
**Telecommunications and exchange
between information technology
systems — Requirements for local and
metropolitan area networks —**

**Part 11:
Wireless LAN medium access control
(MAC) and physical layer (PHY)
specifications**

**AMENDMENT 3: Enhancements for very
high throughput to support Chinese
millimeter wave frequency bands
(60 GHz and 45 GHz)**

*Télécommunications et échange entre systèmes informatiques —
Exigences pour les réseaux locaux et métropolitains —*

*Partie 11: Spécifications du contrôle d'accès du milieu sans fil (MAC)
et de la couche physique (PHY)*

*AMENDEMENT 3: Améliorations pour un très haut débit afin de
prendre en charge les bandes de fréquences millimétriques chinoises
(60 GHz et 45 GHz)*



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IEEE Std 802.11aj™-2018

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as amended by IEEE Std 802.11ai™-2016
and IEEE Std 802.11ah™-2016)

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

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

**Amendment 3: Enhancements for Very High
Throughput to Support Chinese Millimeter Wave
Frequency Bands (60 GHz and 45 GHz)**

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of the
IEEE Computer Society**

Approved 15 February 2018

IEEE-SA Standards Board

Abstract: The IEEE 802.11™ directional multi-gigabit (DMG) physical layer (PHY) and the medium access control (MAC) layer are modified by this amendment to IEEE Std 802.11™-2016 to enable operation in the Chinese millimeter wave frequency band around 60 GHz. This amendment also defines modifications to the IEEE 802.11 PHY and MAC layer to enable operation in the Chinese millimeter wave frequency band around 45 GHz.

Keywords: beamforming, CDMG, China directional multi-gigabit, China millimeter-wave multi-gigabit, CMMG, DBC, DCS, dynamic bandwidth control, dynamic channel selection, IEEE 802.11™, IEEE 802.11aj™, opportunistic transmission, spatial sharing

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Introduction

This introduction is not part of IEEE Std 802.11aj-2018, IEEE Standard for Information technology—Local and metropolitan area networks—Specific requirements—Part 11: Wireless LAN MAC and PHY Specifications—Amendment 3: Enhancements for Very High Throughput to Support Chinese Millimeter Wave Frequency Bands (60 GHz and 45 GHz).

The purpose of this amendment is to support operation in the Chinese millimeter wave frequency bands (60 GHz and 45 GHz) to enable multi-Gb/s throughput.

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

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

**Amendment 3: Enhancements for Very High
Throughput to Support Chinese Millimeter Wave
Frequency Bands (60 GHz and 45 GHz)**

(This amendment is based on IEEE Std 802.11™-2016 as amended by IEEE Std 802.11ai™-2016 and IEEE Std 802.11ah™-2016.)

NOTE—The editing instructions contained in this amendment define how to merge the material contained here into the base document and its other amendments to form the new comprehensive standard.

Editing instructions are shown ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using either ~~strike through~~ (to remove old material) or underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make large changes in existing text, subclauses, tables, or figures by removing existing material and replacing it with new material. Editorial notes will not be carried over into future editions because the changes will be incorporated into the base standard.¹

1. Overview

1.3 Supplementary information on purpose

Insert the following item at the end of the dashed list in 1.3:

- Defines the PHY and MAC enhancements to enable operation in the Chinese millimeter wave frequency bands (60 GHz and 45 GHz).

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

3. Definitions, acronyms, and abbreviations

3.2 Definitions specific to IEEE Std 802.11

Insert the following definitions into 3.2 in alphabetical order:

China directional multi-gigabit (CDMG): Pertaining to operation in DMG and where the channel is contained within the Chinese 60 GHz frequency band.

NOTE—The Chinese 60 GHz channel set is defined in Table E-5 in Annex E.

China directional multi-gigabit small band beacon interval (CDMG SBBI): A value, in units of TUs, represents the length of a beacon interval (BI) operating on a 1.08 GHz channel.

