IEEE P802.11
Wireless LANs

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| Draft Specification Text for MAC Service Update |
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Abstract

This document contains draft text to update the 802.11 MAC service interface to provide access to additional facilities needed by higher layers when using the MAC and PHY facilities provided by TGbd. These updates also provide a better match between IEEE 802.11 and IEEE 1609.

**Changes to clause 5.2.3.2**

The parameters of the primitive are as follows:

MA-UNITDATA.request(

source address,

destination address,

routing information,

data,

priority,

service class,

station vector,(11ak)

MSDU format(11ak),

 radio environment request vector

)

The source address (SA) parameter specifies an individual MAC sublayer address of the sublayer entity from which the MSDU is being transferred.

The destination address (DA) parameter specifies either an individual or a group MAC sublayer entity address.

The routing information parameter specifies the route for the data transfer (a null value indicates source routing is not to be used). For IEEE Std 802.11, the routing information parameter shall be null.

The data parameter specifies the MSDU to be transmitted by the MAC sublayer entity. The length of the MSDU shall be less than or equal to the value shown in Table 9-25 (Maximum data unit sizes (in octets) and durations (in microseconds)).

The priority parameter specifies the requested priority of the data unit transfer. The allowed values of priority are described in 5.1.1.3 (Interpretation of priority parameter in MAC service primitives).

(11ak)NOTE—For a GLK STA, the bridge port provides the priority. That priority might have been derived from a priority tag in the frame arriving on another port of the bridge or from the configuration of that port if the frame arrived there untagged.

The service class parameter specifies the requested service class of the data unit transfer. The allowed values of service class are described in 5.1.1.4 (Interpretation of service class parameter in MAC service primitives in a STA) and 5.1.3 (MSDU ordering).

(11ak)The station vector parameter is a set of service\_access\_point\_identifiers (see 5.2.2 (GLK MAC data service specification(11ak))) and is not null when dot11GLKImplemented is true and is null or not present otherwise. It indicates the set of virtual point-to-point LANs for these data transfers, which are mapped to the set of general links over which the MSDU is transferred.

(11ak)The MSDU format parameter indicates whether the supplied MSDU is in EPD or LPD format.

The radio environment request vector contains information that allows higher layer entities to control the format, encoding, and MPDU handling for TGbd transmission. This parameter shall be present when dot11NVGActivated is TRUE and absent otherwise.

**Changes to clause 5.2.4.2**

The parameters of the primitive are as follows:

MA-UNITDATA.indication(

source address,

destination address,

routing information,

data,

reception status,

priority,

service class,

station vector,(11ak)

MSDU format(11ak),

 radio environment status vector

)

The SA parameter is an individual address as specified by the SA field of the incoming frame.

The DA parameter is either an individual or a group address as specified by the DA field of the incoming frame.

The routing information parameter specifies the route that was used for the data transfer. The MAC sublayer entity shall set this field to null.

The data parameter specifies the MSDU as received by the local MAC entity.

The reception status parameter indicates the success or failure of the received frame. The MAC always reports “success” because all failures of reception are discarded without generating MA-UNITDATA.indication primitive.

The priority parameter specifies the receive processing priority that was used for the data unit transfer. The allowed values of priority are described in 5.1.1.3 (Interpretation of priority parameter in MAC service primitives).

The service class parameter specifies the receive service class that was used for the data unit transfer. The allowed values of service class are described in 5.1.1.4 (Interpretation of service class parameter in MAC service primitives in a STA) and 5.1.3 (MSDU ordering).

(11ak)The station vector parameter is a set of service\_access\_point\_identifiers (see 5.2.2 (GLK MAC data service specification(11ak))) and is not null when dot11GLKImplemented is true. It indicates only the single virtual point-to-point LAN for this data transfer, which is mapped from the general link over which the MSDU was received.

(11ak)The MSDU format parameter indicates if the received MSDU is in EPD or LPD format.

The radio environment status vector provides information to higher layer entities about the current radio environment and the most recent TGbd reception. This parameter shall be present when dot11NGVActivated is TRUE and absent otherwise.

