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

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

Spectrum and Transmit Power Management extensions in the 5GHz band in Europe

Sponsored by the
IEEE 802 Committee
of the
IEEE Computer Society

Comment: E30.1

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Introduction

(This introduction is not part of IEEE P802.11h, Draft Supplement 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: DFS and TPC extensions in the 5GHz band in Europe)

Example:

At the time this standard was completed, the working group had the following membership:

Chair of working group (to be provided by IEEE editor at time of publication)

List of members of working group (to be provided by IEEE editor at time of publication)

The following persons were on the balloting committee:

List of members of balloting committee (to be provided by IEEE editor at time of publication)

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Contents

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Draft Supplement 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:

Spectrum and Transmit Power Management extensions in the 5GHz band in Europe

[The editing instructions contained in this supplement define how to merge the material contained herein into the current edition of IEEE Std 802.11 2003

Comment: E26

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Deleted: Edition and the 802.11a, 802.11b, 802.11b-cor1 and 802.11d supplements

The editing instructions are shown in ***bold italic***. Three editing instructions are used:

Change is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed either by using strikethrough (to remove old material) or underscore (to add new material).

Delete removes existing material.

Insert adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instructions.

Editorial notes will not be carried over into future editions.]

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1.2 Purpose

Insert the following text at the end of the clause

- Defines mechanisms for dynamic frequency selection (DFS) and transmit power control (TPC) that may be used to satisfy regulatory requirements for operation in the 5GHz band in Europe. The regulations and conformance tests are listed in Clause 2.

2. Normative References

Insert the following citation at the appropriate location in clause 2

Deleted: :

ERC/DEC/(99)23, ERC Decision of 29 November 1999 on the harmonized frequency bands to be designated for the introduction of High Performance Radio Local Area Networks (HIPERLANs)[1].

ITU-R M.[8A-9B.RLAN.DFS], Working Document towards a Preliminary Draft New Recommendation[2]

Comment: E30.4 Can someone provide a dated equivalent reference?

EN 301 893, Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive[3]

Comment: E30.4 Can someone provide a dated equivalent reference?

[1] ERC documents are available from European Radiocommunications Office, Midtermolen 1, DK-2100, Copenhagen, Denmark (http://www.ero.dk).

[2] ITU documents are available from International Telecommunications Union, Place des Nations, 1211 Geneva 20, Switzerland (http://www.itu.int)

[3] ETSI documents are available from ETSI, 650 Route des Lucioles, F-06921 Sopia Antipolis Cedex, France (http://www.etsi.org)

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3. Definitions

Insert the following new definitions in alphabetical order into clause 3, renumbering as necessary.

Comment: E31.2
Deleted: *at the appropriate locations*
Deleted: *:*

3.51 dynamic frequency selection (DFS): Facilities mandated to satisfy requirements in some regulatory domains for radar detection and uniform channel spreading in the 5GHz band. These facilities may also be used for other purposes, such as automatic frequency planning.

Comment: E31.1
Deleted: DFS

3.52 transmit power control (TPC): Facilities mandated to satisfy requirements in some regulatory domains for maximum transmit power and transmit power mitigation in the 5GHz band. These facilities may also be used for other purposes, such as reduction of interference, range control and reduction of power consumption.

Comment: E31.1
Deleted: TPC

3.53 transmit power: Effective Isotropic Radiated Power.

Comment: E31.1
Deleted: Transmit power is the

3.54 receive power: Mean power measured at the antenna connector.

Comment: E31.1
Deleted: Receive power is the m

3.55 5GHz band in Europe: Refers to the nineteen 20MHz channels between 5GHz and 6GHz in which WLAN operation is allowed in the CEPT regulatory domain. The channels are specified in Table 88 in 17.3.8.3.3.

Comment: E31.1
Deleted: The 5GHz band in Europe r

3.56 DFS Owner: A STA in an IBSS that takes responsibility for selecting the next channel after radar is detected operating in a channel. Due to the nature of IBSS's it cannot be guaranteed that there will be a single DFS owner at any particular time and the protocol is robust to this situation.

Comment: E29
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3.57 received power indicator (RPI): A quantized measure of the received power level as seen at the antenna connector.

Comment: E31.1
Deleted: The DFS Owner is a

3.58 uniform spreading: A regulatory requirement per ERC/DEC/(99)23 for a channel selection mechanism that provides uniform loading across a minimum set of channels in the regulatory domain.

Comment: E32
Deleted: .

3.59 link margin: Ratio of the received signal power to the minimum desired by the STA. The STA may incorporate rate information and channel conditions, including interference, into its computation of link margin. The specific algorithm for computing the link margin is implementation dependent.

Comment: E31.1
Deleted: RPI is a

Comment: E31.1
Deleted: Uniform spreading is a

4. Abbreviations and acronyms

Comment: E31.1
Deleted: Link margin is defined as the r

Insert the following text in alphabetical order into clause 4.

Comment: E31.4
Deleted: *the appropriate location*
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DFS dynamic frequency selection

TPC transmit power control

RPI receive power indication

RLAN radio local area network

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5. General description

5.3 Logical Service Interfaces

Insert the following at the end of the list of architectural services in 5.3as follows

Comment: E27

Deleted: *Add*

Deleted: *to the complete list of IEEE802.11 architectural services as follows:*

j) Dynamic Frequency Selection

k) Transmit Power Control

5.3.1 Station service

Insert the following at the end of the list of station services in 5.3.1 as follows

Comment: E27

Deleted: *Add to the Station service as follows:*

e) Dynamic Frequency Selection

f) Transmit Power Control

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5.4 Logical Service Interfaces

Change the first paragraph as follows:

Deleted: :

There are several services specified by IEEE 802.11. Six of the services are used to support MSDU delivery between STAs. Three of the services are used to control IEEE 802.11 LAN access and confidentiality. Two of the services are used to provide spectrum management.

Comment: E33

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Insert the following text for 5.4.4, 5.4.4.1 and 5.4.4.2 after 5.4.3.3as follows:

Deleted: *at the end of clause 5.4*

5.4.4 Spectrum management services

Two services are required to satisfy requirements in some regulatory domains for operation in the 5GHz band. These services are called transmit power control (TPC) and dynamic frequency selection (DFS).

5.4.4.1 Transmit Power Control

ERC/DEC/(99)23 requires RLANs operating in the 5GHz band to use transmitter power control, involving specification of a regulatory maximum transmit power and a mitigation requirement for each allowed channel, to reduce interference with satellite services. The transmit power control (TPC) service is used to satisfy this regulatory requirement.

The TPC service provides for the:

- Association of STAs with an AP in a BSS based on the STAs power capability.
- Specification of regulatory and local maximum transmit power levels for the current channel.
- Selection of a transmit power for each transmission in a channel within constraints imposed by regulatory requirements..
- Adaptation of transmit power based on a range of information, including path loss and link margin estimates.

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5.4.4.2 Dynamic Frequency Selection

ERC/DEC/(99)23 requires RLANs operating in the 5GHz band to implement a mechanism to avoid co-channel operation with radar systems and to ensure uniform utilization of available channels. The dynamic frequency selection (DFS) service is used to satisfy these regulatory requirements.

The DFS service provides for:

- Association of STAs with an AP in a BSS based on the STAs' supported channels.
- Quieting the current channel so it can be tested for the presence of radar with less interference from other STAs.
- Testing channels for radar before using a channel and while operating in a channel.
- Discontinuing operations after detecting radar in the current channel to avoid interference with radar.
- Detecting radar in the current and other channels based on regulatory requirements.
- Requesting and reporting of measurements in the current and other channels.
- Selecting and advertising a new channel to assist the migration of a BSS or IBSS after radar is detected.

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5.5 Relationships between services

Insert the following text at the end of the list of Class 1, Management frames as follows

Comment: E27

Deleted: *Add to the definition of class 1, management frames as follows:*

vi) Action

5.7.2 Association

Insert the following text under "Association request" just after entry for "ESS ID" as follows

Deleted: *:*

- Power Capability
- Supported channels

5.7.3 Reassociation

Insert the following text under "Reassociation request" just after entry for "ESS ID" as follows

Deleted: *:*

- Power Capability
- Supported channels

Insert the following text for 5.7.8 after 5.7.7 as follows

Deleted: *at the end of clause 5.7*

5.7.8 Spectrum Management

The spectrum management services are supported by the action message:

Spectrum Management Action

- Message type: Management
- Message subtype: Spectrum Management Action
- Information Items:
  - Action identification
  - Dialog token
  - Action dependent information
  - Direction of Message: From STA to STA

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7.1.3.1.2 Type and Subtype fields

Insert the Management/Action row and change the Management/Reserved row in Table 1 as follows

Comment: E27

Deleted: *Change the contents of Table 1 as follows*:

Table 1 - Valid type and subtype combinations

Type Value b3 b2	Type description	Subtype value b7 b6 b5 b4	Subtype description
00	Management	1101	Action
00	Management	~~1101~~1110-1111	Reserved

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7.2.3.1 Beacon frame format

Change the order 11 information field and insert the order 14-18 information fields as follows

Comment: E27
Comment: E35
Deleted: *add*
Deleted: *:*

Table 5 - Beacon frame body

Order	Information	Notes
11	Country	Country element shall be present if dot11MultiDomainCapabilityEnabled is true or dot11SpectrumManagementRequired is true
14	Power Constraint	Power Constraint element shall be present if dot11SpectrumManagementRequired is true
15	Channel Switch Announcement	Channel Switch Announcement element may be present if dot11SpectrumManagementRequired is true
16	Quiet	Quiet element may be present if dot11SpectrumManagementRequired is true
17	IBSS DFS	IBSS DFS element shall be present if dot11SpectrumManagementRequired is true in an IBSS
18	TPC Report	TPC Report element shall be present if dot11SpectrumManagementRequired is true

Comment: E35
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7.2.3.4 Association Request frame format

Insert the order 5-6 information fields as follows

Comment: E27
Deleted: *Add*
Deleted: *and order*
Deleted: *:*

Table 7 - Association Request frame body

Order	Information	Notes
5	Power Capability	Power Capability element shall be present if dot11SpectrumManagementRequired is true
6	Supported Channels	Supported Channels element shall be present if dot11SpectrumManagementRequired is true

7.2.3.6 Reassociation Request frame format

Insert the order 6-7 information fields as follows

Comment: E27
Deleted: *Add*
Deleted: *and order*
Deleted: *:*

Table 9 - Reassociation Request frame body

Order	Information	Notes
6	Power Capability	Power Capability element shall be present if dot11SpectrumManagementRequired is true
7	Supported Channels	Supported Channels element shall be present if dot11SpectrumManagementRequired is true

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7.2.3.9 Probe Response frame format

Change the order 10and 13-n information fields and insert the order 13 -17 information fields as follows

Comment: E27

Comment: E37

Deleted: *add*

Deleted: *:*

Table 12 - Probe Response frame body

Order	Information
10	Country[5]
13	Power Constraint[9]
14	Channel Switch Announcement[10]
15	Quiet[11]
16	IBSS DFS[12]
17	TPC Report[13]
~~13~~18-n	Requested information elements[8]

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Change the notes to Table 12 on the order 10 element as follows

5 - Included if dot11MultiDomainCapabilityEnabled or dot11SpectrumManagementRequired is true.

Comment: E26

Insert the notes to Table 12 on the order 13-17 elements as follows

9 – Shall be included if dot11SpectrumManagementRequired is true.

10 – May be included if dot11SpectrumManagementRequired is true.

11 – May be included if dot11SpectrumManagementRequired is true.

12 – Shall be included if dot11SpectrumManagementRequired is true in an IBSS.

13 – Shall be included if dot11SpectrumManagementRequired is true.

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Insert 7.2.3.12 after 7.2.3.11 as follows

Comment: E38

Deleted: *the following frame format*

7.2.3.12 Action frame format

The frame body of a management frame of subtype Action contains the information shown in Table 16.

Table 16 - Action frame body

Order	Information
1	Action

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7.3.1.4 Capability Information field

Change the second paragraph as follows

Deleted: *supporting text*
Deleted: :

The length of the Capability Information field is 2 octets. ~~The Capability Information field consists of the following subfields: ESS, IBSS, CF Pollable, CF Poll Request, Privacy, Short Preamble, Packet Binary Convolutional Code (PBCC), and Channel Agility, and Spectrum Management.~~ The format of the Capability Information field is as illustrated in Figure 27.

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Comment: E39

Change the contents of Figure 27 as shown, with appropriate formatting

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Comment: E26
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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 Management	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)

Figure 27 - Capability Information fixed field

Insert the following text at the end of 7.3.1.4

Deleted: *clause*
Deleted: :

A STA shall set the Spectrum Management subfield in the Capability Information field equal to 1 if the STA's dot11SpectrumManagementRequired is true, otherwise it shall be set equal to 0.