China millimeter-wave multi-gigabit (CMMG): Pertaining to operation in a frequency band containing a channel in 42.3 GHz to 47.3 GHz or 47.2 GHz to 48.4 GHz frequency bands.

NOTE—The Chinese 45 GHz channel set is defined in Table E-5 in Annex E.

China millimeter-wave multi-gigabit (CMMG) basic service set (BSS): A BSS in which DMG Beacon frames are transmitted by CMMG stations (STAs).

China millimeter-wave multi-gigabit (CMMG) duplicate physical layer (PHY) protocol data unit (PPDU) format: The data transmission (TXVECTOR parameter CH_BANDWIDTH equal to CBW1080) duplicates the transmission of a 540 MHz signal over every 540 MHz frequency segment.

China millimeter-wave multi-gigabit (CMMG) physical layer (PHY) protocol data unit (PPDU): A Clause 26 PPDU transmitted or received using the Clause 26 physical layer (PHY).

China millimeter-wave multi-gigabit (CMMG) beamformee: A CMMG station (STA) that receives a CMMG physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix and that supports the CMMG transmit beamforming feedback mechanism as described in 10.34a.

China millimeter-wave multi-gigabit (CMMG) beamformer: A CMMG station (STA) that transmits a CMMG physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix.

China millimeter-wave multi-gigabit (CMMG) single medium access control (MAC) protocol data unit (CMMG single MPDU): An MPDU that is the only MPDU in an aggregate MPDU (A-MPDU) carried in a CMMG physical layer (PHY) protocol data unit (PPDU) and that is carried in an A-MPDU subframe with the EOF subfield of the MPDU delimiter field equal to 1.

synchronizing access point (AP) or personal basic service set (PBSS) control point (PCP): A CDMG AP or PCP that is operating on a 1.08 GHz channel but still transmitting its DMG Beacon frames on the relevant 2.16 GHz channel with the AP or PCP Role subfield of the Dynamic Bandwidth Control element (9.4.2.218) set to 0 and providing synchronization service to a synchronized AP or PCP on the relevant 2.16 GHz channel.

synchronized access point (AP) or personal basic service set (PBSS) control point (PCP): A CDMG AP or PCP that is operating on a 1.08 GHz channel but still transmitting its DMG Beacon frames on the relevant 2.16 GHz channel with the AP or PCP Role subfield of the Dynamic Bandwidth Control element (9.4.2.218) set to 1 and synchronizing with the synchronizing AP or PCP on the relevant 2.16 GHz channel.

3.4 Abbreviations and acronyms

Insert the following abbreviations into 3.4 in alphabetical order:

CEF	channel estimation field
CDMG	China directional multi-gigabit
DBC	dynamic bandwidth control
DCS	dynamic channel selection
OCEF	OFDM channel estimation field
CMMG	China millimeter-wave multi-gigabit
SBBI	small band beacon interval
SCEF	single carrier channel estimation field
OSTF	OFDM short training field
ZCZ	zero correlation zone

4. General description

4.3 Components of the IEEE 802.11 architecture

Insert the following subclauses, 4.3.25 and 4.3.26, after 4.3.24:

4.3.25 CDMG STA

The IEEE 802.11 CDMG STA is a DMG STA that supports CDMG operation in Chinese 60 GHz frequency band when `dot11CDMGOptionImplemented` is true. In addition to CDMG features, a CDMG STA supports DMG features as described in 4.3.21. A CDMG STA also supports CDMG features as identified in Clause 10, Clause 11, and Clause 24. A CDMG STA supports transmission and reception of frames that are compliant with PHY specifications as defined in Clause 24. A CDMG STA is also a QoS STA. The basic channel access of a CDMG STA (see 10.36 and 10.60) allows it to operate in an Infrastructure BSS or in an IBSS or in a PBSS.

Besides supporting DMG PHY features defined in Clause 20, a CDMG STA also supports the PHY signaling as described in 24.4, 24.5, and 24.6. At a minimum, a CDMG STA supports the mandatory modulation and coding scheme (MCS) and PHY protocol data unit (PPDU) formats described in 24.4 and 24.5.

