   B7

Condensed PHY Type	TSF offset Flag

Bits: 7   1
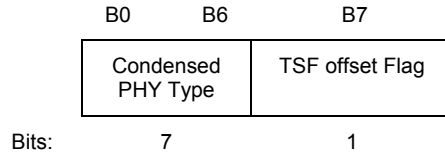
1   **Figure k35—PHY Options field**

2   Condensed PHY Type indicates the PHY type of the AP being reported. It shall have an integer value
3   between 0 and 127 as defined by dot11PHYType.

4   TSF offset Flag is a one bit field. When it is set to 1 it indicates that a TSF offset field is present for this
5   Neighbor List Entry. When set to 0 it indicates that a TSF offset field is not present for this Neighbor List
6   Entry. The Neighbor Report may have the TSF offset Flag set in some Neighbor List Entries and not set in
7   others.

8   The TSF offset is 4 octets long and contains TSF Offset and Beacon Interval subfields.

TSF Offset	Beacon Interval
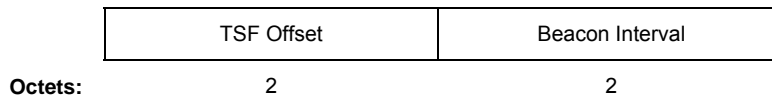
Octets: 2   2

9   **Figure k36—TSF offset field format**

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

13   The Beacon Interval field is the beacon interval of the Neighbor AP being reported. This field is defined in
14   clause 7.3.1.3 and illustrated in Figure 26.

15   **7.3.2.28 RCPI element**

16   The RCPI element contains a RCPI value.

Element ID	Length	RCPI

Octets: 1   1   1
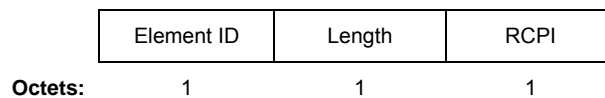
17   **Figure k37—RCPI element format**

18   The length field shall be set to 1.

19   The RCPI field shall contain the RCPI value as defined in the RCPI measurement clause for the PHY type
20   at the measuring STA. The RCPI element is used in the active scan procedure as described in 11.1.3.2.2
21   and elsewhere. The RCPI Information element is also used in the Association and Reassociation Response

1   frame to indicate the received power level of the corresponding Association or Reassociation Request
2   frame.

3   **7.3.2.29 BSS Load element**

4   The BSS Load element contains information on the current station population , traffic level, and service
5   level in the BSS. The element information field is defined in Figure k.

Element ID	Length	AP Service Load	Access Category Service Load (optional)	Station Count (optional)	Channel Utilization (optional)
Octets: 1	1	1	4	2	1

6   **Figure k38—BSS Load element format**

7   The Length field shall be set to the number of octets in the following fields.

8   The AP Service Load shall be a scalar indication of the relative level of service loading at an AP. A low
9   value shall indicate more available service capacity than a higher value. The value 0 shall indicate that this
10   AP is not currently serving any STA. The value 255 shall indicate that the AP Service Load is not
11   available.

12   — If dot11QoSOptionImplemented is true: the values between 0 and 254 shall be set equal to the subfield
13   value for the Average Access Delay for the Best Effort (AADBE) within the Access Category Service
14   Load field.

15   — If dot11QoSOptionImplemented is false: the values between 0 and 254 shall be a logarithmically
16   scaled representation of the average medium access delay for DCF transmitted packets measured from
17   the time the DCF packet is ready for transmission (i.e. begins CSMA/CA access) until the actual
18   packet transmission start time. A value of 1 shall represent a 50 us delay while a value of 253 shall
19   represent a 5.5 ms delay or any delay greater than 5.5 ms. The value 254 shall indicate that DCF
20   services are currently blocked. The AP shall measure and average the medium access delay for all
21   transmit packets using DCF access mechanism over a continuos thirty second measurement window.
22   The accuracy for the average medium access delay shall be +/- 200 usec or better when averaged over
23   at least 200 packets.

24   The Access Category (AC) Service Load field shall be included in the BSS Load only if
25   dot11QoSOptionImplemented is true. The AC Service load field is formatted as four subfields as shown in
26   Figure k39. The AC Service Load shall be a scalar indication of the Average Access Delay (AAD) at a
27   QAP for services for each of the indicated Access Categories. A low value shall indicate shorter access
28   delay than a higher value. If the QAP is not currently providing services at the indicated AC, the AAD for
29   this AC shall be set equal to the AAD of the following AC (located adjacent and to the right) within the
30   Access Category Service field. The value 0 shall indicate that this QAP is not currently providing services
31   of the indicated AC or of any higher priority AC. The values between 0 and 254 shall be a logarithmically
32   scaled representation of the average medium access delay for transmitted packets in the indicated AC
33   measured from the time the EDCF packet is ready for transmission (i.e. begins CSMA/CA access) until the
34   actual packet transmission start time. A value of 1 shall represent a 50 us delay while a value of 253 shall
35   represent a 5.5 ms delay or any delay greater than 5.5 ms. The value 254 shall indicate that services at the
36   indicated AC are currently blocked. The value 255 shall indicate that the AC Service Load is not available.
37   The QAP shall measure and average the medium access delay for all transmit packets of the indicated AC
38   using EDCF access mechanism over a continuos thirty second measurement window. The accuracy for the
39   average medium access delay shall be +/- 200 usec or better when averaged over at least 200 packets.

Average Access Delay for Best Effort (AADBE)	Average Access Delay for Background (AADBG)	Average Access Delay for Video (AADVI)	Average Access Delay for Voice (AADVO)
Octets: 1	1	1	1
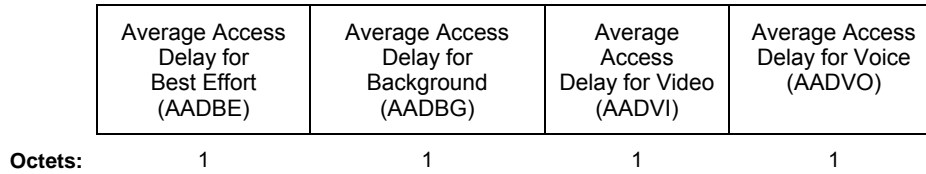
1   **Figure k39—Access Category Service Load subfields**

2   The Station Count field is interpreted as an unsigned integer that indicates the total number of STAs
3   currently associated with this BSS. The Station Count field shall not be present in beacon or probe
4   response frames if dot11QoSOptionImplemented and dot11QBSSLoadImplemented are both true.

5   The Channel Utilization field is defined as the percentage of time the AP sensed the medium busy, as
6   indicated by either the physical or virtual carrier sense mechanism. This percentage is represented as a
7   moving average of ((channel busy time/(dot11ChannelUtilizationBeaconIntervals * dot11BeaconPeriod *
8   1024)) *255), where channel busy time is defined to be the number of microseconds during which the
9   carrier sense mechanism, as defined in 9.2.1, has indicated a channel busy indication, and
10 dot11ChannelUtilizationBeaconIntervals represents the number of consecutive beacon intervals during
11 which the average should be calculated. The default value of dot11ChannelUtilizationBeaconIntervals is
12 defined in Annex D. The Channel Utilization field shall not be present in beacon or probe response frames
13 if dot11QoSOptionImplemented and dot11QBSSLoadImplemented are both true.

14 **7.3.2.30 Antenna Information element**

15 The Antenna Information element contains the Antenna ID field as shown in Figure k40.

Element ID	Length	Antenna ID
Octets: 1	1	1
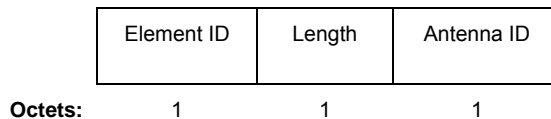
16   **Figure k40—Antenna Information element format**

17 The length field shall be set to 2.

18 The Antenna ID field contains the identifying number for the antenna used to transmit the frame containing
19 this Information element. The valid range for the Antenna ID is 1 through 254. The value 0 shall indicate
20 that the antenna identifier is unknown. The value 255 shall indicate that this frame was transmitted using
21 multiple antennas. that the antenna identifier is unknown. The value 255 indicates that this measurement
22 was made with multiple antennas. The value 1 is used for a STA with only one antenna. STAs with more
23 than one antenna shall assign Antenna IDs to each antenna as consecutive, ascending numbers. Each
24 Antenna ID number represents a unique antenna characterized by a fixed relative position, a fixed relative
25 direction and a peak gain for that position and direction.

26 **7.3.2.31 RSNI element**

27 The RSNI element contains a RSNI value, as shown in Figure k41.

Element ID	Length	RSNI
1	1	1

Octets:
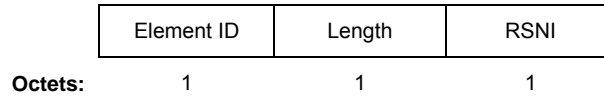
1   **Figure k41—RSNI element format**

2   The length field shall be set to 1.

3   The RSNI field contains the RSNI value for the received frame as measured by the reporting STA at the
4   currently in use receiving antenna connector. RSNI is the received signal to noise plus interference ratio
5   derived from the measured RCPI for the received frame and from the measured ANPI for the channel used
6   to received the frame. RSNI is calculated by the ratio of the received signal power (RCPI - ANPI) over the
7   noise plus interference power (ANPI), expressed in db (1/2 db steps), where RSNI = [(ratio(dB) + 10) * 2],
8   for ratios in the range -10dB to +118dB.

9   **7.4 Action frame format details**

10   *Insert the following new clauses after the end of clause 7.4.4:*

11   **7.4.5 Radio Measurement action details**

12   Several Action frame formats are defined for Radio Measurement purposes. An Action field, in the octet
13   field immediately after the Category field, differentiates the formats. The Action field values associated
14   with each frame format are defined in Table k11.

15   **Table k11 — 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

16   **7.4.5.1 Radio Measurement Request frame format**

17   The Radio Measurement Request frame uses the Action frame body format. It is transmitted by a STA
18   requesting another STA to make one or more measurements one or more channels. The format of the frame
19   is shown in Figure k42.

Category	Action	Dialog Token	Number of Repetitions	Measurement Request Elements
Octets: 1	1	1	2	variable
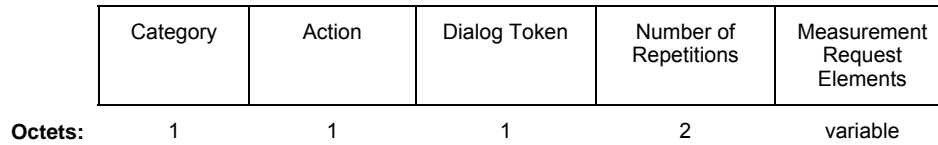
1   **Figure k42—Radio Measurement Request frame body format**

2   The Category field shall be set to the value indicating the Radio Measurement category, as specified in
3   Table 19a in 7.3.1.11.

4   The Action field shall be set to indicate a Measurement Request according to Table k11 in 7.4.5.

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

7   The Number of Repetitions field contains the requested number of repetitions for all the Measurement
8   Request elements in this frame. A value of zero in the Number of Repetitions field indicates Measurement
9   Request elements are executed once without repetition.

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

13   **7.4.5.2 Radio Measurement Report frame format**

14   The Measurement Report frame uses the Action frame body format. It is transmitted by a STA in response
15   to a Measurement Request frame or by a STA providing a triggered autonomous measurement report. The
16   format of the frame is shown in Figure k43.

Category	Action	Dialog Token	Measurement Report Elements
Octets: 1	1	1	variable
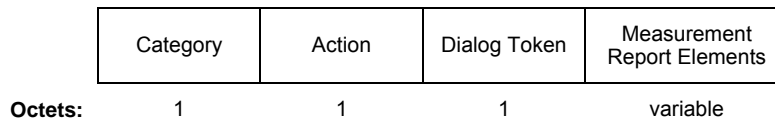
17   **Figure k43—Measurement Report frame body format**

18   The Category field shall be set to indicate the Radio Measurement category according to Table 19a.

19   The Action field shall be set to indicate a Measurement Report according to Table k11.

20   The Dialog Token field shall be set equal to the value in any corresponding Measurement Request frame. If
21   the Radio Measurement Report frame is not being transmitted in response to a Radio Measurement Request
22   frame then the Dialog token shall be set equal to zero.

23   The Measurement Report Elements field shall contain one or more Measurement Report elements
24   described in 7.3.2.22. The number and length of the Measurement Report elements in a Radio
25   Measurement Report frame is limited by the maximum allowed MMPDU size.

1   **7.4.5.3 Link Measurement Request Frame Format**

2   The Link Measurement Request frame uses the Action frame body format and is transmitted by a STA to
3   request another STA to respond with a Link Measurement Report frame to enable measurement of link
4   path loss and estimation of link margin. The format of the frame is shown in Figure k44.

Category	Action	Dialog Token	Transmit Power	Max Transmit Power
Octets: 1	1	1	1	1
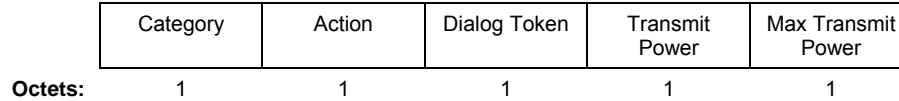
5   **Figure k44—Link Measurement Request frame body format**

6   The Category field shall be set to the value indicating the Radio Measurement category, as specified in
7   Table 19a in 7.3.1.11.

8   The Action field shall be set to indicate a Link Measurement Request according to Table k11 in 7.4.5.

9   The Dialog Token field shall be set equal to a non-zero value chosen by the STA sending the request to
10   identify the transaction.

11   The Transmit Power element shall be set to the transmit power used to transmit the frame containing the
12   Link Measurement Request. The element is coded as a signed integer in units of decibels relative to 1 mW.
13   The maximum tolerance for the transmit power value reported in the Transmit Power element shall be ± 5
14   dB by the STA transmitting the Link Measurement Request frame.

15   The Max Transmit Power element is coded as a signed integer and is 1 octet in length. It provides an upper
16   limit, in units of decibels, on the transmit power as measured at the output of the antenna connector to be
17   used by the transmitting STA on the current channel.

18   **7.4.5.4 Link Measurement Report Frame Format**

19   The Link Measurement Report frame uses the Action frame body format and is transmitted by a STA in
20   response to a Link Measurement Request frame. The format of the frame is shown in Figure k45.

Category	Action	Dialog Token	TPC Report element	Receive Antenna ID	Transmit Antenna ID
Octets: 1	1	1	4	1	1
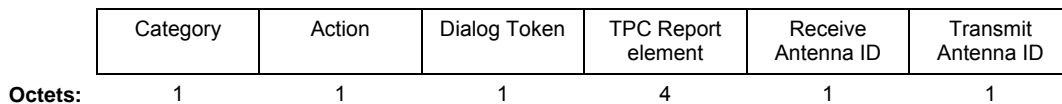
21   **Figure k45—Link Measurement Report frame body format**

22   The Category field shall be set to indicate the Radio Measurement category according to Table 19a in
23   7.3.1.11.

24   The Action field shall be set to indicate a Link Measurement Report according to Table k11 in 7.4.5.

25   The Dialog Token field shall be set equal to the Dialog Token value in the corresponding Link
26   Measurement Request frame.

27   The TPC Report element shall be set as described 7.3.2.18.

1   The Receive Antenna ID field contains the identifying number for the antenna used to receive the
2   corresponding Link Measurement Request frame. Antenna ID is defined in 7.3.2.29.

3   The Transmit Antenna ID field contains the identifying number for the antenna used to transmit this Link
4   Measurement Report frame. Antenna ID is defined in 7.3.2.29.

5   **7.4.5.5 Neighbor Report Request frame format**

6   The Neighbor Report Request frame uses the Action frame body format and is transmitted by a STA
7   requesting information in the Neighbor Report about neighboring AP's. The format of the Neighbor Report
8   Request frame body is shown in Figure k46.

Category	Action	Dialog Token	Neighbor Report Request Types	SSID element

| Octets: | 1 | 1 | 1 | 1 | variable |
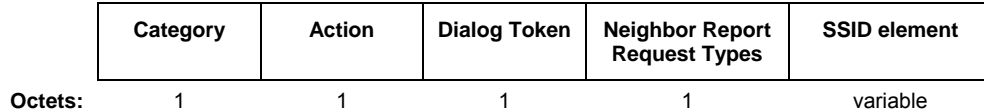
9   **Figure k46—Neighbor Report Request frame body format**

10 The Category field shall be set to the value indicating the Radio Measurement category, as specified in
11 Table 19a in 7.3.1.11.

12 The Action field shall be set to the value indicating Neighbor Report Request, as specified in Table k11 in
13 7.4.5.

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

16 The Neighbor Report Request Types field shall be one octet in length and shall contain the subfields as
17 shown in **Error! Reference source not found.**.

B0	B1	B7
Neighbor TSF offset Request	Reserved	

| Bits: | 1 | 7 |
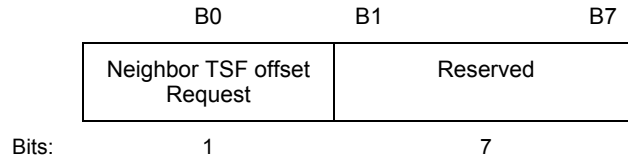
18   **Figure k47—Neighbor Report Request Types Subfield**

19 Neighbor TSF offset Request – This bit is set to 1 to request TSF offset information be provided in
20 neighbor list entires if available. When this bit is set to 0 the TSF Info field shall not be included in any
21 neighbor list entries.

22 All other bits are reserved and shall be set to 0 on transmission and ignored on reception.

23 The SSID element is defined in 7.3.2.1. It's inclusion shall indicate a request for a neighbor list for the
24 specified SSID in the SSID Element. The absence of a SSID element indicates neighbor report for the
25 current ESS.

26 **7.4.5.6 Neighbor Report Response frame format**

27 The Neighbor Report Response frame uses the Action frame body format and is transmitted by a STA in
28 response to a Neighbor Report Request frame. The format of the Neighbor Report Response frame body is
29 shown in Figure k48.

Category	Action	Dialog Token	Neighbor Report Elements
Octets: 1	1	1	variable
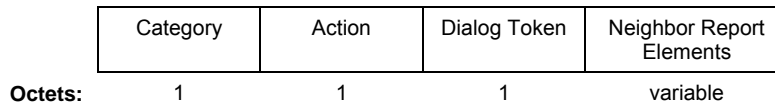
1   **Figure k48—Neighbor Report Response frame body format**

2   The Category field shall be set equal to the value indicating the Radio Measurement category, as specified
3   in Table 19a in 7.3.1.11.

4   The Action field shall be set equal to the value indicating Neighbor Report Response, as specified in Table
5   k11 in 7.4.5.

6   The Dialog Token field shall be set equal to the value in the corresponding Neighbor Report Request
7   frame. If the Neighbor Report Response frame is not being transmitted in response to a Neighbor Report
8   Request frame then the Dialog token shall be set equal to zero.

9   The Neighbor Report Elements field shall contain the Neighbor Report elements described in 7.3.2.27. If
10   the STA has no information in response to the Neighbor Report Request, the Neighbor Report elements
11   shall be omitted. The number and length of the Neighbor Report Elements in a Neighbor Report frame is
12   limited by the maximum allowed MMPDU size.

13   # 10. Layer management

14   ## 10.3 MLME SAP Interface

15   ### 10.3.2 Scan

16   #### 10.3.2.2 MLME-SCAN.confirm

17   ##### 10.3.2.2.2 Semantics of the Service Primitive

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

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 Probe Request frame measured during the active scan procedure. This parameter shall be present within a BSSDescription returned in an MLME-SCAN.confirm primitive when an RCPI element was present in the received Probe Response. Present only when the MIB attribute dot11RadioMeasurementEnabled is true.
PowerConstraint	As defined in frame format	As defined in frame format	The contents of the Power Constraint element when received. Present only when the MIB attribute dot11SpectrumManagementRequired is true or dot11RadioMeasurementEnabled is true.
TPCReport	As defined in frame format	As defined in frame format	The contents of the TPC Report element when received. Present only when either the MIB attribute dot11SpectrumManagementRequired or dot11RadioMeasurementEnabled is true.
APChannelReportSet	Set of AP Channel Reports each as defined in the Channel Report element format	Set of AP Channel Reports each as defined in the Channel Report element format	The contents of any AP Channel Report elements received. Present only when the MIB attribute dot11RadioMeasurementEnabled is true.
BSS Load	As defined in frame format	As defined in frame format	The values from the BSS Load information element if such an element was present in the probe response or beacon, else null.

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

2   **10.3.11 ~~Spectrum Management p~~Protocol layer model <u>for spectrum management & radio</u>**
3   **<u>measurement</u>**

4   The layer management extensions for measurement<u>, TPC</u> and channel switching assume a certain partition
5   of ~~spectrum management~~ functionality between the MLME and station management entity (SME). This
6   partitioning assumes that policy decisions (e.g., regarding measurement and channel switching) reside in
7   the SME, while the protocol for measurement, switch timing and the associated frame exchanges resides
8   within the MLME (see Figure 67a).

9   The informative diagrams within this clause further illustrate the ~~spectrum management~~ protocol <u>layer</u>
10   model adopted. Figure 67b and Figure 67c depict the measurement process for a peer STA to accept and
11   reject a measurement request respectively. <u>Figure 67d illustrates the TPC adaptation process. Lastly, Figure</u>
12   <u>67e</u> depicts the management process for a channel switch using a Channel Switch Announcement frame.

13   *Insert a new paragraph after the second paragraph in 10.3.11 as follows:*

14   It should be noted that these diagrams are intended as examples and do not depict all possible protocol
15   scenarios, e.g., a measurement request may result in more than one measurement report frame as described

1   in 11.10.6 and 11.11. Note that when rejecting a radio measurement category request it is mandatory for a
2   STA to send a measurement report with the Incapable bit set if the STA is permanently unable to make the
3   requested measurement or with the Refused bit set if the STA is refusing the request.

4   *Change the primitive definitions in 10.3.12.1.2, 10.3.12.3.2, 10.3.14.1.2 and 10.3.14.3.2 as follows:*

5   **10.3.12 Measurement Request**

6   **10.3.12.1 MLME-MREQUEST.request**

7   **10.3.12.1.2 Semantics of the Service Primitive**

8   The primitive parameters are as follows:

```
9    MLME-MREQUEST.request              (
10                                      Peer MAC Address,
11                                      Dialog Token,
12                                      Measurement Request Set,
13                                      Measurement Category
14                                      )
```

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 shall be ~~set~~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. If dot11RadioMeasurementEnabled is true, the Measurement Request Set includes the Number of Repetitions for the Measurement Request Set.
Number of Repetitions	Integer	0 – 65535	The number of times the Measurement Reqest Set is to be repeated. Shall only be present if Measurement Category is RADIO MEASUREMENT.
Measurement Category	Enumeration	SPECTRUM MANAGEMENT, or RADIO MEASURE-MENT	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.

15   **10.3.12.3 MLME-MREQUEST.indication**

16   **10.3.12.3.2 Semantics of the Service Primitive**

17   The primitive parameters are as follows:

```
18   MLME-MREQUEST.indication           (
19                                      Peer MAC Address,
20                                      Dialog Token,
21                                      Measurement Request Set,
```

48

1   Measurement Category
2   )

Name	Type	Valid Range	Description
Peer MAC Address	MACAddress	Any valid individual 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 a Measurement Request. If dot11RadioMeasurementEnabled is true, the Measurement Request Set includes the Number of Repetitions for the Measurement Request Set.
Number of Repetitions	Integer	0 – 65535	The number of times the Measurement Reqest Set is to be repeated. Shall only be present if Measurement Category is RADIO MEASUREMENT.
Measurement Category	Enumeration	SPECTRUM MANAGEMENT, or RADIO MEASURE-MENT	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.

3   **10.3.14 Measurement Report**

4   **10.3.14.1 MLME-MREPORT.request**

5   **10.3.14.1.2 Semantics of the Service Primitive**

6   The primitive parameters are as follows:

7   MLME-MREPORT.request   (
8   Peer MAC Address,
9   Dialog Token,
10   Measurement Report Set,
11   Measurement Category
12   )

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 shall be set.
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 MEASURE-MENT	Indicates whether the Measurement Report Set is a set of Spectrum Management or Radio Measurement measurement reports. Shall only be present if dot11RadioMeasurementEnabled is true.

