IEEE P802.11
Wireless LANs

|  |
| --- |
| LB266-CR-for-Clause-35.17 |
| Date: 2022-09-11 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Arik Klein | Huawei | Huawei TLV Research Center |  | arik.klein@huawei.com  |
| Michael Montemurro | Huawei | Huawei Ottawa Research Center |  | michael.montemurro@huawei.com |
| Stephen McCann | Huawei | Huawei Ottawa Research Center |  | stephen.mccann@huawei.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes CR for CID 10326, 12695, 12696, 12697 (LB266).

Revisions:

Rev 0: Initial version of the document.

Rev 1: Updating text following offline discussions.

Rev 2: further updates due to offline comments.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbe Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 10326 | Michael Montemurro | 533/40 | 35.17 | It would be good to provide a mode for EPCS that could be applied to a non-EHT, non-ML STA. Furthermore, different EPCS services could be allocated to different STAs, it would be good to provide the support for multiple NSEP services. | Commenter is willing to collaborate on a submission with a set of changes. | **Revised**.**TGbe editor please implement changes as shown in doc 11-22/1671r2 tagged as 10326** |
| 12695 | Arik Klein | 535 | 35.17.2 | There are multiple types of services that could be enabled using EPCS priority access. Some examples of these services could be: emergency voice services, video camera feeds, or real-time sensor feeds.Need to add the establishment of the EPCS Priority access operation per specific service type, including its own unique characteristics | The commenter will provide a contribution on this issue, as pointed in the comment | **Revised****TGbe editor please implement changes as shown in doc 11-22/1671r2 tagged as 12695.** |
| 12696 | Arik Klein | 535 | 35.17.2 | In the case of MLO, when the EPCS priority access is established - it applies for all setup links, though it might not be suitable to be used on all the links.Need to the capability for EPCS priority access to be enabled only on a specific subset of MLD links or alternatively to be prohibited on a specific subset of links. | The commenter will provide a contribution on this issue, as pointed in the comment | **Revised****TGbe editor please implement changes as shown in doc 11-22/1671r2 tagged as 12696.** |
| 12697 | Arik Klein | 535 | 35.17.2 | Need to add an option of unsolicited update of EPCS Parameters concurrently during the service duration, per specific service type, such as: EDCA Parameter set, enabled link set (in case of MLO) etc.(Note: this comments is in conjunction with previous comments on adding EPCS priority access service per specific service type and in case of MLD - also apply it for specific set of enabled /prohibited links) | The commenter will provide a contribution on this issue, as pointed in the comment | **Revised****TGbe editor please implement changes as shown in doc 11-22/1671r2 tagged as 12697.** |

## ***Discussion***

According to 802.11be D2.0, the EPCS priority access is established between AP MLD and its associated non-AP MLD, once authorized. When established, the priority access is applied for all frames exchanged between the AP MLD and the non-AP MLD.

However, from the AP MLD perspective, the management of the EPCS priority access has another level of complexity which has not been addressed:

* Different types of devices (non-AP MLDs) across the WLAN network (e.g. mobile device, security camera, IoT sensor)
* Different services that may need different priory access parameters (such as: Emergency call, video, etc.).
* Same service can be used on different type of devices, but with different priority access parameters per device type (e.g. video on mobile vs. video feeds on security camera).

For that purpose, we define the Service Type which may be seen as a collection of one or more services. Each service type is assigned with a specific set of EDCA Parameters, thus the service type will have the same priority for channel access when applied on different types of devices.
Moreover, the service type will be used to authorize one or more services for a device type by the Service Provider.

The Service Provider may provision a non-AP MLD (i.e. a device type) with more than a single service type. However, it should be clarified that only a single EPCS service type can be established between the non-AP MLD and AP MLD at a time (with single set of EPCS EDCA Parameters)

Due to the fact that service type may include different services from different access categories, we may enable to map different EPCS services to different links (which may be subset of setup links pertain to a particular device (i.e. non-AP MLD)).