4.3.26 CMMG STA

The IEEE 802.11 CMMG STA operates in 42.3 GHz to 47.3 GHz or 47.2 GHz to 48.4 GHz frequency bands.

The main PHY features in a CMMG STA are the following:

- 540 MHz channel width
- Control mode and SC mode (directional transmit and receive)
- Single spatial stream MCS 0 (control mode transmit and receive) in all supported channel widths
- Single spatial stream MCSs 1 to 3 (SC mode transmit and receive) in all supported channel widths
- LDPC coding with length 672
- Normal guard interval as defined in Table 25-3
- Optional support for 1080 MHz channel width
- Optional support for CMMG MCSs 4 to 8 (SC mode transmit and receive)
- Optional support for CMMG MCSs 9 to 16 (OFDM mode transmit and receive)
- Optional support for short guard interval (transmit and receive)
- Optional support for LDPC coding with length 2016
- Optional support MIMO transmission (SC mode and OFDM mode transmit and receive)
- Optional support for STBC (transmit and receive)
- Optional support for transmit beamforming sounding (by sending a CMMG NDP)
- Optional support for responding to transmit beamforming sounding

The CMMG STA provides PHY and MAC features that can support a throughput of 1 Gb/s and greater, as measured at the MAC data service access point (SAP). A CMMG STA supports CMMG features as identified in Clause 10, Clause 11, and Clause 25. A CMMG STA operates in a CMMG BSS and supports transmission and reception of frames that are compliant with PHY specifications as defined in Clause 25. A CMMG STA is also a QoS STA. The basic channel access of a CMMG STA (see 10.36) allows it to operate in an Infrastructure BSS, in an IBSS, or in a PBSS. Certain CMMG features such as service period allocation are available only to CMMG STAs that are associated with an AP or with a PCP, while other

CMMG features such as EDCA operation in a PBSS do not require association. A CMMG STA supports beamforming (BF) as described in 10.38 and 20.10 and GCM encryption as described in 12.5.5.

A CMMG STA supports the PHY signaling as described in 25.4, 25.5, and 25.6. At a minimum, a CMMG STA supports the mandatory modulation and coding scheme (MCS) and PHY protocol data unit (PPDU) formats described in 25.4 and 25.5. A CMMG STA has PHY features that include a low-density parity check (LDPC) encoding, a preamble making use of zero correlation zone (ZCZ) sequences, and beamforming. The PPDU's are always transmitted with the same channel spacing as described in Annex E.

A CMMG STA supports MAC features that provide channel access in an environment in which transmissions use a directional antenna pattern or use multiple input multiple output antenna pattern. A CMMG STA has MAC features that include frame aggregation, block ack features, service periods, contention based access periods, CMMG protected period, AP or PCP clustering, dynamic channel time management, reverse direction, spatial sharing, beamforming, and fast session transfer in a multi-band device. A CMMG STA is not a mesh STA. A CMMG STA follows the same channel access rules irrespective of the type of BSS in which it operates.

6. Layer management

6.3 MLME SAP interface

6.3.3 Scan

6.3.3.3 MLME-SCAN.confirm

6.3.3.3.2 Semantics of the service primitive

Insert the following rows at the end of the untitled table describing BSSDescriptions in 6.3.3.3.2:

Name	Type	Valid range	Description	IBSS adoption
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.	Do not adopt.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.	Do not adopt.
CMMG Operation	CMMG Operation element	As defined in 9.4.2.228.	Specifies the parameters within the CMMG Operation element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.	Do not adopt.