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7.3.1.7 Reason Code field

Insert reason codes 10-11 and change the Reserved reason code row in Table 18 as follows:

Comment: E26
Deleted: *Add*
Deleted: *to table 18*
Deleted: *:*

Table 18 - Reason codes

Reason Code	Meaning
10	Disassociated because the information in the Power Capability element is unacceptable
11	Disassociated because the information in the Supported Channels element is unacceptable
~~10~~12-65536	Reserved

Comment: E26
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7.3.1.9 Status Code field

Insert status codes 22-24 and change the Reserved status code row in Table 19 as follows:

Comment: E26
Deleted: *Add*
Deleted: *to*
Deleted: *t*
Deleted: *:*

Table 19 - Status codes

Status Code	Meaning
22	Association request rejected because Spectrum Management capability is required
23	Association request rejected because the information in the Power Capability element is unacceptable
24	Association request rejected because the information in the Supported Channels element is unacceptable
~~22~~25-65536	Reserved

Comment: E26
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Insert 7.3.1.11 after 7.3.1.10 and renumber figures and tables as necessary.

Comment: E26

Deleted: *the following clause*

Deleted: *:*

7.3.1.11 Action field

The Action field provides a mechanism for specifying extended management actions. The format of the Action field is shown in Figure 1

	Category	Action Details
Octets:	1	variable

Figure 1 – Action field

The Category field shall be set to one of the non-reserved values shown in Table 1. If a STA receives a unicast Action frame with an unrecognized Category field or some other syntactic error and the most significant bit of the Category field set equal to 0 then the STA shall return the Action frame to the source without change except that the most significant bit of the Category field shall be set equal to 1.

Comment: Editorial

The Action Details field contains the details of the action. The details of the actions allowed in each category are described in the appropriate subclause referenced in Table 1.

Comment: E29

Table 1 - Category values

Name	Value	See subclause
Spectrum management	0	7.4.1
Reserved	1-127	-
Error	128-255	-

Comment: E29

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7.3.2 Information elements

Insert element ID's 32-41 and change the Reserved element ID row into Table 20 as follows

Comment: E26
Comment: E40
Deleted: *the following information elements*
Deleted: *of clause 7.3.2 in place of the reserved IDs:*

Table 20 - Element IDs

Information element	Element ID
Power Constraint	32
Power Capability	33
TPC Request	34
TPC Report	35
Supported Channels	36
Channel Switch Announcement	37
Measurement Request	38
Measurement Report	39
Quiet	40
IBSS DFS	41
Reserved	~~32~~42-255

Comment: E26
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Insert the 7.3.2.13 – 7.3.2.22 after 7.3.2.12 renumbering figures and tables as appropriate

Comment: Editorial
Deleted: *following sub-clause*
Deleted: . *R*
Deleted: .

7.3.2.13 Power Constraint element

Comment: E26
Deleted: 9

The Power Constraint element contains the information necessary to allow a STA to determine the local maximum transmit power in the current channel. The format of the Power Constraint element is shown in Figure 2.

	Element ID	Length	Local Power Constraint
Octets:	1	1	1

Figure 2 - Power Constraint element format

The Length field shall be set equal to 1.

The Local Power Constraint field shall be set equal to a value that allows the mitigation requirements to be satisfied in the current channel. The field is coded as an unsigned integer in units of dB. The local maximum transmit power for a channel is thus defined as the Maximum Transmit Power Level specified for the channel in the Country element minus the Local Power Constraint specified for the channel (from the MIB) in the Power Constraint element.

The Power Constraint element is included in Beacon frames, as described in 7.2.3.1, and Probe Response frames, as described in 7.2.3.9. The use of Power Constraint elements is described in 11.5.2.

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7.3.2.14 Power Capability element

Comment: E26
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The Power Capability element specifies the minimum and maximum transmit powers with which a STA is capable of transmitting in the current channel. The format of the Power Capability element is shown in Figure 3.

	Element ID	Length	Minimum Transmit Power Capability	Maximum Transmit Power Capability
Octets:	1	1	1	1

Figure 3 - Power Capability element format

The Length field shall be set equal to 2.

The Minimum Transmit Power Capability field shall be set equal to the nominal minimum transmit power with which the STA is capable of transmitting in the current channel, with a tolerance +/-5dB. The field is coded as a signed integer in units of dBm.

The Maximum Transmit Power Capability field shall be set equal to the nominal maximum transmit power with which the STA is capable of transmitting in the current channel, with a tolerance +/-5dB . The field is coded as a signed integer in units of dBm.

Comment: E29
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The Power Capability element is included in Association Request frames, as described in 7.2.3.4, and Reassociation Request frames, as described in 7.2.3.6. The use of Power Capability elements is described in 11.5.1.

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7.3.2.15 TPC Request element

The TPC Request element contains a request for a STA to report transmit power and link margin information using a TPC Report element. The format of the TPC Request element is shown in Figure 4.

	Element ID	Length
Octets:	1	1

Figure 4 - TPC Request element format

The Length field shall be set equal to 0.

The TPC Request element is included in a TPC Request frame, as described in 7.4.1.3. The use of TPC Request elements and frames is described in 11.5.4.

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7.3.2.16 TPC Report element

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The TPC Report element contains transmit power and link margin information sent in response to a TPC Request element. A TPC Report element is included in a Beacon or Probe Response without a corresponding request. The format of the TPC Report element is shown in Figure 5.

	Element ID	Length	Transmit Power	Link Margin
Octets:	1	1	1	1

Figure 5 - TPC Report element format

The Length field shall be set equal to 2.

The Transmit Power field shall be set equal to the transmit power used to transmit the frame containing the TPC Report element. The field is coded as a signed integer in units of dBm. The maximum tolerance for the transmit power value reported in the TPC Response element shall be +/- 5 dB. This tolerance is defined as the difference, in dB, between the reported power value and the actual EIRP of the STA (measured when transmitting 1500 octet frames).

Comment: T5
Deleted: The difference in output power actually transmitted by the STA between two power levels, where the difference in nominal output power indicates an increase of N dB, shall be max(N-3, 0) dB to N+3dB.

The Link Margin field contains the link margin at the time and for the rate at which the frame containing the TPC Request element was received. The field is coded as a signed integer in units of dB. The Link Margin field shall be set equal to zero and shall be ignored when a TPC Report element is included in a Beacon frame or Probe Response frame.

The TPC Report element is included in a TPC Report frame, as described in 7.4.1.4, in Beacon frames, as described in clause 7.2.3.1, and Probe Response frames, as described in 7.2.3.9. The use of TPC Report elements and frames is described in 11.5.4.

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7.3.2.17 Supported Channels element

Comment: E26
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The Supported Channels element contains a list of channels (from those defined in 17.3.8.3.2) in which a STA is capable of operating. The format of the Supported Channels element is shown in Figure 6.

	Element ID	Length	Supported Channels
Octets:	1	1	26

Figure 6 - Supported Channels element format

The Length field shall be set equal to 26.

The Supported Channels field is a 26-octet bit field, where bit 0 corresponds to channel 0 and bit 200 corresponds to channel 200 (as defined in 17.3.8.3.2). A bit in the field shall be set equal to 1 when the STA supports operation in the corresponding channel, otherwise it shall be set equal to 0. Bits 201-207 shall be set equal to 0.

Comment: E29
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The Supported Channels element is included in Association Request frames, as described in 7.2.3.4, and Reassociation Request frames, as described in 7.2.3.6. The use of the Supported Channels element is described in 11.6.7.

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7.3.2.18 Channel Switch Announcement element

Comment: E26
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The Channel Switch Announcement element is used by an AP in a BSS or a STA in an IBSS to advertise when it is changing to a new channel and the channel number of the new channel. The format of the Channel Switch Announcement element is shown in Figure 7.

	Element ID	Length	Channel Switch Mode	New Channel Number	Channel Switch Count
Octets:	1	1	1	1	1

Figure 7 - Channel Switch Announcement element format

The Length field shall be set equal to 3.

The Channel Switch Mode field indicates any restrictions on transmission until a channel switch. An AP in a BSS or a STA in an IBSS shall set the Channel Switch Mode field to either 0 or 1 on transmission. A Channel Switch Mode set equal to 1 means that the STA in a BSS to which the frame containing the element is addressed shall transmit no further frames within the BSS until the scheduled channel switch. A STA in an IBSS may treat a Channel Switch Mode field set equal to 1 as advisory. A Channel Switch Mode set equal to 0 does not impose any requirement on the receiving STA.

The New Channel Number field shall be set equal to the number of the channel to which the STA is moving (as defined in 17.3.8.3.2).

Comment: E29
Deleted: clause

The Channel Switch Count field either shall be set equal to the number of TBTTs until the STA sending the Channel Switch Announcement element will switch to the new channel or shall be set equal to 0. A value of 1 indicates that the switch will occur immediately before the next TBTT. A value of 0 indicates that the switch will occur at any time after the frame containing the element is transmitted.

The Channel Switch Announcement element is included in Channel Switch Announcement frames, as described in 7.4.1.5, and may be included in Beacon frames, as described in 7.2.3.1, and Probe Response frames, as described in 7.2.3.9. The use of Channel Switch Announcement elements and frames is described in 11.6.7.

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Comment: Editorial
Deleted: *Insert the following sub-clauses. Renumber figures and tables as appropriate.*
Comment: E26
Deleted: 15

7.3.2.19 Measurement Request element

The Measurement Request element contains a request that the receiving STA undertake the specified measurement action. The format of the Measurement Request element is shown in Figure 8.

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

Figure 8 - Measurement Request element format

	Parallel	Enable	Request	Report	Reserved
Bit:	0	1	2	3	4-7

Figure 9 - Measurement Request Mode field

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

The Measurement Token shall be set to a non-zero number that is unique among the Measurement Request elements in a particular Measurement Request frame.

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

- Parallel bit (bit 0) indicates whether the request should start in series or in parallel with the request described by any immediately previous Measurement Request element in the same Measurement Request frame. The Parallel bit shall be set equal to 0 when the request starts immediately after the previous request completed. The Parallel bit shall be set equal to 1 when the request starts at the same time as the previous request. The first Measurement Request element in a Measurement Request frame shall have the Parallel bit set equal to 0.
- Enable bit (bit 1) indicates whether this element is used to request the destination STA to enable or disable the sending of measurement requests and autonomous measurement reports of a specified type to this STA. The Enable bit shall be set equal to 1 when the Request bit and Report bit are valid. The Enable bit shall be set equal to 0 when the Request bit and Report bit are invalid.
- Request bit (bit 2) indicates whether the STA receiving the request shall enable or disable measurement requests of the type specified in the Measurement Type field. The Request bit shall be set equal to 1 when enabling a measurement request. The Request bit shall be set equal to 0 when disabling a measurement request or when the Request bit is invalid (i.e. when Enable bit is set equal to 0 or when the Measurement Type field contains a reserved measurement request type value).
- Report bit (bit 3) indicates whether the STA receiving the request shall enable or disable autonomous measurement reports of the type corresponding to the measurement report specified in the Measurement Type field. The Report bit shall be set equal to 1 when enabling an autonomous measurement report. The Report bit shall be set equal to 0 when disabling an autonomous measurement report or when the Report bit is invalid (i.e. when Enable bit is set equal to 0 or when the Measurement Type field contains a reserved measurement report type value).

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- All other bits are reserved and shall be set equal to 0.

The use of the Enable, Request and Report bits is also summarized in Table 7.3.2.19. See 11.6.6 for the description of how a STA shall handle requests to enable or disable measurement requests and autonomour reports.

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Table 7.3.2.19 Summary of use of Enable, Request and Report bits

Bits			Meaning of bits
Enable	Request	Report	
0	0	0	When Enable bit is set equal 0, Request and Report bits are invalid and shall be set equal to 0
0	0	1	Not allowed
0	1	0	Not allowed
0	1	1	Not allowed
1	0	0	The transmitting STA is requesting that it is sent neither measurement requests nor autonomous measurement reports of the types indicated in the Measurement Type field
1	1	0	The transmitting STA is indicating it will accept measurement requests and requesting it is not be sent autonomous measurement reports of the types indicated in the Measurement Type field
1	0	1	The transmitting STA is requesting it not be sent measurement requests and indicating it will accept autonomous measurement reports of the types indicated in the Measurement Type field
1	1	1	The transmitting STA is indicating it will accept measurement requests and autonomous measurement reports of the type indicated in the Measurement Type field

The Measurement Type field shall be set to a number that identifies a measurement request or a measurement report. Those Measurement Types that have been allocated for measurement requests are shown in Table 2 and measurement reports are shown in Table 3.

The Measurement Request field shall be null when the Enable bit is set equal to 1 and shall contain the specification of the measurement request, as described in the following subclauses, when the Enable bit is set equal to 0.