Moreover, according to 802.11be D2.0, when EPCS priority access service is established – it applies for all setup links of an MLD, though it might not be suitable to be used on all the setup links per specific device (i.e. non-AP MLD). Thus, we suggest to optionally add a unique TID-To-Link mapping to implement this attribute per specific device, if needed.

In addition, there is a need to add a mechanism to modify the parameters of an existing EPCS priority access during the service. It is suggested to utilize the EPCS Priority Access Enable Response frame in an unsolicited mode for this purpose.

\*\*\* End of Discussion \*\*\*

*TGbe editor: Please note baseline is 11be D2.2 and REVme D1.3*

* + - 1. **MLME-EPCSPRIACCESSENABLE.request**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

* + - * 1. **Function**

This primitive initiates a request to a peer MAC entity to enable EPCS priority access (#10326, #12695) for a specified service type.

* + - * 1. **Semantics of the service primitive**

The primitive parameters are as follows:

MLME-EPCSPRIACCESSENABLE.request(

PeerSTAAddress, Dialog Token,

(#10326, #12695) Service Type,

(#10199)PriorityAccessMultiLink

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MAC address | Any valid individual MAC address | Specifies the address of the peer MAC entity with which the EPCS priority access procedure is performed. |
| Dialog Token | Integer | 0–255 | The dialog token to identify the EPCS priority access procedure. |
| (#10326, #12695) EPCS Service Type | Integer | 0-31 | The Service Type for which the EPCS priority access is established.A value of 0 indicates that the EPCS priority access service is applicable for all services. |
| (#10199)PriorityA ccessMultiLink | Priority Access Multi-Link element | As defined in 9.4.2.312.6 (Priority Access Multi-Link element) | Specifies the EDCA Parameter sets (#12696) and optionally the TID-To-Link mapping used by EPCS priority access for the specified EPCS Service type. (#11793)This parameter is optionally present if the primitive is generated by an AP MLD, and not present otherwise (see 35.16.2.2 (Setup procedures for EPCS priority access)). |

* + - 1. **MLME-EPCSPRIACCESSENABLE.confirm**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

* + - * 1. **Function**

This primitive reports the response to a request to enable EPCS priority access (#10326, #12695) for a specified service type with a peer MAC entity.

* + - * 1. **Semantics of the service primitive**

The primitive parameters are as follows:

MLME-EPCSPRIACCESSENABLE.confirm(

PeerSTAAddress, Dialog Token,

(#10326, #12695) Service Type, Status Code,

(#10199)PriorityAccessMultiLink

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MAC address | Any valid individual MAC address | Specifies the address of the peer MAC entity with which the EPCS priority access procedure is performed. |
| Dialog Token | Integer | 0–255 | The dialog token to identify the EPCS priority access procedure. |
| (#10326, #12695) EPCS Service Type | Integer | 0-31 | The Service Type for which the EPCS priority access is established.A value of 0 indicates that the EPCS priority access service is applicable for all services. |
| Status Code | As defined in frame format | As defined in 9.4.1.9 (Status Code field) | Indicates the status of the request procedure |
| (#10199)PriorityA ccessMultiLink | Priority Access Multi-Link element | As defined in 9.4.2.312.6 (Priority Access Multi-Link element) | Specifies EDCA Parameter sets (#12696) and optionally the TID-To-Link mapping used by EPCS priority access for the specified EPCS Service type. |

* + - 1. **MLME-EPCSPRIACCESSENABLE.indication**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

* + - * 1. **Function**

This primitive indicates that a request to enable EPCS priority access (#10326, #12695) for a specified service type has been received from a peer MAC entity.