10.3.14.3 MLME-MREPORT.indication

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 (MLME-
MREQUEST.request), or may 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
                                     )
```

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 a Measurement Report.
<u>Measurement Category</u>	<u>Enumeration</u>	<u>SPECTRUM MANAGEMENT, or RADIO MEASURE-MENT</u>	<u>Indicates whether the Measurement Report Set is a set of Spectrum Management or Radio Measurement measurement reports. Shall only be present if dot11RadioMeasurementEnabled is true.</u>

1 *Insert the following clauses with the tables included therein, renumbering as necessary:*

2 **10.3.17 Link Margin request**

3 This set of primitives allows STA to retrieve uplink and downlink link margins as computed in 11.13.9.

4 **10.3.17.1 MLME-LINKMARGIN.request**

5 **10.3.17.1.1 Function**

6 This set of primitives allows STA to retrieve uplink and downlink link margins as computed in 11.13.9.

7 **10.3.17.1.2 Semantics of the Service Primitive**
8 The primitive parameters are as follows:

9   MLME-LINKMARGIN.request   (
10   Link Margin Category
11   )
12

Name	Type	Valid Range	Description
Link Margin Category	Enumeration	ULM or DLM or ALL	Differentiates between uplink link margin and downlink link margin request. Shall only be present if dot11MeasurementPilotEnabled is true.

13 **10.3.17.1.3 When generated**

14 This primitive is generated by the SME to request that a Link Margin report, which contains link margins
15 computed base on information received in Measurement Pilot frame, be sent to the SME upper layer
16 application.

1   **10.3.17.1.4 Effect of receipt**

2   On receipt of this primitive, the MLME shall measure link margin based on information received in and a
3   measurement of the Measurement Pilot frames and report this back to the SME in a MLME-
4   LINKMARGIN.confirm primitive.

5   **10.3.17.2 MLME-LINKMARGIN.confirm**

6   **10.3.17.2.1 Function**

7   This primitive reports the result of the Link Margin request.

8   **10.3.17.2.2 Semantics of the Service Primitive**
9   The primitive parameters are as follows:

10   MLME-LINKMARGIN.confirm   (
11   ResultCode,
12   Link Margin Category,
13   Uplink Link Margin,
14   Downlink Link Margin
15   )
16
17

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID PARAMETERS, LM INFO UNAVAILABLE	Reports the outcome of a Link Margin request
Link Margin Category	Enumeration	ULM or DLM or ALL	Differentiates between uplink link margin and downlink link margin computation. Shall only be present if dot11MeasurementPilotEnabled is true.
Uplink Link Margin	Integer	0 – 255	Uplink link margin computed based on information received in Measurement Pilot frame. Shall only be present if dot11MeasurementPilotEnabled is true.
Downlink Link Margin	Integer	0 – 255	Downlink link margin computed based on information received in Measurement Pilot frame. Shall only be present if dot11MeasurementPilotEnabled is true.

18   **10.3.17.2.3 When generated**
19   This primitive is generated by the MLME when the Link Margin report is ready.

20   **10.3.17.2.4 Effect of receipt**
21   The SME upper layer application receives the Link Margin report it has requested.

22   *Insert the following new clauses following 10.3.23:*

23   **10.3.24 Neighbor Report**

52

1   The following MLME primitives support the signaling of Neighbor Reports.

2   **10.3.24.1 MLME-NEIGHBORREP.request**

3   **10.3.24.1.1 Function**

4   This primitive requests that a Neighbor Report Request frame be sent to the AP with which the STA is
5   associated. It is valid only at a Radio Measurement capable non-AP STA.

6   **10.3.24.1.2 Semantics of the Service Primitive**

7   The primitive parameters are as follows:

8   MLME-NEIGHBORREP.request   (
9   DialogToken,
10   NeighborReportRequestType,
11   NeighborReportFailureTimeout
12   )

Name	Type	Valid Range	Description
DialogToken	Integer	1 – 255	The Dialog Token to identify the neighbor report transaction.
NeighborReport RequestType	Enumeration	BASIC, TSF_INFO	Set to TSF_INFO to request that neighbor list entries contain TSF offset where available.
NeighborReport FailureTimeout	Integer	≥ 1	Specifies a time limit (in TU) after which the neighbor report procedure will be terminated.

13   **10.3.24.1.3 When Generated**

14   This primitive is generated by the SME to request that a Neighbor Report Request frame be sent to the AP
15   with which the STA is associated to request a Neighbor Report.

16   **10.3.24.1.4 Effect of Receipt**

17   On receipt of this primitive, the MLME constructs a Neighbor Report Request Action management frame.
18   The STA then attempts to transmit this to the AP with which it is associated.

19   **10.3.24.2 MLME-NEIGHBORREP.confirm**

20   **10.3.24.2.1 Function**

21   This primitive reports the result of a neighbor report request. It is valid only at a Radio Measurement
22   capable non-AP STA.

23   **10.3.24.2.2 Semantics of the Service Primitive**

24   The primitive parameters are as follows:

25   MLME-NEIGHBORREP.confirm   (
26   ResultCode,
27   DialogToken,
28   NeighborListSet
29   )

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID_ PARAMETERS, TIMEOUT, TRANSMISSIO N_FAILURE, UNSPECIFIED_ FAILURE	Indicates the result of the corresponding MLME-NEIGHBORREP.request.
DialogToken	Integer	As defined in the corresponding MLME-NEIGHBORREP. request	The Dialog Token to identify the neighbor report transaction.
NeighborListSet	Set of Neighbor List Entries each as defined in the Neighbor Report element format	Set of Neighbor List Entries each as defined in the Neighbor Report element format	A set of Neighbor List Entries each representing a neighboring AP being reported as defined in the Neighbor Report element format. Only present if ResultCode = SUCCESS

10.3.24.2.3 When Generated

This primitive is generated by the MLME as a result of an MLME-NEIGHBORREP.request and indicates the results of the request.

This primitive is generated when the MLME-NEIGHBORREP.request contains invalid parameters, when a timeout or failure occurs, or when the STA receives a Neighbor Report Response frame from the AP.

10.3.24.2.4 Effect of Receipt

On receipt of this primitive, the SME evaluates the ResultCode and may use the reported data.

1   **10.3.24.3 MLME-NEIGHBORREP.indication**

2   **10.3.24.3.1 Function**

3   This primitive indicates that a Neighbor Report Request frame was received from a non-AP STA. It is
4   valid only at a Radio Measurement capable AP.

5   **10.3.24.3.2 Semantics of the Service Primitive**

6   The primitive parameters are as follows:

7   MLME-NEIGHBORREP.indication   (
8   PeerSTAAddress,
9   DialogToken,
10   NeighborReportRequestType
11   )

Name	Type	Valid Range	Description
PeerSTAAddress	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.
NeighborReport RequestType	Enumeration	BASIC, TSF_INFO	The value TSF_INFO requests that neighbor list entries contain TSF offset where available.

12   **10.3.24.3.3 When Generated**

13   This primitive is generated by the MLME when a valid Neighbor Report Request frame is received.

14   **10.3.24.3.4 Effect of Receipt**

15   On receipt of this primitive the SME should operate according to the procedure in 11.12.2.

16   **10.3.24.4 MLME-NEIGHBORREP.response**

17   **10.3.24.4.1 Function**

18   This primitive is generated in response to an MLME-NEIGHBORREP.indication requesting a neighbor
19   report be sent to a non-AP STA. It is valid only at a Radio Measurement capable AP.

55

1   **10.3.24.4.2 Semantics of the Service Primitive**

2   The primitive parameters are as follows:

3   MLME-NEIGHBORREP.response   (
4   PeerSTAAddress,
5   ResultCode,
6   DialogToken,
7   NeighborListSet
8   )

Name	Type	Valid Range	Description
PeerSTAAddress	MACAddress	Any valid individual MAC Address	The address of the non-AP STA MAC entity from which a Neighbor Report Request frame was received.
ResultCode	Enumeration	SUCCESS, INVALID_ PARAMETERS, REFUSED, UNSPECIFIED_ FAILURE	Indicates the results of the corresponding MLME-NEIGHBORREP.indication.
DialogToken	Integer	As defined in the corresponding MLME-NEIGHBORREP. indication	The Dialog Token to identify the neighbor report transaction.
NeighborListSet	Set of Neighbor List Entries each as defined in the Neighbor Report element format	Set of Neighbor List Entries each as defined in the Neighbor Report element format	A set of Neighbor List Entries each representing a neighboring AP being reported as defined in the Neighbor Report element format. Only present if ResultCode = SUCCESS.

9   **10.3.24.4.3 When Generated**

10   This primitive is generated by the SME in response to an MLME-NEIGHBORREP.indication requesting a
11   neighbor report be sent to a non-AP STA. If the returned ResultCode is SUCCESS, the primitive contains
12   the neighbor report entries to be sent to the STA.

13   **10.3.24.4.4 Effect of Receipt**

14   On receipt of this primitive, the MLME constructs a Neighbor Report Response frame. The STA then
15   attempts to transmit this to the non-AP STA indicated by the PeerSTAAddress parameter.

16   **10.3.25 Link Measure Request**

17   The following primitives support the measurement of link path loss, and the estimation of link margin
18   between peer entities for Radio Resource Measurement.

1   **10.3.25.1 MLME-LINKMEASURE.request**

2   *10.3.25.1.1 Function*

3   This primitive supports the measurement of link path loss, the estimation of link margin between peer
4   entities.

5   *10.3.25.1.2 Semantics of the Service Primitive*

6   The primitive parameters are as follows:

7   MLME-LINKMEASURE.request   (
8   PeerMACAddress,
9   DialogToken
10   )

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.

11   **10.3.25.1.3 When Generated**

12   This primitive is generated by the SME to request that a Link Measurement Request frame be sent to the
13   peer entity to request that entity to report transmit power and link margin information.

14   **10.3.25.1.4 Effect of Receipt**

15   On receipt of this primitive, the MLME constructs a Link Measurement Request frame. The STA then
16   attempts to transmit this to the STA indicated in the PeerMACAddress parameter.

17   **10.3.25.2 MLME-LINKMEASURE.confirm**

18   *10.3.25.2.1 Function*

19   This primitive reports the result of a Link Measurement request.

20   *10.3.25.2.2 Semantics of the Service Primitive*

21   The primitive parameters are as follows:

22   MLME-LINKMEASURE.confirm   (
23   ResultCode,
24   DialogToken,
25   TransmitPower,
26   LinkMargin,
27   RCPI
28   )

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 corresponding MLME-LINKMEASURE.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 Measure 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 Measure Report frame. Only present if ResultCode = SUCCESS.
RCPI	Integer	As defined in 15.4.8.5, or 17.3.10.6, or 18.4.8.5	The RCPI level of the received Link Measurement Report frame. Only present if ResultCode = SUCCESS.

10.3.25.2.3 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 Response frame from the requested STA.

10.3.25.2.4 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

11.1.3.2 Active scanning

11.1.3.2.1 Sending a probe response

Change the first paragraph as shown below:

STAs, subject to criteria below, receiving Probe Request frames shall respond with a probe response only if the SSID in the probe request is the broadcast SSID or matches the specific SSID of the STA. If the DS Parameter Set information element is present in the probe request, a STA where dot11RadioMeasurementEnabled is true shall respond only if the channel number from the DS Parameter Set element matches the channel in use by the STA. If the DS Parameter Set information element is present in the probe request, a STA where dot11RadioMeasurementEnabled is false may respond only if the

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1   channel number from the DS Parameter Set element matches the channel in use by the STA. Probe
2   Response frames shall be sent as directed frames to the address of the STA that generated the probe
3   request. The probe response shall be sent using normal frame transmission rules. An AP shall respond to
4   all probe requests meeting the above criteria. In an IBSS, the STA that generated the last beacon shall be
5   the STA that responds to a probe request.

6   *Insert the following paragraph at the end of clause 11.1.3.2.1:*

7   When a probe response frame is returned in response to a probe request frame which contains Requested
8   information elements, any of the requested elements which appear as individual items in the ordering list of
9   Table 12 shall appear both in their individual ordered location as specified in Table 12 and in the ordered
10 location reserved for the list of requested elements, where the requested elements appear in increasing
11 numerical element ID order.

12 **11.1.3.2.2 Active scanning procedure**

13 *Insert the following text at the end of this clause:*

14 If dot11RadioMeasurementEnabled is true and a Probe Request with a Request Information element which
15 contains the RCPI element ID is received then a RCPI element shall be included in the Probe Response. If
16 a RCPI element is received in a Probe Response frame, the RCPI value shall be included in the
17 RCPIMeasurement parameter of the BSSDescription in the MLME-SCAN.confirm.

18 If dot11RadioMeasurementEnabled is true and if the Request Information element of the Probe Request
19 includes the RCPI element ID, an AP shall include a RCPI element in the Probe Response. An AP may
20 measure RCPI on the received Probe Request frame and include the result in the RCPI element of the
21 Probe Response. If no measurement result is available the RCPI value shall be set to indicate that a
22 measurement is not available.

23 *Change clause 11.9 as follows:*

24 **11.9 TPC procedures**

25 ERC/DEC/(99)23 requires RLANs operating in the 5GHz band to use transmitter power control, involving
26 specification of a regulatory maximum transmit power and a mitigation requirement for each allowed
27 channel, to reduce interference with satellite services. This Standard describes such a mechanism, referred
28 to as Transmit Power Control (TPC).

29 This clause describes TPC procedures that may be used to satisfy these and similar future regulatory
30 requirements in Europe. The procedures may also satisfy comparable needs in other regulatory domains
31 and other frequency bands and may be useful for other purposes, such as reduction of interference, range
32 control and reduction of power consumption.

33 STAs shall use the TPC procedures defined in this clause if dot11SpectrumManagementRequired is true or
34 dot11RadioMeasurementEnabled is true. dot11SpectrumManagementRequired shall be set true when
35 regulatory authorities require TPC. It may also be set true in other circumstances. The TPC procedures
36 provide for the:
37 • Association of STAs with an AP in a BSS based on the STA's power capability (11.9.1).

38 • Specification of regulatory and local maximum transmit power levels for the current channel (11.9.2).

39 • Selection of a transmit power for each transmission in a channel within constraints imposed by
40   regulatory and local requirements (11.9.3).

41 • Measurement of link path loss and estimation of link margin (11.9.4).

1 • Adaptation of transmit power based on a range of information, including path loss and link margin
2   estimates (11.9.4).

3 For the purposes of TPC:

4 • A STA with dot11SpectrumManagementRequired set equal to true shall not operate in a BSS or IBSS
5   unless the Spectrum Management bit is set equal to 1 in the Capability Information field in Beacons,
6   Measurement Pilot frames, and Probe Responses received from other STAs in the BSS or IBSS, *with*
7   *the following exception.*

8 • A STA may operate when the Spectrum Management bit is set equal to 0 if the STA can determine
9   that it is in a regulatory domain that does not require TPC, or can ensure that it will meet regulatory
10   requirements even if TPC is not employed. Potential methods for determining the regulatory domain
11   include receiving a country indication in the beacon, Measurement Pilot frame, user confirmation, or
12   configuration information within the device. Potential methods to ensure regulations are met even if
13   TPC is not employed include using a transmit power that is below the legal maximum (including any
14   mitigation factor).

15 • A STA shall set dot11SpectrumManagementRequired equal to true before associating with a BSS or
16   IBSS in which the Spectrum Management bit is set equal to 1 in the Capability Information field in
17   Beacons, Measurement Pilot frames, and Probe Responses received from the BSS or IBSS.

18 • APs may allow association of devices that do not have the Spectrum Management bit set equal to 1 in
19   the Capability Information field in Association and Reassociation Requests received from the STA to
20   account for the existence of legacy devices that do not support TPC but do meet regulatory
21   requirements.

22 *Change clause 11.9.2 as follows:*

23 **11.9.2 Specification of regulatory and local maximum transmit power levels**

24 A STA shall determine a regulatory maximum transmit power for the current channel. The STA shall use
25 the minimum of the following:
26 — Any regulatory maximum transmit power received in a Country element from the AP in its BSS or
27   another STA in its IBSS and

28 — Any regulatory maximum transmit power for the channel in the current regulatory domain received in
29   the Max Regulatory Power field from the AP in its BSS or known by the STA from other sources.

30 A STA shall determine a local maximum transmit power for the current channel. The STA shall use the
31 minimum of the following:
32 — Any local maximum transmit power received in the combination of a Country element and a Power
33   Constraint element from the AP in its BSS or another STA in its IBSS and

34 — Any local maximum transmit power for the channel regulatory domain known by the STA from other
35   sources.

36 Any calculation of the local maximum transmit power for the channel shall ensure the mitigation
37 requirements for the channel in the current regulatory domain can be satisfied. The conservative approach
38 is to set the local maximum transmit power level equal to the regulatory maximum transmit power level
39 minus the mitigation requirement. However, it may be possible to satisfy the mitigation requirement using
40 a higher local maximum transmit power level. A lower local maximum transmit power level may be used
41 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 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 the current channel in Beacon frames and Probe Response frames using the combination of a Country element and a Power Constraint element.

When dot11MeasurementPilotEnabled is set to true, an AP in a BSS shall advertise the regulatory maximum transmit power for the current channel in Measurement Pilot frames using a Max Regulatory Power field.

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 new clauses after clause 11.10:

11.11 Radio Measurement Procedures

This clause describes the radio measurements and the procedures for requesting and reporting radio measurements between STAs.

11.11.1 Dedicated versus concurrent measurements

Measurements on non-serving channels are dedicated measurements, requiring the measuring STA to interrupt its data services on the serving channel, switch channels and make measurements.

Measurements on the serving channel may be executed by the STA as concurrent measurements and may not require the STA to interrupt its data services.

11.11.2 Station responsibility for measuring non-serving channel

All stations are responsible for maintaining data services and an association or membership with the BSS or IBSS respectively, on the serving channel while performing measurements on non-serving channels.

A STA shall determine the time between successive non-serving channel measurements. This time may be a fixed length, or it may be determined by the STA using application-specific, or other knowledge.

11.11.3 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.

The Radio Measurement category permits a randomization interval to be specified for measurement start times. This avoids the 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. A Randomization Interval of 0 in a measurement request shall mean that no random delay is to be used.

1   NOTE—It is important that designers recognize the need for statistical independence among the pseudo random
2   number streams among STAs.

3   A number of repetitions may be specified in the Radio Measurement Request frame. In this case, the
4   measurements in the frame are repeated as detailed further in clause 11.11.7. Each time a measurement is
5   repeated, the STA shall recalculate the random delay as described above.

6   **11.11.4 Measurement Duration**

7   If the Duration Mandatory bit is set to 1 in the Measurement Request mode field of a measurement request,
8   the requested STA, if it accepts the request, shall perform the measurement over the Measurement Duration
9   specified in the request. If the STA is unable to commit to making the measurement over the requested
10 duration it shall refuse the request by sending a measurement report with the refused bit set in the
11 Measurement Report Mode field. The measurement duration in the measurement report shall be equal to
12 the requested measurement duration.

13 If the Duration Mandatory bit is set to 0 in the Measurement Request mode field of a measurement request,
14 the requested STA, if it accepts the request, shall attempt a measurement using the requested duration as a
15 target measurement duration, and may report results with an actual measurement duration less than the
16 requested duration. The duration over which the measurement was made shall be included in the
17 measurement duration field of the measurement report.

18 Each separate measurement within the Radio Measurement Request frame shall be performed over a
19 continuous time period.

20 **11.11.5 Station responsibility for conducting measurements**

21 A Radio Measurement-capable STA shall decode and interpret each Radio Measurement Request frame
22 that it receives and shall assess the contents against it's capabilities and the impact on its own performance.
23 A measurement request can be refused by the receiving STA by sending a Radio Measurement Report with
24 the refused bit set in the Measurement Report Mode field if its execution would significantly degrade the
25 station's performance. The reasons for refusing a measurement request are outside the scope of this
26 standard but may include reduced quality of service, unacceptable power consumption, measurement
27 scheduling conflicts, or other significant factors.

28 In assessing the performance impact of each measurement request element, a STA may use application-
29 specific knowledge or other knowledge to limit the time it spends away from the serving channel. In doing
30 so, the STA may either reject any Measurement Request element with a mandatory measurement duration
31 exceeding the maximum allowed off-serving channel time, or measure for a reduced duration.

32 Radio measurement requests and reports are specific transactions localized to a BSS. A STA shall cancel
33 all in-process radio measurements and shall delete all pending, unprocessed radio measurement requests
34 upon receipt of a Disassociation message or upon association or reassociation with a BSSID different from
35 its most recent association.

36 **11.11.6 Requesting and reporting of measurements**

37 A STA may measure one or more channels itself or a STA may request peer STAs in the same BSS to
38 measure one or more channels on its behalf.

39 When requesting other STAs to measure one or more channels, a STA shall use a Radio Measurement
40 Request frame containing one or more Measurement Request elements. The measurement request may be
41 sent to an individual or group destination address. The permitted measurement requests are shown in Table
42 k12.

43   **Table k12—Allowed measurement requests**

Service Set	Source of Request	Destination of Request	Receiver Address of Radio Measurement Request Frame
Infrastructure BSS	AP	STA	Individual or group
	STA	AP	Individual only
	STA	STA	Individual only for DLS within a QBSS, otherwise not allowed
IBSS	STA	STA	Individual or group

1　The source and destination of a measurement request shall both be a member of the same infrastructure
2　BSS or a member of the same IBSS. Measurement requests with an individual Receiver Address shall only
3　be sent to STAs that have indicated Radio Measurement capability.

4　The set of requested measurements received in the most recently received Radio Measurement Request
5　frame of highest precedence is active at a STA. The precedence order for measurement requests shall be as
6　follows (highest precedence first):

7　　　— Measurement requests received in individually addressed Radio Measurement Request frames

8　　　— Measurement requests received in received in Multicast-group addressed Radio Measurement
9　　　　　Request frames

10　　　— Measurement requests received in received in Broadcast addressed Radio Measurement Request
11　　　　　frames

12　The Measurement Request elements are processed in sequence by default, with certain Measurement
13　Request elements processed in parallel according to the parallel bit field setting – see 7.3.2.21. If
14　measurement resources are available, the STA processes each element by setting up and making the
15　specified measurement.

16　The Measurement Request elements within a Radio Measurement Request frame may specify multiple
17　measurement types across multiple channels.

18　A STA may receive another Radio Measurement Request frame while the measurements requested in a
19　previous Radio Measurement Request frame are pending or in progress. In this case, the set of
20　measurement requests in the new frame supersedes any previous requests received in a Radio Measurement
21　Request frame of the same or lower precedence. The measuring STA shall report the results of any
22　completed measurements and terminate any pending or in-progess measurements. Results from a
23　terminated in-progess measurement may be valid and reported if Duration Mandatory was not set to 1 in
24　the corresponding request. It is permissible for the superceding Radio Measurement Request frame to
25　contain no new measurement requests. If a station receives a Radio Measurement Request frame with
26　lower precedence than the currently active Radio Measurement Request frame, the station shall discard the
27　measurement requests in the new Radio Measurement Request frame. Measurement Request elements that
28　have the Enable bit set to 1 shall be processed in all received Radio Measurement Request frames
29　regardless of these precedence rules.

30　If a STA receives a spectrum management Measurement Request with Measurement Type equal to 0
31　(Basic Request), this shall always take priority over any pending or in-progress radio measurements.

32　A STA that issues a radio measurement request to another STA to perform a measurement on the serving
33　channel may continue to transmit MPDUs and MMPDUs to that STA while the measurement is being
34　processed.

A STA that issues a radio measurement request to another STA to perform a measurement on a non-serving 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-serving channel measurement.

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. 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.

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. 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.

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 Mesaurement Request frames in this manner.

Note—Since measurements on non-serving channels could potentially degrade a station's performance, non-serving channel measurements should be requested sparingly and for short durations. Since measurements on the serving channel execute concurrently with normal traffic processing, serving channel measurements may be requested more frequently and for longer durations.

11.11.7 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, 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. When completing the 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.

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.

11.11.8 Triggered Autonomous Reporting

Autonomous reporting is defined for Spectrum Management measurements supporting DFS – see 11.6.6. 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, all autonomous reporting shall be subject to trigger conditions set by the enabling STA that determine when measurement reports are issued. This is termed triggered autonomous reporting and provides a method for reporting during continuous background measurement. 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 QoS Metrics measurement type – see 11.11.9.10.

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 Measurement Request Frame. The 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 without trigger conditions having been set. If a Measurement Request element is received with the Enable and Report bits set to 1 without trigger conditions in the Measurement Request field then that Measurement Request element shall be ignored.

If a request to enable triggered autonomous reporting is sent to an individual address and the receipient STA does not support measurements of the type indicated, 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 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 the trigger conditions have been met.

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 7.2.3.21.

A STA in an infrastructure BSS shall cease all triggered autonomous reporting if it disassociates, or re-associates to a different BSS. 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

1   set shall be processed without regard for the measurement precedence rules for requested measurements in
2   11.7.6.

3   **11.11.9 Specific measurement usage**

4   **11.11.9.1 Beacon Report**

5   If a STA accepts a Beacon Request it shall respond with a Radio Measurement Report frame containing
6   Beacon Measurement Reports for all observed BSSs matching the BSSID and SSID in the Beacon
7   Measurement Request. The RCPI in the Beacon Report indicates the power level of the received Beacon,
8   Measurement Pilot or Probe Response frame. RCPI in a Beacon Report element may be used with other
9   Beacon Report elements to determine the most suitable AP target for roaming. For repeated measurements
10 (when the Measurement Request frame contains a non zero value for the Number of Repetitions field), the
11 transmission of the Beacon Report element may be conditional on the measured RCPI or RSSI value. Table
12 k3 lists the reporting conditions that are based on the measured RCPI or RSSI levels.

13 The RCPI in the Beacon Report indicates the power level of the received beacon. RCPI in a Beacon Report
14 element may be used with other Beacon Report elements to determine the most suitable AP target for
15 roaming. For repeated measurements (when the Measurement Request frame contains a non zero value for
16 the Number of Repetitions field), the transmission of the Beacon Report element may be conditional, based
17 on the beacon's measured RCPI or RSSI value with respect to the requested reporting condition. Table k3
18 lists the reporting conditions.

19 If the Measurement Mode in the measurement request is Passive or Passive Pilot, the measuring STA shall
20 perform the following procedure on the requested channel:

21   a) Set a measurement duration timer.

22   b) At the end of the measurement duration, process all received Beacon, or Probe Response
23   management frames with the requested SSID and BSSID to compile the measurement report. If
24   only Measurement Pilot frames were received in the measurement duration and the requested
25   Measurement Mode was Passive Pilot, process all Measurement Pilot Frames with the requested
26   BSSID to compile the measurement report.

27 If the Measurement Mode in the measurement request is Active, the measuring STA shall perform the
28 following procedure on the requested channel:

29   a) If the channel is not the serving channel, wait for dot11RadioMeasurementProbeDelay, or until a
30   PHY-RXSTART.indication has been received.

31   b) Using the basic access protocol in 9.2.5.1, send a Probe Request management frame to the
32   broadcast destination address (DA). The BSSID field in the Probe Request shall be set to the
33   BSSID field in the measurement request. The SSID element in the Probe Request shall be set to
34   the SSID element in the measurement request.

35   c) Set a measurement duration timer.

36   d) At the end of the measurement duration, process all received Probe Response and Beacon
37   management frames with the requested SSID and BSSID to compile the measurement report.

38 If the Measurement Mode is STA Selected, the selection of measurement mode shall be made by the
39 measuring STA. If the measuring STA supports Passive Pilot mode and the measurement request contained
40 the wildcard SSID, the measuring STA shall select between Passive, Passive Pilot, or Active mode.
41 Otherwise the selection shall be between Passive and Active mode. The choice of mode is outside the
42 scope of this amendment.

1   When more than one Beacon, or Probe Response from a BSS is received in the measurement duration, the
2   contents of the Beacon Report shall be based on the latest received. If only Measurement Pilot frames were
3   received in the measurement duration and the Measurement Mode was Passive Pilot, the contents of the
4   Beacon Report shall be based on the latest Measurement Pilot frame received.

5   If the BSSID field in the Measurement Request contains a broadcast BSSID, all observed BSSs with the
6   requested SSID shall be reported. If the SSID element in the Measurement Request contains the wildcard
7   SSID, all observed BSSs shall be reported. In Active mode, this shall be regardless of whether a received
8   Probe Reponse frame was triggered by the measuring STAs Probe Request.

9   On accepting a Beacon measurement request with Channel Number set to 0 a STA shall conduct
10 measurements on all supported channels in the specified Regulatory Class where the measurement is
11 permitted on the channel and the channel is valid for the current regulatory domain. Measurements shall be
12 made within the specified Measurement Interval with the time between each consecutive measurement as
13 defined in 11.11.2. Measurements shall cease either when all supported channels have been measured, or
14 the measurement interval has expired.

15 On accepting a Beacon measurement request with Channel Number set to 255 a STA shall iteratively
16 conduct measurements on all supported channels listed in the AP Channel Report where the measurement
17 is permitted on the channel and the channel is valid for the current regulatory domain. For iterative beacon
18 measurements, the measurement duration applies to the measurement on each channel. Measurements shall
19 be made within the specified Measurement Interval with the time between each consecutive measurement
20 as defined in 11.11.2. Measurements shall cease either when all supported channels have been measured,
21 or the measurement interval has expired. If an AP Channel Report is not available in the STA, the STA
22 shall iteratively conduct measurements on all supported channels in the specified Regulatory Class that are
23 valid for the current regulatory domain.

24 If the Measurement Mode in the measurement request is Beacon Table, the measuring STA shall return a
25 Beacon Report containing the current contents of any stored beacon information for any supported channel
26 with the requested SSID and BSSID without performing additional measurements. The receiving STA
27 shall ignore the channel specified in the Beacon Request when Beacon Table mode is selected. The beacon
28 information accumulated may be the result of any operation that caused the STA to aquire these results. If
29 the STA has no beacon information available then the STA may either refuse the request or send an empty
30 Beacon Report.

31 For repeated measurements, the Beacon Request element may specify a reporting condition that determines
32 when the measuring STA is to send a Beacon Report element for a measured Beacon, Measurement Pilot
33 or Probe Response frame with the requested BSSID. When the requested Reporting Condition value is non
34 zero, the STA shall create and transmit a Beacon Report element for that measured frame only if the
35 condition indicated in Table k3 is true. Otherwise, a Beacon Report element is not created for that
36 measured frame. For reporting conditions 5-10, the serving AP's RCPI and the serving AP's RSSI referred
37 to in Table k3 are moving average values of the RCPI or RSSI of the 10 most recent Beacon frames
38 received from the measuring STA's serving AP. The serving AP's RCPI and the serving AP's RSSI are so
39 averaged to provide a more accurate and stable indication of the signal level from the serving AP. For
40 reporting conditions 5-10, the STA shall use the serving AP's RCPI or RSSI (with offset, if any) to test the
41 measured RCPI or RSSI to determine whether to create and send a Beacon Report element for this
42 measured Beacon, Measurement Pilot or Probe Response frame. Figure k49 diagrams the beacon RCPI
43 measurements for reporting conditions 5 and 6.

67
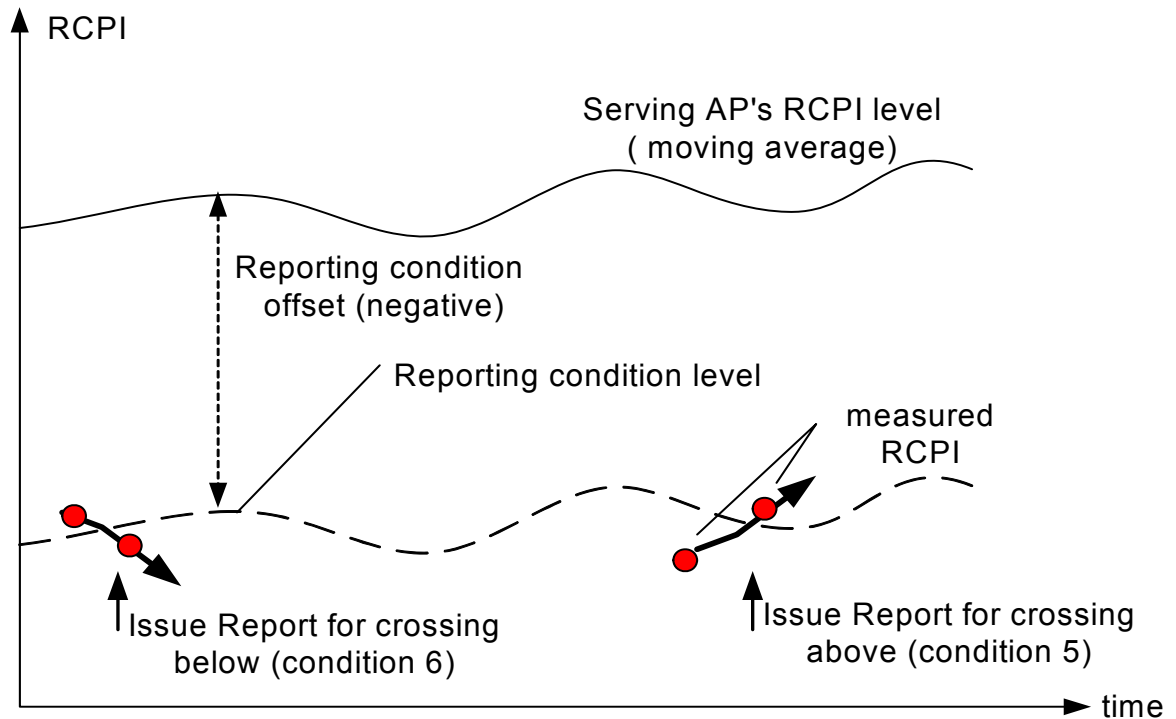
Figure k49—Reporting Condition for RCPI Crossing Level with Offset

2 **11.11.9.2 Frame Report**

3   If a station accepts a Frame Request it shall respond with a Radio Measurement Report frame containing
4   one or more Measurement (Frame) Report elements. The measuring station shall receive all observable
5   traffic during the measurement duration and shall summarize this traffic in one or more Frame Report
6   elements. Each Frame Report element contains one or more Frame Report Entries. The measuring station
7   shall count the number of unicast data and management frames received from one transmit address during
8   the measurement duration and shall summarize this traffic in a Frame Report Entry. Each Frame Report
9   Entry contains the Transmit Address, BSSID, Average RCPI, Last RCPI, Antenna ID and Number of
10 Frames for the counted in the Frame Report Entry. The reported Average RCPI shall be the average of the
11 RCPI values of all frames counted in the Frame Report Entry. The Last RCPI shall be the RCPI value of
12 the most recently received frame counted in the Frame Report Entry. The Antenna ID field contains the
13 identifying number for the antenna used to receive the most recently received frame included in this report.
14 If different antennas are used to receive the frame preamble and the frame body, this Antenna ID shall
15 contain the identifying number for the antenna used to receive the frame body.

16 **11.11.9.3 Channel Load Report**

17 If a station accepts a Channel Load Request it shall respond with a Radio Measurement Report frame
18 containing one Measurement (Channel Load) Report element.

19 **11.11.9.4 Noise Histogram Report**

20 If a station accepts a Noise Histogram Request it shall respond with a Radio Measurement Report frame
21 containing one Measurement (Noise Histogram) Report element. The Noise Histogram Report shall
22 contain the RPI densities observed in the channel for the nine RPI levels defined in Table k7.

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1   To compute the RPI densities, the STA shall measure the RPI in the specified channel as a function of time
2   over the measurement duration when NAV is equal to 0 (when virtual CS mechanism indicates idle
3   channel) except during frame transmission or reception. The time resolution of the RPI measurements shall
4   be in microseconds. The RPI densities are then computed for each of the nine possible RPI values using
5   Integer (256 * ([Duration receiving at RPI value (microseconds)] / (1024 * [Measurement Duration (TU)]
6   – [NAVBUSY (microseconds)]))). NAVBUSY is the total time in microseconds that NAV is non-zero
7   during the Measurement Duration. The sum of the RPI densities will be approximately 255.

8   Average Noise Power Indicator (ANPI) value represents the average noise plus interference power on the
9   measured channel at the antenna connector during the measurement duration. To calculate ANPI, the STA
10 shall maesure and use RPI in the specified channel when NAV is equal to 0 (when virtual CS mechanism