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Table 2 – Measurement Type definitions for measurement requests

Name	Measurement Type
Basic Request	0
CCA Request	1
RPI Histogram Request	2
Reserved	3-255

The Measurement Request element is included in a Measurement Request frame as described in 7.4.1.1. The use of Measurement Request elements and frames is described in 11.6.6.

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7.3.2.19.1 Basic Request

A Measurement Type in the Measurement Request element may indicate a Basic Request. The response to a Basic Request is a Basic Report. It is mandatory for a STA in a BSS to generate a Basic Report in response to a Basic Request if the request is received from the AP with which it is associated, except as specified in 11.6.6. The Measurement Request field corresponding to a Basic Request is shown in Figure 10.

	Channel Number	Measurement Duration
Octets:	1	2

Figure 10 - Measurement Request field format for a Basic Request

The Channel Number field shall be set equal to the channel number for which the measurement request applies (as defined in 17.3.8.3.2).

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The Measurement Duration field shall be set equal to the duration of the requested measurement, expressed in TUs.

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7.3.2.19.2 CCA Request

A Measurement Type in the Measurement Request element may indicate a CCA Request. A response to a CCA Request is a CCA Report. It is optional for a STA to generate a CCA Report in response to a CCA Request. The Measurement Request field corresponding to a CCA Request is shown in Figure 11.

	Channel Number	Measurement Duration
Octets:	1	2

Figure 11 - Measurement Request field format for a CCA Request

The Channel Number field shall be set equal to the channel number for which the measurement request applies (as defined in 17.3.8.3.2).

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The Measurement Duration field shall be set equal to the duration of the requested measurement, expressed in TUs.

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7.3.2.19.3 RPI Histogram Request

A Measurement Type in the Measurement Request element may indicate an RPI Histogram Request. A response to an RPI Histogram Request is an RPI Histogram Report. It is optional for a STA to generate a RPI Histogram Report in response to a RPI Histogram Request. The Measurement Request field corresponding to an RPI Histogram Request is shown in Figure 12.

	Channel Number	Measurement Duration
Octets:	1	2

Figure 12 - Measurement Request field format for a RPI Histogram Request

The Channel Number field shall be set equal to the channel number for which the measurement request applies (as defined in 17.3.8.3.2).

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The Measurement Duration field shall be set equal to the duration of the requested measurement, expressed in TUs.

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7.3.2.20 Measurement Report element

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

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

Figure 14 - Measurement Report Mode field

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 equal 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 equal to zero.

The Measurement Report Mode field (shown in Figure 14) is a bit field with the following bits defined:

- Parallel bit (bit 0) indicates whether the measurement starts in series or in parallel with the measurement described by any immediately previous Measurement Report element in the same Measurement Report frame or in a previous Measurement Report frame with the same Dialog Token value. The Parallel bit shall be set equal to 0 to indicate the measurement started immediately after the previous measurement completed. The Parallel bit shall be set equal to 0 to indicate the measurement started at the same time as the previous measurement. The first Measurement Report element in a Measurement Report frame shall have the Parallel bit set equal to 0.

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

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

- All other bits are reserved and shall be set equal to 0.

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The Measurement Type field shall be set to a number that identifies the measurement report. Those Measurement Types that have been allocated are shown in Table 3.

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The Measurement Report field shall be null when the Incapable bit is set equal to 1 or the Refused bit is set equal to 1. Otherwise, it shall contain the specification of the measurement report, as described in the following subclauses.

Comment: E29

Table 3 – Measurement Type definitions for measurement reports

Name	Measurement Type
Basic Report	0
CCA Report	1
RPI Histogram Report	2
Reserved	3-255

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

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7.3.2.20.1 Basic Report

A Measurement Type in the Measurement Report element may indicate a Basic Report. The format of the Measurement Report field corresponding to a Basic Report is shown in Figure 15. It is mandatory for a STA to support the generation of this report.

	Channel Number	Measurement Duration	Map
Octets:	1	2	1

Figure 15 - Measurement Report field format for a Basic Report

	BSS	OFDM Preamble	Unidentified Signal	Radar	Unmeasured	Reserved (0)
Bit:	**0**	**1**	**2**	**3**	**4**	**5-7**

Figure 16 - Map field format

The Channel Number field shall be set equal to the channel number to which the Basic Report applies (as defined in 17.3.8.3.2).

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

The Map field is coded as a bit field, as shown in Figure 16, and shall contain a:

- BSS bit, which shall be set equal to 1 when at least one valid MPDU was received in the channel during the measurement period from another BSS or IBSS. Otherwise, the BSS bit shall be set equal to 0.
- OFDM Preamble bit, which shall be set equal to 1 when at least one sequence of short training symbols, as defined in 17.3.3, was detected in the channel during the measurement period without a subsequent valid Signal field. This may indicate the presence of an OFDM preamble, such as HIPERLAN/2. Otherwise, the OFDM Preamble bit shall be set equal to 0.

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- Unidentified Signal bit, which shall be set equal to 1 when significant power is detected in the channel during the measurement period that cannot be characterized as radar, an OFDM preamble or a valid MPDU. Otherwise, the Unidentified Signal bit shall be set equal to 0. The definition of significant power is implementation dependent. A STA may choose to never set the Unidentified Signal bit equal to 1, regardless of the power in the channel.

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- Radar bit, which shall be set equal to 1 when radar was detected operating in the channel during the measurement period. The algorithm to detect radar shall satisfy regulatory requirements and is outside the scope of this standard. Otherwise, the Radar bit shall be set equal to 0.
- Unmeasured bit, which shall be set equal to 1 when this channel has not been measured. Otherwise, the Unmeasured bit shall be set equal to 0. When the Unmeasured field is set equal to 1 all the other fields shall be set equal to 0.

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7.3.2.20.2 CCA Report

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A Measurement Type in the Measurement Report element may indicate a CCA Report. It is optional for a STA to support the generation of this report. The format of the Measurement Report field corresponding to a CCA Report is shown in Figure 17.

	Channel Number	Measurement Duration	CCA Busy Fraction
Octets:	1	2	1

Figure 17 - Measurement Report field format for a CCA Report

The Channel Number field shall contain the channel number to which the CCA Report applies (as defined in 17.3.8.3.2).

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

The CCA Busy Fraction field shall contain the fractional duration over which CCA indicated the channel was busy during the measurement duration. The resolution of the CCA busy measurement is in microseconds. The CCA Busy Fraction is defined as Ceiling (255 * [Duration CCA indicated channel was busy (microseconds)] / (1024 * [Measurement duration (TUs)])).

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7.3.2.20.3 RPI Histogram Report

A Measurement Type in the Measurement Report element may indicate an RPI Histogram Report. It is optional for a STA to support the generation of this report. The format of the Measurement Report field corresponding to an RPI Histogram Report is shown in Figure 18.

	Channel Number	Measurement Duration
Octets:	1	2

	RPI 0 density	RPI 1 density	RPI 2 density	RPI 3 density	RPI 4 density	RPI 5 density	RPI 6 density	RPI 7 density
Octets:	1	1	1	1	1	1	1	1

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Figure 18 - Measurement Report field format for an RPI Histogram Report

The Channel Number field shall be set equal to the channel number to which the RPI Histogram Report applies (as defined in 17.3.8.3.2).

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The Measurement Duration field shall be set equal to the duration over which the RPI Histogram Report was measured, expressed in TUs.

The RPI Histogram Report shall contain the RPI densities observed in the channel for the eight RPI levels defined in Table 4. To compute the RPI densities, the STA shall measure the received power level on the specified channel, as detected at the antenna connector, as a function of time over the measurement duration. The maximum tolerance of the received power measurements shall be +/- 5 dB. Furthermore, the received signal power measurement should be a monotonic function of the actual power at the antenna. The time resolution of the received power measurements is in microseconds. The received power measurements are converted to a sequence of RPI values by quantising the measurements according to Table 4. The RPI densities are then computed for each of the eight possible RPI values using Ceiling (255 * [Duration receiving at RPI value (microseconds) / (1024 * Measurement duration)]). The sum of the RPI densities will be approximately 255, but could be up to 262 because of rounding effects.

Table 4 - RPI definitions for an RPI Histogram Report

RPI	Power Observed at the Antenna (dBm)
0	Power ≤ -87
1	-87 < Power ≤ -82
2	-82 < Power ≤ -77
3	-77 < Power ≤ -72
4	-72 < Power ≤ -67
5	-67 < Power ≤ -62
6	-62 < Power ≤ -57
7	-57 < Power

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The RPI Histogram Report provides an additional mechanism for a STA to gather information on the state of a channel from other STAs. The STA may use this information to assist in the choice of new channel, to help avoid false radar detections and to assess the general level of interference present on a channel.

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7.3.2.21 Quiet element

The Quiet element defines an interval during which no transmission shall occur in the current channel. This interval may be used to assist in making channel measurements without interference from other STAs in the BSS or IBSS. The format of the Quiet element is shown in Figure 19.

	Element ID	Length	Quiet Count	Quiet Period	Quiet Duration	Quiet Offset
Octets:	1	1	1	1	2	2

Figure 19 - Quiet element format

The Length field shall be set equal to 6.

The Quiet Count field shall be set equal to the number of TBTTs until the beacon interval during which the next quiet interval shall start. A value of one indicates the quiet interval will start during the beacon interval starting at the next TBTT. A value of zero is reserved.

The Quiet Period field shall be set equal to the number of Beacon intervals between the start of regularly scheduled quiet intervals defined by this Quiet element. A value of zero indicates that no periodic quiet interval is defined.

The Quiet Duration field shall be set equal to the duration of the quiet interval, expressed in TUs.

The Quiet Offset field shall be set equal to the offset of the start of the quiet interval from the TBTT specified by the Quiet Count field, expressed in TUs. The value of the Quiet Offset field shall be less than one Beacon interval.

The Quiet element may be included in Beacon frames, as described in 7.2.3.1, and Probe Response frames, as described in 7.2.3.9. The use of Quiet elements is described in 11.6.2.

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7.3.2.22 IBSS DFS element

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The IBSS DFS element contains information for DFS operation in an IBSS. The format of the IBSS DFS element is shown in Figure 20.

	Element ID	Length	DFS Owner	DFS Recovery Interval	Channel Map
Octets:	1	1	6	1	2*n

Figure 20 – IBSS DFS element format

	Channel Number	Map	n tuples, one for each supported channel
Octets:	1	1	

Figure 21 – Channel Map field format

The Length field is variable.

The DFS Owner field shall be set equal to the individual IEEE MAC address of the STA that is the currently known DFS Owner in the IBSS.

The DFS Recovery Interval field indicates the time interval that shall be used for DFS Owner recovery, expressed as an integral number of beacon intervals. The DFS Recovery Interval is static throughout the lifetime of the IBSS and is determined by the STA that starts the IBSS.

The Channel Map field shown in Figure 21shall contain a Channel Number field and a Map field (see 7.3.2.20.1) for each channel supported by the STA transmitting the IBSS DFS element. Note that "n" in Figure 20 is the number of channels supported by the STA.

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The IBSS DFS element may be included in Beacon frames, as described in 7.2.3.1, and Probe Response frames, as described in 7.2.3.9. The use of IBSS DFS elements is described in 11.6.7.2.

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7.4 Action frame format details

This subclause describes the Action frame formats, including the Action Details field, allowed in each of the action categories defined in Table 1 in 7.3.1.11.

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7.4.1 Spectrum Management Action Details

Five Action frame formats are defined for Spectrum Management purposes. An Action field, in the octet field immediately after the Category field, differentiates the five formats. The Action field values associated with each frame format are defined in Table 5.

Table 5 – Spectrum Management Action field values

Action field value	Description
0	Measurement Request
1	Measurement Report
2	TPC Request
3	TPC Report
4	Channel Switch Announcement
5-255	Reserved

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7.4.1.1 Measurement Request frame format

The Measurement Request frame uses the Action frame body format and is transmitted by a STA requesting another STA to measure one or more channels. The format of the Measurement Request frame body is shown in Figure 22.

	Category	Action	Dialog Token	Activation Delay	Measurement Offset	Measurement Request Elements
Octets:	1	1	1	1	1	variable

Figure 22 - Measurement Request frame body format

The Category field shall be set equal to 0 (representing Spectrum Management).

The Action field shall be set equal to 0 (representing a Measurement Request frame).

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

The Activation Delay field shall be set equal to the number of TBTTs until the interval specified by the Measurement Offset field starts. A value of 0 indicates no activation delay. A value of 1 indicates the next TBTT.

The Measurement Offset field shall be set equal to the time after the activation delay, expressed in TUs, at which the measurement specified by the first Measurement Request element shall start. If there is no activation delay, the Measurement Offset shall be set equal to zero and the measurement specified by the first Measurement Request element shall begin after reception of the Measurement Request frame is complete. The value of the Measurement Offset field shall be less than one Beacon interval.