* + - * 1. **Semantics of the service primitive**

The primitive parameters are as follows:

MLME-EPCSPRIACCESSENABLE.indication(

PeerSTAAddress, Dialog Token,

(#10326, #12695) Service Type,

(#10199)PriorityAccessMultiLink

)

| **Name** | **Type** | **Valid range** | **Description** |
| --- | --- | --- | --- |
| PeerSTAAddress | MAC address | Any valid individual MAC address | Specifies the address of the peer MAC entity with which the EPCS priority access procedure is performed. |
| Dialog Token | Integer | 0–255 | The dialog token to identify the EPCS priority access procedure. |
| (#10326, #12695) EPCS Service Type | Integer | 0-31 | The Service Type for which the EPCS priority access is established.A value of 0 indicates that the EPCS priority access service is applicable for all services. |
| (#10199)PriorityA ccessMultiLink | Priority Access Multi-Link element | As defined in 9.4.2.312.6 (Priority Access Multi-Link element) | Specifies EDCA Parameter sets (#12696) and optionally the TID-To-Link mapping used by EPCS priority access for the specified EPCS Service type. |

* + - 1. **MLME-EPCSPRIACCESSENABLE.response**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

* + - * 1. **Function**

This primitive is generated by the MLME to send a response to a peer MAC entity that sent a request to ena- ble EPCS priority access (#10326, #12695) for a specified service type.

* + - * 1. **Semantics of the service primitive**

The primitive parameters are as follows:

MLME-EPCSPRIACCESSENABLE.response(

PeerSTAAddress, Dialog Token,

(#10326, #12695) Service Type, Status Code,

(#10199)PriorityAccessMultiLink

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MAC address | Any valid individual MAC address | Specifies the address of the peer MAC entity with which the EPCS priority access procedure is performed. |
| Dialog Token | Integer | 0–255 | The dialog token to identify the EPCS priority access procedure. |
| (#10326, #12695) EPCS Service Type | Integer | 0-31 | The Service Type for which the EPCS priority access is established.A value of 0 indicates that the EPCS priority access service is applicable for all services. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| Status Code | As defined in frame format | As defined in 9.4.1.9 (Status Code field) | Indicates the status of the request procedure |
| (#10199)PriorityA ccessMultiLink | Priority Access Multi-Link element | As defined in 9.4.2.312.6 (Priority Access Multi-Link element) | Specifies EDCA Parameter sets (#12696) and optionally the TID-To-Link mapping used by EPCS priority access for the specified EPCS Service type. (#11793)This parameter is optionally present if the primitive is generated by an AP MLD, and not present otherwise (see 35.16.2.2 (Setup procedures for EPCS priority access)). |

# Management and Extension frame body components

* + 1. **Fields that are not elements**

(#10326, #12695, #12696)

***TGbe editor: Please insert a new subclause after 9.4.1.74, as follows:***

**9.4.1.X EPCS Control field**

The EPCS Control field is defined in [Figure 9-XXX (EPCS Control field format)](#bookmark94)

|  |  |  |
| --- | --- | --- |
|  | B0 B4 | B5 B15 |
|  | EPCS Service Type | Reserved |
| Bits: | 5 | 10 |

**Figure 9-XXX—EPCS Control field format**

The value of the EPCS Service Type subfield indicates a type of the service for which an EPCS priority access is established. The value of EPCS Service Type subfield is set by a higher layer function and is conveyed by an SME using the EPCS priority access MLME primitives define in 6.3.131. The mapping of a one or more services to a service type is beyond the scope of this standard.

The service type is set to a value between 1 and 31. A value of 0 indicates that the EPCS priority access service is applicable for all services.

* + 1. **Elements**
			- 1. **Priority Access Multi-Link element**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

The Priority Access Multi-Link element carries EDCA Parameter sets used by EPCS priority access (see 35.16 (EPCS priority access)).