6.3.7 Associate

6.3.7.2 MLME-ASSOCIATE.request

6.3.7.2.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.7.2.2:

```
MLME-ASSOCIATE.request(
    ...
    CDMG Capabilities,
    CMMG Capabilities,
    VendorSpecificInfo
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.7.2.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.7.3 MLME-ASSOCIATE.confirm

6.3.7.3.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.7.3.2:

The primitive parameters are as follows:

```
MLME-ASSOCIATE.confirm(
    ...
    CDMG Capabilities,
    CMMG Capabilities,
    VendorSpecificInfo
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.7.3.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.7.4 MLME-ASSOCIATE.indication

6.3.7.4.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.7.4.2:

The primitive parameters are as follows:

MLME-ASSOCIATE.indication(

...
CDMG Capabilities,
CMMG Capabilities,
VendorSpecificInfo
)

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.7.4.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.7.5 MLME-ASSOCIATE.response

6.3.7.5.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.7.5.2:

The primitive parameters are as follows:

MLME-ASSOCIATE.response(
 ...
CDMG Capabilities,
CMMG Capabilities,
VendorSpecificInfo
)

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.7.5.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.8 Reassociate

6.3.8.2 MLME-REASSOCIATE.request

6.3.8.2.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.8.2.2:

The primitive parameters are as follows:

```
MLME-REASSOCIATE.request(  
    ...  
    CDMG Capabilities,  
    CMMG Capabilities,  
    VendorSpecificInfo  
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.8.2.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.8.3 MLME-REASSOCIATE.confirm

6.3.8.3.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.8.3.2:

The primitive parameters are as follows:

```
MLME-REASSOCIATE.confirm(  
    ...  
    CDMG Capabilities,  
    CMMG Capabilities,  
    VendorSpecificInfo  
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.8.3.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.8.4 MLME-REASSOCIATE.indication

6.3.8.4.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.8.4.2:

The primitive parameters are as follows:

```
MLME-REASSOCIATE.indication(
    ...
    CDMG Capabilities,
    CMMG Capabilities,
    VendorSpecificInfo
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.8.4.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.8.5 MLME-REASSOCIATE.response

6.3.8.5.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.8.5.2:

The primitive parameters are as follows:

```
MLME-REASSOCIATE.response(  
    ...  
    CDMG Capabilities,  
    CMMG Capabilities,  
    VendorSpecificInfo  
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.8.5.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true; otherwise not present.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.11 Start

6.3.11.2 MLME-START.request

6.3.11.2.2 Semantics of the service primitive

Insert the following parameters in the primitive parameters list in 6.3.11.2.2:

The primitive parameters are as follows:

```
MLME-START.request(  
    ...  
    CDMG Capabilities,  
    CMMG Capabilities,  
    CMMG Operation,  
    VendorSpecificInfo  
)
```

Insert the following rows before the VendorSpecificInfo row in the untitled table in 6.3.11.2.2:

Name	Type	Valid range	Description
CDMG Capabilities	CDMG Capabilities element	As defined in 9.4.2.217.	Specifies the parameters within the CDMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CDMGOptionImplemented is true.
CMMG Capabilities	CMMG Capabilities element	As defined in 9.4.2.227.	Specifies the parameters within the CMMG Capabilities element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true and is absent otherwise.
CMMG Operation	CMMG Operation element	As defined in 9.4.2.228.	Specifies the parameters within the CMMG Operation element that are supported by the MAC entity. The parameter is present if dot11CMMGOptionImplemented is true; otherwise not present.

6.3.11.2.4 Effect of receipt

Insert the following paragraph before the last paragraph of 6.3.11.2.4:

If the MLME of a CMMG STA receives an MLME-START.request primitive with a Basic CMMG MCS and NSS Set field in the CMMG Operation parameter containing any unsupported <CMMG MCS, NSS> tuple, the MLME response in the resulting MLME-START.confirm primitive contains a ResultCode parameter that is not set to the value SUCCESS.