The Measurement Request Elements field shall contain one or more of the Measurement Request elements described in 7.3.2.19. The number and length of the Measurement Request elements in a Measurement Request frame is limited by the maximum allowed MMPDU size.

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7.4.1.2 Measurement Report frame format

The Measurement Report frame uses the Action frame body format and is transmitted by a STA in response to a Measurement Request frame or by a STA autonomously providing measurement information. The format of the Measurement Report frame body is shown in Figure 23.

	Category	Action	Dialog Token	Measurement Report Elements
Octets:	1	1	1	variable

Figure 23 - Measurement Report frame body format

The Category field shall be set equal to 0 (representing Spectrum Management).

The Action field shall be set equal to 1 (representing a Measurement Report frame).

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

The Measurement Report Elements field shall contain one or more of the Measurement Report elements described in 7.3.2.20. The number and length of the Measurement Report elements in a Measurement Report frame is limited by the maximum allowed MMPDU size.

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7.4.1.3 TPC Request frame format

The TPC Request frame uses the Action frame body format and is transmitted by a STA requesting another STA for transmit power and link margin information. The format of the TPC Request frame body is shown in Figure 24.

	Category	Action	Dialog Token	TPC Request element
Octets:	1	1	1	2

Figure 24 - TPC Request frame body format

The Category field shall be set equal to 0 (representing Spectrum Management).

The Action field shall be set equal to 2 (representing a TPC Request frame).

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

The TPC Request element shall be set as described in 7.3.2.15.

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7.4.1.4 TPC Report frame format

The TPC Report frame uses the Action frame body format and is transmitted by a STA in response to a TPC Request frame. The format of the TPC Report frame body is shown in Figure 25.

	Category	Action	Dialog Token	TPC Report element
Octets:	1	1	1	4

Figure 25 - TPC Report frame body format

The Category field shall be set equal to 0 (representing Spectrum Management).

The Action field shall be set equal to 3 (representing a TPC Report frame).

The Dialog Token field shall be set equal to the Dialog Token value in the corresponding TPC Request frame.

The TPC Report element shall be set as described 7.3.2.16.

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7.4.1.5 Channel Switch Announcement frame format

The Channel Switch Announcement frame uses the Action frame body format and is transmitted by an AP in a BSS or a STA in an IBSS to advertise a channel switch. The format of the Channel Switch Announcement frame body is shown in Figure 26.

	Category	Action	Channel Switch Announcement element
Octets:	1	1	5

Figure 26 – Channel Switch Announcement frame body format

The Category field shall be set equal to 0 (representing Spectrum Management).

The Action field shall be set equal to 4 (representing a Channel Switch Announcement frame).

The Channel Switch Announcement element shall be set as described 7.3.2.18.

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9.2.3.2 PCF IFS (PIFS)

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The PIFS shall be used only by STAs operating under the PCF to gain priority access to the medium at the start of the CFP or by a STA to transmit a Channel Switch Announcement frame. A STA using the PCF shall be allowed to transmit CF traffic after its CS mechanism (see 9.2.1) determines that the medium is idle at the TxPIFS slot boundary as defined in 9.2.10. A STA may also transmit a Channel Switch Announcement frame after its CS mechanism (see 9.2.1) determines that the medium is idle at the TxPIFS slot boundary. The use of the PIFS by STAs operating under the PCF is described in 9.3. The use of PIFS by STAs transmitting a Channel Switch Announcement frame is described in 11.6.

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10.3 MLME SAP interface

10.3.2.2 MLME-SCAN.confirm

10.3.2.2.2 Semantics of the Service Primitive

Insert the following parameters to the definition of BSSDescription:

Comment: E27

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Name	Type	Valid Range	Description
Country	As defined in the Country Element format	As defined in the Country Element format	The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Only present when TPC functionality is required, as specified in clause 11.5, or when dot11MultiDomainCapabilityEnabled is true
IBSS DFS Recovery Interval	Integer	1 – 255	Only present if BSSType = INDEPENDENT The time interval that shall be used for DFS recovery Only present when DFS functionality is required, as specified in clause 11.6

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10.3.6.1 MLME-ASSOCIATE.request

10.3.6.1.2 Semantics of the service primitive

Change the following primitive parameter list

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MLME-ASSOCIATE.request (
PeerSTAAddress,
AssociateFailureTimeout,
CapabilityInformation,
ListenInterval,
Supported Channels
)

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Insert the following row to the end of the table

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Name	Type	Valid Range	Description
Supported Channels	Bit field as defined in the Supported Channels Element	As defined in the Supported Channels Element	The list of channels in which the STA is capable of operating. Only present when DFS functionality is required, as specified in clause 11.6.

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10.3.7.1 MLME-REASSOCIATE.request

10.3.7.1.2 Semantics of the service primitive

Change the following primitive parameter list

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MLME-REASSOCIATE.request (
NewAPAddress,
ReassociateFailureTimeout,
CapabilityInformation,
ListenInterval,
Supported Channels
)

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Insert the following row to the end of the table

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Name	Type	Valid Range	Description
Supported Channels	Bit field as defined in the Supported Channels Element	As defined in the Supported Channels Element	The list of channels in which the STA is capable of operating. Only present when DFS functionality is required, as specified in clause 11.6.

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10.3.10.1 MLME-START.request

10.3.10.1.2 Semantics of the service primitive

Change the following primitive parameter list

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MLME-START.request (
SSID,
BSSType,
BeaconPeriod,
DTIMPeriod,
CF parameter set,
PHY parameter set,
IBSS parameter set,
ProbeDelay,
CapabilityInformation,
BSSBasicRateSet,
OperationalRateSet,
Country,
IBSS DFS Recovery Interval
)

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Insert the following rows to the end of the table

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Name	Type	Valid Range	Description
Country	As defined in the Country Element format	As defined in the Country Element format	The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Only present when TPC functionality is required, as specified in clause 11.5, or when dot11MultiDomainCapabilityEnabled is true.
IBSS DFS Recovery Interval	Integer	1 – 255	Only present if BSSType = INDEPENDENT. The time interval that shall be used for DFS Recovery. Only present when DFS functionality is required, as specified in clause 11.6.

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10.3.11 Spectrum Management Protocol Layer Model

The layer management extensions for measurement and channel switching assume a certain partition of Spectrum Management functionality between the MLME and SME. This partitioning assumes that policy decisions, for example regarding measurement and channel switching reside in the SME, while the protocol for measurement, switch timing and the associated frame exchanges resides within the MLME.

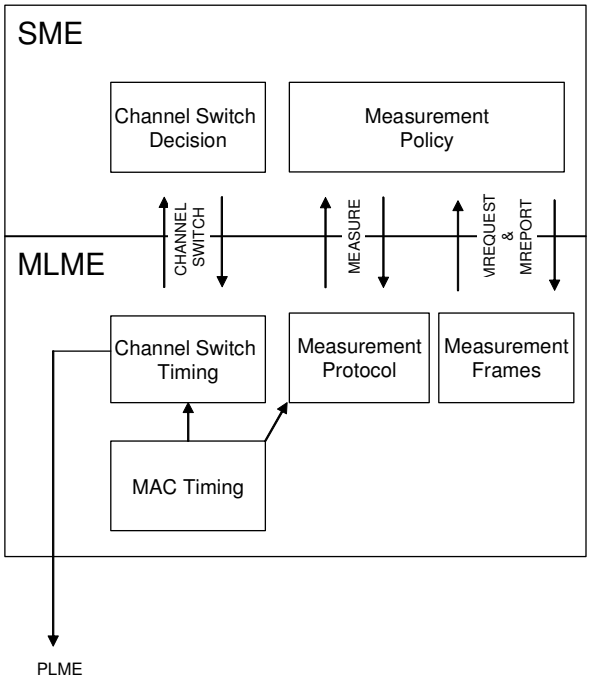

Figure 27 – Layer Management Model

The informative diagrams within this clause further illustrate the spectrum management protocol model adopted. Figure 28 and Figure 29 depict the measurement process for a peer STA accepting and rejecting a measurement request respectively. Figure 30 illustrates the TPC adaptation process. Lastly, Figure 31 depicts the management process for a channel switch using a Channel Switch Announcement frame.

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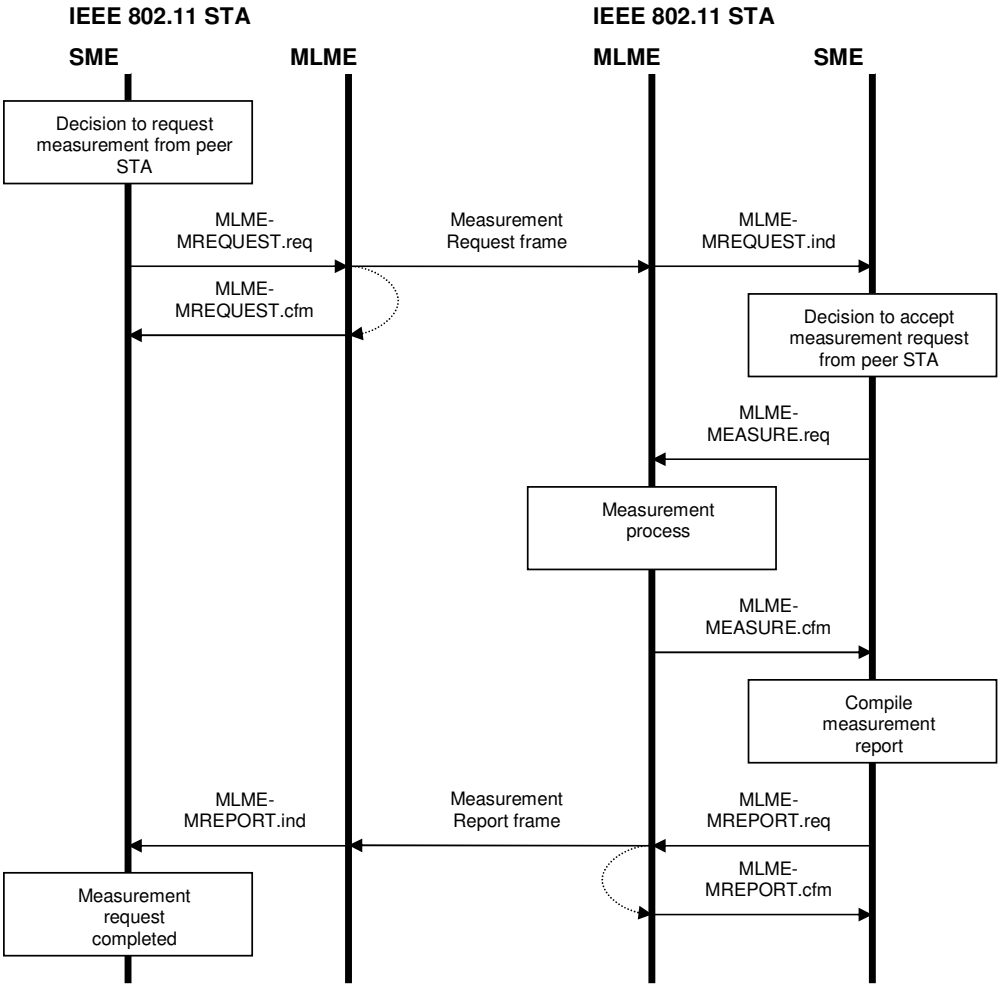

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Figure 28 - Measurement Request - Accepted