(#12696) The format of the Presence Bitmap subfield of the Multi-Link Control field in a Priority Access

Multi-Link element is defined in Figure 9-1002aa0 (Presence Bitmap subfield of the Priority Access Multi-Link element format).

|  |  |  |
| --- | --- | --- |
|  | B0 | B1 B11 |
|  | TID-To-Link Mapping Present | Reserved |
| Bits | 1 | 11 |

**Figure 9-1002aa0—Presence Bitmap subfield of the Priority Access Multi-Link element format(#12696)**

(#12696) The TID-To-Link Mapping Present subfield is set to 1 if the TID-To-Link Mapping Control field is present in the Common Info field. Otherwise, it is set to 0.

The format of the Common Info field of the Priority Access Multi-Link element is defined in [Figure 9-](#bookmark177) [1002aa (Common Info field of the Priority Access Multi-Link element format(#10569))](#bookmark177).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Common Info Length | AP MLD MAC Address |  TID-To-Link Mapping Control |  Link Mapping of TID 0 (Optional) | …. |  Link Mapping of TID 7 (Optional) |
| Octets | 1 | 6 |  0 or 1 or 2 |  0 or 2 |  |  0 or 2 |

**Figure 9-1002aa—Common Info field of the Priority Access Multi-Link element format (#10569)(#12696)**

(#10569)The Common Info Length subfield indicates the number of octets in the Common Info field, including one octet for the Common Info Length subfield.

The AP MLD MAC Address subfield specifies the MAC Address of the AP MLD which the AP transmitting the Priority Access Multi-Link element is affiliated with.

(#12696) The TID-To-Link Mapping Control field is defined in 9.4.2.314 (TID-To-Link Mapping element).

It is present in case that a different TID-To-Link mapping is applied for the EPCS priority access service type defined in the EPCS Control field carried in the EPCS Priority Access Enable Request frame or EPCS Priority Access Response frame.

Otherwise – it is not present.

(#12696) The Link Mapping of TID n field is defined in 9.4.2.314 (TID-To-Link Mapping element)

* + - 1. **EPCS Priority Access Enable Request frame format**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

The EPCS Priority Access Enable Request frame is an Action frame of category Protected EHT. It is trans- mitted by a requesting MLD to request that EPCS priority access be enabled. The Action field of the EPCS Priority Access Enable Request frame contains the information shown in [Table 9-623g (EPCS Priority](#bookmark233) [Access Enable Request frame Action field format)](#bookmark233).

**Table 9-623g—EPCS Priority Access Enable Request frame Action field format**

| **Order** | **Meaning** |
| --- | --- |
| 1 | Category |
| 2 | Protected EHT Action |
| 3 | Dialog Token |
| 4 | EPCS Control (#10326, #12695, #12696) |
| 5 | Priority Access Multi-Link element |

The Category field is defined in [9.4.1.11 (Action field)](#bookmark81).

The Protected EHT Action field is defined in [9.6.35.1 (Protected EHT Action field)](#bookmark228).The Dialog Token field is defined in 9.4.1.12 (Dialog Token field) and set by the requesting MLD.

(#10326, #12695, #12696) The EPCS Control field is defined in 9.4.1.X (EPCS Control field)

The Priority Access Multi-Link field is defined in [9.4.2.312.6 (Priority Access Multi-Link element)](#bookmark172).

* + - 1. **EPCS Priority Access Enable Response frame format**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

The EPCS Priority Access Enable Response frame is an Action frame of category Protected EHT. It is transmitted in response to an EPCS Priority Access Enable Request frame. The Action field of the EPCS Priority Access Enable Response frame contains the information shown in [Table 9-623h (EPCS Priority Access](#bookmark234) [Enable Response frame Action field format)](#bookmark234).

**Table 9-623h—EPCS Priority Access Enable Response frame Action field format**

|  |  |
| --- | --- |
| **Order** | **Meaning** |
| 1 | Category |
| 2 | Protected EHT |
| 3 | Dialog Token  |
| 4 | Status Code |
| 5 | EPCS Control (#10326, #12695, #12696) |
| 6 | Priority Access Multi-Link element |

The Category field is defined in [9.4.1.11 (Action field)](#bookmark81).