11 indicates idle channel) except during frame transmission or reception. ANPI power is defined in dBm using
12 the same units and accuracy as defined for RCPI.

13 11.11.9.7 STA Statistics Report

14 A STA receiving a STA Statistics Request shall respond with a Radio Measurement Report frame
15 including one STA Statistics Report element. If the Requested Measurement Duration value is 0, the STA
16 shall report the current values for the requested Statistics Group Data. If the Requested Measurement
17 Duration value is greater than 0, The STA Statistics Report reports the change in the requested Statistics
18 Group Data measured within that non-zero Measurement Duration.

19 11.11.9.8 Location Configuration Information Report

20 A STA receiving an LCI request shall respond with a Radio Measurement Report frame including one
21 Location Configuration Information element (LCI Report).

22 An LCI request may indicate a location request for the local STA or the remote STA by setting the LCI
23 request Location Subject octet to indicate a Local or Remote request respectively. For a Local Request, the
24 reporting STA shall send a LCI Report that indicates the location of the requesting STA. For a Remote
25 Request, the reporting STA shall send a LCI Report that indicates the location of the reporting STA.

26 NOTE—Local LCI Measurement Request is used by requesting STA to obtain its own location by asking "Where am
27 I?". Remote LCI Measurement Request is used by requesting STA to obtain location of reporting STA by asking
28 "Where are you?".

29 If the STA receiving an LCI request lacks the means to report the requested location to the requested
30 accuracy, then the LCI Report shall have Latitude resolution, Longitude resolution and Altitude resolution
31 set to zero. If the STA has no information about the physical location of the 'Local' requestor, then it shall
32 set the Incapable bit in the Measurement Report Mode field. The method by which the physical location
33 information in the LCI Report is generated is not specified, to allow the accuracy of the reported location
34 to be 'best effort.'

35 NOTE—The physical location information of the STA may be set by administrative means. A STA receiving an LCI
36 Report with the Incapable bit set can make an LCI request for the location of the 'Remote' STA to obtain the reporting
37 STA's physical location.

38 11.11.9.9 Measurement Pause

39 A Measurement Pause is used within a Measurement Request Frame to provide a time delay between the
40 processing of two other Measurement Request Elements within the sequence of Measurement Request
41 Elements in that Frame. If a STA accepts a Measurement Pause Request it shall delay processing of the
42 next measurement request in the Measurement Request Frame. If the Measurement Pause Request is the
43 last Request Element in a repeated Measurement Request Frame, the STA shall delay processing the first
44 Request Element in the Measurement Request Frame for the next repeat.. This delay shall be no less than
45 the Pause delay specified in the Maeasurement Pause Request. A Measurement Pause shall not be sent as
46 the only Request Element in a Measurement Request Frame. A Measurement Pause shall not be included

1   as the last Request Element in a Measurement Request Frame which has the Number of Repetitions field
2   set to 0. There is no measurement report associated with a Measurement Pause Request.

3   **11.11.9.10 QoS Metrics Report**

4   A QSTA receiving a QoS Metrics Request shall respond with a Radio Measurement Report frame
5   containing one Measurement (QoS Metrics) Report element. If the traffic stream (TS) that is corresponding
6   to the Traffic Identifier is deleted, either by a DELTS Action Frame or by disassociation, the STA shall
7   cease sending Radio Measurement Reports.

8   The QoS Metrics measurement shall be made on traffic that is transmitted from the measuring QSTA to the
9   peer QSTA and TC or TS indicated in the request. The Peer QSTA Address may be the MAC address of
10 the QSTA from which the Measurement Request was sent, or the MAC address of another QSTA within
11 the QBSS. This enables a QAP to query QoS Metrics for DLS links. A QAP shall refuse measurement
12 requests for traffic to other QSTAs in the BSS.

13 The requesting and reporting STAs must be QSTAs. A non-QSTA receiving a QoS Metrics Measurement
14 Request shall reject the request with indication of "incapable".

15 A QSTA may request that a QoS metrics report be sent when MSDU discard, or delay metrics for a
16 specified TC, or TS at a measuring QSTA reach a defined threshold. This is termed a triggered QoS
17 metrics measurement and shall be requested by setting the Enable and Report bits to 1 within a
18 Measurement Request Element containing the QoS Metrics Measurement Type. The Measurement Request
19 field shall contain a QoS Metrics Request with the trigger conditions specified in the Triggered Reporting
20 field. One or more trigger conditions may be set with specified thresholds. See 11.11.9.

21 A triggered QoS metrics request shall not be sent to a QAP. A QAP that receives a triggered QoS metrics
22 request shall not respond. The number of simultaneous triggered QoS metrics measurements supported at
23 non-AP QSTA is outside the scope of the standard.

24 A non-AP QSTA accepting a triggered QoS measurement shall measure the requested TC, or TS. If a
25 trigger condition occurs, the measuring non-AP QSTA shall send a QoS metrics measurement report to the
26 requesting QSTA. The measuring non AP-QSTA shall not send further triggered QoS reports until the
27 Trigger Timeout period specified in the request has expired, or new trigger conditions have been requested.
28 Measurement of QoS Metrics shall continue during the reporting timeout period.

29 If a non-AP QSTA receives a requested QoS metrics measurement for a TC, or TS that is already being
30 measured using a triggered QoS metrics measurement, the triggered QoS measurement shall be suspended
31 for the duration of the requested QoS measurement. When triggered measurement resumes the QoS metrics
32 shall be reset.

33 QoS metrics reported in a triggered QoS metrics report shall be the values accumulated over the number of
34 transmitted MSDUs prior to the trigger event given in the Measurement Count field of the QoS metrics
35 measurement request that established the trigger condition. It is possible that a consecutive or delay trigger
36 event occurs after acceptance of a triggered QoS metrics measurement but before the number of MSDUs in
37 Measurement Count have been transmitted. In this case the report shall be the values accumulated since
38 measurement started. The measurement count value appears in the Transmitted MSDU Count field of a
39 triggered QoS metrics measurement report. Measurement duration shall not be used in triggered QoS
40 measurement and the Measurement Duration field in both the Measurement Request and any Measurement
41 Report shall be set to 0.

42 The Measurement Start Time field of a triggered QoS metrics report shall contain the value of the QSTA
43 TSF timer at the time the trigger condition occurred to an accuracy of ±1TU.

44 Once accepted by a measuring non-AP QSTA, a triggered QoS measurement continues to be active until:

1   — The relevant TS is deleted

2   — The measuring non-AP QSTA disassociates or successfully reassociates, or

3   — The measurement is terminated by the requesting QSTA.

4 All triggered QoS measurements shall be terminated at a measuring non-AP QSTA by receiving a triggered
5 QoS metrics measurement request with the Enable bit set to 1 and the Report bit set to 0. A QoS metrics
6 measurement request with no trigger conditions shall terminate a triggered QoS measurement for the TC,
7 or TS specified in the request. A QSTA requesting a triggered QoS measurement may update the trigger
8 conditions by sending a triggered QoS metrics measurement request specifying the new trigger conditions.

9 11.12 Usage of the Neighbor Report

10 A Neighbor Report is sent by an AP and it contains information on known neighbor AP's. A Neighbor
11 Report may not be exhaustive either by choice, or due to the fact that there may be neighbor APs not
12 known to the AP. The Neighbor Report contents shall be derived from the MIB table
13 dot11RRMNeighborReportTable. The mechanism by which the contents of this table are determined is
14 outside the scope of this amendment, but it may include information from measurement reports received
15 from the STA's within the BSS, information obtained via a management interface, or the DS.

16 11.12.1 Purpose of a Neighbor Report

17 The purpose of the Neighbor Report is to enable the STA to optimize aspects of neighbor BSS transition
18 and ESS operation. A Neighbor Report element contains information on APs which the STA may use as
19 candidates for a BSS transition. A Neighbor Report element shall only contain entries for validated
20 neighbor APs that are members of ESSs requested in the Neighbor Report Request.

21 Since the information in the Neighbor Report may be stale, it should be considered advisory; information
22 obtained by the report recipient through a scan or other sources may also be considered, possibly
23 overriding information in the Neighbor Report. For example, where information contained within a
24 Neighbor Report is contradicted by information in the Beacon/Probe Response, the Beacon/Probe
25 Response information should take precedence; similarly, where information is available within a
26 standardized security handshake (for example the 4-way handshake as defined in clause 8.5.3.), it may be
27 considered.

28 11.12.2 Requesting a Neighbor Report

29 An associated STA requesting a Neighbor Report shall send a Neighbor Report Request frame to its
30 associated AP. An AP accepting a Neighbor Report Request shall respond with a Neighbor Report
31 Response frame. If there are no list entries available the AP shall send a Neighbor Report Response with
32 no Neighbor List Entries.

33 11.12.3 Receiving a Neighbor Report

34 An AP receiving a Neighbor Report Request shall respond with a Neighbor Report Response frame
35 containing zero or more Neighbor Report elements. If SSID elements are specified in the corresponding
36 Neighbor Report Request frame, the Neighbor Report element shall only contain information from the MIB
37 table dot11RRMNeighborReportTable concerning neighbor APs that are members of the current ESS or
38 ESSs identified by the SSID elements contained within the Neighbor Report Request. If the SSID element
39 is omitted the Neighbor Report element shall contain information from the MIB table
40 dot11RRMNeighborReportTable concerning neighbor APs that belong to the same ESS as the requesting
41 STA. If there are no list entries available the AP shall send a Neighbor Report Response with no Neighbor
42 List Entries.

1 A serving AP shall include a TSF Offset field in the Neighbor List Entry only if it is able to guarantee an
2 accumulated error of ±1.5 TU or better on the TSF Offset subfield.

3 NOTE—The error budget (±1.5 TU) can be broken down as follows:

4 Delays by the measuring STA in transmitting the first bit of the Beacon Report after receiving the last bit of a neighbor
5 AP's Beacon or Probe Response (±0.5 TU).

6 Error caused by rounding to the nearest TU boundary when converting Neighbor TSF Offset from microseconds to
7 TUs (±0.5 TU).

8 Delays by the serving AP between reception of the last bit of the Beacon Report and transmission of the first bit of the
9 Neighbor Report (±0.5 TU).

10 **11.13 Link Measurement**

11 A STA may use a Link Measurement Request frame to request another STA to respond with a Link
12 Measurement Report frame containing link margin and transmit power information. A STA receiving a
13 Link Measurement Request frame shall respond with a Link Measurement Report frame containing the
14 power used to transmit the response in the Transmit Power field and the estimated link margin in the Link
15 Margin field.

16 An AP in a BSS or a STA in an IBSS shall include a TPC Report element with the Link Margin field set
17 equal to zero and containing transmit power information in the Transmit Power field in any Beacon or
18 Probe Response it transmits.

19 **11.14 Measurement Pilot frame generation and usage**

20 **11.14.1 Measurement Pilot frame generation by an AP**

21 If dot11MeasurementPilotEnabled is true, an AP shall maintain a Measurement Pilot frame generation
22 function and transmit Measurement Pilot frames according to the dot11MeasurementPilotPeriod attribute
23 within the AP. This defines a series of TMPTTs exactly dot11MeasurementPilotPeriod apart. A TMPTT
24 arrives when the AP's local TSF timer (in μs) modulo the Measurement Pilot Frame Interval equals zero.
25 At each TMPTT, the AP shall schedule a Measurement Pilot frame as the next frame for transmission
26 unless the TMPTT collides with a TBTT, in which case the AP shall not generate the Measurement Pilot
27 frame. AP shall schedule and transmit Measurement Pilot frames based on the AC specified in the
28 dot11MeasurementPilotTransmitPriority attribute.

29 In case the medium is determined by the carrier-sense mechanism (see 9.2.1) to be unavailable, the AP
30 shall delay the actual transmission of a Measurement Pilot frame according to the basic medium access
31 rules specified in Clause 9 for a maximum period of one dot11MeasurementPilotPeriod and drop the
32 Measurement Pilot frame at the next TMPTT.

33 An AP shall transmit Measurement Pilot frames to the broadcast address. An AP shall not retransmit or
34 buffer Measurement Pilot frames for power save reasons. Once started, the AP shall maintain Measurement
35 Pilot frame transmissions for the life of the BSS.

36 **11.14.2 Link margin calculation (informative)**

37 STA may calculate link margin with information received in measurement pilot frames, use it to assess the
38 current link condition, and assist in roaming decision. Link margin may be calculated as follows:

1 Let RCPIMaxPwr representing the RCPI that would have been received by a STA in a downlink frame if
2 the frame were sent with the Max Transmit Power. Further assuming that STA knows "STA Noise Floor"
3 and "STA Max Transmit Power".

4 RCPIMaxPwr = RCPI + (Max Transmit Power – Transmit Power Used)

5 Downlink Link Margin (DLM) = RCPIMaxPwr – STA Noise Floor

6 Uplink Link Margin (ULM) = RCPIMaxPwr – (Max Transmit Power – STA Max
7 Transmit Power) – Transceiver Noise Floor

8 **12 PHY service specification**

9 **12.3 Detailed PHY service specifications**

10 **12.3.4 Basic service and options**

11 **12.3.4.3 PHY-SAP service primitives parameters**

12 *Change row 4 and insert 2 new rows into Table 29 as shown:*

13 **Table 29—PHY-SAP service primitive parameters**

Parameter	Associated primitive	Value
RXVECTOR	PHY-RXSTART.indication PHY-RXEND.indication	A set of parameters
RPI-STATE	PHY-CCARESET.request PHY-CCARESET.confirm	RPI-ON, RPI-OFF
RPI-REPORT	PHY-CCA.indication PHY-CCARESET.confirm	A set of RPI values for the preceding time interval

14 **12.3.5 PHY-SAP detailed service specification**

15 **12.3.5.8 PHY-CCARESET.request**

16 *Change the following clauses as shown:*

17 **12.3.5.8.1 Function**

18 This primitive is a request by the MAC sublayer to the local PHY entity to reset the CCA state machine
19 and to turn RPI reporting on and off by means of the RPI-STATE parameter.

20 **12.3.5.8.2 Semantics of the service primitive**

21 The semantics of the primitives are as follows:

22 PHY-CCARESET.request(RPI-STATE)

~~This primitive has no parameters.~~

The RPI-STATE parameter shall be present if dot11RadioMeasurementEnabled is true. The RPI-STATE parameter can be one of two values: RPI-ON or RPI-OFF. The parameter value is RPI-ON when the MAC sublayer is requesting the PHY entity to report RPI values when the PHY is neither receiving nor trans mitting an MPDU. RPI-ON turns on RPI reporting in the PHY entity. RPI-OFF turns off RPI 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 RPI-STATE parameter is set to RPI-ON, the PHY entity collects RPI values when it is not transmitting or receiving and provides those values to the MAC sublayer using the RPI-REPORT parameter.

12.3.5.9 PHY-CCARESET.confirm

Change the following clauses 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 RPI values when RPI reporting is turned on.

12.3.5.9.2 Semantics of the service primitive

The semantics of the primitives are as follows:

> PHY-CCARESET.~~request~~confirm(RPI-STATE, RPI-REPORT)

~~This primitive has no parameters.~~

The RPI-STATE parameter shall be present if dot11RadioMeasurementEnabled is true. The RPI-STATE parameter can be one of two values: RPI-ON or RPI-OFF. The RPI-STATE value shall be set to the value of RPI-STATE received by the PHY entity in the most recent PHY-CCARESET.request.

The RPI-REPORT parameter shall be present if dot11RadioMeasurementEnabled is true and if RPI reporting was turned on prior to the receipt of the latest PHY-CCARESET.request. The RPI-REPORT parameter provides a set of RPI values for a time interval. The set ot RPI 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.

1 **12.3.5.10 PHY-CCA.indication**

2 *Change the following clauses as shown:*

3 **12.3.5.10.1 Function**

4 This primitive is an indication by the PHY to the local MAC entity of the current state of the medium and
5 to provide observed RPI values when RPI reporting is turned on.

6 **12.3.5.10.2 Semantics of the service primitive**

7 The primitive provides the following parameter:

8   PHY-CCA.indication (STATE, RPI-REPORT)

9 The STATE parameter can be one of two values: BUSY or IDLE. The parameter value is BUSY if the
10 channel assessment by the PHY determines that the channel is not available. Otherwise, the value of the
11 parameter is IDLE.

12 The RPI-REPORT parameter shall be present if dot11RadioMeasurementEnabled is true and if RPI
13 reporting has been turned on by the RPI-STATE parameter. The RPI-REPORT parameter provides a set of
14 RPI values for a time interval. The set of RPI values may be used by the MAC sublayer for Radio
15 Measurement purposes. The set ot RPI values are recent values observed by the PHY entity since the
16 generation of the most recent PHY-TXEND.confirm, PHY-RXEND.indication, PHY-
17 CCARESET.confirm, or PHY_CCA.indication, whichever occurred latest.

18 **12.3.5.11 PHY-RXSTART.indication**

19 **12.3.5.11.2 Semantics of the service primitive**

20 *Change the third paragraph as shown:*

21 The RXVECTOR represents a list of parameters that the PHY provides the local MAC entity upon receipt
22 of a valid PLCP Header or upon receipt of the last PSDU data bit in the received frame. This vector may
23 contain both MAC and MAC management parameters. The required parameters are listed in 12.3.4.4.

24 **12.3.5.12 PHY-RXEND.indication**

25 **12.3.5.12.2 Semantics of the service primitive**

26 *Change the first two paragraphs and insert text following the third paragraph as shown:*

27 The primitive provides the following parameters:

28 PHY-RXEND.indication (RXERROR, RXVECTOR)

29 *Insert the following text after the third paragraph:*

30 The RXVECTOR represents a list of parameters that the PHY provides the local MAC entity upon receipt
31 of a valid PLCP Header or upon receipt of the last PSDU data bit in the received frame. RXVECTOR is an
32 included parameter only when dot11RadioMeasurementEnabled is true. This vector may contain both
33 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

3

15.2 DSSS PLCP sublayer

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15.2.7 Receive PLCP

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Change the second and fifth paragraph of 15.2.7 as shown:

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The receive PLCP is shown in Figure 97.

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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.

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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.

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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 98. 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.

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27

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.

28

Change Figure 97 as follows:

29
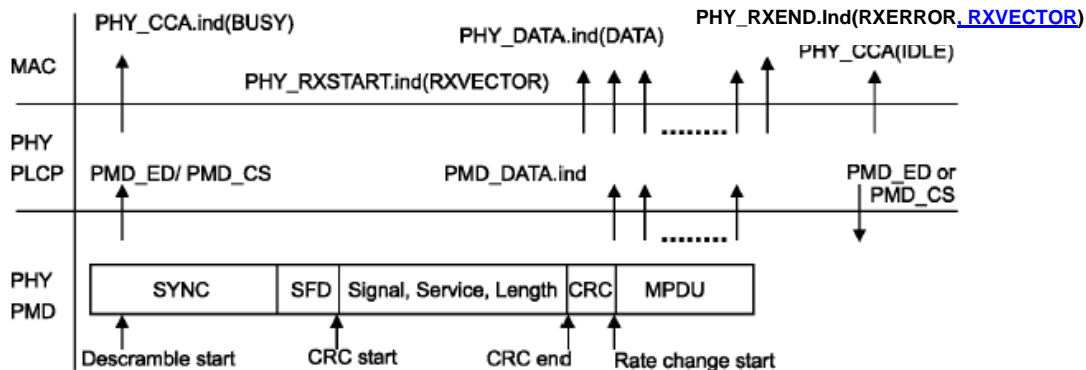
30

Figure 97 — Receive PLCP

1 **15.4 DSSS PMD sublayer**

2 **15.4.4 Basic service and options**

3 **15.4.4.2 PMD_SAP peer-to-peer service primitive parameters**

4 *Insert a new row into Table 66 as follows:*

5   **Table 66—DSSS PMD_SAP peer-to-peer service primitives**

Parameter	Associated primitive	Value
RCPI	RXVECTOR	8 bits of RCPI. RCPI is present only when dot11RadioMeasurementEnabled is true.

6 **15.4.4.3 PMD_SAP sublayer-to-sublayer service primitives**

7 *Insert new row into Table 67 as follows:*

8   **Table 67—PMD_SAP sublayer-to-sublayer service primitives**

Primitive	Request	Indicate	Confirm	Response
PMD_RCPI		X	--	--

9 **15.4.4.4 PMD_SAP service primitive parameters**

10 *Insert new row into Table 68 as follows:*

11   **Table 68—List of parameters for the PMD primitives**

Parameter	Associated primitive	Value
RCPI	PMD-RCPI.indicate	8 bits of RCPI

12 **15.4.5 PMD_SAP detailed service specification**

13 *Insert the following clause (15.4.5.16) after 15.4.5.15:*

14 **15.4.5.16 PMD_RCPI.indicate**

15 **15.4.5.16.1 Function**

16 This optional primitive, generated by the PMD sublayer, provides the received channel power indicator to
17 the PLCP and MAC.

18 **15.4.5.16.2 Semantics of the service primitive**

19 The primitive shall provide the following parameter:

20 PMD_RCPI.indicate(RCPI).

21 The RCPI shall be a measure of the channel power received by the DSSS PHY. RCPI indications are
22 supported as defined in 15.4.8.5.

77

1   **15.4.5.16.3 When generated**

2   This primitive shall be generated by the PMD when the DSSS PHY is in the receive state. It shall be
3   continuously available to the PLCP, which, in turn, provides the parameter to the MAC entity.

4   **15.4.5.16.4 Effect of receipt**

5   This parameter shall be provided to the PLCP layer for information only. The RCPI may be used in
6   conjunction with RSSI to measure input signal quality.

7   **15.4.8 PMD receiver specifications**

8   *Insert the following clause after 15.4.8.4:*

9   **15.4.8.5 Received Channel Power Indicator (RCPI) Measurement**

10   The RCPI indicator is a measure of the received RF power in the selected channel. This parameter shall be
11   a measure by the PHY sublayer of the received RF power in the channel measured over the entire received
12   frame. RCPI shall be a monotonically increasing, logarithmic function of the received power level defined
13   in dBm. The allowed values for the Received Channel Power Indicator (RCPI) parameter shall be an 8 bit
14   value in the range from 0 through 220, with indicated values rounded to the nearest 0.5 dB as follows:

15   0:   Power $\leq$ -110 dBm

16   1:   Power = -109.5 dBm

17   2:   Power = -109.0 dBm

18   and so on where

19   RCPI = int{(Power in dBm +110)*2} for 0dbm > Power > -110dBm

20   220: Power $\geq$ -0 dBm

21   221-254:   reserved

22   255: Measurement not available

23   Accuracy for each measurement shall be +/- 5dB (95% confidence interval) within the specified dynamic
24   range of the receiver. The measurement shall assume a receiver noise equivalent bandwidth equal to the
25   channel bandwidth multipled by 1.1.

26   **17. Orthogonal frequency division multiplexing (OFDM) PHY specification**
27   **for the 5 GHz band**

28   **17.2 OFDM PHY specific service parameter list**

29   **17.2.3 RXVECTOR parameters**

30   *Insert new row into Table 83 as follows:*

31   **Table 83—RXVECTOR parameters**

Parameter	Associated primitive	Value
RCPI	PHY-RXSTART.indicate (RXVECTOR) PHY-RXEND.indicate (RXVECTOR)	0 to 255. RCPI is present only when dot11RadioMeasurementEnabled is true.

1

2 *Insert the following new clause after Clause 17.2.3.4:*

3 **17.2.3.5 RXVECTOR RCPI**

4 The allowed values for the RCPI parameter are in the range from 0 through 255, as defined in 17.3.10.6.
5 This parameter is a measure by the PHY of the received channel power. RCPI indications of 8 bits are
6 supported. RCPI shall be measured over the entire received frame.

7 **17.3 OFDM PLCP sublayer**

8 **17.3.10 PMD receiver specifications**

9 *Insert the following new clause after Clause 17.3.10.5:*

10 **17.3.10.6 Received Channel Power Indicator (RCPI) Measurement**

11 The RCPI indicator is a measure of the received RF power in the selected channel. This parameter shall be
12 a measure by the PHY sublayer of the received RF power in the channel measured over the entire received
13 frame. RCPI shall be a monotonically increasing, logarithmic function of the received power level defined
14 in dBm. The allowed values for the Received Channel Power Indicator (RCPI) parameter shall be an 8 bit
15 value in the range from 0 through 220, with indicated values rounded to the nearest 0.5 dB as follows:

16   0:   Power $\leq$ -110 dBm

17   1:   Power = -109.5 dBm

18   2:   Power = -109.0 dBm

19   and so on where

20   RCPI = int{(Power in dBm +110)*2} for 0dbm > Power > -110dBm

21   220: Power $\geq$ -0 dBm

22   221-254:   reserved

23   255: Measurement not available

24 Accuracy for each measurement shall be +/- 5dB (95% confidence interval) within the specified dynamic
25 range of the receiver. The measurement shall assume a receiver noise equivalent bandwidth equal to the
26 channel bandwidth multipled by 1.1.

27 **17.3.12 Receive PLCP**

28 *Change the first paragraph of 17.3.12 as follows:*

29 The receive PLCP is shown in Figure 128. In order to receive data, PHY-TXSTART.request shall be
30 disabled so that the PHY entity is in the receive state. Further, through station management (via the PLME)

1   the PHY is set to the appropriate frequency. Other receive parameters, such as RSSI, <u>RCPI,</u> and indicated
2   DATARATE, may be accessed via the PHY-SAP.

3   *Change Figure 128 to insert newparameter as follows:*
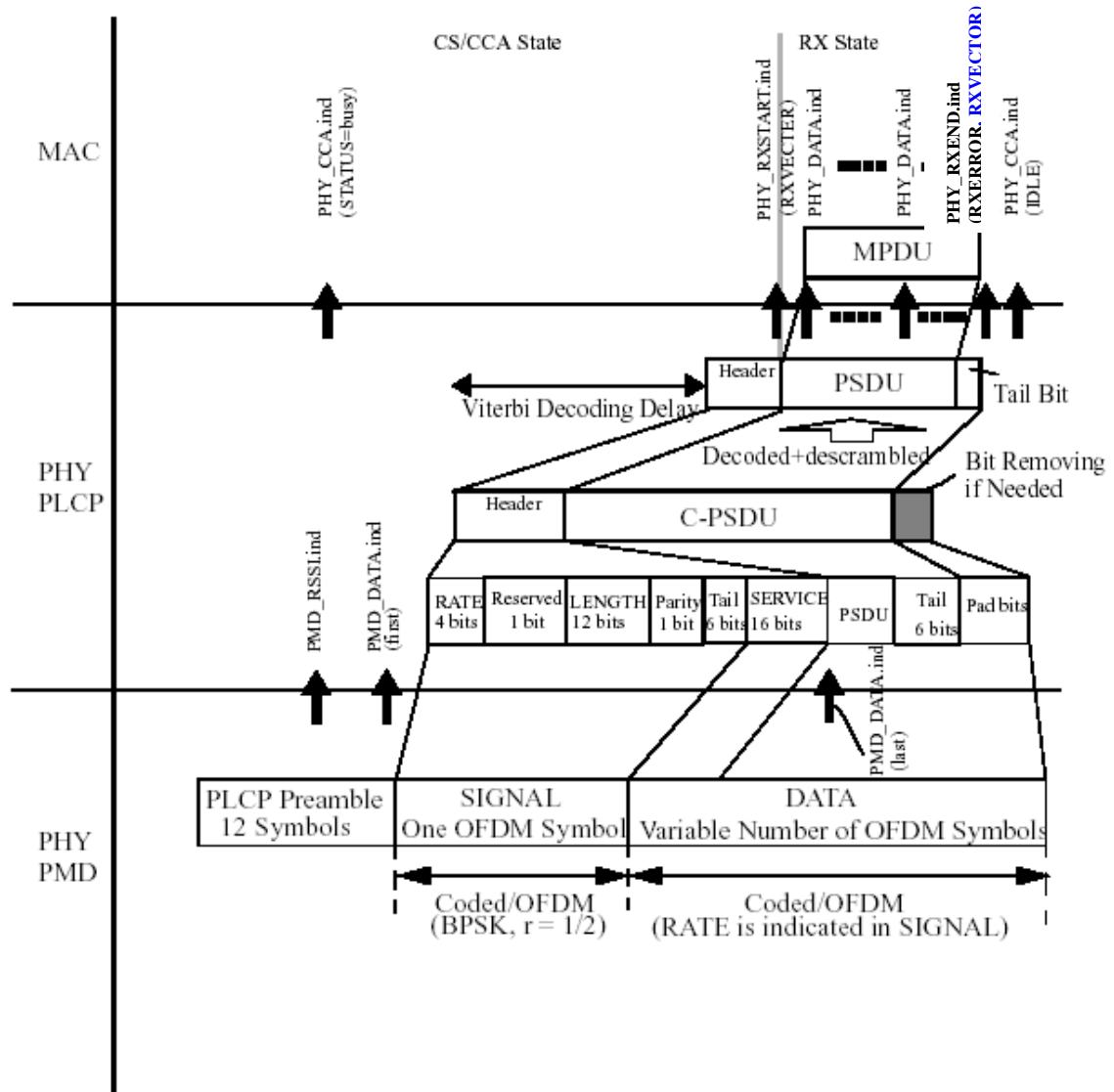
4   **Figure 128—Receive PLCP**

1   **17.5 OFDM PMD sublayer**

2   **17.5.4 Basic service and options**

3   **17.5.4.2 PMD_SAP sublayer-to-sublayer service primitives**

4   *Insert new row into Table 101 as follows:*

5   **Table 101—PMD_SAP sublayer-to-sublayer service primitives**

Primitive	Request	Indicate	Confirm	Response
PMD_RCPI	--	X	--	--

6   **17.5.4.3 PMD_SAP service primitive parameters**

7   *Insert new row into Table 102 as follows:*

8   **Table 102—List of parameters for the PMD primitives**

Parameter	Associated primitive	Value
RCPI	PMD_RCPI.indicate	8 bits of RCPI

9   **17.5.5 PMD_SAP detailed service specification**

10   *Insert the following clause (17.5.5.8) after 17.5.5.7:*

11   **17.5.5.8 PMD_RCPI.indicate**

12   **17.5.5.8.1 Function**

13   This primitive, generated by the PMD sublayer, provides the received channel power indicator to the PLCP
14   and MAC entity.

15   **17.5.5.8.2 Semantics of the service primitive**

16   The primitive shall provide the following parameter:

17   PMD_RCPI.indicate(RCPI).

18   The RCPI shall be a measure of the channel power received by the OFDM PHY. RCPI indications of 8 bits
19   are supported, as defined in 17.3.10.6.

20   **17.5.5.8.3 When generated**

21   This primitive shall be generated by the PMD when the OFDM PHY is in the receive state. It shall be
22   continuously available to the PLCP, which, in turn, provides the parameter to the MAC entity.

23   **17.5.5.8.4 Effect of receipt**

24   This parameter shall be provided to the PLCP layer for information only. The RCPI may be used in
25   conjunction with RSSI to measure input signal quality.

81

1 **18. High Rate direct sequence spread spectrum (HR/DSSS) PHY**
2 **specification**

3 **18.2 High Rate PLCP sublayer**

4 **18.2.6 Receive PLCP**

5 *Change the third paragraph of 18.2.6 as shown:*

6 The receive PLCP is shown in Figure 139 In order to receive data, the PHY-TXSTART.request shall be
7 disabled so that the PHY entity is in the receive state. Further, through station management via the PLME,
8 the PHY shall be set to the appropriate channel and the CCA method chosen. Other receive parameters,
9 such as RSSI, <u>RCPI,</u> SQ, and indicated DATARATE, may be accessed via the PHY-SAP.

10 *Change the fourth paragraph of 18.2.6 as shown:*

11 Upon receiving the transmitted energy, according to the selected CCA mode, the PMD_ED shall be
12 enabled (according to 18.4.8.4) as the RSSI reaches the ED_THRESHOLD, and/or PMD_CS shall be
13 enabled after code lock is established. These conditions are used to indicate activity to the MAC via PHY-
14 CCA.indicate, according to 18.4.8.4. PHY-CCA.indicate(BUSY) shall be issued for ED and/or code lock
15 prior to correct reception of the PLCP header. The PMD primitives, PMD_SQ, ~~and~~ PMD_RSSI, <u>and</u>
16 <u>PMD_RCPI,</u> are issued to update the <u>SQ,</u> RSSI and ~~SQ~~<u>RCPI</u> parameters reported to the MAC.

17 *Change the list following the sixth paragraph of 18.2.6 as shown:*

18   a) The SIGNAL field;

19   b) The SERVICE field;

20   c) The PSDU length in octets (calculated from the LENGTH field in microseconds and the
21   DATARATE in Mbit/s, in accordance with the formula in 18.2.3.5);

22   d) RXPREAMBLE_TYPE (which is an enumerated type taking on values SHORTPREAMBLE or
23   LONGPREAMBLE);

24   e) ~~The antenna used for receive (RX_ANTENNA)~~<u>ANT_STATE (the antenna used for receive)</u>,
25   RSSI, <u>RCPI,</u> and SQ.

26 *Change Figure 139 to insert new parameter as follows:*

82
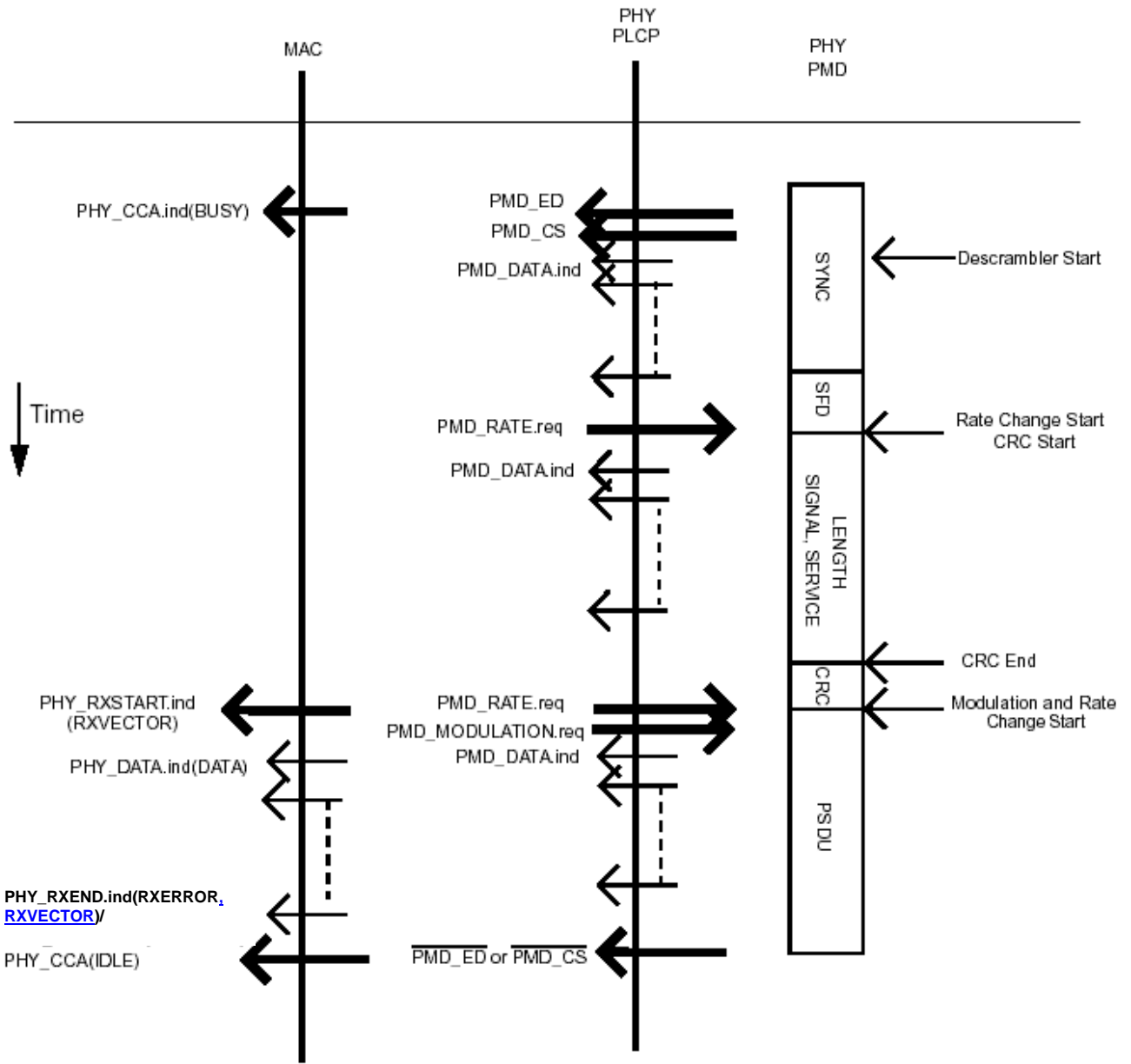
Figure 139—Receive PLCP

18.3 High Rate PLME

18.3.5 Vector descriptions

Insert new rows at the end of Table 108 as follows:

Table 108—Parameter vectors

Parameter	Associated vector	Value

ANT_STATE	RXVECTOR	1 to 256
RSSI	RXVECTOR	0-8 bits of RSSI
RCPI	RXVECTOR	8 bits of RCPI. RCPI is present only when dot11RadioMeasurementEnabled is true.
SQ	RXVECTOR	0-8 bits of SQ

1 **18.4 High Rate PMD sublayer**

2 **18.4.4 Basic service and options**

3 **18.4.4.2 PMD_SAP sublayer-to-sublayer service primitives**

4 *Insert new row into Table 110 as follows:*

5 **Table 110—PMD_SAP sublayer-to-sublayer service primitives**

Primitive	Request	Indicate	Confirm	Response
PMD_RCPI	--	X	--	--

6 **18.4.5 PMD_SAP detailed service specification**

7 *Insert the following clause (18.4.5.16) at the end of 18.4.5:*

8 **18.4.5.16 PMD_RCPI.indicate**

9 **18.4.5.16.1 Function**

10 This optional primitive, generated by the PMD sublayer, provides the received channel power indicator to
11 the PLCP and MAC.

12 **18.4.5.16.2 Semantics of the service primitive**

13 The primitive shall provide the following parameter:

Parameter	Associated primitive	Value	Description
RCPI	PMD_RCPI.indicate	8 bits of RCPI	The RCPI is a measure of the received power by the High Rate PHY as defined in 18.4.8.5.

14 **18.4.5.16.3 When generated**

15 This primitive shall be generated by the PMD when the High Rate PHY is in the receive state when
16 dot11RadioMeasurementEnabled is true. It is continuously available to the PLCP, which, in turn, provides
17 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 RSSI to measure input signal quality.

18.4.8 PMD receiver specifications

Insert the following clause (18.4.8.5) at the end of 18.4.8:

18.4.8.5 Received Channel Power Indicator (RCPI) Measurement

The RCPI indicator is a measure of the received RF power in the selected channel. This parameter shall be a measure by the PHY sublayer of the received RF power in the channel measured over the entire received frame. RCPI shall be a monotonically increasing, logarithmic function of the received power level defined in dBm. The allowed values for the Received Channel Power Indicator (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 $\leq$ -110 dBm

> 1: Power = -109.5 dBm

> 2: Power = -109.0 dBm

> and so on where

> RCPI = int{(Power in dBm +110)*2} for 0dbm > Power > -110dBm

> 220: Power $\geq$ -0 dBm

> 221-254: reserved

> 255: Measurement not available

Accuracy for each measurement shall be +/- 5dB (95% confidence interval) within the specified dynamic range of the receiver. The measurement shall assume a receiver noise equivalent bandwidth equal to the channel bandwidth multipled by 1.1.

19. Extended Rate PHY specification

19.2 PHY specific service parameter list

Insert new row into Table 123B as follows:

Table 123B—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.

1   *19.9 Extended Rate PMD sublayer*

2   **19.9.4 Basic service and options**

3   **19.9.4.2 PMD_SAP sublayer-to-sublayer service primitives**

4   *Insert new row into Table 123I as follows:*

5   **Table 123I—PMD_SAP sublayer-to-sublayer service primitives**

Primitive	Request	Indicate	Confirm	Response
PMD_RCPI	--	X	--	--

6   **19.9.4.3 PMD_SAP service primitive parameters**

7   *Insert new row into Table 123J as follows:*

8   **Table 123J—List of parameters for the PMD primitives**

Parameter	Associated primitive	Value	Description
RCPI	PMD_RCPI.indicate	8 bits of RCPI	The RCPI is a measure of the received channel power. See 19.9.5.14.

1   **19.9.5 PMD_SAP detailed service specification**

2   *Insert the following clause (19.9.5.14) after 19.9.5.13:*

3   **19.9.5.14 PMD_RCPI.indicate**

4   This primitive is the same as that defined in 17.5.5.8 and 18.4.5.16, including the parameter RCPI. This
5   primitive is used for radio measurement purposes and to aid in link optimization algorithms such as
6   roaming decisions.

1   **Annex A**

2   **A.4 PICS proforma–IEEE Std 802.11, 1999 Edition[9]**

3   **A.4.3 IUT configuration**

4   *Append this entry to the end of this table:*

Item	IUT configuration	References	Status	Support
*CFk	Is Radio Resource Measurement supported?	7.3.1.4	O	Yes, No

5   *Insert this new clause after clause A.4.12:*

6   **A.4.13 Radio Resource Measurement extensions**

Item	Protocol Capability	References	Status	Support
	Are the following Radio Resource Measurement capabilities supported?			
RRM1	Radio Measurement Capability	7.3.1.4	CFk:M	Yes, No, N/A
RRM2	Action frame protocol for measurements	7.4	CFk:M	Yes, No, N/A
RRM2.1	Radio Measurement Request frame	7.4.5.1	CFk:M	Yes, No, N/A
RRM2.2	Radio Measurement Report frame	7.4.5.2	CFk:M	Yes, No, N/A
RRM2.3	Link Measurement Request frame	7.4.5.3	CFk:M	Yes, No, N/A
RRM2.4	Link Measurement Report frame	7.4.5.4	CFk:M	Yes, No, N/A
RRM2.5	Neighbor Report Request			
RRM2.5.1	Generate and transmit Neighbor Report Request	7.4.5.5	CFk:M	Yes, No, N/A
RRM2.5.2	Receive and process Neighbor Report Request	7.4.5.5	CFk:M	Yes, No, N/A
RRM2.6	Neighbor Report Response			
RRM2.6.1	Generate and transmit Neighbor Report Response	7.4.5.6, 7.3.2.27	CFk:M	Yes, No, N/A
RRM2.6.2	Receive and process Neighbor Report Response	7.4.5.6, 7.3.2.27	CFk:M	Yes, No, N/A
RRM3	General protocol for requesting and reporting of measurements	7.3.2.21, 7.3.2.22, 11.11, 11.11.7	CFk:M	Yes, No, N/A
RRM3.1	Parallel Measurements	7.3.2.21, 7.3.2.22	CFk:M	Yes, No, N/A
RRM3.2	Enable Measurement Requests	7.3.2.21, 11.11.7	CFk:M	Yes, No, N/A

Item	Protocol Capability	References	Status	Support
RRM3.3	Enable Autonomous Report	7.3.2.21, 11.11.7	CFk:M	Yes, No, N/A
RRM3.4	Duration Mandatory	7.3.2.21, 11.11.4 7.3.2.22	CFk:M	Yes, No, N/A
RRM3.5	Incapable Indication	7.3.2.22	CFk:M	Yes, No, N/A
RRM3.6	Refused Indication	7.4.5.1, 11.11.7	CFk:M	Yes, No, N/A
RRM3.7	Repeated Measurement	7.3.2.21.12	CFk:M	Yes, No, N/A
RRM3.8	Measurement Pause		CFk:M	Yes, No, N/A
RRM4	Beacon Measurement Type	11.11, 11.11.9.1	CFk:M	Yes, No, N/A
RRM4.1	Beacon Request	7.3.2.21.6	CFk:M	Yes, No, N/A
RRM4.2	Passive Measurement mode	7.3.2.21.6 11.11.9.1	CFk:M	Yes, No, N/A
RRM4.3	Passive Pilot Measurement mode	7.3.2.21.6 11.11.9.1	CFk:O	Yes, No, N/A
RRM4.4	Active Measurement mode	7.3.2.21.6 11.11.9.1	CFk:M	Yes, No, N/A
RRM4.5	STA Selected mode	7.3.2.21.6 11.11.9.1	CFk:O	Yes, No, N/A
RRM4.6	Beacon table mode	7.3.2.21.6 11.11.9.1	CFk:M	Yes, No, N/A
RRM4.7	Reporting Conditions	7.3.2.21.6	CFk:O	Yes, No, N/A
RRM4.8	Beacon Report	7.3.2.22.6	CFk:M	Yes, No, N/A
* RRM5	Frame Measurement Type	11.11, 11.11.9.2	CFk:O	Yes, No, N/A
RRM5.1	Frame Request	7.3.2.21.7	(CFk AND RRM5):M	Yes, No, N/A
RRM5.2	Frame Report	7.3.2.22.7	(CFk AND RRM5):M	Yes, No, N/A
RRM6	Channel Load Measurement Type	11.11, 11.11.9.3	CFk:M	Yes, No, N/A
RRM6.1	Channel Load Request	7.3.2.21.4	CFk:M	Yes, No, N/A
RRM6.2	Channel Load Report	7.3.2.22.4	CFk:M	Yes, No, N/A
* RRM7	Noise Histogram Measurement Type	11.11, 11.11.9.4	CFk:M	Yes, No, N/A
RRM7.1	Noise Histogram Request	7.3.2.21.5	CFk:M	Yes, No, N/A
RRM7.2	Noise Histogram Report	7.3.2.22.5	CFk:M	Yes, No, N/A
RRM8	STA Statistics Measurement Type	11.11, 11.11.9.7	CFk:M	Yes, No, N/A
RRM8.1	STA Statistics Request	7.3.2.21.10	CFk:M	Yes, No, N/A
RRM8.2	STA Statistics Report	7.3.2.22.10	CFk:M	Yes, No, N/A
RRM9	LCI Measurement Type	11.11, 11.11.9.8	CFk:M	Yes, No, N/A

Item	Protocol Capability	References	Status	Support
RRM9.1	LCI Request	7.3.2.21.11	CFk:M	Yes, No, N/A
RRM9.2	LCI Report	7.3.2.22.11	CFk:M	Yes, No, N/A
RRM10	QoS Metrics Type	11.11, 11.11.9.10	CFk:O	Yes, No, N/A
RRM10.1	QoS Metrics Type Request	7.3.2.21.13	CFk AND CF12:M	Yes, No, N/A
RRM10.2	QoS Metrics Type Report	7.3.2.22.13	CFk AND CF12:M	Yes, No, N/A
RRM10.3	Triggered QoS Metrics Report	7.3.2.21.13	CFk AND CF12:O	Yes, No, N/A
RRM11	AP Channel Report	7.3.2.9, 7.3.2.26	(CFk AND CF1):M	Yes, No, N/A
RRM12	Neighbor Report Procedure	11.12.2, 11.12.3	CFk:M	Yes, No, N/A
RRM13	RCPI Measurement			
	RCPI Measurement for DSSS PHY at 2.4GHz	15.4.8.5	(CFk AND CF4):M	Yes, No, N/A
	RCPI Measurement for OFDM PHY at 5GHz	17.2.3.5, 17.3.10.6, 17.5.4.3	(CFk AND CF6):M	Yes, No, N/A
	RCPI Measurement for HR DSSS PHY at 2.4GHz	18.4.8.5	(CFk AND CF7):M	Yes, No, N/A
	RCPI Measurement for Extended Rate PHY at 2.4Ghz	19.9.5.14	(CFk AND CF9):M	Yes, No, N/A
RRM14	RCPI Measurement during Active Scanning			
RRM14.1	Respond with RCPI information element when requested	11.1.3.2.2	(CFk AND CF12 AND CF1):M	Yes, No, N/A
RRM14.2	Measurement of RCPI on Probe Request frames	11.1.3.2.2	(CFk AND CF12 AND CF1):O	Yes, No, N/A
RRM15	RSNI Measurement	7.3.2.31	CFk:M	Yes, No, N/A
RRM16	TPC Information in Beacon and Probe Response frames			
RRM16.1	Country and Transmit Power Control (TPC) Report elements included in Beacon and Probe Reponse frames	7.2.3.1, 7.2.3.9, 7.3.2.9, 7.3.2.18, 11.13	CFk: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	CFk:O	Yes, No, N/A
RRM17	Power Capability elements in Association and Reassociation frames	7.2.3.4, 7.2.3.5, 11.10.1	CFk:M	Yes, No, N/A
RRM18	Management Information Base			
RRM18.1	dot11SMTRRMRequest	Annex D	(CFk AND CF1):M	Yes, No, N/A
RRM18.2	dot11SMTRRMReport	Annex D	(CFk AND	Yes, No, N/A

Item	Protocol Capability	References	Status	Support
RRM18.3	dot11SMTRRMConfig	Annex D	CF1):M (CFk AND CF1):M	Yes, No, N/A
RRM19	Measurement Pilot Frame	7.1.3.1.2, 7.2.3.10, 7.3.1.18, 7.3.1.19, 7.3.1.20, 7.3.1.21, 7.3.1.22, 7.3.1.23, 10.3.17, 11.9, 11.14	CFk:O	Yes, No, N/A
RRM20	BSS Load elements included in Beacon and Probe Reponse frames	7.2.3.1, 7.2.3.9, 7.3.2.28	CFk:M	Yes, No, N/A
RRM21	Antenna Information elements included in Beacon and Probe Response frames	7.2.3.1, 7.2.3.9, 7.3.2.30	CFk:M	Yes, No, N/A

1 **Annex D**

2 *In the IMPORT Section of Annex D, insert the following import statement to the end behind the ifIndex*
3 *statement:*
4 `InterfaceIndex FROM IF-MIB;`

5 *In the Major Section of Annex D, insert the following comment to the end of dot11smt section behind*
6 *comment dot11RSNAStatsTable:*
7 `-- dot11RadioResourceManagement ::= { dot11smt 12 }`

8 *In the Major Section of Annex D, insert the following comment to the end of dot11mac section behind*
9 *dot11GroupAddressesTable:*
10 `-- dot11PeerStatsTable ::= { dot11mac 4 }`

11 *In the TEXTUAL CONVENTION of Annex D, insert the following convention to the end behind the*
12 *WEPKeytype convention definition:*
13 `TSFType ::= OCTET STRING (SIZE (8))`
14 `PHYType ::= TEXTUAL-CONVENTION`
15 `    STATUS current`
16 `    DESCRIPTION`
17 `        "The textual convention indicates the frequency band."`
18 `    SYNTAX INTEGER`
19 `        {`
20 `            twoPointFour(0),`
21 `            fiveGHz(1)`
22 `        }`

23 *In the dot11StationConfig table of Annex D, change the dot11StationConfigEntry sequence list as*
24 *follows:*
25 `Dot11StationConfigEntry ::=`
26 `    SEQUENCE {`
27 `        dot11StationID MacAddress,`
28 `        dot11MediumOccupancyLimit INTEGER,`
29 `        dot11CFPollable TruthValue,`
30 `        dot11CFPPeriod INTEGER,`
31 `        dot11CFPMaxDuration INTEGER,`
32 `        dot11AuthenticationResponseTimeOut Unsigned32,`