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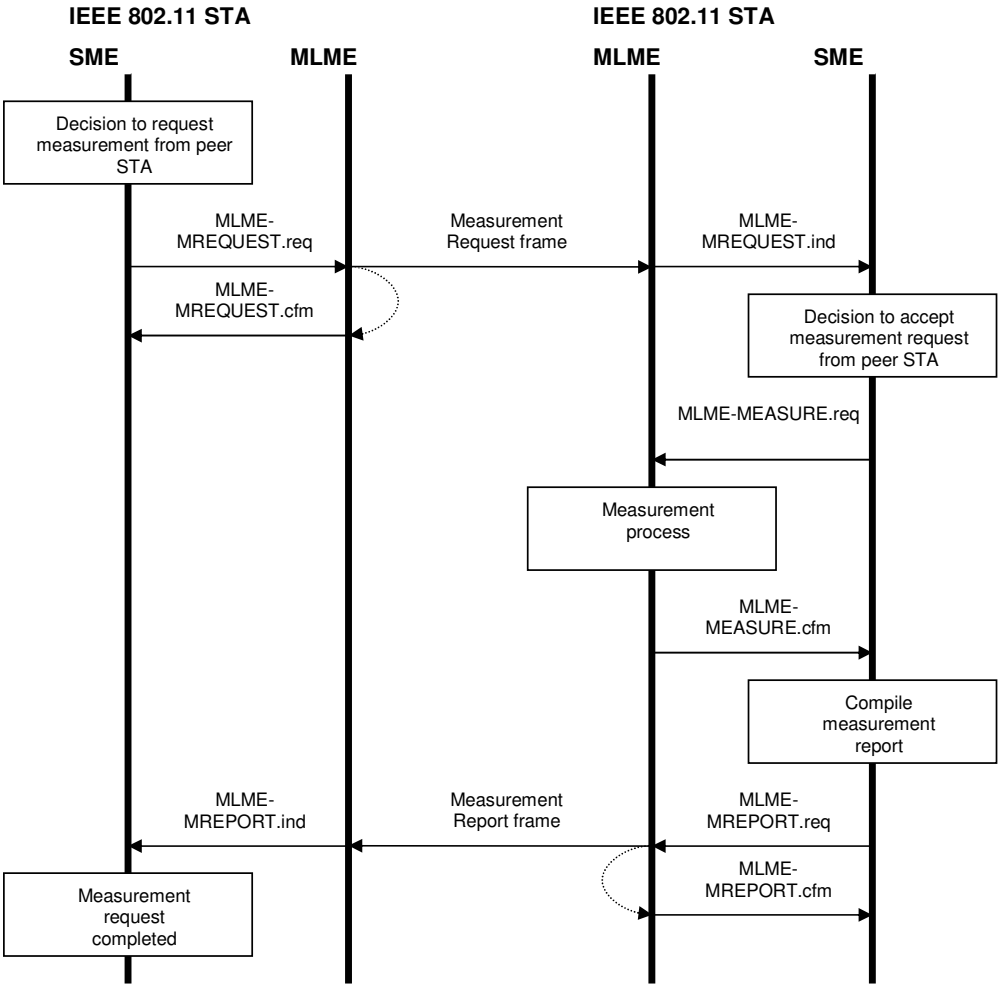

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Figure 29 - Measurement Request - Rejected

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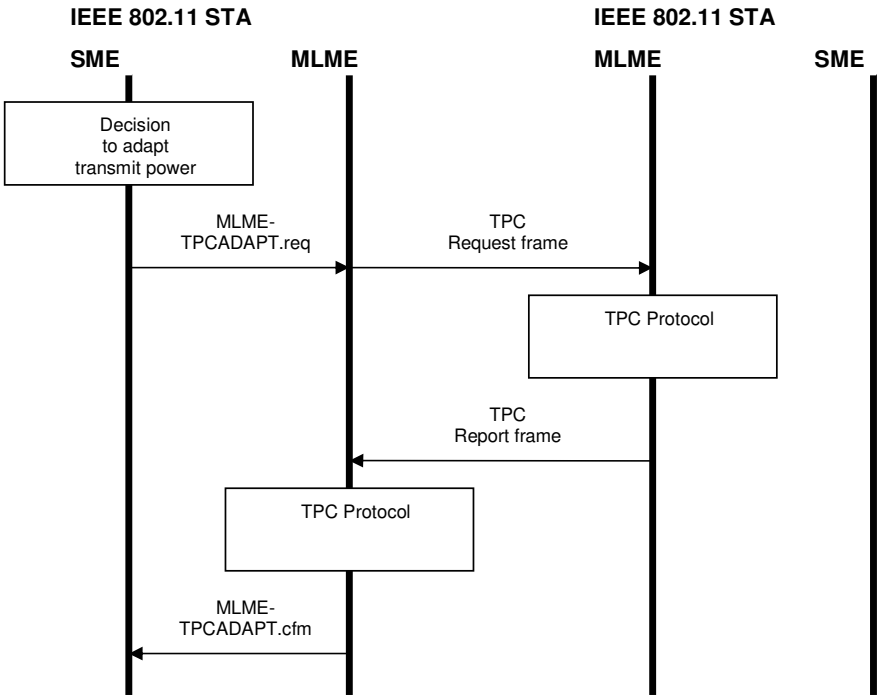

Figure 30 - TPC Adaptation

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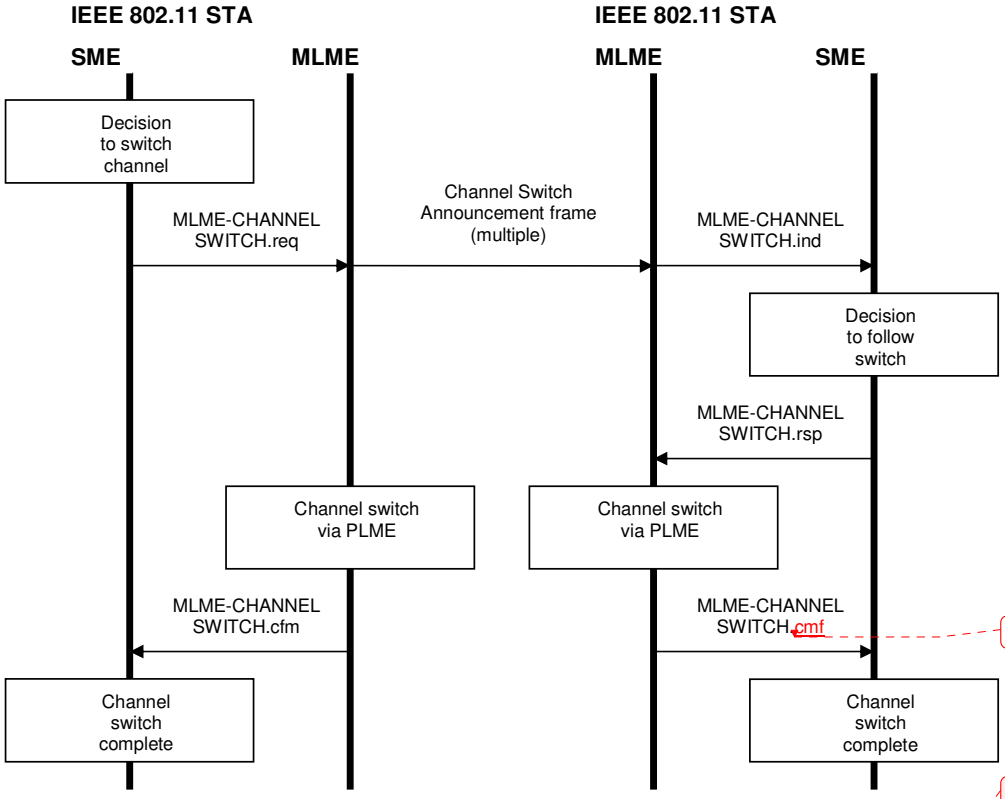

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Figure 31 - Channel Switch

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10.3.12 Measurement Request

This set of primitives supports the signaling of Measurement requests between peer SME entities.

10.3.12.1 MLME-MREQUEST.request

10.3.12.1.1 Function

This primitive requests the transmission of a measurement request to a peer entity.

10.3.12.1.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MREQUEST.request (
Peer MAC Address,
Dialog Token,
Activation Delay,
Measurement Offset,
Measurement Request Set
)

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.
Dialog Token	Integer	0 – 255	The dialog token to identify the measurement transaction.
Activation Delay	Integer	0 – 255	The measurement activation delay in TBTTs as defined for the Measurement Request frame type.
Measurement Offset	Integer	0 – 255	The measurement offset in TUs as defined for the Measurement Request frame type.
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.

10.3.12.1.3 When Generated

This primitive is generated by the SME to request that a Measurement Request frame be sent to a peer entity to initiate one or more measurements.

10.3.12.1.4 Effect of Receipt

On receipt of this primitive, the MLME shall construct a Measurement Request frame containing the set of Measurement Request elements specified. This frame shall then be scheduled for transmission.

10.3.12.2 MLME-MREQUEST.confirm

10.3.12.2.1 Function

This primitive reports the result of a request to send a Measurement Request frame.

10.3.12.2.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MREQUEST.confirm (
ResultCode
)

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID PARAMETERS, UNSPECIFIED FAILURE	Reports the outcome of a request to send a Measurement Request frame.

10.3.12.2.3 When Generated

This primitive is generated by the MLME when the request to transmit a Measurement Request frame completes.

10.3.12.2.4 Effect of Receipt

On receipt of this primitive, the SME shall evaluate the ResultCode.

10.3.12.3 MLME-MREQUEST.indication

10.3.12.3.1 Function

This primitive indicates that a Measurement Request frame has been received requesting the measurement of one or more channels.

10.3.12.3.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MREQUEST.indication (
Peer MAC Address,
Dialog Token,
Activation Delay,
Measurement Offset,
Measurement Request Set
)

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	0 – 255	The dialog token to identify the measurement transaction.
Activation Delay	Integer	0 – 255	The measurement activation delay in TBTTs as defined for the Measurement Request frame type.
Measurement Offset	Integer	0 – 255	The measurement offset in TUs as defined for the Measurement Request frame type.
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.

10.3.12.3.3 When Generated

This primitive is generated by the MLME when a valid Measurement Request frame is received.

10.3.12.3.4 Effect of Receipt

On receipt of this primitive, the SME shall either reject the request, or commence the requested measurements.

10.3.13 Channel Measurement

This set of primitives supports the request and reporting of measurement data.

10.3.13.1 MLME-MEASURE.request

10.3.13.1.1 Function

This primitive is generated by the SME to request that the MLME initiate specified measurements.

10.3.13.1.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MEASURE.request (
Dialog Token,
Activation Delay,
Measurement Offset,
Measurement Request Set
)

Name	Type	Valid Range	Description
Dialog Token	Integer	0 – 255	The Dialog Token to identify the measurement transaction.
Activation Delay	Integer	0 – 255	The measurement activation delay in TBTTs as defined for the Measurement Request frame type.
Measurement Offset	Integer	0 – 255	The measurement offset in TUs as defined for the Measurement Request frame type.
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.

10.3.13.1.3 When Generated

This primitive is generated by the SME to request that the MLME initiate the specified measurements.

10.3.13.1.4 Effect of Receipt

On receipt of this primitive, the MLME shall commence the measurement process.

10.3.13.2 MLME-MEASURE.confirm

10.3.13.2.1 Function

This primitive reports the result of a measurement.

10.3.13.2.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MEASURE.confirm (
ResultCode,
Dialog Token,
Measurement Report Set
)

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID PARAMETERS, UNSPECIFIED FAILURE	The outcome of the measurement request.
Dialog Token	Integer	0 – 255	The Dialog Token to identify the measurement transaction.
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.

10.3.13.2.3 When Generated

This primitive is generated by the MLME to report the results when a measurement set completes.

10.3.13.2.4 Effect of Receipt

On receipt of this primitive, the SME shall evaluate the result code and if appropriate shall store the channel measurements pending communication to the requesting entity, or for local use.

10.3.14 Measurement Report

This set of primitives supports the signaling of measurement reports.

10.3.14.1 MLME-MREPORT.request

10.3.14.1.1 Function

This set of primitives supports the signaling of Measurement reports between peer SME entities.

10.3.14.1.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MREPORT.request (
Peer MAC Address,
Dialog Token,
Measurement Report Set
)

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.

10.3.14.1.3 When Generated

This primitive is generated by the SME to request that a frame be sent to a peer entity to report the results of measuring one of more channels.

10.3.14.1.4 Effect of Receipt

On receipt of this primitive, the MLME shall construct a Measurement Report frame containing the set of Measurement Reports, or Requests according to the Status. This frame shall then be scheduled for transmission.

10.3.14.2 MLME-MREPORT.confirm

10.3.14.2.1 Function

This primitive reports the result of a request to send a Measurement Report frame.

10.3.14.2.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-MREPORT.confirm (
ResultCode
)

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID PARAMETERS, UNSPECIFIED FAILURE	Reports the outcome of a request to send a Measurement Request frame.

10.3.14.2.3 When Generated

This primitive is generated by the MLME when the request to transmit a Measurement Report Frame completes.

10.3.14.2.4 Effect of Receipt

On receipt of this primitive, the SME shall evaluate the ResultCode.

10.3.14.3 MLME-MREPORT.indication

10.3.14.3.1 Function

This primitive indicates that a 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
)

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	Only present if Status = 0, or 1. A set of measurement reports each containing a Measurement Token, Measurement Report Mode, Measurement Type and a Measurement Report.

10.3.14.3.3 When Generated

This primitive is generated by the MLME when a valid Measurement Report frame is received.

10.3.14.3.4 Effect of Receipt

On receipt of this primitive, measurement data may be available for SME processes such as channel selection.

10.3.15 Channel Switch

10.3.15.1 MLME-CHANNELSWITCH.request

10.3.15.1.1 Function

This primitive requests a switch to a new operating channel.

10.3.15.1.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-CHANNELSWITCH.request (
Mode,
Channel Number,
Channel Switch Count
)

Name	Type	Valid Range	Description
Mode	Integer	0, 1	Channel switch mode as defined for the Channel Switch Announcement element.
Channel Number	Integer	As defined in clause 17.3.8.3.2	Specifies the new channel number.
Channel Switch Count	Integer	0 – 255	Specifies the number of TBTTs until the channel switch event, as described for the Channel Switch Announcement element.