The Protected EHT Action field is defined in [9.6.35.1 (Protected EHT Action field)](#bookmark228).

The Dialog Token field value is copied from the Dialog Token field in the corresponding EPCS Priority Access Enable Request frame.

The Status Code field values are defined in [Table 9-78 (Status codes)](#bookmark80).

(#10326, #12695, #12696) The EPCS Control field is defined in 9.4.1.X (EPCS Control field)

The Priority Access Multi-Link field is defined in [9.4.2.312.6 (Priority Access Multi-Link element)](#bookmark172).

##### EPCS priority access operation

* + - 1. **General**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

EPCS priority access is established at the MAC (#10326, #12695) for the service type specified in the MLME-EPCSPRIACCESSENABLE.request primitive by the initiation of the SME. The EPCS priority access (#10326, #12695) for the service type specified by the SME between an AP MLD and its associated non-AP MLD can be in one of the following two states: enabled state or torn down state. The protocols to enable and tear down EPCS priority access (#10326, #12695) for the service type specified by the SME are described in this subclause.

A non-AP STA affiliated with a non-AP MLD shall not send EPCS Priority Access Enable Request and EPCS Priority Access Teardown frames to an AP affiliated with the associated AP MLD unless RSNA with management frame protection (see 12.2.7 (Requirements for management frame protection) and 12.6 (RSNA security association management)) has been successfully negotiated and are capable of invoking EPCS priority access.

An AP affiliated with an AP MLD shall not send EPCS Priority Access Request and EPCS Priority Access Teardown frames to a non-AP STA affiliated with the associated non-AP MLD unless RSNA with management frame protection (see 12.2.7 (Requirements for management frame protection) and 12.6 (RSNA security association management)) has been successfully negotiated and are capable of invoking EPCS priority access.

##### Setup procedures for EPCS priority access 35.16.2.2.1 General

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

The EPCS priority access (#10326, #12695) for one of the one or more service types provisioned for that non-AP MLD shall be in a torn down state upon the completion of successful multi-link setup procedure (i.e., when a non-AP MLD associates with an AP MLD).

(#10326, #12695) NOTE: The provisioning of the non-AP MLD for one or more EPCS service types is done by the Emergency Preparedness service provider and is out of scope of this specification.

The procedures for enabling and tearing down the EPCS priority access (#10326, #12695) for the service type specified by the SME are described in the following subclauses. The procedure for enabling EPCS priority access (#10326, #12695) for the service type specified by the SME is illustrated in [Figure 35-38 (Enabling EPCS](#bookmark125) [priority access)](#bookmark125).

Originator Recipient

MLD SME MLD MAC MLD MAC MLD SME

MLME- EPCSPRIACCESSENABLE.request

EPCS Priority Access Enable Request frame

MLME-

EPCSPRIACCESSENABLE.indication

MLME- EPCSPRIACCESSENABLE.confirm

MLME-

EPCS Priority Access Enable Response EPCSPRIACCESSENABLE.response frame

##### Figure 35-38—Enabling EPCS priority access

As illustrated in [Figure 35-38 (Enabling EPCS priority access)](#bookmark125), an MLD supporting EPCS priority access capability invokes EPCS priority access (#10326, #12695) for the service type specified by the SME on demand when instructed to do so by a higher layer function. After successful invocation of EPCS priority access, both the originator and the responder apply the priority access treatment to EPCS traffic. The AP MLD and non-AP MLD may send a request on any enabled link between them and, if authorized, EPCS priority access treatment will be applied between the MLDs (#12696) using the TID-To-Link mapping applied for that service type (if present) and the EPCS EDCA Parameter set (if included).

##### Procedures at the originating non-AP MLD

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

When instructed to do so by a higher layer function and upon receipt of an MLME-EPCSPRIACCESSENABLE.request primitive (#10326, #12695) for the specified service type, an EPCS non-AP MLD with EPCS priority access in the torn down state shall follow the procedure below to request a change to the EPCS priority access state to be enabled.