6.3.26 TS management interface

6.3.26.1 General

Change Table 6-1 as follows:

Table 6-1—Supported TS management primitives

Primitive	Request	Confirm	Indication	Response
ADDTS (in the context of establishing a TS)	DMG STA <u>CMMG STA</u> non-AP QoS STA	DMG STA <u>CMMG STA</u> non-AP QoS STA	DMG STA <u>CMMG STA</u> HC	DMG STA <u>CMMG STA</u> HC
ADDTS (in the context of requesting an allocation)	Non-AP and non-PCP DMG STA <u>CMMG STA</u>	Non-AP and non-PCP DMG STA <u>CMMG STA</u>	DMG AP or PCP <u>CMMG AP or PCP</u>	DMG AP or PCP <u>CMMG AP or PCP</u>
DELTS	DMG STA <u>CMMG STA</u> non-AP QoS STA HC	DMG STA <u>CMMG STA</u> non-AP QoS STA HC	DMG STA <u>CMMG STA</u> non-AP QoS STA HC	—
ADDTSRESERVE	HC	HC	non-AP QoS STA	non-AP QoS STA

6.3.26.2 MLME-ADDTS.request

6.3.26.2.2 Semantics of the service primitive

Change the primitive parameter list in 6.3.26.2.2 as follows:

The primitive parameters are as follows:

```
MLME-ADDTS.request (
    DialogToken,
    TSPEC,
    TCLAS,
    TCLASProcessing,
    U-APSD Coexistence,
    EBR,
    IntraAccessCategoryPriority,
    HigherLayerStreamID,
    STAAddress,
    DMG TSPEC,
    CMMG TSPEC,
    Multi-band,
    U-PID,
    MMS,
    VendorSpecificInfo
)
```

Insert the following row after the 'DMG TSPEC' row in the untitled table in 6.3.26.2.2:

Name	Type	Valid range	Description
CMMG TSPEC	CMMG TSPEC element	As defined in 9.4.2.134a.	Specifies the characteristics and QoS scheduling requirements of the CMMG allocation request.

6.3.26.3 MLME-ADDTS.confirm

6.3.26.3.2 Semantics of the service primitive

Change the primitive parameter list in 6.3.26.3.2 as follows:

The primitive parameters are as follows:

```
MLME-ADDTS.confirm(
    ResultCode,
    DialogToken,
    TSDelay,
    TSPEC,
    Schedule,
    TCLAS,
    TCLASProcessing,
    EBR,
    HigherLayerStreamID,
    STAAddress,
    DMG TSPEC,
```

CMMG TSPEC,
 Multi-band,
 U-PID,
 MMS,
 VendorSpecificInfo
)

Insert the following rows after the ‘DMG TSPEC’ row in the untitled table in 6.3.26.3.2:

Name	Type	Valid range	Description
CMMG TSPEC	CMMG TSPEC element	As defined in 9.4.2.228.	Specifies the characteristics and QoS scheduling requirements of the CMMG allocation request.

Change the first two paragraphs after the untitled table in 6.3.26.3.2 as follows:

For the ResultCode value of SUCCESS received by a non-DMG STA or a non-CMMG STA, the TSPEC and the optional TCLAS parameters describe the characteristics of the TS that has been created (or modified); and the specified (nonzero) parameters [with the exception of Service Start Time, Medium Time, and any possibly unspecified minimum set of parameters (see 10.22.4.3) in the TSPEC element in an ADDTS Request frame] exactly match those of the matching MLME-ADDTS.request primitive.

For other values of ResultCode received by a non-DMG STA or a non-CMMG STA, no new TS has been created. In the case of REJECTED_WITH_SUGGESTED_CHANGES, the TSPEC represents an alternative proposal by the HC based on information about the current status of the MAC entity. In the case of REJECTED_HOME_WITH_SUGGESTED_CHANGES, the TSPEC represents an alternative proposal by the HC based on information received from the SSPN interface. A TS is not created with this definition. If the suggested changes are acceptable to the STA, it is the responsibility of the STA to set up the TS with the suggested changes.

6.3.26.3.3 When generated

Change the second paragraph of 6.3.26.3.3 as follows:

This primitive is generated when that MLME-ADDTS.request primitive is found to contain invalid parameters, when a timeout occurs, or when the STA receives a response in the form of an ADDTS Response frame in the corresponding QoS Action frame from the HC, ~~or~~ DMG STA, or CMMG STA.