10.3.15.1.3 When Generated

This primitive is generated by the SME to schedule a channel switch and announce this to peer entities in the BSS.

10.3.15.1.4 Effect of Receipt

On receipt of this primitive, the MLME shall schedule the channel switch event and announce this to other STAs in the BSS using the Channel Switch Announcement frame or element. The MLME shall ensure the timing of frame transmission takes into account the activation delay. The actual channel switch may be achieved at the appropriate time through the MLME-PLME interface using the PLME-SET primitive of the dot11CurrentFrequency MIB attribute.

10.3.15.2 MLME-CHANNELSWITCH.confirm

10.3.15.2.1 Function

This primitive reports the result of a request to switch channel.

10.3.15.2.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-CHANNELSWITCH.confirm (
ResultCode
)

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID PARAMETERS, UNSPECIFIED FAILURE	Reports the result of a channel switch request.

10.3.15.2.3 When Generated

This primitive is generated by the MLME when a channel switch request completes. Possible unspecified failure causes include an inability to schedule a channel switch announcement.

10.3.15.2.4 Effect of Receipt

On receipt of this primitive, the SME shall evaluate the ResultCode.

10.3.15.3 MLME-CHANNELSWITCH.indication

10.3.15.3.1 Function

This primitive indicates that a channel switch announcement has been received from a peer entity.

10.3.15.3.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-CHANNELSWITCH.indication (
Peer MAC Address,
Mode,
Channel Number,
Channel Switch Count
)

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.
Mode	Integer	0, 1	Channel switch mode as defined for the Channel Switch Announcement element.
Channel Number	Integer	As defined in clause 17.3.8.3.2	Specifies the new channel number.
Channel Switch Count	Integer	0 – 255	Specifies the number of TBTTs until the channel switch event as described for the Channel Switch Announcement element.

10.3.15.3.3 When Generated

This primitive is generated by the MLME when a valid Channel Switch Announcement is received.

10.3.15.3.4 Effect of Receipt

On receipt of this primitive, the SME shall decide whether to accept the switch.

10.3.15.4 MLME-CHANNELSWITCH.response

10.3.15.4.1 Function

This primitive is used to schedule an accepted channel switch.

10.3.15.4.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-CHANNELSWITCH.response (
Mode,
Channel Number,
Channel Switch Count
)

Name	Type	Valid Range	Description
Mode	Integer	0, 1	Channel switch mode as defined for the Channel Switch Announcement element.
Channel Number	Integer	As defined in clause 17.3.8.3.3	Specifies the new channel number.
Channel Switch Count	Integer	0 – 255	Specifies the number of TBTTs until the channel switch event. as described for the Channel Switch Announcement element.

10.3.15.4.3 When Generated

This primitive is generated by the SME to schedule an accepted channel switch request.

10.3.15.4.4 Effect of Receipt

On receipt of this primitive, the MLME shall schedule the channel switch. The actual channel switch may be achieved at the appropriate time through the MLME-PLME interface using the PLME-SET primitive of the dot11CurrentFrequncy MIB attribute.

10.3.16 TPC Request

This set of primitives supports the adaptation of transmit power between peer entities as described in clause 11.5.4.

10.3.16.1 MLME-TPCADAPT.request

10.3.16.1.1 Function

This primitive supports the adaptation of transmit power between peer entities as specified in clause 11.5.4.

10.3.16.1.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-TPCADAPT.request (
Peer MAC Address,
Dialog Token
)

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 TPC request shall be set.
Dialog Token	Integer	0 – 255	The dialog token to identify the TPC transaction.

10.3.16.1.3 When Generated

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

10.3.16.1.4 Effect of Receipt

On receipt of this primitive, the MLME shall construct a TPC Request frame. This frame shall then be scheduled for transmission.

10.3.16.2 MLME-TPCADAPT.confirm

10.3.16.2.1 Function

This primitive reports the result of the TPC adaption procedure.

10.3.16.2.2 Semantics of the Service Primitive

The primitive parameters are as follows:

MLME-TPCADAPT.confirm (
ResultCode
)

Name	Type	Valid Range	Description
ResultCode	Enumeration	SUCCESS, INVALID PARAMETERS, UNSPECIFIED FAILURE	Reports the outcome of a request to send a TPC Request frame.

10.3.16.2.3 When Generated

This primitive is generated by the MLME when the TPC adaption procedure completes.

10.3.16.2.4 Effect of Receipt

On receipt of this primitive, the SME shall evaluate the ResultCode.

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Insert 11.5- 11.5.4 as follows renumbering figures and tables, as appropriate

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11.5 TPC procedures

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

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

STAs shall use the TPC procedures defined in this clause if dot11SpectrumManagementRequired is true. dot11SpectrumManagementRequired shall be set true when regulatory authorities require TPC. It may also be set true in other circumstances. The TPC procedures provide for the:

- Association of STAs with an AP in a BSS based on the STA's power capability (11.5.1).
- Specification of regulatory and local maximum transmit power levels for the current channel (11.5.2).
- Selection of a transmit power for each transmission in a channel within constraints imposed by regulatory and local requirements (11.5.3).
- Adaptation of transmit power based on a range of information, including path loss and link margin estimates (11.5.4).

For the purposes of TPC:

- A STA with dot11SpectrumManagementRequired set equal to true shall not operate in a BSS or IBSS unless the Spectrum Management bit is set equal to 1 in the Capability Information field in Beacons and Probe Responses received from other STAs in the BSS or IBSS, with the following exception.
- A STA may operate when the Spectrum Management bit is set equal to 0 if the STA can determine that it is in a regulatory domain that does not require TPC, or can ensure that it will meet regulatory requirements even if TPC is not employed. Potential methods for determining the regulatory domain include receiving a country indication in the beacon, user confirmation, or configuration information within the device. Potential methods to ensure regulations are met even if TPC is not employed include using a transmit power that is below the legal maximum (including any mitigation factor).
- A STA shall set dot11SpectrumManagementRequired equal to true before associating with a BSS or IBSS in which the Spectrum Management bit is set equal to 1 in the Capability Information field in Beacons and Probe Responses received from the BSS or IBSS.
- APs may allow association of devices that do not have the Spectrum Management bit set equal to 1 in the Capability Information field in Association and Reassociation Requests received from the STA to account for the existence of legacy devices that do not support TPC but do meet regulatory requirements.

11.5.1 Association based on transmit power capability

A STA shall provide an AP with its minimum and maximum transmit power capability for the current channel when associating or reassociating, using a Power Capability element in Association Request or Reassociation Request frames.

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An AP may use the minimum and maximum transmit power capability of associated STAs as an input into the algorithm used to determine the local transmit power constraint for any BSS it maintains. The specification of the algorithm is beyond the scope of this standard.

An AP may reject an association or reassociation request from a STA if it considers the STA's minimum or maximum transmit power capability is unacceptable. For example, a STA's power capability might be unacceptable if it violates local regulatory constraints or increases the probability of hidden stations by a significant degree. The criteria for accepting or rejecting an association or reassociation on the basis of transmit power capability are beyond the scope of this standard.

11.5.2 Specification of regulatory and local maximum transmit power levels

A STA shall determine a regulatory maximum transmit power for the current channel. The STA shall use the minimum of:

- Any regulatory maximum transmit power received in a Country element from the AP in its BSS or another STA in its IBSS and;
- Any regulatory maximum transmit power for the channel in the current regulatory domain known by the STA from other sources.

A STA shall determine a local maximum transmit power for the current channel. The STA shall use the minimum of:

- Any local maximum transmit power received in the combination of a Country element and a Power Constraint element from the AP in its BSS or another STA in its IBSS and;
- Any local maximum transmit power for the channel regulatory domain known by the STA from other sources.

Any calculation of the local maximum transmit power for the channel shall ensure the mitigation requirements for the channel in the current regulatory domain can be satisfied. The conservative approach is to set the local maximum transmit power level equal to the regulatory maximum transmit power level minus the mitigation requirement. However, it may be possible to satisfy the mitigation requirement using a higher local maximum transmit power level. A lower local maximum transmit power level may be used for other purposes, such as range control or reduction of interference.

The regulatory and local maximum transmit powers may change in an 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 Beacons and Probe Responses 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 Beacons and Probe Responses using the combination of a Country element and a Power Constraint element.

11.5.3 Selection of a transmit power

A STA may select any transmit power for transmissions in a channel within the following constraints:

- A STA shall determine a regulatory maximum transmit power and a local maximum transmit power for a channel in the current regulatory domain before transmitting in the channel.
- An AP shall use a transmit power less than or equal to the regulatory maximum transmit power level for the channel. However, the AP shall also ensure the regulatory mitigation requirement is met.
- A STA that is not an AP shall use a transmit power less than or equal to the local maximum transmit power level for the channel.

11.5.4 Adaptation of the transmit power

A STA may use any criteria, and in particular any path loss and link margin estimates, to dynamically adapt the transmit power for transmissions of an MPDU to another STA. The adaptation methods or criteria are beyond the scope of this standard.

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

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

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11.6 DFS procedures

ERC/DEC/(99)23 requires RLANs operating in the 5GHz band to implement a mechanism to avoid co-channel operation with radar systems and to ensure uniform utilization of available channels. This Standard describes such a mechanism, referred to as Dynamic Frequency Selection (DFS).

This clause describes DFS procedures that may be used to satisfy these and similar future regulatory requirements in Europe. The procedures may also satisfy comparable needs in other regulatory domains and frequency bands and may be useful for other purposes.

STAs shall use the DFS procedures defined in this clause if dot11SpectrumManagementRequired is true. dot11SpectrumManagementRequired shall be set true when regulatory authorities require DFS. It may also be set true in other circumstances. The DFS procedures provide for:

- Association of STAs with an AP in a BSS based on the STAs' supported channels (11.6.1).
- Quieting the current channel so it can be tested for the presence of radar with less interference from other STAs (11.6.2).
- Testing channels for radar before using a channel and while operating in a channel (11.6.3).
- Discontinuing operations after detecting radar in the current channel to avoid further interfering with the radar (11.6.4).
- Detecting radar in the current and other channels based on regulatory requirements (11.6.5).
- Requesting and reporting of measurements in the current and other channels (11.6.6).
- Selecting and advertising a new channel to assist the migration of a BSS or IBSS after radar is detected (11.6.7).

For the purposes of DFS:

- A STA with dot11SpectrumManagementRequired set equal to true shall not operate in a BSS or IBSS unless the Spectrum Management bit is set equal to 1 in the Capability Information field in Beacons and Probe Responses received from other STAs in the BSS or IBSS, with the following exception.
- A STA may operate when the Spectrum Management bit is set equal to 0 if the STA can determine that it is in a regulatory domain that does not require DFS, or can ensure that it will meet regulatory requirements even if DFS is not employed. Potential methods for determining the regulatory domain include receiving a country indication in the beacon, user confirmation, or configuration information within the device. Potential methods to ensure regulations are met even if DFS is not employed include independently detecting radar and ceasing operation on channels on which radar is detected.
- A STA shall set dot11SpectrumManagementRequired equal to true before associating with a BSS or IBSS in which the Spectrum Management bit is set equal to 1 in the Capability Information field in Beacons and Probe Responses received from the BSS or IBSS.
- APs may allow association of devices that do not have the Spectrum Management bit set equal to 1 in the Capability Information field in Association and Reassociation Requests received from a STA to account for the existence of legacy devices that do not support DFS but do meet regulatory requirements.

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11.6.1 Association based on supported channels

A STA shall provide an AP with a list of the channels in which it can operate when associating or reassociating using a Supported Channels element in Association Request or Reassociation Request frames.

An AP may use the supported channels list for associated STAs as an input into an algorithm used to select a new channel for the BSS. The specification of the algorithm is beyond the scope of this standard.

An AP may reject an association or reassociation request from a STA if it considers the STA's supported channel list is unacceptable. For example, a STA's supported channel list might be unacceptable if it can only operate in a limited number of channels. The criteria for accepting or rejecting associations or reassociations are beyond the scope of this standard.

11.6.2 Quieting channels for testing

An AP in a BSS may schedule quiet intervals by transmitting one or more Quiet elements in Beacons and Probe Responses. The AP may stop scheduling quiet intervals or change the value of the Quiet Period field, the Quiet Duration field and the Quiet Offset field in Quiet elements as required. Only the most recently received Beacon or Probe Response defines all future quiet intervals and therefore, quiet intervals based on older Beacons or Probe Responses, shall be discarded.

Only the STA starting an IBSS may specify a schedule of quiet intervals, by transmitting one or more Quiet elements in the first Beacon establishing the IBSS. All STAs in an IBSS shall continue these quiet interval schedules by including appropriate Quiet elements in any transmitted Beacons or Probe Responses.