```
1              dot11PrivacyOptionImplemented TruthValue,
2              dot11PowerManagementMode INTEGER,
3              dot11DesiredSSID OCTET STRING,
4              dot11DesiredBSSType INTEGER,
5              dot11OperationalRateSet OCTET STRING,
6              dot11BeaconPeriod INTEGER,
7              dot11DTIMPeriod INTEGER,
8              dot11AssociationResponseTimeOut Unsigned32,
9              dot11DisassociateReason INTEGER,
10             dot11DisassociateStation MacAddress,
11             dot11DeauthenticateReason INTEGER,
12             dot11DeauthenticateStation MacAddress,
13             dot11AuthenticateFailStatus INTEGER,
14             dot11AuthenticateFailStation MacAddress,
15             dot11SpectrumManagementImplemented TruthValue,
16             dot11SpectrumManagementRequired TruthValue,
17             dot11MultiDomainCapabilityImplemented TruthValue,
18             dot11MultiDomainCapabilityEnabled TruthValue,
19             dot11CountryString OCTET STRING,
20             dot11RSNAOptionImplemented TruthValue,
21             dot11RSNAPreauthenticationImplemented TruthValue,
22             dot11AssociateStation MacAddress,
23             dot11AssociateID INTEGER,
24             dot11AssociateFailStation MacAddress,
25             dot11AssociateFailStatus INTEGER,
26             dot11ReassociateStation MacAddress,
27             dot11ReassociateID INTEGER,
28             dot11ReassociateFailStation MacAddress,
29             dot11ReassociateFailStatus INTEGER,
30             dot11RadioMeasurementCapable TruthValue,
31             dot11RadioMeasurementEnabled TruthValue,
32             dot11RadioMeasurementProbeDelay INTEGER,
33             dot11MeasurementPilotEnabled TruthValue,
34             dot11MeasurementPilotPeriod INTEGER,
35             dot11MeasurementPilotTransmitPriority INTEGER }
```

36 *Update the dot11BeaconPeriod element as shown:*
```
37  dot11BeaconPeriod OBJECT-TYPE
38         SYNTAX INTEGER (1..65535)
39         MAX-ACCESS read-write
40         STATUS current
41         DESCRIPTION
42                "This attribute shall specify the number of TUs that a station shall use for
43                scheduling Beacon transmissions. This value is transmitted in Beacon, Probe
44                Response, and Measurement Pilot frames."
45         ::= { dot11StationConfigEntry 12 }
```

46 *Insert the following elements to the end of dot11StationConfigTable element definitions after*
47 *dot11RSNAOptionImplemented:*
```
48  dot11AssociateStation OBJECT-TYPE
49         SYNTAX MacAddress
50         MAX-ACCESS read-only
51         STATUS current
52         DESCRIPTION
53                "This attribute holds the MAC address from the
54                Address 1 field of the most recently transmitted
55                association response frame. If no association response
56                frame has been transmitted, the value of this attribute
57                shall be 0."
58         ::= { dot11StationConfigEntry 28 }
59
60  dot11AssociateID OBJECT-TYPE
61         SYNTAX INTEGER(0..2007)
62         MAX-ACCESS read-only
63         STATUS current
64         DESCRIPTION
65                "This attribute holds the Association ID from the
66                most recently transmitted association response frame.
67                If no association response frame has been transmitted,
68                the value of this attribute shall be 0."
69         ::= { dot11StationConfigEntry 29 }
70
71  dot11AssociateFailStation OBJECT-TYPE
```