6.3.26.4 MLME-ADDTS.indication

6.3.26.4.1 Function

Change 6.3.26.4.1 as follows:

This primitive reports to the DMG STA’s SME, CMMG STA’s SME, or HC’s SME the request for adding (or modifying) a TS.

6.3.26.4.2 Semantics of the service primitive

Change the primitive parameter list in 6.3.26.4.2 as follows:

```
MLME-ADDTS.indication (
    DialogToken,
    STAAddress,
    TSPEC,
    TCLAS,
    TCLASProcessing,
    U-APSD Coexistence,
    EBR,
    IntraAccessCategoryPriority,
    HigherLayerStreamID,
    DMG TSPEC,
    CMMG TSPEC,
    Multi-band,
    U-PID,
    MMS,
    VendorSpecificInfo
)
```

Insert the following row after the 'DMG TSPEC' row in the untitled table in 6.3.26.4.2:

Name	Type	Valid range	Description
CMMG TSPEC	CMMG TSPEC element	As defined in 9.4.2.134a.	Specifies the characteristics and QoS (scheduling) requirements of the CMMG allocation request.

6.3.26.5 MLME-ADDTS.response

6.3.26.5.2 Semantics of the service primitive

Change the primitive parameter list in 6.3.26.5.2 as follows:

The primitive parameters are as follows:

```
MLME-ADDTS.response (
    ResultCode,
    DialogToken,
    STAAddress,
    TSDelay,
    TSPEC,
    Schedule,
    TCLAS,
    TCLASProcessing,
    U-APSD Coexistence,
    EBR,
    HigherLayerStreamID,
    DMG TSPEC,
    CMMG TSPEC,
    Multi-band,
```

U-PID,
 MMS,
 VendorSpecificInfo
)

Insert the following row after the 'DMG TSPEC' row in the untitled table in 6.3.26.5.2:

Name	Type	Valid range	Description
CMMG TSPEC	CMMG TSPEC element	As defined in 9.4.2.134a.	Specifies the characteristics and QoS (scheduling) requirements of the CMMG allocation request.

Insert the following subclause, 6.3.118, after 6.3.117.5.4:

6.3.118 DCS procedure

6.3.118.1 General

This subclause describes the management procedures associated with the dynamic channel selection mechanism.

6.3.118.2 MLME-DCSMEASUREMENT.request

6.3.118.2.1 Function

This primitive requests transmission of a DCS Measurement Request frame to the DCS responder AP or PCP with which to perform the DCS procedure.

6.3.118.2.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-DCSMEASUREMENT.request (
 DCSResponderAddress,
 DCSMeasurementRequest
)

Name	Type	Valid range	Description
DCSResponderAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP to which the DCS Measurement Request frame is transmitted.
DCSMeasurementRequest	DCS Measurement Request Action field	As defined in 9.6.8.37.	Specifies the parameters of the DCS measurement request.

6.3.118.2.3 When generated

This primitive is generated by the SME to request that a DCS Measurement Request frame be sent to the DCS responder AP or PCP with which to perform the DCS procedure.

On receipt of this primitive, the MLME indicates the MAC sublayer to construct and attempt to transmit a DCS Measurement Request frame.

6.3.118.3.1 Function

This primitive indicates that a DCS Measurement Request frame is received.

The primitive parameters are as follows:

```

MLME-DCSMEASUREMENT.indication (
    DCSRequesterAddress,
    DCSMeasurementRequest
)

```

Name	Type	Valid range	Description
DCSRequesterAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP from which the DCS Measurement Request frame is received.
DCSMeasurementRequest	DCS Measurement Request Action field	As defined in 9.6.8.37.	Specifies the parameters of the DCS measurement request.

6.3.118.3.3 When generated

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

6.3.118.3.4 Effect on receipt

Once the SME receives this primitive, the STA operates according to the procedure defined in 11.49.