Multiple independent quiet intervals may be scheduled, to ensure that not all quiet intervals have the same timing relationship to TBTT, by including multiple Quiet elements in Beacon or Probe Responses.

Control of the channel is lost at the start of a quiet interval and the NAV is set by all the STAs in the BSS or IBSS for the length of the quiet interval. Transmission of any MPDU and any associated acknowledgment shall be complete before the start of the quiet interval. If, before starting transmission of an MPDU, there is not enough time remaining to allow the transmission to complete before the quiet interval starts, the STA shall defer the transmission by selecting a random back off time, using the present CW (without advancing to the next value in the series). The short retry counter and long retry counter for the MSDU are not affected.

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11.6.3 Testing channels for radars

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A STA shall not use a channel on which the STA has recorded radars are operating or a channel that has not been tested recently for the presence of radars. A STA shall test for the presence of radars for at least:

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- A contiguous time equal to dot11StartupTestTime before operating in a new channel if the new channel has not been tested for radars for at least dot11StartupTestTime during the last dot11StartupTestValidTime.
- A contiguous time equal to dot11StartupTestTime before operating in a new channel if the channel was previously determined to contain radars during the last dot11StartupTestValidTime.
- dot11OperatingTestTime (where the time is only accumulated during testing) of each dot11OperatingTestCycleTime while operating in a channel. Testing may occur at any time, including during quiet intervals, SIFS periods, collisions or packet reception.

A STA may start operating in a new channel without following the start-up testing procedures described above if:

- The STA moves to the channel as a result of the receipt of a Channel Switch Announcement from another STA in the STA's IBSS or from the AP in the STA's BSS.
- The STA is joining a BSS or IBSS not currently advertising, using Channel Switch Announcement elements, that it is about to move to a new channel.

The default values for the variables related to testing channels for radars are shown in Table 6. However, these variables must be set according to the rules for the current regulatory domain.

Table 6 – Default values for testing channel for radars

Variable	Default value
dot11StartupTestTime	10,000 TUs
dot11StartupTestValidTime	24*60*60*1000 TUs
dot11OperatingTestTime	20 TUs
dot11OperatingTestCycleTime	100 TUs

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11.6.4 Discontinuing operations after detecting radars

If a STA is operating in a channel and detects radars in the channel or accepts that another STA has detected radar in the channel then the STA shall discontinue all transmissions of:

- Data frames within dot11MaxDataOperationsTime.
- Management and Control frames within dot11MaxMoveTime, and the aggregate duration of these frames are to be less than dot11MacManagementOperationsTime.

The default values for the variables related to discontinuing operations after detecting radar are shown in Table 7. However, these variables must be set according to the rules for the current regulatory domain.

Table 7 – Default values for variables related to discontinuing operations

Variable	Default value
dot11MaxDataOperationsTime	200 TUs
dot11MaxManagementOperationsTime	20 TUs
dot11MaxMoveTime	10000 TUs

11.6.5 Detecting radars

The methods to detect radars operating in a channel that satisfy regulatory requirements (see EN301893) are beyond the scope of this standard .

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11.6.6 Requesting and reporting of measurements

A STA may measure one or more channels itself or a STA may request other STAs in the same BSS or IBSS to measure one or more channels on its behalf, either in a quiet interval or during normal operation.

When requesting other STAs to measure one or more channels, a STA shall use a Measurement Request frame containing one or more Measurement Request elements. The measurement request may be sent to an individual or group destination address. Addressing requests to multiple STAs should be used with care to avoid a reply storm.

The measurement requests effectively allowed by these rules are shown in Table 8.

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Table 8 – Allowed measurement requests

Service Set	Source of request	Destination of request	Type of measurement request allowed
BSS	AP	STA	Individual or group
	STA	AP	Individual only
	STA	STA	None
IBSS	STA	STA	Individual or group

A STA that successfully requests another STA to perform a measurement on another channel should not transmit MSDUs or MMPDUs to that STA during the interval defined for the measurement plus any required channel switch intervals. In determining this period, a STA shall assume that any required channel switches take less than dot11ChannelSwitchTime per switch.

A STA that receives a Measurement Request frame from a STA in its BSS or IBSS shall parse the frame's Measurement Request elements in order, with any first measurement starting at the time specified by the Activation Delay field and the Measurement Offset field, in series or parallel as indicated by the Parallel bit in each Measurement Request element. A STA may ignore any group addressed Measurement Request frames.

Any result of a measurement request shall be returned without undue delay to the requesting STA in Measurement Report elements using one or more Measurement Report frames. The result may be the completed measurement or an indication that the STA is refusing or is incapable of completing the measurement request.

An STA shall report it is refusing a measurement request if:

- The STA is capable of undertaking a measurement request and;
- The STA does not want to undertake the measurement request at this time and;
- The measurement request is not mandatory (note: measurements are specified as mandatory or optional in 7.3.2.19)

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An STA shall report it is incapable a measurement request if:

- The STA is incapable of undertaking an optional measurement request or;
- The STA does not support the channel specified in a mandatory measurement request or;
- The STA does not support requested parallel measurements in different channels.

The Measurement Report frames shall contain the same Dialog Token field as the corresponding Measurement Request frame and each Measurement Report element shall contain the same Measurement Token field as the corresponding Measurement Request element.

A STA may autonomously report measurements to another STA in its BSS or IBSS using a Measurement Report frame with a Dialog Token field set equal to 0 containing one or more Measurement Report elements. A STA in an IBSS may also autonomously report measurements to other STAs in the IBSS using the IBSS Basic Reports fields in the IBSS DFS element in a Beacon or Probe Response.

A STA may enable or disable measurement requests or autonomous measurement reports from another STA by transmitting Measurement Request elements with the Enable bit set equal to 1 and Request bit and Report bit set equal to 0 or 1 as appropriate. These elements do not require a corresponding Measurement Report element in a Measurement Report Frame. All measurement requests and reports are enabled by default. An AP may ignore a request to disable a mandatory measurement request. All others requests shall be honored.

11.6.7 Selecting and advertising a new channel

An attempt may be made to move a BSS to a new operating channel. It is an objective that disruption to the BSS is minimized in this process, though it should be recognized that a channel switch might not successfully move all STAs. It should also be stressed that the channel switch process is distinct from the regulatory requirement to cease transmission on a particular channel in the presence of radar.

11.6.7.1 Selecting and advertising a new channel in an Infrastructure BSS

The decision to switch to a new operating channel in an Infrastructure BSS shall only be made by the AP. An AP may make use of the information in Supported Channel elements and the results of measurements undertaken by the AP and other STAs in the BSS to assist the selection of the new channel. The algorithm to choose a new channel is beyond the scope of this standard but shall satisfy applicable regulatory requirements, including uniform spreading rules and channel testing rules. The AP shall attempt to select a new channel that is supported by all associated STAs, though it should be noted that this might not always be possible.

An AP shall inform associated STAs the AP is moving to a new channel and maintain the association by advertising the switch using Channel Switch Announcement elements in Beacon, Probe Response and Channel Switch Announcement frames until the intended channel switch time. The AP may force STAs in the BSS to stop transmissions until the channel switch takes place using the Channel Switch Mode field in the Channel Switch Announcement element. If possible, the channel switch should be scheduled so that all STAs in the BSS, including those in power save mode, have the opportunity to receive at least one Channel Switch Announcement element before the switch. The AP may send the Channel Switch Announcement frame in a BSS without performing a back off, after determining the WM is idle for one PIFS period.

A STA that receives a Channel Switch announcement element may choose not to perform the specified switch but to take alternative action. For example, it may choose to move to a different BSS.

A STA in a BSS that is not the AP shall not transmit the Channel Switch Announcement element.

11.6.7.2 Selecting and advertising a new channel in an IBSS

DFS in an IBSS is complicated by the following:

- There is no central AP function for collating measurements, or coordinating a channel switch. If STAs make independent decisions to move channel in the presence of radar, there is a danger that all STAs will announce a switch to differing channels if several of them detect the radar.
- There is no association protocol that can be used (a) to exchange supported channel information and (b) to determine membership of the IBSS at a given instant for requesting measurements.
- Beaconing is a shared process and therefore it cannot be guaranteed that an STA that has something to send such as a channel switch message will be the next STA to beacon.
- The DFS Owner service, IBSS DFS element and Channel Switch Announcement frame address these issues.
- The DFS Owner service provides a central point of coordination for a channel switch. It attempts to minimize the probability that multiple STAs concurrently decide to switch to different channels. The DFS Owner and DFS Recovery interval fields within the IBSS DFS Element support the DFS Owner service.
- Each STA shall include a Channel Map field within the IBSS DFS elements that it transmits. This communicates the STA supported channel set and basic measurement reports for that STA.
- The ability to send a Channel Switch Announcement element within a management frame other than a beacon, or probe response is essential.

The potential for hidden nodes within an IBSS means that the IBSS channel switch protocol is best effort. All members of an IBSS shall have an individual responsibility to cease transmission on a particular channel in the presence of radar.

A STA at which an IBSS is started shall be a DFS owner in that IBSS. That STA shall include its MAC address in the DFS Owner field of the IBSS DFS Element and DFS Recovery Interval from the MLME.START request parameter. The purpose of the DFS Owner is to coordinate a channel switch when required. All STAs within a spectrum managed IBSS shall have the ability to become DFS Owner.

Each STA in an IBSS shall adopt the DFS Owner and the DFS Owner Recovery Interval from any valid IBSS DFS element when the frame contained a matching SSID and the value of the timestamp is later than the STAs TSF timer. The STA shall include the adopted values within the IBSS DFS elements it transmits. Since all STAs in an IBSS participate in sending beacon frames, this process will always, over a number of beacon intervals, result in a unified view of one DFS Owner throughout the IBSS.

If a STA detects radar and wants to attempt a channel switch using the DFS Owner, the STA shall broadcast one or more Measurement Report frames indicating the presence of the radar.

A DFS Owner receiving a Measurement Report frame indicating the presence of radar in the current channel shall select and advertise a new operating channel (including the possibility of no change). The DFS Owner may make use of information received in Channel Maps and from measurements undertaken by other members of the IBSS to assist the selection of the new channel. The algorithm to choose a new channel is beyond the scope of this standard but shall satisfy any regulatory requirements, including uniform spreading rules and channel testing rules. The DFS Owner shall attempt to select a new channel that is supported by all members of the IBSS. It should be noted that this process might be imperfect in that the DFS Owner may have incomplete knowledge and there may be no suitable channel.

The DFS Owner shall attempt to make the members of the IBSS aware of the new operating channel by broadcasting at least one Channel Switch Announcement frame. The DFS Owner shall also include the Channel Switch Announcement element in all Beacon, Probe Response or Channel Switch Announcement frames until the intended channel switch time. An STA that receives a valid Channel Switch Announcement Element shall repeat this element in all Beacon, Probe Response frames that it transmits. The DFS Owner may attempt to silence STAs in the IBSS until the channel switch takes place using the Channel Switch Mode field in the Channel Switch Announcement element. If possible, the channel switch should be scheduled so that all STAs in the IBSS, including those in power save mode, have the opportunity to receive at least one Channel Switch Announcement element before the switch.

If an STA does not receive a valid Channel Switch Announcement element from the DFS Owner within DFS Recovery Time measured from the end of the frame within which radar notification was first transmitted by the STA or received from another STA then it shall enter a DFS Owner recovery mode. In DFS Owner recovery mode, the STA shall assume the role of DFS Owner, shall select a new operating channel and advertise this by transmitting a Channel Switch Announcement frame using the contention resolution algorithm defined for beacon transmission at TBTT in clause 11.1.2.2. The STA shall also include the Channel Switch Announcement element in all Beacon, and Probe Response frames until the intended channel switch time. A STA that is not the DFS Owner shall not initiate a channel switch.

The STA shall leave DFS Owner recovery mode prior to the channel switch if it receives a valid Channel Switch Announcement element from another member of the IBSS, in which case the STA shall adopt the received channel switch information. If the Channel Switch Announcement element was within a Beacon, or Probe Response, the STA shall also adopt the DFS Owner address from the IBSS DFS element. If the Channel Switch Announcement element was within a Channel Switch Announcement frame, the STA shall adopt the DFS Owner from the TA address of the received frame.

There are several circumstances when DFS Owner recovery is required. For example, if the original DFS Owner has left the network, or when the original measurement report was not received by the initial DFS Owner. It should be noted that DFS Owner recovery might temporarily give rise to more than one DFS Owner within the IBSS. This is mitigated by the random nature of the IBSS DFS recovery mechanism. However, since all STAs in an IBSS participate in sending beacon frames, over a number of beacon periods, there will be convergence from multiple DFS Owners to one DFS Owner.