```
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds 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 30 }

dot11AssociateFailStatus OBJECT-TYPE
        SYNTAX INTEGER(0..65535)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds 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 31 }

dot11ReassociateStation OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds the MAC address from the
            Address 1 field of the most recently transmitted
            reassociation response frame. If no reassociation response
            frame has been transmitted, the value of this attribute
            shall be 0."
        ::= { dot11StationConfigEntry 32 }

dot11ReassociateID OBJECT-TYPE
        SYNTAX INTEGER(0..2007)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds the Association ID from the
            most recently transmitted reassociation response frame.
            If no reassociation response frame has been transmitted,
            the value of this attribute shall be 0."
        ::= { dot11StationConfigEntry 33 }

dot11ReassociateFailStation OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds 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 34 }

dot11ReassociateFailStatus OBJECT-TYPE
        SYNTAX INTEGER(0..65535)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds 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 35 }

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
```

```
1                    Measurement. Otherwise it is not capable of performing
2                    Radio Measurement.
3                    The default value of this attribute is FALSE."
4            ::= { dot11StationConfigEntry 36 }
5
6    dot11RadioMeasurementEnabled OBJECT-TYPE
7            SYNTAX TruthValue
8            MAX-ACCESS read-write
9            STATUS current
10           DESCRIPTION
11                   "A STA may use the defined Radio Measurement procedures if
12                   this attribute is TRUE. The default value of this attribute
13                   is FALSE."
14           ::= { dot11StationConfigEntry 37 }
15
16   dot11RadioMeasurementProbeDelay OBJECT-TYPE
17           SYNTAX INTEGER
18           MAX-ACCESS read-write
19           STATUS current
20           DESCRIPTION
21                   "The value of ProbeDelay to be used when making a beacon
22                   type measurement with measurement mode active."
23           ::= { dot11StationConfigEntry 38 }
24
25   dot11MeasurementPilotEnabled OBJECT-TYPE
26           SYNTAX TruthValue
27           MAX-ACCESS read-write
28           STATUS current
29           DESCRIPTION
30                   "A STA shall transmit Measurement Pilot frames if this attribute is TRUE.
31                   The default value of this attribute is FALSE."
32           ::= { dot11StationConfigEntry 39 }
33
34   dot11MeasurementPilotPeriod OBJECT-TYPE
35           SYNTAX INTEGER (1..65535)
36           MAX-ACCESS read-write
37           STATUS current
38           DESCRIPTION
39           "This attribute shall specify the number of TUs that a station shall use for
40           scheduling Measurement Pilot transmissions. This value is transmitted in
41           Measurement Pilot frames."
42           ::= { dot11StationConfigEntry 40 }
43
44   dot11MeasurementPilotTransmitPriority OBJECT-TYPE
45           SYNTAX INTEGER (0..3)
46           MAX-ACCESS read-write
47           STATUS current
48           DESCRIPTION
49           "This attribute shall specify the Access Category (AC), at which Measurement Pilot
50           frames are transmitted."
51           ::= { dot11StationConfigEntry 41 }
52
```

In SMT Notification Objects Section of Annex D, insert the following notifications behind dot11AuthenticateFail:

```
55   dot11Associate NOTIFICATION-TYPE
56           OBJECTS { ifIndex, dot11AssociateStation, dot11AssociateID}
57           STATUS current
58           DESCRIPTION
59                   "The associate notification shall be sent when the STA sends
60                   an Association Response frame with a status code equal to 'successful.'
61                   The value of the notification shall include the MAC address of the
62                   MAC to which the Association Response frame was sent and the
63                   Association ID.
64                   ifIndex - Each 802.11 interface is represented by an
65                   ifEntry. Interface tables in this MIB module are indexed
66                   by ifIndex."
67           ::= { dot11SMTnotification 0 4 }
68
69   dot11AssociateFailed NOTIFICATION-TYPE
70           OBJECTS { ifIndex, dot11AssociateFailStatus,
71           dot11AssociateFailStation }
72           STATUS current
```

```
 1          DESCRIPTION
 2                  "The associate failed notification shall be sent when the
 3                  STA sends an Association Response frame with a status code
 4                  other than 'successful.' The value of the notification shall
 5                  include the MAC address of the MAC to which the Association
 6                  Response frame was sent and the reason for the association failure.
 7                  ifIndex - Each 802.11 interface is represented by an
 8                  ifEntry. Interface tables in this MIB module are indexed
 9                  by ifIndex."
10          ::= { dot11SMTnotification 0 5 }
11
12  dot11Reassociate NOTIFICATION-TYPE
13          OBJECTS { ifIndex, dot11ReassociateStation, dot11ReassociateID}
14          STATUS current
15          DESCRIPTION
16                  "The reassociate notification shall be sent
17                  when the STA sends an Reassociation Response frame with a
18                  status code equal to 'successful.' The value of
19                  the notification shall include the MAC address of the
20                  MAC to which the Reassociation Response frame was sent and the
21                  Reassociation ID.
22                  ifIndex - Each 802.11 interface is represented by an
23                  ifEntry. Interface tables in this MIB module are indexed
24                  by ifIndex."
25          ::= { dot11SMTnotification 0 6 }
26
27  dot11ReassociateFailed NOTIFICATION-TYPE
28          OBJECTS { ifIndex, dot11ReassociateFailStatus,
29          dot11ReassociateStation }
30          STATUS current
31          DESCRIPTION
32                  "The reassociate failed notification shall be sent
33                  when the STA sends an Reassociation Response frame with a
34                  status code other than 'successful.' The value of
35                  the notification shall include the MAC address of the
36                  MAC to which the Reassociation Response frame was sent and
37                  the reason for the reassociation failure.
38                  ifIndex - Each 802.11 interface is represented by an
39                  ifEntry. Interface tables in this MIB module are indexed
40                  by ifIndex."
41          ::= { dot11SMTnotification 0 7 }
```

42   ***In dot11CountersTable change Dot11CountersEntry as follows:***

```
43  Dot11CountersEntry ::=
44          SEQUENCE { dot11TransmittedFragmentCount                 Counter32,
45                     dot11MulticastTransmittedFrameCount           Counter32,
46                     dot11FailedCount                              Counter32,
47                     dot11RetryCount                               Counter32,
48                     dot11MultipleRetryCount                       Counter32,
49                     dot11FrameDuplicateCount                      Counter32,
50                     dot11RTSSuccessCount                          Counter32,
51                     dot11RTSFailureCount                          Counter32,
52                     dot11ACKFailureCount                          Counter32,
53                     dot11ReceivedFragmentCount                    Counter32,
54                     dot11MulticastReceivedFrameCount              Counter32,
55                     dot11FCSErrorCount                            Counter32,
56                     dot11TransmittedFrameCount                    Counter32,
57                     dot11WEPUndecryptableCount                    Counter32,
58                     dot11QoSDiscardedFragmentCount                Counter32,
59                     dot11AssociatedStationCount                   Counter32,
60                     dot11QoSCFPollsReceivedCount                  Counter32,
61                     dot11QoSCFPollsUnusedCount                    Counter32,
62                     dot11QoSCFPollsUnusableCount                  Counter32,
63                     dot11QoSCFPollsLostCount                      Counter32 }
64
```

65   ***Insert the following attribute definition to the end of the dot11CountersEntry attributes:***

```
66  Dot11QoSCFPollsLostCount OBJECT-TYPE
67          SYNTAX Counter32
68          MAX-ACCESS read-only
69          STATUS current
```

95

```
        DESCRIPTION
            "This counter shall increment for each QoS (+)CF-Poll that has been
            issued by the HC where there was no response from the QSTA indicated in
            the RA field."
    ::= { dot11CountersEntry 20 }
```

In SMT MIB of Annex D, insert the following Radio Resource Management MIB at the after the Robust Security Network Association (RSNA and TSN) MIB

```
-- ****************************************************************
-- * Radio Resource Management
-- ****************************************************************
dot11RadioResourceManagement OBJECT IDENTIFIER ::= { dot11smt 13 }

-- ****************************************************************
-- *  dot11RRMRequest and dot11RRMReport Usage
-- *
-- *  The dot11RRMRequest and dot11RRMReport portions of the SMT 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 SMT 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 SMT 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 SMT MIB
-- *  of STA x upon completion of the measurement.
-- *
-- *        MIB.Set                              MIB.Set
-- *          or                                   or
-- *        MIB.Get                              MIB.Get
-- *   +--------|---------+              +--------|---------+
-- *   | SME    |         |              | SME    |         |
-- *   |       \ /        |              |       \ /        |
-- *   |    +--------+    |              |    +--------+    |
-- *   |    | SMT MIB |   |              |    | SMT 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 SMT 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 dot11 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
```
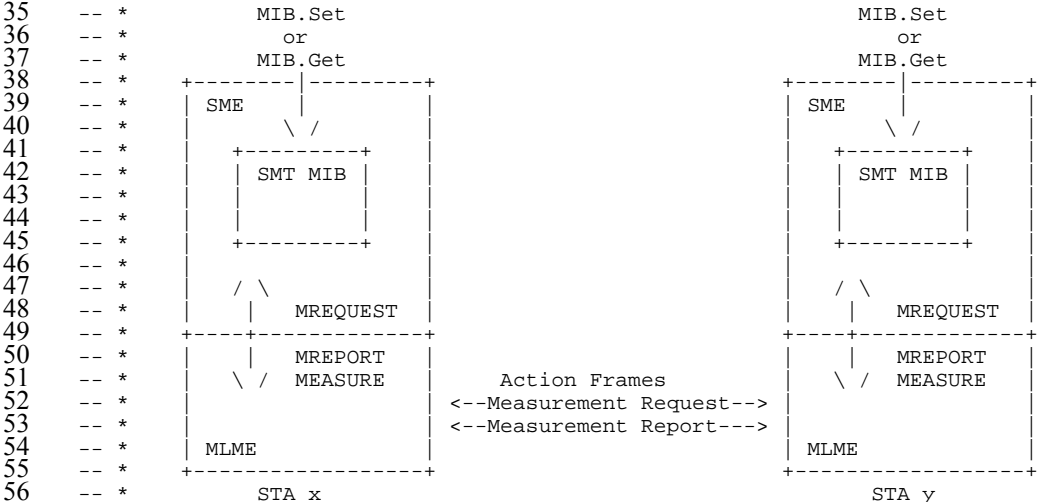
```
1    -- *  dot11RRMRqstRowStatus(s) objects are set to active to indicate that
2    -- *  the SME can trigger the appropriate MLME primitives.  Upon processing
3    -- *  the request, the SME returns the corresponding dot11RRMRqstRowStatus(s)
4    -- *  object to notInsService and are now available for additional
5    -- *  measurement requests.
6    -- *
7    -- *  After a radio measurement is complete the SME populates the RRMReport
8    -- *  objects with the results of the measurement.  Each STA maintains a set
9    -- *  of RRMReport tables, one for each corresponding measurement type.  The
10   -- *  results of the entire measurement sequence are spread across the tables
11   -- *  based on what types of measurements were requested.  Each xxxReportEntry
12   -- *  within a xxxReportTable contains a xxxRprtRqstToken that corresponds
13   -- *  to the original dot11RRMRqstToken in the measurement request.  So the
14   -- *  results of the measurement can be collected by searching the appropriate
15   -- *  xxxReportTables and retrieve any reports with the matching request
16   -- *  token.
17   -- ************************************************************************

18
19   -- ********************************************************************
20   -- * Radio Resource Measurement Requests
21   -- ********************************************************************
22   dot11RRMRequest OBJECT IDENTIFIER ::= { dot11RadioResourceManagement 1 }

23
24   -- ********************************************************************
25   -- * dot11RRMRequest TABLE
26   -- ********************************************************************
27   dot11RRMRequestNextIndex OBJECT-TYPE
28       SYNTAX Unsigned32(0..65535)
29       MAX-ACCESS read-only
30       STATUS current
31       DESCRIPTION
32           "Identifies a hint for the next value of dot11RRMRqstIndex to be used in a
33           row creation attempt for dot11RRMRequestTable. If no new rows can be created
34           for some reason, such as memory, processing requirements, etc, the SME shall
35           set this attribute to 0. It shall update this attribute to a proper value
36           other than 0 as soon as it is capable of receiving new measurement requests.
37           The nextIndex is not necessarily sequential nor monotonically increasing."
38       ::= { dot11RRMRequest 1 }

39
40   dot11RRMRequestTable OBJECT-TYPE
41       SYNTAX SEQUENCE OF Dot11RRMRequestEntry
42       MAX-ACCESS not-accessible
43       STATUS current
44       DESCRIPTION
45           "This group contains the current list of requests for RRM
46           reports to be issued and have been issued until removed. A network manager
47           adds a RRM request by creating a row with createAndWait row status and then
48           filling in the request parameters/attributes.
49           The request becomes active to be issued when the row status
50           is set to Active. The columnar objects or attributes other than the
51           rowstatus shall not be written if the rowStatus is Active. The request rows
52           can be deleted, if commanded by a network manager via changing the value of
53           dot11RRMRqstRowStatus to Destroy. This may leave orphaned rows if a manager
54           crashes and forgets which rows are being used by it. One recommended way to
55           manage orphaned or finished rows is to delete rows if their
56           dot11RRMRqstRowStatus remains other than Active for longer than a
57           period (recommend at least 5 minutes, RFC 2579). Or another recommended
58           way is to delete older rows as needed based on their dot11RRMRqstTimeStamp
59           values. This can be done by the agent as well as the manager. "
60       ::= { dot11RRMRequest 2 }

61
62   dot11RRMRequestEntry OBJECT-TYPE
63       SYNTAX Dot11RRMRequestEntry
64       MAX-ACCESS not-accessible
65       STATUS current
66       DESCRIPTION
67           "An entry in the dot11RRMRequestTable Indexed by dot11RRMRqstIndex."
68           INDEX { dot11RRMRqstIndex }
69       ::= { dot11RRMRequestTable 1 }

70
71   Dot11RRMRequestEntry ::=
72       SEQUENCE {
73           dot11RRMRqstIndex Unsigned32,
74           dot11RRMRqstRowStatus RowStatus,
75           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,
                dot11RRMRqstBssid MacAddress,
                dot11RRMRqstSSID OCTET STRING,
                dot11RRMRqstReportingCondition INTEGER,
                dot11RRMRqstThresholdOffset INTEGER,
                dot11RRMRqstSTAStatRqstGroupID INTEGER,
                dot11RRMRqstLCIRqstOctet INTEGER,
                dot11RRMRqstPauseTimeUnit INTEGER,
                dot11RRMRqstPauseTime INTEGER,
                dot11RRMRqstQoSMetricsPeerQSTAAddress MacAddress,
                dot11RRMRqstQoSMetricsTrafficIdentifier INTEGER,
                dot11RRMRqstQoSMetricsBin0Range INTEGER,
                dot11RRMRqstTrigdQoSAverageCondition TruthValue,
                dot11RRMRqstTrigdQoSConsecutiveCondition Truthvalue,
                dot11RRMRqstTrigdQoSDelayCondition Truthvalue,
                dot11RRMRqstTrigdQoSAverageThreshold INTEGER,
                dot11RRMRqstTrigdQoSConsecutiveThreshold INTEGER,
                dot11RRMRqstTrigdQoSDelayThresholdRange INTEGER,
                dot11RRMRqstTrigdQoSDelayThreshold INTEGER,
                dot11RRMRqstTrigdQoSMeasurementCount INTEGER,
                dot11RRMRqstTrigdQoSTimeout INTEGER }

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 measurement request can be unambiguously created based on the
              parameters in the row, then the
              MLME may proceed to issue the request to its intended targets when
              appropriate. If not, this attribute may be set to Not-ready immediately to
              indicate parametric errors. However, it is the network managers
              responsibility to correct the error. If the request is successfully issued
              to the target STA, then the rowStatus is set to notInService."
         REFERENCE
              "IEEE 802.11, Clause 7.3.2.21"
        ::= { dot11RRMRequestEntry 2 }

dot11RRMRqstToken OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "A unique string to identify a group of rows to be issued as parallel or
              backto back measurements. To guarantee the uniqueness of this token
              acrossmultiple network managers, it is recommended that this token be
              prefixed
              with the IP address of the network manager creating this row. This token
              isnot necessarily equivalent to the measurement tokens in RRM request
              frames.If this attribute is an empty string, then this row of request is
              independentfrom other requests."
```

```
                DEFVAL { "" }
                ::= { dot11RRMRequestEntry 3 }

dot11RRMRqstRepetitions OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
             "The Number of Repetions 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."
        ::= { 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),
                        beaconRequest(5),
                        frameRequest(6),
                        staStatistics(7),
                        lci(8),
                        qosMetrics(9),
                        pause(255)
                        }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
             "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
             "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 channel number on which this request instructs the target STA to
             perform measurements and report. This attribute is ignored if
             dot11RRMRqstType = STA statistics Request, LCI Request 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 specified."
        ::= { dot11RRMRequestEntry 9 }

dot11RRMRqstRegulatoryClass OBJECT-TYPE
        SYNTAX INTEGER {
                        twoPointFourGHz(0),
```

```
1                                    fiveGHz(1)
2                                }
3           MAX-ACCESS read-create
4           STATUS current
5           DESCRIPTION
6                "Regulatory Class indicates the frequency band in which the receiving STA
7                shall conduct its measurement. This attribute is ignored if dot11RRMRqstType
8                = STA statistics Request, LCI Request or Measurement Pause. However, even in
9                that case, this value should set to the current Regulatory Class for this
10               interface, so that the row can be set to active when ready with all
11               attributes specified."
12          REFERENCE
13               "IEEE 802.11, Error! Reference source not found."
14          ::= { dot11RRMRequestEntry 10 }
15
16   dot11RRMRqstRndInterval OBJECT-TYPE
17          SYNTAX Unsigned32
18          UNITS "TUs"
19          MAX-ACCESS read-create
20          STATUS current
21          DESCRIPTION
22               "This attribute sets the Randomization Interval in the measurement Request
23               Frame for this RRM Request. This attribute is ignored if dot11RRMRqstType =
24               STA statistics Request, LCI Request or Measurement Pause."
25          DEFVAL { 0 }
26          ::= { dot11RRMRequestEntry 11 }
27
28   dot11RRMRqstDuration OBJECT-TYPE
29          SYNTAX Unsigned32
30          UNITS "TUs"
31          MAX-ACCESS read-create
32          STATUS current
33          DESCRIPTION
34               "This attribute sets the Measurement Duration in the measurement Request
35               Element for this Mesurement Request."
36          DEFVAL { 0 }
37          ::= { dot11RRMRequestEntry 12 }
38
39   dot11RRMRqstParallel OBJECT-TYPE
40          SYNTAX TruthValue
41          MAX-ACCESS read-create
42          STATUS current
43          DESCRIPTION
44               "This attribute corresponds to the parallel bit of the request frame that
45               contains this row of request. Default is false which means the measurement
46               shall start immediately after the previous measurement completed. If this
47               value is true, then the STA shall search through this table to find rows
48               with the same
49               dot11RRMRqstToken and rowStatus Active and put them into a single
50               measurement request frame with the parallel bit set to one. A value of one
51               in the parallel bit shall mean the measurement shall start at the same time
52               as the previous measurement.  It is recommended that the SNMP manager should
53               wait until all such rows are created and set their rowStatus to Active with
54               a single request or within a
55               short period of time.  If there are too many rows to fit into a single
56               request
57               Frame, then it is the STAs discretion to select a subset of rows. It is
58               recommended that the SNMP manager to control the size of the grouped
59               requests, with the knowledge of the maximum size of request frames. If too
60               many rows are identified, there is no guarantee the behavior is
61               consistent."
62               DEFVAL { false }
63          ::= { dot11RRMRequestEntry 13 }
64
65          dot11RRMRqstEnable OBJECT-TYPE
66          SYNTAX TruthValue
67          MAX-ACCESS read-create
68          STATUS current
69          DESCRIPTION
70               "This attribute corresponds to the enable bit of the request frame that
71               contains this row of request. Default is false."
72               DEFVAL { false }
73          ::= { dot11RRMRequestEntry 14 }
74
75   dot11RRMRqstRequest OBJECT-TYPE
```

```
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "This attribute corresponds to the request bit of the request frame that
            contains this row of request. This attribute indicates whether this STA
            shall accept measurement requests from the target STA. Default is false."
            DEFVAL { false }
        ::= { dot11RRMRequestEntry 15 }


dot11RRMRqstReport OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "This attribute corresponds to the report bit of the request frame that
            contains this row of request. This bit controls whether the target STA shall
            enable autonomous measurement report, and does not affect directed requests.
            Default is false."
            DEFVAL { false }
        ::= { dot11RRMRequestEntry 16 }


dot11RRMRqstDurationMandatory OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "This attribute corresponds to the duration mandatory bit of the request
            frame that contains this row of request. Default is false."
            DEFVAL { false }
::= { dot11RRMRequestEntry 17 }


dot11RRMRqstBeaconRqstMode OBJECT-TYPE
        SYNTAX INTEGER {
                        passive(0),
                        passivePilot(1),
                        active(2),
                        staSelected(3),
                        beaconTable(4)
                        }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "dot11RRMRqstBeaconRqstMode corresponds to the Measurement Mode for
            Beacon Request element. This attribute is only valid if the
            dot11RRMRqstType is 5, indicating a beacon report. Otherwise this
            attribute is ignored."
            DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 18 }


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 broadcast BSSID when the
            measurement is to be performed on any AP(s) on the specified channel."
            DEFVAL { 'FFFFFFFF'H }
        ::= { dot11RRMRequestEntry 19 }


dot11RRMRqstSSID OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..32))
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "This attribute indicates the SSID for the measurement. The
            SSID shall be set to the wildcard SSID when the measurement
            is to be performed on any ESS/IBSS on the specified channel."
            DEFVAL {''H }
        ::= { dot11RRMRequestEntry 20 }


dot11RRMRqstReportingCondition OBJECT-TYPE
        SYNTAX INTEGER {
                        afterEveryMeasurement(0),
```

```
                            rcpiAboveAbsoluteThreshold(1),
                            rcpiBelowAbsoluteThreshold(2),
                            rssiAboveAbsoluteThreshold(3),
                            rssiBelowAbsoluteThreshold(4),
                            rcpiAboveOffsetThreshold(5),
                            rcpiBelowOffsetThreshold(6),
                            rssiAboveOffsetThreshold(7),
                            rssiBelowOffsetThreshold(8),
                            rcpiInBound(9),
                            rssiInBound(10)
                         }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The Reporting Condition defines when the measured results are to be
            reported to the requesting STA."
         REFERENCE
                "IEEE 802.11, Table k3—Reporting Condition definitions for Beacon Request
element"
                DEFVAL {0}
        ::= { dot11RRMRequestEntry 21 }

dot11RRMRqstThresholdOffset OBJECT-TYPE
        SYNTAX INTEGER (-127..127)
        UNITS "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."
         DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 22 }

dot11RRMRqstSTAStatRqstGroupID OBJECT-TYPE
        SYNTAX INTEGER {
                        staCounters(0),
                        bssLoad(1)
                        }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The attribute corresponds to the group identity if dot11RRMRqstType =
            STA statistics Request. This attribute shall be ignored otherwise.
            0 = STA Counters from dot11CountersTable
            1 = BSS Load as defined in 7.3.2.29"
            DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 23 }

dot11RRMRqstLCIRqstOctet OBJECT-TYPE
        SYNTAX INTEGER {
                        local(0),
                        remote(1)
                        }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The attribute corresponds to the subject of the LCI measurement request."
            DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 24 }

dot11RRMRqstPauseTimeUnit OBJECT-TYPE
        SYNTAX INTEGER {
                        tu(0),
                        tu1000(1)
                        }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The Measurement Period Unit subfield defines the time unit for the
            Measurement Interval subfield."
         REFERENCE
            "IEEE 802.11, Table k5—Time Unit Definitions"
            DEFVAL {0}
::= { dot11RRMRequestEntry 25 }
```

```
dot11RRMRqstPauseTime OBJECT-TYPE
        SYNTAX INTEGER (0..32768)
        UNITS "TUs or 1000*TUs, according to dot11RRMRqstPauseTimeUnit"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "The Pause Time consists of a 15 bit unsigned integer number
              representing the time period during 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"
        DEFVAL { 0 }
        ::= { dot11RRMRequestEntry 26 }

dot11RRMRqstQoSMetricsPeerQSTAAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "This attribute specifies the peer QSTA address to be measured for a QoS
              Metrics measurement"
     ::= { dot11RRMRequestEntry 27 }

dot11RRMRqstQoSMetricsTrafficIdentifier OBJECT-TYPE
        SYNTAX INTEGER(0..16)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "This attribute specifies the TC, or TS to be measured for a QoS Metrics
              measurement"
     ::= { dot11RRMRequestEntry 28 }

dot11RRMRqstQoSMetricsBin0Range OBJECT-TYPE
        SYNTAX INTEGER(1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "This attribute specifies the delay range for bin 0 of the transmit delay
              histogram."
     ::= { dot11RRMRequestEntry 29 }

dot11RRMRqstTrigdQoSAverageCondition OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "Corresponds to the Average bit in the Triggered Condition bit-field and is
              used to request triggered reporting with triggering based on the number of
              MSDUs discarded averaged over dot11RRMRqstTrigdQoSMEasurementCount reaching
              dot11RRMRqstTrigdQoSAverageThreshold."
        DEFVAL { false }
     ::= { dot11RRMRequestEntry 30 }

dot11RRMRqstTrigdQoSConsecutiveCondition OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "Corresponds to the Consecutive bit in the Triggered Condition bit-field and
              is used to request triggered reporting with triggering based on the
              consectutive number of MSDUs discarded reaching
              dot11RRMRqstTrigdQoSConsecutiveThreshold."
        DEFVAL { false }
     ::= { dot11RRMRequestEntry 31 }

dot11RRMRqstTrigdQoSDelayCondition OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
              "Corresponds to the Delay bit in the Triggered Condition bit-field and is
              used to request triggered reporting with triggering based on the
              consectutive number of MSDUs that experience a transmit delay greater than
              dot11RRMRqstTrigdQoSDelayThresholdRange reaching
              dot11RRMRqstTrigdQoSDelayThreshold."
```

```
           DEFVAL { false }
      ::= { dot11RRMRequestEntry 32 }

dot11RRMRqstTrigdQoSAverageThreshold OBJECT-TYPE
           SYNTAX INTEGER (1-255)
           MAX-ACCESS read-create
           STATUS current
           DESCRIPTION
                "The trigger threshold for triggered QoS Metrics based on average MSDUs
                discarded. Triggering occurs if the number of MSDUs discarded over the
                moving average number of transmitted MSDUs in
                dot11RRMRqstTrigdQoSMeasurementCount reaches this threshold."
           DEFVAL { 10 }
      ::= { dot11RRMRequestEntry 33 }

dot11RRMRqstTrigdQoSConsecutiveThreshold OBJECT-TYPE
           SYNTAX INTEGER (1-255)
           MAX-ACCESS read-create
           STATUS current
           DESCRIPTION
                "The trigger threshold for triggered QoS Metrics based on consecutive MSDUs
                discarded. Triggering occurs if the consecutive number of MSDUs discarded
                reaches this threshold."
           DEFVAL { 5 }
      ::= { dot11RRMRequestEntry 34 }

dot11RRMRqstTrigdQoSDelayThresholdRange OBJECT-TYPE
           SYNTAX INTEGER (0-3)
           MAX-ACCESS read-create
           STATUS current
           DESCRIPTION
                "The first part of the trigger threshold for triggered QoS Metrics based on
                consecutive MSDUs delayed. Triggering 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."
           DEFVAL { 1 }
      ::= { dot11RRMRequestEntry 35 }

dot11RRMRqstTrigdQoSDelayThreshold OBJECT-TYPE
           SYNTAX INTEGER (1-255)
           MAX-ACCESS read-create
           STATUS current
           DESCRIPTION
                "The second part of the trigger threshold for triggered QoS Metrics based on
                consecutive MSDUs delayed. Triggering occurs if the consecutive number of
                MSDUs that experience a transmit delay greater than
                dot11RRMRqstQoSDelayThresholdRange reaches this value."
           DEFVAL { 20 }
      ::= { dot11RRMRequestEntry 36 }

dot11RRMRqstTrigdQoSMeasurementCount OBJECT-TYPE
           SYNTAX INTEGER (1-255)
           MAX-ACCESS read-create
           STATUS current
           DESCRIPTION
                "Contains a number of MSDUs to be used as a moving average count in the
                average error threshold and in determining the scope of the reported QoS
                metrics in a triggered measurement report."
           DEFVAL { 100 }
      ::= { dot11RRMRequestEntry 37 }

dot11RRMRqstTrigdQoSTimeout OBJECT-TYPE
           SYNTAX INTEGER (1-255)
           MAX-ACCESS read-create
           STATUS current
           DESCRIPTION
                "Contains a value in units of 100TU during which a measuring STA shall not
                generate further triggered QoS metrics reports after a trigger condition has
                been met and a report generated."
           DEFVAL { 20 }
      ::= { dot11RRMRequestEntry 38 }