**Changes to clause 5.2.5.2**

The parameters of the primitive are as follows:

MA-UNITDATA-STATUS.indication(

source address,

destination address,

transmission status,

provided priority,

provided service class,

 radio environment status vector

)

The SA parameter is an individual MAC sublayer entity address as specified in the associated MA-UNITDATA.request primitive.

The DA parameter is either an individual or group MAC sublayer entity address as specified in the associated MA-UNITDATA.request primitive.

The transmission status parameter is used to pass status information back to the local requesting LLC sublayer entity or bridge port(11ak). IEEE Std 802.11 specifies the following values for transmission status:

* Successful.
* Undeliverable (excessive data length).
* Undeliverable (non-null source routing).
* Undeliverable: unsupported priority (for priorities other than Contention at a non-QoS STA; or for priorities other than Contention, or an integer in the range 0 to 15 at a QoS STA).(M53)
* Undeliverable: unsupported service class (for service classes other than ReorderableGroupAddressed (#66)for non-QoS STAs and service classes other than QoSAck or QoSNoAck for QoS STAs).
* Unavailable priority (for (M53)an integer in the range 1 to 15 at a STA that is associated in a non-QoS BSS, or an integer in the range 8 to 15 at an IBSS STA(#2488), in which case the MSDU is transmitted with a provided priority of Contention).
* Undeliverable: unavailable service class(#66).
* Undeliverable (no BSS available).
* Undeliverable (cannot encrypt with a null key).
* In a STA in which dot11RejectUnadmittedTraffic is true, Undeliverable: unadmitted traffic (for a requested priority in the range 0 to 7 because there is no admitted TS for this priority and admission control is required for the AC).
* In an AP in which dot11SSPNInterfaceActivated is true, Undeliverable (violation of limit specified by dot11NonAPStationMaxAuthVoiceRate in the dot11InterworkingTable for the non-AP STA identified by the destination address of the MA-UNITDATA.request primitive).
* In an AP in which dot11SSPNInterfaceActivated is true, Undeliverable (violation of limit specified by dot11NonAPStationMaxAuthVideoRate in the dot11InterworkingTable for the non-AP STA identified by the destination address of the MA-UNITDATA.request primitive).
* In an AP in which dot11SSPNInterfaceActivated is true, Undeliverable (violation of limit specified by dot11NonAPStationMaxAuthBestEffortRate in the dot11InterworkingTable for the non-AP STA identified by the destination address of the MA-UNITDATA.request primitive).
* In an AP in which dot11SSPNInterfaceActivated is true, Undeliverable (violation of limit specified by dot11NonAPStationAuthMaxBackgroundRate in the dot11InterworkingTable for the non-AP STA identified by the destination address of the MA-UNITDATA.request primitive).
* In an AP in which dot11SSPNInterfaceActivated is true, Undeliverable (violation of limit specified by dot11NonAPStationAuthMaxHCCAHEMMRate in the dot11InterworkingTable for the non-AP STA identified by the destination address of the MA-UNITDATA.request primitive).

If the transmission status parameter is Successful, the provided priority parameter specifies the priority used for the associated data unit transfer (Contention (M53)or an integer in the range 0 to 15); otherwise the provided priority parameter is not present.

If the transmission status parameter is Successful, the provided service class parameter specifies the class of service for the associated data unit transfer; otherwise the provided service class parameter is not present. In non-QoS STAs, the value of this parameter is ReorderableGroupAddressed(#66). In QoS STAs, it is QoSAck or QoSNoAck.

The radio environment status vector provides information to higher layer entities about the current radio environment and the most recent TGbd reception. This parameter shall be present when dot11NGVActivated is TRUE and absent otherwise.

**Insert the following, new subclauses at the end of clause 5**

**5.3 Radio Environment Vectors**

The radio environment vectors allow higher layer entities to provide control information to and receive status information from the MAC sublayer entity appropriate for communication within a rapidly changing radio environment.