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17.3.8.3.3 Channelization

Change first two rows and insert a new third row in Table 94 as follows

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Table 94 – Valid operating channel numbers by regulatory domain and band

Regulatory domain	Band (GHz)	Operating channel numbers	Channel center frequencies (MHz)
United States CEPT	U-NII lower band (5.15-5.25)	36 40 44 48	5180 5200 5220 5240
United States CEPT	U-NII middle band (5.25-5.35)	52 56 60 64	5260 5280 5300 5320
CEPT	(5.47-5.725)	100 104 108 112 116 120 124 128 132 136 140	5500 5520 5540 5560 5580 5600 5620 5640 5660 5680 5700

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5,540 MHz¶
5,560 MHz¶
5,580 MHz¶
5,600 MHz¶
5,620 MHz¶
5,640 MHz¶
5,660 MHz¶
5,680 MHz¶
5,700 MHz

Delete the first paragraph after Table 94

Change paragraph after Figure 119

The center frequency is indicated in Figure 123 for the USA frequency channel plan; however, no subcarrier is allocated on the center frequency as described in Figure 121.

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17.3.9.1 Transmit power levels

Change the first paragraph as following

~~The maximum allowable output power according to FCC regulations is shown in Table 95~~. The maximum allowable output power by regulatory domain is shown in Table 95.

Change Table 95 as follows

Table 89 – Transmit power level ~~for the United States~~ by regulatory domain

Frequency band (GHz)	USA (Maximum output power with up to 6dBi antenna gain) (mW)	CEPT (EIRP) (mW)
5.15-5.25 GHz	40 (2.5 mW/MHz)	200 mW
5.25-5.35 GHz	200 (12.5 mW/MHz)	200 mW
5.470-5.725 GHz	-	1 W
5.725-5.825 GHz	800 (50 mW/MHz)	-

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Annex A – PICS

A.4.3 IUT configuration

Item	IUT configuration	References	Status	Support
*CF9	Is Spectrum Management operation supported?	7.3.1.4, 11.6	CF6:O	Yes, No

A.4.11 Spectrum Management extensions

Item	IUT configuration	References	Status	Support
SM1	Country, Power Constraint and TPC Report elements included in Beacon and Probe Response frames	7.2.3.1, 7.2.3.9, 7.3.2.9, 7.3.2.13, 7.3.2.16	CF9: M	Yes, No
SM2	Spectrum Management Capability Bit	7.3.1.4	CF9: M	Yes, No
SM3	Power Capability and Supported Channels elements in Association and Re-association Frames	7.2.3.4, 7.2.3.5	CF9:M	Yes, No
SM4	Action frame protocol for spectrum management actions	7.3.1.11, 7.4	CF9:M	Yes, No
	Measurement Request frame	7.4.1.1	CF9:M	Yes, No
	Measurement Report frame	7.4.1.2	CF9:M	Yes, No
	TPC Request frame	7.4.1.3	CF9:M	Yes, No
	TPC Report frame	7.4.1.4	CF9:M	Yes, No
	Channel Switch Announcement frame	7.4.1.5	CF9:M	Yes, No
SM5	Measurement Requests			
	Basic Request	7.3.2.19.1	CF9:M	Yes, No
	CCA Request	7.3.2.19.2	CF9:O	Yes, No, N/A
	RPI Histogram	7.3.2.19.3	CF9:O	Yes, No, N/A
	Enabling/disabling requests & reports	7.3.2.19	CF9:M	Yes, No
SM6	Measurement Reports			
	Basic Report	7.3.2.20.1	CF9:M	Yes, No
	CCA Report	7.3.2.20.2	CF9:O	Yes, No, N/A
	RPI Histogram Report	7. 3.2.20.3	CF9:O	Yes, No, N/A
	Refusal to measure	7.3.2.20	CF9:M	Yes, No
SM7	Quiet interval			
	AP defined Quiet interval	7.2.3.1, 7.2.3.9, 7.3.2.21, 11.6.2	(CF1 and CF9):M	Yes, No
	STA defined Quiet interval	7.2.3.1, 7.2.3.9, 7.3.2.21,11.6.2	(CF2 and CF9):M	Yes, No
	STA support for Quiet interval	7.2.3.1, 7.2.3.9, 7.3.2.21,11.6.2	CF9:M	Yes, No

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SM8	Association control based on spectrum management capability	11.5, 11.6	(CF1 and CF9):M	Yes, No
SM9	Association control based on transmit power capability	11.5.1	(CF1 and CF9):M	Yes, No
SM10	Maximum Transmit Power Levels			
	AP determination and communication of local maximum transmit power level	11.5.2	(CF1 and CF9):M	Yes, No
	STA determination and communication of local maximum transmit power level	11.5.2	(CF2 and CF9):M	Yes, No
SM11	Selection of transmit power	11.5.3	CF9:M	Yes, No
SM12	Adaptation of transmit power			
	TPC Report in Beacon & Probe Response	11.5.4	CF9:M	Yes, No
	Dynamic transmit power adaptation	11.5.4	CF9:O	Yes, No, N/A
SM13	Testing channels for radars	11.6.3	CF9:M	Yes, No
SM14	Detecting and discontinuing operations after detection of a radar	11.6.4	CF9:M	Yes, No
SM15	Requesting and reporting of measurements	11.6.6	CF9:M	Yes, No
SM16	Autonomous reporting of radars	11.6.6	CF9:M	Yes, No
SM17	IBSS DFS Element including channel map	7.3.2.22	(CF2 and CF9): M	Yes, No
SM18	DFS Owner function	11.6.7	(CF2 and CF9): M	Yes, No
SM19	DFS Owner Recovery procedure	11.6.7	(CF2 and CF9): M	Yes, No
SM20	Channel Switch Procedure			
	Transmission of channel switch announcement and channel switch procedure by an AP	11.6.7	(CF1 and CF9): M	Yes, No
	Transmission of channel switch announcement and channel switch procedure by a STA	11.6.7	(CF2 and CF9): M	Yes, No
	Reception of channel switch announcement and channel switch procedure by a STA	11.6.7	CF9:M	Yes, No
	Association based on supported channels	11.6.1	CF9:M	Yes, No

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Comment: A2: Technical issue spotted by editor: the PICS contained nothing relating to the "shall" in 11.6.1

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Annex D – ASN.1 encoding of the MAC and PHY MIB

In "Major Sections" of Annex D, add the following text to the end of the Station Management attributes

```
dot11SpectrumManagementCapabilityTable ::= {dot11smt 8}
```

In "SMT Station Config Table of Annex D, add the following text to the end of the dot11StationConfigEntry sequence list

```
,
dot11SpectrumManagementImplemented TruthValue,
dot11SpectrumManagementRequired TruthValue
```

Insert the following elements to the end of the dot11StationConfigEntry element definitions behind dot11AuthenticateFailStation

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```
dot11SpectrumManagementImplemented OBJECT-TYPE
   SYNTAX TruthValue
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute, when TRUE, indicates that the station
      implementation is capable of supporting spectrum management. The
      capability is disabled otherwise. The default value of this
      attribute is FALSE."
::= { dot11StationConfigEntry 24 }

dot11SpectrumManagementRequired OBJECT-TYPE
   SYNTAX TruthValue
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "A STA will use the defined TPC and DFS procedures if and only if
      this attribute is TRUE. The default value of this attribute is
      FALSE."
::= { dot11StationConfigEntry 25 }

*********************************************************************
* dot11SpectrumManagement TABLE
*********************************************************************

dot11SpectrumManagementTable OBJECT-TYPE
   SYNTAX SEQUENCE OF dot11SpectrumManagementEntry
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
      "This (conceptual) table of attributes for spectrum management"
::= {dot11smt 8}
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```
Dot11SpectrumManagementEntry OBJECT-TYPE
   SYNTAX Dot11SpectrumManagementEntry
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
      "An entry (conceptual row) in the Spectrum Management Table.
      IfIndex - Each 802.11 interface is represented by an ifEntry.
      Interface tables in this MIB are indexed by ifIndex."
   INDEX {ifIndex, dot11SpectrumManagementIndex}
::= {dot11SpectrumManagementTable 1}

Dot11SpectrumManagementEntry ::=
   SEQUENCE {
   dot11SpectrumManagementIndex Integer32,
   dot11MitigationRequirement Integer32,
   dot11StartupTestTime Integer32,
   dot11StartupTestValidTime Integer32,
   dot11OperatingTestTime Integer32,
   dot11OperatingTestCycleTime Integer32,
   dot11MaxDataOperationsTime Integer32,
   dot11MaxManagementOperationsTime Integer32,
   dot11MaxMoveTime Integer32,
   dot11ChannelSwitchTime Integer32,
   dot11PowerCapabilityMax Integer32,
   dot11PowerCapabilityMin Integer32}

dot11SpectrumManagementIndex OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
      "The auxiliary variable used to identify instances of the columnar
      objects in the Spectrum Management Table."
::= { dot11SpectrumManagementEntry 1}

dot11MitigationRequirement OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the mitigation requirement in dB
      required. The default value of this attribute shall be 3dB."
::= { dot11SpectrumManagementEntry 4}
```

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Deleted: dot11FirstChannelNumber Integer32,¶
dot11NumberofChannels Integer32,¶

Comment: T25

Deleted: dot11FirstChannelNumber OBJECT-TYPE¶
SYNTAX Integer32¶
MAX-ACCESS read-write¶
STATUS current¶
DESCRIPTION¶
"This attribute shall indicate the value of the lowest channel number in the sub-band for the associated domain country string. The default value of this attribute shall be zero."¶
::= { dot11SpectrumManagementEntry 2}¶
dot11NumberofChannels OBJECT-TYPE¶
SYNTAX Integer32¶
MAX-ACCESS read-write¶
STATUS current¶
DESCRIPTION¶
"This attribute shall indicate the value of the total number of channels allowed in the sub-band for the associated domain country string. The default value of this attribute shall be zero."¶
::= { dot11SpectrumManagementEntry 3}¶

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```
dot11StartupTestTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the start up radar test time. The
      unit of this attribute is TUs. The default value of this attribute
      shall be 10*1000 TUs."
::= { dot11SpectrumManagementEntry 5}

dot11StartupTestValidTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the time after the startup test for
      which a "no radar present" result is valid. The unit of this
      attribute is TUs. The default value of this attribute shall be
      24*60*60*1000 TUs."
::= { dot11SpectrumManagementEntry 6}

dot11OperatingTestTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the aggregate time of an operating
      radar test, in TUs, each testing cycle. The unit of this attribute
      is TUs. The default value of this attribute shall be 20 TUs."
::= { dot11SpectrumManagementEntry 7}

dot11OperatingTestCycleTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the cycle time for an operating
      radar test, in TUs. The unit of this attribute is TUs. The default
      value of this attribute shall be 100 TUs."
::= { dot11SpectrumManagementEntry 8}
```

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```
dot11MaxDataOperationsTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the maximum time a STA may transmit
      MPDUs in a channel after detecting a radar in the channel. The unit
      of this attribute is TUs. The default value of this attribute shall
      be 200 TUs."
::= { dot11SpectrumManagementEntry 9}

dot11MaxManagementOperationsTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the maximum time (only measured
      while transmission is occurring) an STA may transmit MMPDUs in a
      channel after detecting a radar in the channel. The unit of this
      attribute is TUs. The default value of this attribute shall be 20
      TUs."
::= { dot11SpectrumManagementEntry 10}

dot11MaxMoveTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate the maximum time during which an STA
      may transmit MMPDUs in a channel after detecting a radar in the
      channel, subject to the dot11MaxManagementOperationsTime
      restriction. The unit of this attribute is TUs. The default value
      of this attribute shall be 10000 TUs."
::= { dot11SpectrumManagementEntry 11}

dot11ChannelSwitchTime OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read-write
   STATUS current
   DESCRIPTION
      "This attribute shall indicate assumed channel switch time,
      measured in TUs. The unit of this attribute is TUs. The default
      value of this attribute shall be 2 TUs. The minimum value shall be
      1 TU."
::= { dot11SpectrumManagementEntry 12}
```

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dot11PowerCapabilityMax OBJECT-TYPE
-- SYNTAX Integer32 ----------------------------------------------------
   MAX-ACCESS read
   STATUS current
   DESCRIPTION
      "This attribute shall the maximum transmit Power Capability of this
      station. The unit of this attribute is dBm. The default value of
      this attribute shall be 0dBm."
::= { dot11SpectrumManagementEntry 13}

dot11PowerCapabilityMin OBJECT-TYPE
   SYNTAX Integer32
   MAX-ACCESS read
   STATUS current
   DESCRIPTION
      "This attribute shall the minimum transmit Power Capability of this
      station. The unit of this attribute is dBm. The default value of
      this attribute shall be -100dBm."
::= { dot11SpectrumManagementEntry 14}



*********************************************************************
* End of dot11SpectrumManagement TABLE
*********************************************************************
```

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