-- *********************************************************************
-- * End of dot11RRMRequest TABLE
```

```
1    -- ***********************************************************************
2
3    -- ***********************************************************************
4    -- * Radio Resource Measurement Reports
5    -- * Report tables contain measurement reports received by this STA or
6    -- * results of measurements performed by this STA.
7    -- ***********************************************************************
8    dot11RRMReport OBJECT IDENTIFIER ::= { dot11RadioResourceManagement 2 }
9
10   -- ***********************************************************************
11   -- * dot11ChannelLoadReport TABLE
12   -- ***********************************************************************
13   dot11ChannelLoadReportTable OBJECT-TYPE
14           SYNTAX SEQUENCE OF Dot11ChannelLoadReportEntry
15           MAX-ACCESS not-accessible
16           STATUS current
17           DESCRIPTION
18                   "Group contains the current list of Channel Load reports that have been
19                   received by the MLME. The report tables shall be maintained as FIFO to
20                   preserve freshness, thus the rows in this table can be deleted for memory
21                   constraints or other implementation constraints determined by the vendor.
22                   New rows shall have different RprtIndex values than those deleted within the
23                   range limitation of the index. One easy way is to monotonically increase
24                   RprtIndex for new reports being written in the table."
25           ::= { dot11RRMReport 1 }
26
27   dot11ChannelLoadReportEntry OBJECT-TYPE
28           SYNTAX Dot11ChannelLoadReportEntry
29           MAX-ACCESS not-accessible
30           STATUS current
31           DESCRIPTION
32                   "An entry in the dot11ChannelLoadReportTable Indexed by
33                   dot11ChannelLoadRprtIndex."
34           INDEX { dot11ChannelLoadRprtIndex }
35           ::= { dot11ChannelLoadReportTable 1 }
36
37   Dot11ChannelLoadReportEntry ::=
38       SEQUENCE {
39           dot11ChannelLoadRprtIndex Unsigned32,
40           dot11ChannelLoadRprtRqstToken OCTET STRING,
41           dot11ChannelLoadRprtIfIndex InterfaceIndex,
42           dot11ChannelLoadMeasuringSTAAddr MacAddress,
43           dot11ChannelLoadRprtChanNumber INTEGER,
44           dot11ChannelLoadRprtRegulatoryClass INTEGER,
45           dot11ChannelLoadRprtActualStartTime TSFType,
46           dot11ChannelLoadRprtMeasurementDuration Unsigned32,
47           dot11ChannelLoadRprtChannelLoad INTEGER,
48           dot11ChannelLoadRprtMeasurementMode INTEGER }
49
50   dot11ChannelLoadRprtIndex OBJECT-TYPE
51           SYNTAX Unsigned32
52           MAX-ACCESS not-accessible
53           STATUS current
54           DESCRIPTION
55                   "Index for Channel Load Report elements in
56                   dot11ChannelLoadReportTable, greater than 0."
57           ::= { dot11ChannelLoadReportEntry 1 }
58
59   dot11ChannelLoadRprtRqstToken OBJECT-TYPE
60           SYNTAX OCTET STRING
61           MAX-ACCESS read-only
62           STATUS current
63           DESCRIPTION
64                   "This attribute holds the request token that was specified in the
65                   Measurement request that generated this measurement report. This should be
66                   an exact match to the original dot11RRMRqstToken attribute. Note that there
67                   may be  multiple entries in the table that match this value since a single
68                   request may generate multiple measurement reports."
69           ::= { dot11ChannelLoadReportEntry 2 }
70
71   dot11ChannelLoadRprtIfIndex OBJECT-TYPE
72           SYNTAX InterfaceIndex
73           MAX-ACCESS read-only
74           STATUS current
75           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
             "The channel number for this row of Channel Load Report Table."
        ::= { dot11ChannelLoadReportEntry 5 }
dot11ChannelLoadRprtRegulatoryClass OBJECT-TYPE
        SYNTAX PHYType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Regulatory Class indicates the frequency band in which this row of
             ChannelLoad report has been conducted."
         REFERENCE
             "IEEE 802.11, Error! Reference source not found."
        ::= { dot11ChannelLoadReportEntry 6 }


dot11ChannelLoadRprtActualStartTime OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "This attribute corresponds to 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 corresponds to the duration over which the ChannelLoad
             Report was measured."
        ::= { dot11ChannelLoadReportEntry 8 }


dot11ChannelLoadRprtChannelLoad OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        UNITS "1/255"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Channel Load shall contain the fractional duration over which the
             measuring STA determined the channel to be busy during the
             measurement duration."
         REFERENCE
             "IEEE 802.11, Clause 7.3.2.22.4"
        ::= { dot11ChannelLoadReportEntry 9 }


dot11ChannelLoadRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                        lateBit(0),
                        incapableBit(1),
                        refusedBit(2),
                        }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "MeasurementMode corresponds to the Measurement Report Mode field in
             the Measurement Report Element and is used to indicate the reason for
             a failed measurement request. 0 indicates the STA is unable to carry
             out a measurement request because it received the request after the
             requested measurement time. 1 indicates this STA is incapable of
```

```
 1                    generating the report. 3 indicates his STA is refusing to generate
 2                    the report."
 3                DEFVAL { 0 }
 4            ::= { dot11ChannelLoadReportEntry 10 }
 5
 6    -- **********************************************************************
 7    -- * End of dot11ChannelLoadReport TABLE
 8    -- **********************************************************************
 9
10    -- **********************************************************************
11    -- * dot11NoiseHistogramReport TABLE
12    -- **********************************************************************
13    dot11NoiseHistogramReportTable OBJECT-TYPE
14            SYNTAX SEQUENCE OF Dot11NoiseHistogramReportEntry
15            MAX-ACCESS not-accessible
16            STATUS current
17            DESCRIPTION
18                "Group contains the current list of Noise Histogram reports that have been
19                received by the MLME. The report tables shall be maintained as FIFO to
20                preserve freshness, thus the rows in this table can be deleted for memory
21                constraints or other implementation constraints determined by the vendor.
22                New rows shall have different RprtIndex values than those deleted within the
23                range limitation of the index. One easy way is to monotonically increase
24                RprtIndex for new reports being written in the table."
25            ::= { dot11RRMReport 2 }
26
27    dot11NoiseHistogramReportEntry OBJECT-TYPE
28            SYNTAX Dot11NoiseHistogramReportEntry
29            MAX-ACCESS not-accessible
30            STATUS current
31            DESCRIPTION
32                "An entry in the dot11NoiseHistogramReportTable
33                Indexed by dot11NoiseHistogramRprtIndex."
34            INDEX { dot11NoiseHistogramRprtIndex }
35            ::= { dot11NoiseHistogramReportTable 1 }
36
37    Dot11NoiseHistogramReportEntry ::=
38        SEQUENCE {
39            dot11NoiseHistogramRprtIndex Unsigned32,
40            dot11NoiseHistogramRprtRqstToken OCTET STRING,
41            dot11NoiseHistogramRprtIfIndex InterfaceIndex,
42            dot11NoiseHistogramMeasuringSTAAddr MacAddress,
43            dot11NoiseHistogramRprtChanNumber INTEGER,
44            dot11NoiseHistogramRprtRegulatoryClass INTEGER,
45            dot11NoiseHistogramRprtActualStartTime TSFType,
46            dot11NoiseHistogramRprtAntennaID INTEGER,
47            dot11NoiseHistogramRprtANPI INTEGER,
48            dot11NoiseHistogramRprtMeasurementDuration Unsigned32,
49            dot11NoiseHistogramRprtRPIDensity0 INTEGER,
50            dot11NoiseHistogramRprtRPIDensity1 INTEGER,
51            dot11NoiseHistogramRprtRPIDensity2 INTEGER,
52            dot11NoiseHistogramRprtRPIDensity3 INTEGER,
53            dot11NoiseHistogramRprtRPIDensity4 INTEGER,
54            dot11NoiseHistogramRprtRPIDensity5 INTEGER,
55            dot11NoiseHistogramRprtRPIDensity6 INTEGER,
56            dot11NoiseHistogramRprtRPIDensity7 INTEGER,
57            dot11NoiseHistogramRprtRPIDensity8 INTEGER,
58            dot11NoiseHistogramRprtMeasurementMode INTEGER }
59
60    dot11NoiseHistogramRprtIndex OBJECT-TYPE
61            SYNTAX Unsigned32
62            MAX-ACCESS not-accessible
63            STATUS current
64            DESCRIPTION
65                "Index for Noise Histogram elements in dot11NoiseHistogramReportTable,
66                greater than 0."
67            ::= { dot11NoiseHistogramReportEntry 1 }
68
69    dot11NoiseHistogramRprtRqstToken OBJECT-TYPE
70            SYNTAX OCTET STRING
71            MAX-ACCESS read-only
72            STATUS current
73            DESCRIPTION
74                "This attribute holds the request token that was specified in the
75                measurement request that generated this measurement report. This should be
```

```
 1                   an exact match to the original dot11RRMRqstToken attribute. Note that there
 2                   may be multiple entries in the table that match this value since a single
 3                   request may generate multiple measurement reports."
 4           ::= { dot11NoiseHistogramReportEntry 2 }
 5
 6   dot11NoiseHistogramRprtIfIndex OBJECT-TYPE
 7           SYNTAX InterfaceIndex
 8           MAX-ACCESS read-only
 9           STATUS current
10           DESCRIPTION
11               "The ifIndex for this row of Noise Histogram Report has been received
12               on. "
13           ::= { dot11NoiseHistogramReportEntry 3 }
14
15   dot11NoiseHistogramMeasuringSTAAddr OBJECT-TYPE
16           SYNTAX MacAddress
17           MAX-ACCESS read-only
18           STATUS current
19           DESCRIPTION
20               "The MAC address of the measuring STA for this row of Noise Histogram
21               report."
22           ::= { dot11NoiseHistogramReportEntry 4 }
23
24   dot11NoiseHistogramRprtChanNumber OBJECT-TYPE
25           SYNTAX INTEGER
26           MAX-ACCESS read-only
27           STATUS current
28           DESCRIPTION
29               "The channel number on which this measurement report was made."
30           ::= { dot11NoiseHistogramReportEntry 5 }
31
32   dot11NoiseHistogramRprtRegulatoryClass OBJECT-TYPE
33           SYNTAX INTEGER {
34                       twoPointFourGHz(0),
35                       fiveGHz(1)
36                       }
37           MAX-ACCESS read-only
38           STATUS current
39           DESCRIPTION
40               "Regulatory Class indicates the frequency band in which this row of
41               noise histogram report has been conducted."
42            REFERENCE
43               "IEEE 802.11, Error! Reference source not found."
44           ::= { dot11NoiseHistogramReportEntry 6 }
45
46   dot11NoiseHistogramRprtActualStartTime OBJECT-TYPE
47           SYNTAX TSFType
48           MAX-ACCESS read-only
49           STATUS current
50           DESCRIPTION
51               "This attribute corresponds to the TSF value at the time when the
52               measurement started."
53           ::= { dot11NoiseHistogramReportEntry 7 }
54
55   dot11NoiseHistogramRprtAntennaID OBJECT-TYPE
56           SYNTAX INTEGER(0..255)
57           MAX-ACCESS read-only
58           STATUS current
59           DESCRIPTION
60               "The Antenna ID contains the identifying number for the antenna used for
61               this measurement. The value 0
62               indicates that the antenna identifier is unknown.  The value 255
63               indicates that this measurement was made with multiple antennas. that the
64               antenna identifier is unknown. The value 255 indicates that this measurement
65               was made with multiple antennas. The value 1 is used for a STA with only one
66               antenna.  STAs with more than one antenna shall assign Antenna IDs to each
67               antenna as consecutive, ascending numbers. Each  Antenna ID number
68               represents a unique antenna characterized by a fixed relative position, a
69               fixed relative direction and a peak gain for that position and direction."
70           ::= { dot11NoiseHistogramReportEntry 8 }
71
72   dot11NoiseHistogramRprtANPI OBJECT-TYPE
73           SYNTAX INTEGER(0..255)
74           UNITS "dBm"
75           MAX-ACCESS read-only
```

```
        STATUS current
        DESCRIPTION
            "This attribute corresponds to 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
            RPI in the specified channel when NAV is equal to 0 (when virtual CS
            mechanism indicates idle channel) except during frame transmission or
            reception."
        ::= { dot11NoiseHistogramReportEntry 9 }

dot11NoiseHistogramRprtMeasurementDuration OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute corresponds to the duration over which the Noise Histogram
            Report was measured."
        ::= { dot11NoiseHistogramReportEntry 10 }

dot11NoiseHistogramRprtRPIDensity0 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the measured RPI density for non-802.11 signals
            from Power <= -92dBm."
        ::= { dot11NoiseHistogramReportEntry 11 }

dot11NoiseHistogramRprtRPIDensity1 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the measured RPI density for non-802.11 signals
            from -92dBm < Power <= -87dBm."
        ::= { dot11NoiseHistogramReportEntry 12 }

dot11NoiseHistogramRprtRPIDensity2 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the measured RPI density for non-802.11 signals
            from -87dBm < Power <= -82dBm."
        ::= { dot11NoiseHistogramReportEntry 13 }

dot11NoiseHistogramRprtRPIDensity3 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the measured RPI density for non-802.11 signals
            from -82dBm < Power <= -77dBm."
        ::= { dot11NoiseHistogramReportEntry 14 }

dot11NoiseHistogramRprtRPIDensity4 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the measured RPI density for non-802.11 signals
            from -77dBm < Power <= -72dBm."
        ::= { dot11NoiseHistogramReportEntry 15 }

dot11NoiseHistogramRprtRPIDensity5 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the measured RPI density for non-802.11 signals
            from -72dBm < Power <= -67dBm."
        ::= { dot11NoiseHistogramReportEntry 16 }
```

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```
dot11NoiseHistogramRprtRPIDensity6 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "This attribute contains the measured RPI density for non-802.11 signals
             from -67dBm < Power <= -62dBm."
        ::= { dot11NoiseHistogramReportEntry 17 }

dot11NoiseHistogramRprtRPIDensity7 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "This attribute contains the measured RPI density for non-802.11 signals
             from -62dBm < Power <= -57dBm."
        ::= { dot11NoiseHistogramReportEntry 18 }

dot11NoiseHistogramRprtRPIDensity8 OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "This attribute contains the measured RPI density for non-802.11 signals
             from Power -57dBm <= Power."
        ::= { dot11NoiseHistogramReportEntry 19 }

dot11NoiseHistogramRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                        lateBit(0),
                        incapableBit(1),
                        refusedBit(2),
                        }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "MeasurementMode corresponds to the Measurement Report Mode field in
             the Measurement Report Element and is used to indicate the reason for
             a failed measurement request. 0 indicates the STA is unable to carry
             out a measurement request because it received the request after the
             requested measurement time. 1 indicates this STA is incapable of
             generating the report. 3 indicates his STA is refusing to generate
             the report."
        DEFVAL { 0 }
        ::= { dot11NoiseHistogramReportEntry 20 }

-- **********************************************************************
-- * 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 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 3 }

dot11BeaconReportEntry OBJECT-TYPE
        SYNTAX Dot11BeaconReportEntry
        MAX-ACCESS not-accessible
        STATUS current
             DESCRIPTION
             "An entry in the dot11BeaconReportTable Indexed by dot11BeaconRprtIndex."
        INDEX { dot11BeaconRprtIndex }
```

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```
 1                 ::= { dot11BeaconReportTable 1 }
 2
 3       Dot11BeaconReportEntry ::=
 4           SEQUENCE {
 5               dot11BeaconRprtIndex Unsigned32,
 6               dot11BeaconRprtRqstToken OCTET STRING,
 7               dot11BeaconRprtIfIndex InterfaceIndex,
 8               dot11BeaconMeasuringSTAAddr MacAddress,
 9               dot11BeaconRprtChanNumber INTEGER,
10               dot11BeaconRprtRegulatoryClass INTEGER,
11               dot11BeaconRprtActualStartTime TSFType,
12               dot11BeaconRprtMeasurementDuration Unsigned32,
13               dot11BeaconRprtPhyType INTEGER,
14               dot11BeaconRprtReportedFrameType INTEGER,
15               dot11BeaconRprtRCPI INTEGER,
16               dot11BeaconRprtRSNI INTEGER,
17               dot11BeaconRprtBSSID MacAddress,
18               dot11BeaconRprtAntennaID INTEGER,
19               dot11BeaconRprtParentTSF TSFType,
20               dot11BeaconRprtReportedFrameBody OCTET STRING,
21               dot11BeaconRptMeasurementMode INTEGER }
22
23       dot11BeaconRprtIndex OBJECT-TYPE
24               SYNTAX Unsigned32
25               MAX-ACCESS not-accessible
26               STATUS current
27               DESCRIPTION
28                   "Index for Beacon Report elements in dot11BeaconReportTable, greater than
29                   0."
30               ::= { dot11BeaconReportEntry 1 }
31
32       dot11BeaconRprtRqstToken OBJECT-TYPE
33               SYNTAX OCTET STRING
34               MAX-ACCESS read-only
35               STATUS current
36               DESCRIPTION
37                   "This attribute holds the request token that was specified in the
38                   measurement request that generated this measurement report. This should be
39                   an exact match to the original dot11RRMRqstToken attribute. Note that there
40                   may be multiple entries in the table that match this value since a single
41                   request may generate multiple measurement reports."
42               ::= { dot11BeaconReportEntry 2 }
43
44       dot11BeaconRprtIfIndex OBJECT-TYPE
45               SYNTAX InterfaceIndex
46               MAX-ACCESS read-only
47               STATUS current
48               DESCRIPTION
49                   "The ifIndex for this row of Beacon Report has been received on."
50               ::= { dot11BeaconReportEntry 3 }
51
52       dot11BeaconMeasuringSTAAddr OBJECT-TYPE
53               SYNTAX MacAddress
54               MAX-ACCESS read-only
55               STATUS current
56               DESCRIPTION
57                   "The MAC address of the measuring STA for this row of Beacon report."
58               ::= { dot11BeaconReportEntry 4 }
59
60       dot11BeaconRprtChanNumber OBJECT-TYPE
61               SYNTAX INTEGER
62               MAX-ACCESS read-only
63               STATUS current
64               DESCRIPTION
65                   "The channel number on which this row of report detected beacons
66                   and probe responses."
67               ::= { dot11BeaconReportEntry 5 }
68
69       dot11BeaconRprtRegulatoryClass OBJECT-TYPE
70               SYNTAX PHYType
71               MAX-ACCESS read-only
72               STATUS current
73               DESCRIPTION
74                   "Regulatory Class indicates the frequency band in which this row
75                   of beacon report has been conducted."
```

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```
1              REFERENCE
2                  "IEEE 802.11, Error! Reference source not found."
3              ::= { dot11BeaconReportEntry 6 }
4
5      dot11BeaconRprtActualStartTime OBJECT-TYPE
6              SYNTAX TSFType
7              MAX-ACCESS read-only
8              STATUS current
9              DESCRIPTION
10                 "This attribute corresponds to the TSF value at the time when the
11                 measurement started."
12             ::= { dot11BeaconReportEntry 7 }
13
14     dot11BeaconRprtMeasurementDuration OBJECT-TYPE
15             SYNTAX Unsigned32
16             UNITS "TUs"
17             MAX-ACCESS read-only
18             STATUS current
19             DESCRIPTION
20                 "This attribute corresponds to the duration over which the Beacon Report was
21                 measured."
22             ::= { dot11BeaconReportEntry 8 }
23
24     dot11BeaconRprtPhyType OBJECT-TYPE
25             SYNTAX INTEGER {
26                         fhss(1),
27                         dsss(2),
28                         irbaseband(3),
29                         ofdm(4),
30                         hrdsss(5),
31                         erp(6)
32                         }
33             UNITS "dot11PHYType"
34             MAX-ACCESS read-only
35             STATUS current
36             DESCRIPTION
37                 "This attribute corresponds to the PHY Type for this row of
38                 Beacon Report."
39             ::= { dot11BeaconReportEntry 9 }
40
41     dot11BeaconRprtReportedFrameType OBJECT-TYPE
42             SYNTAX INTEGER {
43                         beaconOrProbeResponse(0),
44                         measurementPilot(1)
45                         }
46             MAX-ACCESS read-only
47             STATUS current
48             DESCRIPTION
49                 "This attribute corresponds to the frame type reported in
50                 dot11BeaconRprtReportedFrameBody"
51             ::= { dot11BeaconReportEntry 10 }
52
53
54     dot11BeaconRprtRCPI OBJECT-TYPE
55             SYNTAX INTEGER(0..255)
56             MAX-ACCESS read-only
57             STATUS current
58             DESCRIPTION
59                 "This attribute indicates the received channel power of the beacon or
60                 probe response frame in dBm, as defined in the RCPI measurement clause
61                 for the indicated PHY Type."
62             ::= { dot11BeaconReportEntry 11 }
63
64     dot11BeaconRprtRSNI OBJECT-TYPE
65             SYNTAX INTEGER(0..255)
66             MAX-ACCESS read-only
67             STATUS current
68             DESCRIPTION
69                 "This attribute indicates the received signal to noise ratio of the beacon
70                 or probe response frame in dBm. RSNI is the received signal to noise plus
71                 interference ratio derived from the measured RCPI for the received frame and
72                 from the measured ANPI for the channel used to received the frame. RSNI is
73                 calculated by the ratio of  the received signal power (RCPI - ANPI) over the
74                 noise plus interference power (ANPI), expressed in db (1/2 db steps), where
75                 RSNI = [(ratio(dB) + 10) * 2], for ratios in the range -10dB to +118dB.
```

```
 1                    "
 2                ::= { dot11BeaconReportEntry 12 }
 3
 4    dot11BeaconRprtBSSID OBJECT-TYPE
 5            SYNTAX MacAddress
 6            MAX-ACCESS read-only
 7            STATUS current
 8            DESCRIPTION
 9                "This attribute corresponds to the BSSID of the beacon for this row of
10                Beacon Report."
11            ::= { dot11BeaconReportEntry 13 }
12
13    dot11BeaconRprtAntennaID OBJECT-TYPE
14            SYNTAX INTEGER(0..255)
15            MAX-ACCESS read-only
16            STATUS current
17            DESCRIPTION
18                "The Antenna ID contains the identifying number for the antenna used
19                for this measurement. The value 0 indicates that the antenna identifier is
20                unknown.  The value 255 indicates that this measurement was made with
21                multiple antennas. The value 1 is used for a STA with only one antenna.
22                STAs with more than one antenna shall assign Antenna IDs to each antenna as
23                consecutive, ascending numbers. Each Antenna ID number represents a unique
24                antenna characterized by a fixed relative position, a fixed relative
25                direction and a peak gain for that position and direction."
26            ::= { dot11BeaconReportEntry 14 }
27
28    dot11BeaconRprtParentTSF OBJECT-TYPE
29            SYNTAX TSFType
30            MAX-ACCESS read-only
31            STATUS current
32            DESCRIPTION
33                "This attribute corresponds to the TSF value of the serving measuring STA's
34                TSF value at the time the measuring STA received the beacon or probe
35                response frame."
36            ::= { dot11BeaconReportEntry 15 }
37
38    dot11BeaconRprtReportedFrameBody OBJECT-TYPE
39            SYNTAX OCTET STRING (SIZE(0..100))
40            MAX-ACCESS read-only
41            STATUS current
42            DESCRIPTION
43                "This attribute contains the fixed fields and information elements from the
44                frame body of the Beacon, Measurement Pilot or Probe Response frame being
45                received.
46                All reported TIM elements are truncated to 4 octets."
47            ::= { dot11BeaconReportEntry 16 }
48
49    dot11BeaconRprtMeasurementMode OBJECT-TYPE
50            SYNTAX INTEGER {
51                        lateBit(0),
52                        incapableBit(1),
53                        refusedBit(2),
54                        }
55            MAX-ACCESS read-only
56            STATUS current
57            DESCRIPTION
58                "MeasurementMode corresponds to the Measurement Report Mode field in
59                the Measurement Report Element and is used to indicate the reason for
60                a failed measurement request. 0 indicates the STA is unable to carry
61                out a measurement request because it received the request after the
62                requested measurement time. 1 indicates this STA is incapable of
63                generating the report. 3 indicates his STA is refusing to generate
64                the report."
65                DEFVAL { 0 }
66            ::= { dot11BeaconReportEntry 17 }
67
68    -- *****************************************************************
69    -- * End of dot11BeaconReport TABLE
70    -- *****************************************************************
71
72    -- *****************************************************************
73    -- * dot11FrameReport TABLE
74    -- *****************************************************************
75    dot11FrameReportTable OBJECT-TYPE
```

```
 1          SYNTAX SEQUENCE OF Dot11FrameReportEntry
 2          MAX-ACCESS not-accessible
 3          STATUS current
 4          DESCRIPTION
 5              "Group contains the current list of Frame reports that have been received by
 6              the MLME. The report tables shall be maintained as FIFO to preserve
 7              freshness, thus the rows in this table can be deleted for memory constraints
 8              or other implementation constraints determined by the vendor. New rows shall
 9              have different RprtIndex values than those deleted within the range
10              limitation of the index. One easy way is to monotonically increase RprtIndex
11              for new reports being written in the table."
12          ::= { dot11RRMReport 4 }
13
14  dot11FrameReportEntry OBJECT-TYPE
15          SYNTAX Dot11FrameReportEntry
16          MAX-ACCESS not-accessible
17          STATUS current
18          DESCRIPTION
19              "An entry in the dot11FrameReportTable Indexed by dot11FrameRprtIndex."
20          INDEX { dot11FrameRprtIndex }
21          ::= { dot11FrameReportTable 1 }
22
23  Dot11FrameReportEntry ::=
24      SEQUENCE {
25          dot11FrameRprtIndex Unsigned32,
26          dot11FrameRprtIfIndex InterfaceIndex,
27          dot11FrameRprtRqstToken Unsigned32,
28          dot11FrameRprtChanNumber INTEGER,
29          dot11FrameRprtRegulatoryClass INTEGER,
30          dot11FrameRprtActualMsmtStart TSFType,
31          dot11FrameRprtMeasurementDuration Unsigned32,
32          dot11FrameRprtMeasuringSTAAddr MacAddress,
33          dot11FrameRprtBSSID MacAddress,
34          dot11FrameRprtRCPI INTEGER,
35          dot11FrameRprtRSNI INTEGER,
36          dot11FrameRprtAntennaID INTEGER,
37          dot11FrameRprtNumberFrames INTEGER,
38          dot11FrameRptMeasurementMode INTEGER }
39
40  dot11FrameRprtIndex OBJECT-TYPE
41          SYNTAX Unsigned32
42          MAX-ACCESS not-accessible
43          STATUS current
44          DESCRIPTION
45              "Index for Frame Report elements in dot11FrameReportTable, greater than 0."
46          ::= { dot11FrameReportEntry 1 }
47
48  dot11FrameRprtIfIndex OBJECT-TYPE
49          SYNTAX InterfaceIndex
50          MAX-ACCESS read-only
51          STATUS current
52          DESCRIPTION
53              "The ifIndex for this row of Frame Report has been received on."
54          ::= { dot11FrameReportEntry 2 }
55
56  dot11FrameRprtRqstToken OBJECT-TYPE
57  SYNTAX Unsigned32
58          MAX-ACCESS read-only
59          STATUS current
60          DESCRIPTION
61              "Index for Frame Request elements in dot11FrameRequestTable that corresponds
62              to this row of frame report. Since a single frame request can generate
63              multiple rows in the frame report table, one per BSSID, this
64              dot11FrameRprtRqstToken indicates which request this particular row
65              corresponds to. If this row of report is received without a particular
66              request, this attribute should be 0"
67          ::= { dot11FrameReportEntry 3 }
68
69  dot11FrameRprtChanNumber OBJECT-TYPE
70          SYNTAX INTEGER
71          MAX-ACCESS read-only
72          STATUS current
73          DESCRIPTION
74              "The channel number on which this row of report detected frame request
75              responses."
```

```
                ::= { dot11FrameReportEntry 4 }

dot11FrameRprtRegulatoryClass OBJECT-TYPE
        SYNTAX PHYType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Regulatory Class indicates the frequency band in which this row of
            frame report has been conducted."
         REFERENCE
            "IEEE 802.11, Error! Reference source not found."
        ::= { dot11FrameReportEntry 5 }

dot11FrameRprtActualMsmtStart OBJECT-TYPE
        SYNTAX TSFType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute corresponds to 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 corresponds to the duration over which the Frame Report
            was measured, expressed in TUs."
        ::= { dot11FrameReportEntry 7 }

dot11FrameRprtMeasuringSTAAddr OBJECT-TYPE
        SYNTAX MacAddress
        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 corresponds to the BSSID of the STA that transmitted this
            frame."
        ::= { dot11FrameReportEntry 9 }

dot11FrameRprtRCPI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        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 for the
            indicated PHY Type."
        ::= { dot11FrameReportEntry 10 }

dot11FrameRprtRSNI OBJECT-TYPE
        SYNTAX INTEGER(0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            This attribute indicates the received signal to noise ratio of the
            receivedframe in dBm. RSNI is the received signal to noise plus interference
            ratio derived from the RCPI for the received frame and from the most recent
            ANPI value measured on the channel used to received the frame. RSNI may be
            calculated by the ratio of  the received signal power (RCPI - ANPI) over the
            noise plus interference power (ANPI), expressed in db (1/2 db steps), where
            RSNI = [(ratio(dB) + 10) * 2],  for  ratios in the range -10dB to +118dB.
            Other measurement techniques are allowed.
            "
        ::= { dot11FrameReportEntry 11 }
```

```
1    dot11FrameRprtAntennaID OBJECT-TYPE
2          SYNTAX INTEGER(0..255)
3          MAX-ACCESS read-only
4          STATUS current
5          DESCRIPTION
6              "The Antenna ID contains the identifying number for the antenna used for
7              this measurement. The value 0 indicates that the antenna identifier is
8              unknown.  The value 255 indicates that this measurement was made with
9              multiple antennas. The value 1 is used for a STA with only one antenna.
10             STAs with more than one antenna shall assign Antenna IDs to each antenna as
11             consecutive, ascending numbers. Each  Antenna ID number represents a unique
12             antenna characterized by a fixed relative position, a fixed relative
13             direction and a peak gain for that position and direction."
14         ::= { dot11FrameReportEntry 12 }
15
16   dot11FrameRprtNumberFrames  OBJECT-TYPE
17         SYNTAX INTEGER(0..255)
18         MAX-ACCESS read-only
19         STATUS current
20         DESCRIPTION
21             "This attribute corresponds to the number of received frames in the
22             measurement Report Frame for this row of Frame Report."
23         ::= { dot11FrameReportEntry 13 }
24
25   dot11FrameRptMeasurementMode OBJECT-TYPE
26         SYNTAX INTEGER {
27                         lateBit(0),
28                         incapableBit(1),
29                         refusedBit(2),
30                         }
31         MAX-ACCESS read-only
32         STATUS current
33         DESCRIPTION
34             "MeasurementMode corresponds to the Measurement Report Mode field in
35             the Measurement Report Element and is used to indicate the reason for
36             a failed measurement request. 0 indicates the STA is unable to carry
37             out a measurement request because it received the request after the
38             requested measurement time. 1 indicates this STA is incapable of
39             generating the report. 3 indicates his STA is refusing to generate
40             the report."
41             DEFVAL { 0 }
42         ::= { dot11FrameReportEntry 14 }
43
44   -- ********************************************************************
45   -- * End of dot11FrameReport TABLE
46   -- ********************************************************************
47
48   -- ********************************************************************
49   -- * dot11STAStatisticsReport TABLE
50   -- ********************************************************************
51   dot11STAStatisticsReportTable OBJECT-TYPE
52         SYNTAX SEQUENCE OF Dot11STAStatisticsReportEntry
53         MAX-ACCESS not-accessible
54         STATUS current
55         DESCRIPTION
56             "Group contains the current list of STA Statistics reports that have been
57             received by the MLME. The report tables shall be maintained as FIFO to
58             preserve freshness, thus the rows in this table can be deleted for memory
59             constraints or other implementation constraints determined by the vendor.
60             New rows shall have different RprtIndex values than those deleted within the
61             range limitation of the index. One easy way is to monotonically increase
62             RprtIndex for new reports being written in the table."
63         ::= { dot11RRMReport 7 }
64
65         dot11STAStatisticsReportEntry OBJECT-TYPE
66         SYNTAX Dot11STAStatisticsReportEntry
67         MAX-ACCESS not-accessible
68         STATUS current
69         DESCRIPTION
70             "An entry in the dot11STAStatisticsReportTable
71             Indexed by dot11STAStatisticsReportIndex."
72         INDEX { dot11STAStatisticsReportIndex }
73         ::= { dot11STAStatisticsReportTable 1 }
74
75   Dot11STAStatisticsReportEntry ::=
```