**5.3.1 Radio Environment Request Vector**

The radio environment request vector contains the following elements pertaining to the transmission of the MPDU associated with the MSDU associated with the request containing the vector:

* MPDU format (legacy/NGV),
* data rate for transmission,
* MPDU coding (LDPC, etc.),
* number of spatial streams,
* permitted aggregation,
* number of repetitions,
* expiry time (milliseconds until the MSDU is discarded if still not transmited),
* frequency band,
* base channel and channel width,
* transmit power level.

A value representing “selection within MAC sublayer” shall exist for each element.

**5.3.2 Radio Environment Status Vector**

The radio environment status vector contains the following elements pertaining to the reception of the MPDU that contained the MSDU associated with the indication containing the vector:

* MPDU format (legacy/NGV),
* data rate of reception,
* MPDU coding (LDPC, etc.),
* was MSDU part of an A-MPDU,
* frequency band,
* base channel and channel width,
* transmit power level.

**Add new subclauses at end of Clause 5:**

5.4 Radio Environment Report

5.4.1 Introduction

The mechanism provides periodic reports on the radio environment for use in rapidly-varying radio environments.

* + - 1. MA-RADIOENVIRONMENT.indication

5.4.1.1.1 Function

This primitive provides status information on the state of the proximate radio environment.

* + - * 1. Semantics of the service primitive

The primitive parameters are as follows:

MA-RADIOENVIRONMENT.indication(

ChannelBusyPercentage,

CapabilityPercentage,

StationCount

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| ChannelBusyPercentage | Integer | 0 – 100 | Indicates the observed channel busy perentage {*insert definition from IEEE 1609*} |
| CapabilityPercentage | Integer | 0 - 100 | Indicates the percentage the stations indicated in StationCount whose transmissions contain indication of NGV (TGbd) capability |
| StationCound | Integer | 0 - <TBD> | Indicates the number of unique individual stations MAC addresses detected during most recent measurement period of ChannelBusyPercentage and CapabilityPercentage |

* + - * 1. When generated

This primitive is generated periodically by the MAC entity every dot11RadioEnvironmentMeasurementPeriod while dot11NGVActivated is TRUE.

**Add new subclauses at end of Clause 6:**

6.3.x MLME-CANCELTX

6.3.x.1 Introduction

This primitive allows an SME to cancel transmission of MSDUs which have been provided to the MAC entity but not yet transmitted.

6.3.x.2 MLME-CANCELTX.request

6.3.x.2.1 Function

Requests cancellation of transmission of queued MSDUs belonging to a specified access category.

6.3.x.2.2 Semantics of the service primitive

The primitive parameters are as follows:

MLME-CANCELTX.request(

AccessCategory

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| AccessCategory | Integer | 0 - 15 | Specifies the access category for which untransmitted MSDUs are to be removed from the transmit queue. |

6.3.x.2.3 When generated

This primitive is generated by the SME when untransmitted MSDUs need to be removed from the transmit queue.

6.3.x.2.4 Effect of receipt

This primitive initiates removal of the untransmitted MSDUs of the specified access category from their transmit queue.

6.3.x.3 MLME-CANCELTX.confirm

6.3.x.3.1 Function

This primitive reports completion of the removal of untransmitted MSDUs from the transmit queue.

6.3.x.3.2 Semantics of the service primitive

The primitive parameter is as follows:

MLME-CANCETX.confirm()

6.3.x.3.3 When generated

This primitive is generated by the MLME to confirm completion of an MLME-CANCELTX.request primitive.

6.3.x.3.4 Effect of receipt

The SME is notified of the completion of the removal of untransmitted MSDUs.

**Placeholder for MLME-ChangeMACAddress.request**

Other Task Groups, scheduled ahead of TGbd also need a mechanism to change the station MAC address. If the mechanism they define is sufficient to meet the needs for which IEEE 1609 uses MLEMX-AddressChange, then nothing further is required. Otherwise, a subclause for this purpose needs to be added at the end of clause 6.