6.3.118.4 MLME-DCSMEASUREMENT.response

6.3.118.4.1 Function

This primitive requests transmission of a DCS Measurement Report frame to the DCS requester AP or PCP with which to perform the DCS procedure.

6.3.118.4.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-DCSMEASUREMENT.response (
    DCSRequesterAddress,
    DCSMeasurementReport
)
```

Name	Type	Valid range	Description
DCSRequesterAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP to which the DCS Measurement Report frame is transmitted.
DCSMeasurementReport	DCS Measurement Report Action field	As defined in 9.6.8.40.	Specifies the parameters of the DCS measurement response.

6.3.118.4.3 When generated

This primitive is generated by the SME to request that a DCS Measurement Report frame be sent to the DCS requester AP or PCP with which to perform the DCS procedure.

6.3.118.4.4 Effect on receipt

On receipt of this primitive, the MLME indicates the MAC sublayer to construct and attempt to transmit a DCS Measurement Report frame.

6.3.118.5 MLME-DCSMEASUREMENT.confirm

6.3.118.5.1 Function

This primitive indicates that a DCS Measurement Report frame was received.

6.3.118.5.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-DCSMEASUREMENT.confirm (
 DCSResponderAddress,
 DCSMeasurementReport
)

Name	Type	Valid range	Description
DCSResponderAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP from which the DCS Measurement Report frame was received.
DCSMeasurementReport	DCS Measurement Report Action field	As defined in 9.6.8.40.	Specifies the parameters of the DCS measurement response.

6.3.118.5.3 When generated

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

6.3.118.5.4 Effect on receipt

Once the SME receives this primitive, the STA operates according to the procedure defined in 11.49.

6.3.118.6 MLME-DCS.request

6.3.118.6.1 Function

This primitive requests transmission of a DCS Request frame to the DCS responder AP or PCP with which to perform the DCS procedure.

6.3.118.6.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-DCS.request (
    DCSResponderAddress,
    DCSRequest
)
```

Name	Type	Valid range	Description
DCSResponderAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP to which the DCS Request frame is transmitted.
DCSRequest	DCS Request Action field	As defined in 9.6.8.39.	Specifies the parameters of the DCS request.

6.3.118.6.3 When generated

This primitive is generated by the SME to request that a DCS Request frame be sent to the DCS responder AP or PCP with which to perform the DCS procedure.

6.3.118.6.4 Effect on receipt

On receipt of this primitive, the MLME indicates the MAC sublayer to construct and attempt to transmit a DCS Request frame.

6.3.118.7 MLME-DCS.indication

6.3.118.7.1 Function

This primitive indicates that a DCS Request frame is received.

6.3.118.7.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-DCS.indication (
    DCSRequesterAddress,
    DCSRequest
)
```

Name	Type	Valid range	Description
DCSRequesterAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP from which the DCS Request frame is received.
DCSRequest	DCS Request Action field	As defined in 9.6.8.39.	Specifies the parameters of the DCS request.

6.3.118.7.3 When generated

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

6.3.118.7.4 Effect on receipt

Once the SME receives this primitive, the STA operates according to the procedure defined in 11.49.

6.3.118.8 MLME-DCS.response

6.3.118.8.1 Function

This primitive requests transmission of a DCS Response frame to the DCS requester AP or PCP with which to perform the DCS procedure.

6.3.118.8.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-DCS. Response (
 DCSRequesterAddress,
 DCSResponse
)

Name	Type	Valid range	Description
DCSRequesterAddress	MAC Address	Any valid individual MAC address.	Specifies the MAC address of the AP or PCP to which the DCS Measurement Report frame is transmitted.
DCS Response	DCS Response Action field	As defined in 9.6.8.40.	Specifies the parameters of the DCS response.

6.3.118.8.3 When generated

This primitive is generated by the SME to provide the results of a DCS request.

6.3.118.8.4 Effect on receipt

On receipt of this primitive, the MLME indicates the MAC layer to construct and attempt to transmit a DCS Response frame.