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```
 1          SEQUENCE {
 2              dot11STAStatisticsReportIndex Unsigned32,
 3              dot11STAStatisticsReportToken OCTET STRING,
 4              dot11STAStatisticsIfIndex InterfaceIndex,
 5              dot11STAStatisticsSTAAddress MacAddress,
 6              dot11STAStatisticsMeasurementDuration Unsigned32,
 7              dot11STAStatisticsTransmittedFragmentCount Counter32,
 8              dot11STAStatisticsMulticastTransmittedFrameCount Counter32,
 9              dot11STAStatisticsFailedCount Counter32,
10              dot11STAStatisticsRetryCount Counter32,
11              dot11STAStatisticsMultipleRetryCount Counter32,
12              dot11STAStatisticsFrameDuplicateCount Counter32,
13              dot11STAStatisticsRTSSuccessCount Counter32,
14              dot11STAStatisticsRTSFailureCount Counter32,
15              dot11STAStatisticsACKFailureCount Counter32,
16              dot11STAStatisticsReceivedFragmentCount Counter32,
17              dot11STAStatisticsMulticastReceivedFrameCount Counter32,
18              dot11STAStatisticsFCSCount Counter32,
19              dot11STAStatisticsTransmittedFrameCount Counter32,
20              dot11STAStatisticsAPServiceLoad INTEGER,
21              dot11STAStatisticsAverageAccessDelayBestEffort INTEGER,
22              dot11STAStatisticsAverageAccessDelayBackGround INTEGER,
23              dot11STAStatisticsAverageAccessDelayVIdeo INTEGER,
24              dot11STAStatisticsAverageAccessDelayVOice INTEGER,
25              dot11STAStatisticsStationCount INTEGER,
26              dot11STAStatisticsChannelUtilization INTEGER,
27              dot11STAStatisticsRptMeasurementMode INTEGER }
28
29      dot11STAStatisticsReportIndex OBJECT-TYPE
30              SYNTAX Unsigned32
31              MAX-ACCESS not-accessible
32              STATUS current
33              DESCRIPTION
34                  "Index for STA Statistics Report elements in dot11STAStatisticsReportTable,
35                  greater than 0."
36              ::= { dot11STAStatisticsReportEntry 1 }
37
38      dot11STAStatisticsReportToken OBJECT-TYPE
39              SYNTAX OCTET STRING
40              MAX-ACCESS read-only
41              STATUS current
42              DESCRIPTION
43                  "This attribute holds the token that was specified in the measurement
44                  request that generated this measurement report. This should be an exact
45                  match to the original dot11RRMRqstToken attribute. Note that there may be
46                  multiple entries in the table that match this value since a single request
47                  may generate multiple measurement reports."
48              ::= { dot11STAStatisticsReportEntry 2 }
49
50      dot11STAStatisticsIfIndex OBJECT-TYPE
51              SYNTAX InterfaceIndex
52              MAX-ACCESS read-only
53              STATUS current
54              DESCRIPTION
55                  "Identifies the Interface that this row of STA Statistics Report has been
56                  received on"
57      ::= { dot11STAStatisticsReportEntry 3 }
58
59      dot11STAStatisticsSTAAddress OBJECT-TYPE
60              SYNTAX MacAddress
61              MAX-ACCESS read-only
62              STATUS current
63              DESCRIPTION
64                  "The MAC address of the STA that returned this STA Statistics report"
65              ::= { dot11STAStatisticsReportEntry 4 }
66
67      dot11STAStatisticsMeasurementDuration OBJECT-TYPE
68              SYNTAX Unsigned32
69              UNIT "TUs"
70              MAX-ACCESS read-only
71              STATUS current
72              DESCRIPTION
73                  "This attribute corresponds to the duration over which the STA Statistics
74                  was measured."
75              ::= { dot11STAStatisticsReportEntry 5 }
```

```
dot11STAStatisticsTransmittedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11TransmittedFragmentCount returned from the STA in this
            STA Statistics Report"
        ::= { dot11STAStatisticsReportEntry 6 }

dot11STAStatisticsMulticastTransmittedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11MulticastTransmittedFrameCount returned from the STA in
            this STA Statistics Report"
        ::= { dot11STAStatisticsReportEntry 7 }

dot11STAStatisticsFailedCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11FailedCount returned from the STA in this STA Statistics
            Report"
        ::= { dot11STAStatisticsReportEntry 8 }

dot11STAStatisticsRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11RetryCount returned from the STA in this STA Statistics
            Report"
        ::= { dot11STAStatisticsReportEntry 9 }

dot11STAStatisticsMultipleRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11MultipleRetryCount returned from the STA in this STA
            Statistics Report"
        ::= { dot11STAStatisticsReportEntry 10 }

dot11STAStatisticsFrameDuplicateCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11FrameDuplicateCount returned from the STA in this STA
            Statistics Report"
        ::= { dot11STAStatisticsReportEntry 11 }

dot11STAStatisticsRTSSuccessCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11RTSSuccessCount returned from the STA in this STA
            Statistics Report"
        ::= { dot11STAStatisticsReportEntry 12 }

dot11STAStatisticsRTSFailureCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of dot11RTSFailureCount returned from the STA in this STA
            Statistics Report"
        ::= { dot11STAStatisticsReportEntry 13 }

dot11STAStatisticsACKFailureCount OBJECT-TYPE
        SYNTAX Counter32
```

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```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The value of dot11ACKFailureCount returned from the STA in this STA
              Statistics Report"
        ::= { dot11STAStatisticsReportEntry 14 }

dot11STAStatisticsReceivedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The value of dot11ReceivedFragmentCount returned from the STA in this STA
              Statistics Report"
        ::= { dot11STAStatisticsReportEntry 15 }

dot11STAStatisticsMulticastReceivedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The value of dot11MulticastReceivedFrameCount returned from the STA in this
              STA Statistics Report"
        ::= { dot11STAStatisticsReportEntry 16 }

dot11STAStatisticsFCSCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The value of dot11FCSErrorCount returned from the STA in this STA
              Statistics Report"
        ::= { dot11STAStatisticsReportEntry 17 }

dot11STAStatisticsTransmittedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The value of dot11TransmittedFrameCount returned from the STA in this STA
              Statistics Report"
        ::= { dot11STAStatisticsReportEntry 18 }

dot11STAStatisticsAPServiceLoad OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The AP Service Load shall be a scalar indication of the relative level of
            service loading at an AP."
        REFERENCE
            "IEEE 802.11 – Clause 7.3.2.29"
        ::= { dot11STAStatisticsReportEntry 19 }

dot11STAStatisticsAverageAccessDelayBestEffort OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Average Access DelayBestEffort element shall consist of an an Average
            Access Delay (AAD) for the Best Effort Access Category."
        REFERENCE
            "IEEE 802.11 – Clause 7.3.2.29"
        ::= { dot11STAStatisticsReportEntry 20 }

dot11STAStatisticsAverageAccessDelayBackGround OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Average Access DelayBackGround element shall consist of an an Average
            Access Delay (AAD) for the Backgound Access Category."
        REFERENCE
            "IEEE 802.11 – Clause 7.3.2.29"
        ::= { dot11STAStatisticsReportEntry 21 }
```

```
dot11STAStatisticsAverageAccessDelayVIdeo OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Average Access DelayVIdeo element shall consist of an an Average Access
            Delay (AAD) for the Video Access Category."
        REFERENCE
            "IEEE 802.11 – Clause 7.3.2.29"
        ::= { dot11STAStatisticsReportEntry 22 }

dot11STAStatisticsAverageAccessDelayVOice OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Average Access DelayVOice element shall consist of an an Average Access
            Delay (AAD) for the Voice Access Category."
        REFERENCE
            "IEEE 802.11 – Clause 7.3.2.29"
        ::= { dot11STAStatisticsReportEntry 23 }

dot11STAStatisticsStationCount OBJECT-TYPE
        SYNTAX INTEGER (0..65535)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Station Count field is an unsigned integer that indicates the total
            number of STAs currently associated with this BSS."
        ::= { dot11STAStatisticsReportEntry 24 }

dot11STAStatisticsChannelUtilization OBJECT-TYPE
        SYNTAX INTEGER (0..255)
        UNITS "1/255"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Channel Utilization field indicates the fraction of time the AP sensed
            the medium busy."
        REFERENCE
            "IEEE 802.11 – Clause 9.2.1"
        ::= { dot11STAStatisticsReportEntry 25 }

dot11STAStatisticsRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                        lateBit(0),
                        incapableBit(1),
                        refusedBit(2),
                        }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "MeasurementMode corresponds to the Measurement Report Mode field in
            the Measurement Report Element and is used to indicate the reason for
            a failed measurement request. 0 indicates the STA is unable to carry
            out a measurement request because it received the request after the
            requested measurement time. 1 indicates this STA is incapable of
            generating the report. 3 indicates his STA is refusing to generate
            the report."
        DEFVAL { 0 }
        ::= { dot11STAStatisticsReportEntry 26 }

-- ********************************************************************
-- * 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 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 8 }

     dot11LCIReportEntry OBJECT-TYPE
     SYNTAX Dot11LCIReportEntry
     MAX-ACCESS not-accessible
     STATUS current
     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 Unsigned32,
     dot11LCILongitudeResolution INTEGER,
     dot11LCILongitudeInteger INTEGER,
     dot11LCILongitudeFraction Unsigned32,
     dot11LCIAltitudeType INTEGER,
     dot11LCIAltitudeResolution INTEGER,
     dot11LCIAltitudeInteger Integer32,
     dot11LCIAltitudeFraction Unsigned32,
     dot11LCIDatum INTEGER,
     dot11LCIRptMeasurementMode 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 holds the token that was specified 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
             "Latitude resolution is 6 bits indicating the number of valid
             bits in the fixed-point value of Latitude."
        ::= { dot11LCIReportEntry 5 }

dot11LCILatitudeInteger OBJECT-TYPE
        SYNTAX INTEGER (0..511)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Latitude is a 34 bit fixed point value consisting of 9 bits
             of integer and 25 bits of fraction.  This field contains the
             9 bits of integer portion of Latitude."
        ::= { dot11LCIReportEntry 6 }

dot11LCILatitudeFraction OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Latitude is a 34 bit fixed point value consisting of 9 bits
             of integer and 25 bits of fraction.  This field contains the
             25 bits of fraction portion of Latitude."
        ::= { dot11LCIReportEntry 7 }


dot11LCILongitudeResolution OBJECT-TYPE
        SYNTAX INTEGER (0..63)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Longitude resolution is 6 bits indicating the number of valid
             bits in the fixed-point value of Longitude."
        ::= { dot11LCIReportEntry 8 }

dot11LCILongitudeInteger OBJECT-TYPE
        SYNTAX INTEGER (0..511)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Longitude is a 34 bit fixed point value consisting of 9 bits
             of integer and 25 bits of fraction.  This field contains the
             9 bits of integer portion of Longitude."
        ::= { dot11LCIReportEntry 9 }

dot11LCILongitudeFraction OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Longitude is a 34 bit fixed point value consisting of 9 bits
             of integer and 25 bits of fraction.  This field contains the
             25 bits of fraction portion of Longitude."
::= { dot11LCIReportEntry 10 }

dot11LCIAltitudeType OBJECT-TYPE
        SYNTAX INTEGER {
           meters(1),
           floors(2) }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
             "Altitude Type is 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"
::= { dot11LCIReportEntry 11 }
```

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```
1    dot11LCIAltitudeResolution OBJECT-TYPE
2           SYNTAX INTEGER (0..63)
3           MAX-ACCESS read-only
4           STATUS current
5           DESCRIPTION
6                 "Altitude resolution is 6 bits indicating the number of valid
7                 bits in the altitude."
8           ::= { dot11LCIReportEntry 12 }
9
10   dot11LCIAltitudeInteger OBJECT-TYPE
11          SYNTAX Integer32
12          MAX-ACCESS read-only
13          STATUS current
14          DESCRIPTION
15                "Altitude is a 30 bit value defined by the Altitude type field.
16                The field is encoded as a 2s-complement fixed-point 22-bit integer
17                Part with 8-bit fraction.  This field contains the fixed-poing
18                Part of Altitude."
19   ::= { dot11LCIReportEntry 13 }
20
21   dot11LCIAltitudeFraction OBJECT-TYPE
22          SYNTAX Unsigned32
23          MAX-ACCESS read-only
24          STATUS current
25          DESCRIPTION
26                " Altitude is a 30 bit value defined by the Altitude type field.
27                The field is encoded as a 2s-complement fixed-point 22-bit integer
28                Part with 8-bit fraction.  This field contains the fraction part
29                of Altitude."
30   ::= { dot11LCIReportEntry 14 }
31
32   dot11LCIDatum OBJECT-TYPE
33          SYNTAX INTEGER (0..255)
34          MAX-ACCESS read-only
35          STATUS current
36          DESCRIPTION
37                "Datum is an eight-bit value encoding the horizontal and vertical
38                references used for the coordinates given in this LCI."
39   ::= { dot11LCIReportEntry 15 }
40
41   dot11LCIRptMeasurementMode OBJECT-TYPE
42          SYNTAX INTEGER {
43                        lateBit(0),
44                        incapableBit(1),
45                        refusedBit(2),
46                        }
47          MAX-ACCESS read-only
48          STATUS current
49          DESCRIPTION
50                "MeasurementMode corresponds to the Measurement Report Mode field in
51                the Measurement Report Element and is used to indicate the reason for
52                a failed measurement request. 0 indicates the STA is unable to carry
53                out a measurement request because it received the request after the
54                requested measurement time. 1 indicates this STA is incapable of
55                generating the report. 3 indicates his STA is refusing to generate
56                the report."
57                DEFVAL { 0 }
58          ::= { dot11LCIReportEntry 16 }
59
60   -- ********************************************************************
61   -- * End of dot11LCIReport TABLE
62   -- ********************************************************************
63
64   -- ********************************************************************
65   -- * dot11QoSMetricsReport TABLE
66   -- ********************************************************************
67
68   dot11QoSMetricsReportTable OBJECT-TYPE
69          SYNTAX SEQUENCE OF Dot11QoSMetricsReportEntry
70          MAX-ACCESS not-accessible
71          STATUS current
72          DESCRIPTION
73                "Group contains the current list of Transmit Delay Metrics reports that
74                have been received by the MLME. The report tables shall be maintained as
75                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 7 }

Dot11QoSMetricsReportEntry OBJECT-TYPE
            SYNTAX dot11QoSMetricsReportEntry
            MAX-ACCESS not-accessible
            STATUS current
            DESCRIPTION
                "An entry in the dot11QoSMetricsReportTable Indexed by
                dot11QoSMetricsRprtIndex."
            INDEX { dot11QoSMetricsRprtIndex }
            ::= { dot11QoSMetricsReportTable 1 }

Dot11QoSMetricsReportEntry ::=
            SEQUENCE {
                dot11QoSMetricsRprtIndex Unsigned32,
                dot11QoSMetricsRprtRqstToken OCTET STRING,
                dot11QoSMetricsRprtIfIndex InterfaceIndex,
                dot11QoSMetricsMeasuringSTAAddr MacAddress,
                dot11QoSMetricsRprtActualStartTime TSFType,
                dot11QoSMetricsRprtMeasurementDuration Unsigned32,
                dot11QoSMetricsRprtPeerSTAaddress MacAddress,
                dot11QoSMetricsRprtTID INTEGER,
                dot11QoSMetricsRprtAverageQueueDelay Integer32,
                dot11QoSMetricsRprtAverageTransmitDelay Integer32,
                dot11QoSMetricsRprtTransmittedMSDUCount Integer32,
                dot11QoSMetricsRprtMSDUDiscardedCount Integer32,
                dot11QoSMetricsRptMSDUFailedCount Integer32,
                dot11QoSMetricsRptMultipleRetryCount Integer32,
                dot11QoSMetricsRptCFPollsLostCount Integer32,
                dot11QoSMetricsRprtBin0Range INTEGER,
                dot11QoSMetricsRprtDelayHistogram OCTET STRING,
                dot11QoSMetricsRprtMeasurementMode INTEGER }

dot11QoSMetricsRprtIndex OBJECT-TYPE
            SYNTAX Unsigned32
            MAX-ACCESS not-accessible
            STATUS current
            DESCRIPTION
                "Index for Transmit Delay Metrics Report elements in
                dot11QoSMetricsReportTable, greater than 0."
            ::= { dot11QoSMetricsReportEntry 1 }

dot11QoSMetricsRprtRqstToken OBJECT-TYPE
            SYNTAX OCTET STRING
            MAX-ACCESS read-only
            STATUS current
            DESCRIPTION
                "This attribute holds the request token that was specified 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."
            ::= { dot11QoSMetricsReportEntry 2 }

dot11QoSMetricsRprtIfIndex OBJECT-TYPE
            SYNTAX InterfaceIndex
            MAX-ACCESS read-only
            STATUS current
            DESCRIPTION
                "The InterfaceIndex for this row of TransmitQoSMetrics Report has
                been received on."
            ::= { dot11QoSMetricsReportEntry 3 }

dot11QoSMetricsMeasuringSTAAddr OBJECT-TYPE
            SYNTAX MacAddress
            MAX-ACCESS read-only
            STATUS current
            DESCRIPTION
                "The MAC address of the measuring STA for this row of Transmit
```

```
                              Delay Metrics report."
         ::= { dot11QoSMetricsReportEntry 4 }


dot11QoSMetricsRprtActualStartTime OBJECT-TYPE
         SYNTAX TSFType
         MAX-ACCESS read-only
         STATUS current
         DESCRIPTION
                "This attribute corresponds to the TSF value at the time when
                the measurement started."
         ::= { dot11QoSMetricsReportEntry 5 }


dot11QoSMetricsRprtMeasurementDuration OBJECT-TYPE
         SYNTAX Unsigned32
         UNITS "TUs"
         MAX-ACCESS read-only
         STATUS current
         DESCRIPTION
                "This attribute corresponds to the duration over which the Transmit
                Delay Metrics Report was measured, expressed in TUs."
         ::= { dot11QoSMetricsReportEntry 6 }


dot11QoSMetricsRprtPeerSTAAddress 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 QoS Metrics report."
         ::= { dot11QoSMetricsReportEntry 7 }


dot11QoSMetricsRprtTID OBJECT-TYPE
         SYNTAX INTEGER(0..16)
         MAX-ACCESS read-only
         STATUS current
         DESCRIPTION
                "Traffic Identifier shall indicate the TC or TS for which traffic is to
                be measured. Values 0 through 15 are defined. Values 16-255 are reserved. ."
::= { dot11QoSMetricsReportEntry 8 }


dot11QoSMetricsRprtAverageQueueDelay OBJECT-TYPE
         SYNTAX Integer32
         UNITS "TUs"
         MAX-ACCESS read-only
         STATUS current
         DESCRIPTION
                "This attribute holds the average delay of the frames (MSDUs) that are
                passed to the MAC during the measurement duration for the specified
                destination and the specified Traffic Identifier. Queue Delay shall be
                measured from the time the MSDU is passed to the MAC until the transmission
                starts and shall be expressed in TUs."
         ::= { dot11QoSMetricsReportEntry 9 }


dot11QoSMetricsRprtAverageTransmitDelay OBJECT-TYPE
         SYNTAX Integer32
         UNITS "TUs"
         MAX-ACCESS read-only
         STATUS current
         DESCRIPTION
                "This attribute holds the average delay of the frames (MSDUs) that are
                successfully transmitted during the measurement duration for the
                specified destination and the specified Traffic Identifier. Delay shall
                be measured from the time the MSDU is passed to the MAC until ACK is
                received from the intermediate destination."
         ::= { dot11QoSMetricsReportEntry 10}


dot11QoSMetricsRprtBin0Range OBJECT-TYPE
         SYNTAX INTEGER
         MAX-ACCESS read-only
         STATUS current
         DESCRIPTION
                "Contains the delay range for Bin 0 of the delay histogram, expressed
                in TU."
         ::= { dot11QoSMetricsReportEntry 11 }
```

```
dot11QoSMetricsRprtTransmittedMSDUCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Contains the number of MSDUs to the peer QSTA for the TC, or TS
            given by the Traffic Identifier successfully transmitted in
            the measurement duration"
    ::= {dot11QoSMetricsReportEntry 12}


dot11QoSMetricsRprtMSDUDiscardedCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Contains the number of MSDUs to the peer QSTA 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"
    ::= {dot11QoSMetricsReportEntry 13}


dot11QoSMetricsRptMSDUFailedCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Contains the number of MSDUs to the peer QSTA 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."
    ::= {dot11QoSMetricsReportEntry 14}


dot11QoSMetricsRptMultipleRetryCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Contains the number of MSDUs for the TC, or TS given by the
            Traffic Identifier that are successfully transmitted after
            more than one retransmission attempt."
    ::= {dot11QoSMetricsReportEntry 15}


dot11QoSMetricsRptCFPollsLostCount OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Contains the number of QoS (+)CF-Poll frames transmitted to the
            peer QSTA where there was no response from the QSTA. "
    ::= {dot11QoSMetricsReportEntry 16}


dot11QoSMetricsRprtDelayHistogram OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE (6))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute holds the histogram of delay of the frames (MSDUs)
            that are successfully transmitted during the measurement duration
            for the specified Traffic Identifier and the specified 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 TUs. "
::= { dot11QoSMetricsReportEntry 17 }


dot11QoSMetricsRprtMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                    lateBit(0),
                    incapableBit(1),
                    refusedBit(2),
                    }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "MeasurementMode corresponds to the Measurement Report Mode field in
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```
 1                   the Measurement Report Element and is used to indicate the reason for
 2                   a failed measurement request. 0 indicates the STA is unable to carry
 3                   out a measurement request because it received the request after the
 4                   requested measurement time. 1 indicates this STA is incapable of
 5                   generating the report. 3 indicates his STA is refusing to generate
 6                   the report."
 7               DEFVAL { 0 }
 8       ::= { dot11QoSMetricsReportEntry 18 }
 9
10       -- **********************************************************************
11       -- * End of dot11QoSMetricsReport TABLE
12       -- **********************************************************************
13
14       -- **********************************************************************
15       -- * Radio Resource Measurement Configuration Information
16       -- **********************************************************************
17       dot11RRMConfig OBJECT IDENTIFIER ::= { dot11RadioResourceManagement 3 }
18
19       -- **********************************************************************
20       -- * dot11APChannelReport TABLE
21       -- **********************************************************************
22       dot11APChannelReportTable OBJECT-TYPE
23               SYNTAX SEQUENCE OF Dot11APChannelReportEntry
24               MAX-ACCESS not-accessible
25               STATUS current
26               DESCRIPTION
27                   "AP Channel Report information, in tabular form."
28               ::= { dot11RRMConfig 1 }
29
30       dot11APChannelReportEntry OBJECT-TYPE
31               SYNTAX Dot11APChannelReportEntry
32               MAX-ACCESS not-accessible
33               STATUS current
34               DESCRIPTION
35                   "An entry in the dot11APChannelReportTable. Each entry in the table is
36                   indexed by dot11APChannelReportIndex."
37               INDEX { dot11APChannelReportIndex }
38               ::= { dot11APChannelReportTable 1 }
39
40       Dot11APChannelReportEntry ::=
41           SEQUENCE {
42               dot11APChannelReportIndex Unsigned32,
43               dot11APChannelReportIfIndex InterfaceIndex,
44               dot11APChannelReportRegulatoryClass INTEGER,
45               dot11APChannelReportChannelList OCTET STRING,
46               dot11APChannelReportMeasurementMode INTEGER }
47
48       dot11APChannelReportIndex OBJECT-TYPE
49               SYNTAX Unsigned32
50               MAX-ACCESS read-only
51               STATUS current
52               DESCRIPTION
53                   "Index for AP channel report entry in dot11APChannelReportTable, greater
54                   than 0."
55               ::= { dot11APChannelReportEntry 1 }
56
57       dot11APChannelReportIfIndex OBJECT-TYPE
58               SYNTAX InterfaceIndex
59               MAX-ACCESS read-create
60               STATUS current
61               DESCRIPTION
62                   "The ifIndex this row of AP channel report entry belongs to."
63               ::= { dot11APChannelReportEntry 2 }
64
65       dot11APChannelReportRegulatoryClass OBJECT-TYPE
66               SYNTAX PHYType
67               MAX-ACCESS read-create
68               STATUS current
69               DESCRIPTION
70                   "This corresponds to the frequency band for the channel list
71                   being reported."
72               REFERENCE
73                   "IEEE 802.11, Error! Reference source not found."
74               ::= { dot11APChannelReportEntry 3 }
75
```

```
1    dot11APChannelReportChannelList OBJECT-TYPE
2          SYNTAX OCTET STRING (SIZE(16))
3          MAX-ACCESS read-create
4          STATUS current
5          DESCRIPTION
6              "This attribute corresponds to the specific channels being reported. Each
7              octet corresponds to a different channel within the specified Regulatory
8    Class"
9          ::= { dot11APChannelReportEntry 4 }
10
11   dot11APChannelReportMeasurementMode OBJECT-TYPE
12         SYNTAX INTEGER {
13                      lateBit(0),
14                      incapableBit(1),
15                      refusedBit(2),
16                      }
17         MAX-ACCESS read-only
18         STATUS current
19         DESCRIPTION
20             "MeasurementMode corresponds to the Measurement Report Mode field in
21             the Measurement Report Element and is used to indicate the reason for
22             a failed measurement request. 0 indicates the STA is unable to carry
23             out a measurement request because it received the request after the
24             requested measurement time. 1 indicates this STA is incapable of
25             generating the report. 3 indicates his STA is refusing to generate
26             the report."
27             DEFVAL { 0 }
28         ::= { dot11APChannelReportEntry 5 }
29
30   -- **********************************************************************
31   -- * End of dot11APChannelReportTable TABLE
32   -- **********************************************************************
33
34   -- **********************************************************************
35   -- * dot11RRMNeighborReport TABLE
36   -- **********************************************************************
37   dot11RRMNeighborReportNextIndex OBJECT-TYPE
38         SYNTAX INTEGER(0..255)
39         MAX-ACCESS not-accessible
40         STATUS current
41         DESCRIPTION
42             "Identifies the next available index for managing the Neighbor Report table.
43             If this attribute is 0, it indicates that the Neighbor Report feature is not
44             configurable via SNMP, or the table is full and new rows cannot be
45             accepted."
46         ::= { dot11RRMConfig 2 }
47
48         dot11RRMNeighborReportTable OBJECT-TYPE
49         SYNTAX SEQUENCE OF Dot11RRMNeighborReportEntry
50         MAX-ACCESS not-accessible
51         STATUS current
52         DESCRIPTION
53             "Group contains pertinent information on a collection of BSSID's that are
54             candidates to which STA's can roam. The rows are created using createAndWait
55             method and fill in the attributes. When the rowStatus is set to active, the
56             row can be included in Neighbor Report IEs. If there is an error, the
57             rowStatus shall be set to notReady by SME. Since this table contains all
58             Neighbor Report IE entries for all interfaces enabled with the Neighbor
59             Report feature, it is possible to have too many entries for one interface,
60             while still remaining under the MaxTableSize. In that situation, SME shall
61             only include Neighbor Report entries with lower
62             dot11RRMNeighborReportIFIndex up to the maximum possible number of entries
63             for a particular interface identified by ifIndex.
64             SME shall set the rowStatus to notInService for those rows that cannot be
65             included in the Neighbor Report element for that interface."
66         ::= { dot11RRMConfig 3 }
67
68   dot11RRMNeighborReportEntry OBJECT-TYPE
69         SYNTAX Dot11RRMNeighborReportEntry
70         MAX-ACCESS not-accessible
71         STATUS current
72         DESCRIPTION
73             "An entry in the dot11RRMNeighborReportTable"
74         INDEX { dot11RRMNeighborReportIndex }
75         ::= { dot11RRMNeighborReportTable 1 }
```

```
Dot11RRMNeighborReportEntry ::=
    SEQUENCE {
        dot11RRMNeighborReportIndex Unsigned32,
        dot11RRMNeighborReportIfIndex InterfaceIndex,
        dot11RRMNeighborReportBSSID MacAddress,
        dot11RRMNeighborReportReachability INTEGER,
        dot11RRMNeighborReportSecurity TruthValue,
        dot11RRMNeighborReportCapSpectrumMgmt TruthValue,
        dot11RRMNeighborReportCapQoS TruthValue,
        dot11RRMNeighborReportCapAPSD TruthValue,
        dot11RRMNeighborReportCapRRM TruthValue,
        dot11RRMNeighborReportCapBlockAck TruthValue,
        dot11RRMNeighborReportKeyScope TruthValue,
        dot11RRMNeighborReportChannelNumber INTEGER,
        dot11RRMNeighborReportRegulatoryClass INTEGER,
        dot11RRMNeighborReportPhyOptions INTEGER,
        dot11RRMNeighborReportNeighborTSFInfo Unsigned32,
        dot11RRMNeighborReportTSFOffsetFlag TruthValue,
        dot11RRMNeighborReportBeaconInterval Unsigned32,
        dot11RRMNeighborReportRowStatus RowStatus,
        dot11RRMNeighborReportMeasurementMode INTEGER }

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
            "The BSSID of the STA to which this row of Neighbor Report applies."
        ::= { dot11RRMNeighborReportEntry 3 }

dot11RRMNeighborReportReachability OBJECT-TYPE
        SYNTAX INTEGER {
                        notReachable(1),
                        unknown(2),
                        reachable(3)
                        }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Indicates the reachability of the AP represented by
            the dot11NeighborReportBSSID."
        ::= { dot11RRMNeighborReportEntry 4 }

dot11RRMNeighborReportSecurity OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Indicates the RSN capability of the AP
            represented by dot11NeighborReportBSSID"
        ::= { dot11RRMNeighborReportEntry 5 }

dot11RRMNeighborReportCapSpectrumMgmt OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
```

```
                         "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
                "Indicates the QoS capability of the AP represented by
                dot11NeighborReportBSSID"
        ::= { dot11RRMNeighborReportEntry 7 }

dot11RRMNeighborReportCapAPSD OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Indicates the APSD capability of the AP represented by
                dot11NeighborReportBSSID"
        ::= { dot11RRMNeighborReportEntry 8 }

dot11RRMNeighborReportCapRRM OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Indicates the RRM capability of the AP represented by
                dot11NeighborReportBSSID"
        ::= { dot11RRMNeighborReportEntry 9 }

dot11RRMNeighborReportCapBlockAck OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Indicates the BlockAck capability of the AP represented
                by dot11NeighborReportBSSID"
        ::= { dot11RRMNeighborReportEntry 10 }

dot11RRMNeighborReportKeyScope OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Indicates a shared authenticator identity for the AP represented by
                dot11NeighborReportBSSID"
        ::= { dot11RRMNeighborReportEntry 11 }

dot11RRMNeighborReportChannelNumber OBJECT-TYPE
        SYNTAX INTEGER (1..255)
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This is the current operating channel of the STA returning the report"
        ::= { dot11RRMNeighborReportEntry 12 }

dot11RRMNeighborReportRegulatoryClass OBJECT-TYPE
        SYNTAX PHYType
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "This corresponds to the frequency band for the channel list being
                reported."
         REFERENCE
                "IEEE 802.11, Error! Reference source not found."
        ::= { dot11RRMNeighborReportEntry 13 }

dot11RRMNeighborReportPhyOptions OBJECT-TYPE
        SYNTAX INTEGER
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The PHY Options of the Neighbor AP Entry."
        ::= { dot11RRMNeighborReportEntry 14 }
```

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```
dot11RRMNeighborReportNeighborTSFInfo OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The Neighbor TBTT Offset field is as defined in clause 7.3.2.26."
        ::= { dot11RRMNeighborReportEntry 15 }

dot11RRMNeighborReportTSFOffsetFlag OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "Indicates the TSFOffset is included in the Neighbor Report entry."
        ::= { dot11RRMNeighborReportEntry 16 }

dot11RRMNeighborReportBeaconInterval OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "TUs"
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
                "The Beacon Interval field is as defined in clause 7.3.2.27."
        ::= { dot11RRMNeighborReportEntry 17 }

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 parameter
                is invalid, the SME shall set this attribute back to notReady. It is the
                responsibility of the manager to correct the parameters."
        ::= { dot11RRMNeighborReportEntry 18 }

dot11RRMNeighborReporMeasurementMode OBJECT-TYPE
        SYNTAX INTEGER {
                        lateBit(0),
                        incapableBit(1),
                        refusedBit(2),
                        }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "MeasurementMode corresponds to the Measurement Report Mode field in
                the Measurement Report Element and is used to indicate the reason for
                a failed measurement request. 0 indicates the STA is unable to carry
                out a measurement request because it received the request after the
                requested measurement time. 1 indicates this STA is incapable of
                generating the report. 3 indicates his STA is refusing to generate
                the report."
                DEFVAL { 0 }
        ::= { dot11RRMNeighborReportEntry 19 }

-- ***********************************************************************
-- * End of dot11RRMNeighborReport TABLE
-- ***********************************************************************
```

In dot11OperationTable of Annex D, insert the following text to the end of Dot11OperationEntry sequence list:
```
        dot11PeerStatsTableBSSaging Unsigned32,
        dot11PeerStatsTableIBSSaging Unsigned32 }
```


Insert the following elements to the end of dot11OperationTable element definition behind dot11ProductID:
```
dot11PeerStatsTableBSSaging OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "seconds"
        MAX-ACCESS read-write
```

```
1          STATUS current
2          DESCRIPTION
3              "The peerStatsTableBSSaging indicates the period of time
4              which entries for peer STAs that are in the peerStatsTable
5              because the peer STA was authenticated or associated with the
6              local STA shall be kept in the table after the peer STA
7              becomes disassociated. The peer STA entry may be kept in the
8              peerStatsTable for longer than this time."
9          DEFVAL { 300 }
10         ::= { dot11OperationEntry 10 }
11
12  dot11PeerStatsTableIBSSaging OBJECT-TYPE
13         SYNTAX Unsigned32
14         UNITS "seconds"
15         MAX-ACCESS read-write
16         STATUS current
17         DESCRIPTION
18             "The peerStatsTableIBSSaging indicates the period of time
19             which entries for peer STAs that are in the peerStatsTable
20             because the peer STA was in an IBSS that the local STA was
21             joined to, and send a data frame to the local STA, or the
22             local STA attempted to send any frame to the peer STA shall
23             be kept in the table after the peer STA last communicated
24             with the local STA. The peer STA entry may be kept in the
25             peerStatsTable for longer than this time."
26         DEFVAL { 300 }
27         ::= { dot11OperationEntry 11 }
```

28 **In dot11MAC MIB of Annex D, insert the peerStatsTable behind GroupAddressesTable:**

```
29  --*********************************************************************
30  --* dot11PeerStatsTable TABLE
31  --*********************************************************************
32  dot11PeerStatsTable OBJECT-TYPE
33         SYNTAX SEQUENCE OF Dot11PeerStatsEntry
34         MAX-ACCESS not-accessible
35         STATUS current
36         DESCRIPTION
37             "This table contains statistics for peer STAs. The following peer STAs
38             appear in this table:
39             1. Authenticated peer STAs must appear in this table. Their
40             entries must not be removed until at least
41             dot11PeerStatsTableBSSaging seconds have passed after they are
42             marked as deauthenticated.
43             2. Peer STAs joined to the same IBSS as this STA that have
44             sent any data frame to this STA must appear in this table.
45             Entries for these peer STAs may be removed when this STA is
46             no longer joined to the same IBSS, or if dot11PeerStatsTableIBSSaging
47             seconds have passed since a data frame was exchanged with the peer STA.
48             3. Other peer STAs may be included in this table."
49         ::= { dot11mac 4 }
50
51  dot11PeerStatsEntry OBJECT-TYPE
52         SYNTAX Dot11PeerStatsEntry
53         MAX-ACCESS not-accessible
54         STATUS current
55         DESCRIPTION
56             "An entry in the Dot11PeerStaStatsEntry Table.
57             Indexed by ifIndex and the MAC address of the remote
58             STA dot11PeerStaAddress"
59         INDEX { ifIndex, dot11PeerAddress }
60         ::= { dot11PeerStatsTable 1 }
61
62  Dot11PeerStatsEntry ::=
63      SEQUENCE {
64          dot11PeerAddress MacAddress,
65          dot11PeerTransmittedFragmentCount Counter32,
66          dot11PeerMulticastTransmittedFrameCount Counter32,
67          dot11PeerFailedCount Counter32,
68          dot11PeerRetryCount Counter32,
69          dot11PeerMultipleRetryCount Counter32,
70          dot11PeerFrameDuplicateCount Counter32,
71          dot11PeerRTSSuccessCount Counter32,
72          dot11PeerRTSFailureCount Counter32,
73          dot11PeerACKFailureCount Counter32,
74          dot11PeerReceivedFragmentCount Counter32,
```

```
                dot11PeerMulticastReceivedFrameCount Counter32,
                dot11PeerTransmittedFrameCount Counter32,
                dot11PeerWEPUndecryptableCount Counter32,
                dot11PeerWEPICVErrorCount Counter32,
                dot11PeerReceivedOctetCount Counter32,
                dot11PeerTransmittedOctetCount Counter32,
                dot11PeerReceivedBeaconCount Counter32,
                dot11PeerLastReceivedRCPI INTEGER }

dot11PeerAddress OBJECT-TYPE
        SYNTAX MacAddress
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "MAC address identifying a peer STA."
        ::= { dot11PeerStatsEntry 1 }

dot11PeerTransmittedFragmentCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall be incremented for an acknowledged MPDU
            with an individual address in the address 1 field or an MPDU
            with a multicast address in the address 1 field of type Data
            or Management."
        ::= { dot11PeerStatsEntry 2 }

dot11PeerMulticastTransmittedFrameCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment only when the multicast bit
            is set in the destination MAC address of a successfully
            transmitted MSDU. When operating as a non-AP STA in an ESS, where
            these frames are directed to the AP, this implies having
            received an acknowledgment to all associated MPDUs."
        ::= { dot11PeerStatsEntry 3 }

dot11PeerFailedCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment when an MSDU is not transmitted
            successfully due to the number of transmit attempts exceeding
            either the dot11ShortRetryLimit or dot11LongRetryLimit."
        ::= { dot11PeerStatsEntry 4 }

dot11PeerRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment when an MSDU is successfully
            transmitted after one or more retransmissions."
        ::= { dot11PeerStatsEntry 5 }

dot11PeerMultipleRetryCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment when an MSDU is successfully
            transmitted after more than one retransmission."
        ::= { dot11PeerStatsEntry 6 }

dot11PeerFrameDuplicateCount OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment when a frame is received
            that the Sequence Control field indicates is a duplicate."
```

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```
   ::= { dot11PeerStatsEntry 7 }

   dot11PeerRTSSuccessCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment when a CTS is received in
                   response to an RTS."
           ::= { dot11PeerStatsEntry 8 }

   dot11PeerRTSFailureCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment when a CTS is not received in
                   response to an RTS."
           ::= { dot11PeerStatsEntry 9 }

   dot11PeerACKFailureCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment when an ACK is not received
                   when expected."
           ::= { dot11PeerStatsEntry 10 }

   dot11PeerReceivedFragmentCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall be incremented for each successfully
                   received MPDU of type Data or Management."
           ::= { dot11PeerStatsEntry 11 }

   dot11PeerMulticastReceivedFrameCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment when a MSDU is received
                   with the multicast bit set in the destination MAC address."
           ::= { dot11PeerStatsEntry 12 }

   dot11PeerTransmittedFrameCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment for each successfully
                   transmitted MSDU."
           ::= { dot11PeerStatsEntry 13 }

   dot11PeerWEPUndecryptableCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment when a frame is received with
                   the WEP subfield of the Frame Control field set to one and the
                   WEPOn value for the key mapped to the TA's MAC address
                   indicates that the frame should not have been encrypted
                   that frame is discarded due to the receiving STA not
                   implementing the privacy option."
           ::= { dot11PeerStatsEntry 14 }

   dot11PeerWEPICVErrorCount OBJECT-TYPE
           SYNTAX Counter32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                   "This counter shall increment when a frame is received with the
```

```
 1                      WEP subfield of the Frame Control field set to one and the value
 2                      of the ICV as received in the frame does not match the ICV value
 3                      that is calculated for the contents of the received frame."
 4              ::= { dot11PeerStatsEntry 15 }
 5
 6  dot11PeerReceivedOctetCount OBJECT-TYPE
 7          SYNTAX Counter32
 8          MAX-ACCESS read-only
 9          STATUS current
10          DESCRIPTION
11              "Total number of octets of data in MSDUs received from this peer."
12          ::= { dot11PeerStatsEntry 16 }
13
14  dot11PeerTransmittedOctetCount OBJECT-TYPE
15          SYNTAX Counter32
16          MAX-ACCESS read-only
17          STATUS current
18          DESCRIPTION
19              "Total number of octets of data in unicast MSDUs successfully transmitted
20              to this peer."
21          ::= { dot11PeerStatsEntry 17 }
22
23  dot11PeerReceivedBeaconCount OBJECT-TYPE
24          SYNTAX Counter32
25          MAX-ACCESS read-only
26          STATUS current
27          DESCRIPTION
28              "Number of beacon frames received from this peer."
29          ::= { dot11PeerStatsEntry 18 }
30
31  dot11PeerLastReceivedRCPI OBJECT-TYPE
32          SYNTAX INTEGER (0..255)
33          MAX-ACCESS read-only
34          STATUS current
35          DESCRIPTION
36              "The RCPI from the most recently received frame, or 0 if no
37              frames have been received."
38          ::= { dot11PeerStatsEntry 19 }
39
40  -- ********************************************************************
41  -- * End of dot11PeerStatsReport TABLE
42  -- ********************************************************************
```

43 ***Insert the following compliance groups as appropriate in Compliance Statements:***
```
44  dot11RRMCompliance MODULE-COMPLIANCE
45          STATUS current
46          DESCRIPTION
47              "The compliance statement for SNMPv2 entities that implement the
48              IEEE 802.11 MIB for Measurement Services."
49          MODULE -- this module
50          MANDATORY-GROUPS {
51              dot11SMTRRMRequest,
52              dot11SMTRRMReport,
53              dot11SMTRRMConfig
54              }
55  -- OPTIONAL-GROUPS { }
56      ::= { dot11Compliances 3 }
57
58
```

59 ***Insert the following at the end of the section "Groups – units of conformance":***
```
60  dot11SMTRRMRequest OBJECT-GROUP
61          OBJECTS {    dot11RRMRqstIndex,
62                       dot11RRMRqstRowStatus,
63                       dot11RRMRqstToken,
64                       dot11RRMRqstIfIndex,
65                       dot11RRMRqstType,
66                       dot11RRMRqstTargetAdd,
67                       dot11RRMRqstTimeStamp,
68                       dot11RRMRqstChanNumber,
69                       dot11RRMRqstRegulatoryClass,
70                       dot11RRMRqstRndInterval,
71                       dot11RRMRqstDuration,
72                       dot11RRMRqstParallel,
```

```
                        dot11RRMRqstEnable,
                        dot11RRMRqstRequest,
                        dot11RRMRqstReport,
                        dot11RRMRqstDurationMandatory,
                        dot11RRMRqstBeaconRqstMode,
                        dot11RRMRqstBssid,
                        dot11RRMRqstReportingCondition,
                        dot11RRMRqstThresholdOffset,
                        dot11RRMRqstSTAStatRqstGroupID }
        STATUS current
        DESCRIPTION
            "The SMTRRMRequest package is a set of attributes that shall be
            present if the STA supports the Radio Measurement service."
    ::= { dot11Groups 31 }

dot11SMTRRMReport OBJECT-GROUP
        OBJECTS {   dot11ChannelLoadRprtIndex,
                    dot11ChannelLoadRprtRqstToken,
                    dot11ChannelLoadRprtIfIndex,
                    dot11ChannelLoadMeasuringSTAAddr,
                    dot11ChannelLoadRprtChanNumber,
                    dot11ChannelLoadRprtChanBand,
                    dot11ChannelLoadRprtActualStartTime,
                    dot11ChannelLoadRprtMeasurementDuration,
                    dot11ChannelLoadRprtCcaBusyFraction,
                    dot11ChannelLoadRprtChannelLoad,
                    dot11NoiseHistogramRprtIndex,
                    dot11NoiseHistogramRprtRqstToken,
                    dot11NoiseHistogramRprtIfIndex,
                    dot11NoiseHistogramMeasuringSTAAddr,
                    dot11NoiseHistogramRprtChanNumber,
                    dot11NoiseHistogramRprtChanBand,
                    dot11NoiseHistogramRprtActualStartTime,
                    dot11NoiseHistogramRprtMeasurementDuration,
                    dot11NoiseHistogramRprtRPIDensity0,
                    dot11NoiseHistogramRprtRPIDensity1,
                    dot11NoiseHistogramRprtRPIDensity2,
                    dot11NoiseHistogramRprtRPIDensity3,
                    dot11NoiseHistogramRprtRPIDensity4,
                    dot11NoiseHistogramRprtRPIDensity5,
                    dot11NoiseHistogramRprtRPIDensity6,
                    dot11NoiseHistogramRprtRPIDensity7,
                    dot11NoiseHistogramRprtRPIDensity8,
                    dot11BeaconRprtIndex,
                    dot11BeaconRprtRqstToken,
                    dot11BeaconRprtIfIndex,
                    dot11BeaconMeasuringSTAAddr,
                    dot11BeaconRprtChanNumber,
                    dot11BeaconRprtChanBand,
                    dot11BeaconRprtActualStartTime,
                    dot11BeaconRprtMeasurementDuration,
                    dot11BeaconRprtPhyType,
                    dot11BeaconRprtRCPI,
                    dot11BeaconRprtBSSID,
                    dot11BeaconRprtParentTSF,
                    dot11BeaconRprtTargetTSF,
                    dot11BeaconRprtBeaconInterval,
                    dot11BeaconRprtCFStatus,
                    dot11BeaconRprtPrivacy,
                    dot11BeaconRprtBSSMode,
                    dot11BeaconRprtReceivedElements,
                    dot11STAStatisticsReportIndex,
                    dot11STAStatisticsReportToken,
                    dot11STAStatisticsIfIndex,
                    dot11STAStatisticsSTAAddress,
                    dot11STAStatisticsMeasurementDuration,
                    dot11STAStatisticsTransmittedFragmentCount,
                    dot11STAStatisticsMulticastTransmittedFrameCount,
                    dot11STAStatisticsFailedCount,
                    dot11STAStatisticsRetryCount,
                    dot11STAStatisticsMultipleRetryCount,
                    dot11STAStatisticsFrameDuplicateCount,
                    dot11STAStatisticsRTSSuccessCount,
                    dot11STAStatisticsRTSFailureCount,
                    dot11STAStatisticsACKFailureCount,
```

```
1                               dot11STAStatisticsReceivedFragmentCount,
2                               dot11STAStatisticsMulticastReceivedFrameCount,
3                               dot11STAStatisticsFCSCount,
4                               dot11STAStatisticsTransmittedFrameCount,
5                               dot11QoSMetricsRprtIndex Unsigned32,
6                               dot11QoSMetricsRprtRqstToken OCTET STRING,
7                               dot11QoSMetricsRprtIfIndex InterfaceIndex,
8                               dot11QoSMetricsMeasuringSTAAddr MacAddress,
9                               dot11QoSMetricsRprtActualStartTime TSFType,
10                              dot11QoSMetricsRprtMeasurementDuration Unsigned32,
11                              dot11QoSMetricsRprtPeerSTAAddress MacAddress,
12                              dot11QoSMetricsRprtTID INTEGER,
13                              dot11QoSMetricsRprtAverageQueueDelay Integer32,
14                              dot11QoSMetricsRprtAverageTransmitDelay Integer32,
15                              dot11QoSMetricsRprtTransmittedMSDUCount Integer32,
16                              dot11QoSMetricsRprtMSDUDiscardedCount Integer32,
17                              dot11QoSMetricsRptMSDUFailedCount Integer32,
18                              dot11QoSMetricsRptMultipleRetryCount Integer32,
19                              dot11QoSMetricsRptCFPollsLostCount Integer32,
20                              dot11QoSMetricsRprtBin0Range INTEGER,
21                              dot11QoSMetricsRprtDelayHistogram OCTET STRING,
22                              dot11QoSMetricsRprtMeasurementMode INTEGER,
23                              dot11QoSMetricsRprtIndex Unsigned32,
24                              dot11QoSMetricsRprtRqstToken OCTET STRING,
25                              dot11QoSMetricsRprtIfIndex InterfaceIndex,
26                              dot11QoSMetricsMeasuringSTAAddr MacAddress,
27                              dot11QoSMetricsRprtActualStartTime TSFType,
28                              dot11QoSMetricsRprtMeasurementDuration Unsigned32,
29                              dot11QoSMetricsRprtPeerSTAAddress MacAddress,
30                              dot11QoSMetricsRprtTID INTEGER,
31                              dot11QoSMetricsRprtAverageQueueDelay Integer32,
32                              dot11QoSMetricsRprtAverageTransmitDelay Integer32,
33                              dot11QoSMetricsRprtTransmittedMSDUCount Integer32,
34                              dot11QoSMetricsRprtMSDUDiscardedCount Integer32,
35                              dot11QoSMetricsRptMSDUFailedCount Integer32,
36                              dot11QoSMetricsRptMultipleRetryCount Integer32,
37                              dot11QoSMetricsRptCFPollsLostCount Integer32,
38                              dot11QoSMetricsRprtBin0Range INTEGER,
39                              dot11QoSMetricsRprtDelayHistogram OCTET STRING,
40                              dot11QoSMetricsRprtMeasurementMode INTEGER }
41          STATUS current
42          DESCRIPTION
43              "The SMTRRMReport package is a set of attributes that shall be
44              present if the STA supports the Radio Measurement service."
45      ::= { dot11Groups 32 }
46
47  dot11SMTRRMConfig OBJECT-GROUP
48          OBJECTS {    dot11APChannelReportIndex,
49                       dot11APChannelReportIfIndex,
50                       dot11APChannelReportRegulatoryClass,
51                       dot11APChannelReportChannelList,
52                       dot11APChannelReporMeasurementMode
53                       dot11RRMNeighborReportIndex,
54                       dot11RRMNeighborReportIfIndex,
55                       dot11RRMNeighborReportReachability,
56                       dot11RRMNeighborReportSecurity,
57                       dot11RRMNeighborReportCapSpectrumMgmt,
58                       dot11RRMNeighborReportCapQoS,
59                       dot11RRMNeighborReportCapAPSD,
60                       dot11RRMNeighborReportCapRRM,
61                       dot11RRMNeighborReportCapBlockAck,
62                       dot11RRMNeighborReportKeyScope,
63                       dot11RRMNeighborReportChannelNumber,
64                       dot11RRMNeighborReportRegulatoryClass,
65                       dot11RRMNeighborReportPhyOptions,
66                       dot11RRMNeighborReportNeighborTSFInfo,
67                       dot11RRMNeighborReportTSFOffsetFlag,
68                       dot11RRMNeighborReportBeaconInterval,
69                       dot11RRMNeighborReportRowStatus,
70                       dot11RRMNeighborReportMeasurementMode }
71          STATUS current
72          DESCRIPTION
73              "The SMTRRMConfig package is a set of attributes that shall be
74              present if the STA supports the Radio Measurement service."
75      ::= { dot11Groups 33 }
```

1   **Annex I**

2   **I.1 External regulatory references**

3   *Change the documents column in Table I.1 as shown:*

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	ECC DEC (04) 08, ETSI EN 301 893, ETS 300-328	CEPT

4   *Insert a new row and change the last row of Table I.2 as shown:*

Emissions limits set	USA	Europe	Japan
4 2.45 GHz band	FCC CFR47, Clause 15.247	ETS 300-328	MPHPT EO Articles 7, 49.20
5-255	Reserved	Reserved	Reserved

5   *Insert a new row and change the last row of Table I.3 as shown:*

Behavior limits set	USA	Europe	Japan
9 2.45 GHz band	FCC CFR47, Clause 15.247	ETS 300-328	MPHPT EO Article 49.20
10-255	Reserved	Reserved	Reserved

6   *Insert a new second row in Table I.6 as shown:*

Frequency band (GHz)	USA (Maximum output power with up to 6 dBi antenna gain) (mW)	Europe (EIRP)
2.400-2.4835	1 000	100 mW

7   *Insert a new second row in Table I.7 as shown:*

Frequency band (GHz)	Regulatory type	Japan

138

| 2.400-2.497 | Nomadic access, unlicensed | < 10 mW/MHz EIRP |

1

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1 **Annex J**

2 *Change the title, insert a new row and change the last row of Table J.1 as shown:*

3   **Table J.1—Regulatory classes ~~for 5 GHz bands~~ in the USA**

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	1-11	1 000	4	9
5-255	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

4 *Change the title, insert a new row and change the last row of Table J.2 as shown:*

5   **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 (EIRP)	Emissions Limits set	Behavior Limits set
4	2.407	25	1-13	100	4	9
5-255	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

6 *Change the title, insert two new rows and change the last row of Table J.3 as shown:*

7   **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 (dBm)	Emissions Limits set	Behavior Limits set

21	2.407	25	1-13	10 mW/MHz	4	6, 9
22	2.414	25	14	10 mW/MHz	4	6, 9
23-255	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

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