A non-AP STA that is operating on an enabled link and is affiliated with the initiating non-AP MLD shall transmit an EPCS Priority Access Enable Request frame (9.6.35.5 (EPCS Priority Access Enable Request frame format)) to the corresponding AP affiliated with the associated EPCS AP MLD.

The destination of the EPCS Priority Access Enable Request frame is the MAC address of the AP with which the initiating non-AP EHT STA is associated or the MAC address of the AP that is affiliated with the AP MLD with which the initiating non-AP MLD is associated and that is operating on the same link on which the EPCS Priority Access Enable Request frame is transmitted.

If a non-AP STA affiliated with the initiating non-AP MLD receives an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) with a matching dialog token and a value of SUCCESS in the Status Code field, then the initiating non-AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.confirm primitive (#10326, #12695) for the service type specified in the EPCS Control field with a value of SUCCESS in the Status Code field indicating that EPCS priority access is in an enabled state. The initiating non-AP MLD shall enable EPCS priority access so that subsequently transmitted traffic receives EPCS priority access treatment using the procedure defined in [35.17.3 (EPCS priority](#bookmark126) [access procedure)](#bookmark126) (#10326, #12695, #12696) with the parameters defined for the specified service type in the Priority Access Multi-Link element.

If a non-AP STA affiliated with the initiating non-AP MLD receives an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) with a matching dialog token and a value not equal to SUCCESS in the Status Code field, then the initiating non-AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.confirm primitive (#10326, #12695) for the service type specified in the EPCS Control field with the status code from the response frame indicating the failure to change EPCS priority access to an enabled state. In this case, the initiating non-AP MLD shall not apply the EPCS priority access procedure (#10326, #12695, #12696) using the parameters defined for the specified service type in the Priory Access Multi-Link element. The higher layer function that triggers the EPCS priority access (#10326, #12695) for the specified service type is responsible for managing reattempts after receiving responses with a status code value other than SUCCESS.

When instructed to do so by a higher layer function and upon receipt of an MLME-EPCSPRIACCESSTEARDOWN.request primitive, an EPCS non-AP MLD with EPCS priority access in an enabled state shall use the following procedure to change the EPCS priority access to a torn down state.

NOTE—A non-AP MLD can initiate the teardown procedure regardless of whether the AP MLD or the non-AP MLD initiated the process to enable EPCS priority access.

1. A non-AP STA affiliated with the tearing down non-AP MLD shall transmit an EPCS Priority Access Teardown frame (9.6.35.7 (EPCS Priority Access Teardown frame details)) to an AP affiliated with the associated EPCS AP MLD. The destination of the EPCS Priority Access Teardown frame is the MAC address of the AP with which the tearing down non-AP EHT STA is associated or the MAC address of the AP that is affiliated with the AP MLD with which the tearing down non-AP MLD is associated and that is operating on the same link on which the EPCS Priority Access Teardown Request frame is transmitted. The tearing down non-AP MLD shall change the EPCS priority access to the torn down state so that subsequently transmitted traffic does not receive EPCS priority access treatment (#10326, #12695, #12696) using the parameters defined for the specified service type in the Priory Access Multi-Link element.

##### Procedures at the originating AP MLD

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

When instructed to do so by a higher layer function triggered via an external interface, and upon receipt of an MLME-EPCSPRIACCESSENABLE.request primitive, an (#10261)EPCS AP MLD shall follow the procedure below to request the change of the EPCS priority access for an associated non-AP MLD to the enabled state (#10326, #12695) for the service type specified by the SME.

NOTE 1—The definition of the external interface is out of the scope of this standard.

An AP MLD with dot11SSPNInterfaceActivated equal to true shall verify if the dot11EPCSPriorityAccessAuthorized for the non-AP MLD in the dot11InterworkingEntry is set to true (#10326, #12695) for the specified service type.

NOTE 2—Successful verification is defined when the dot11EPCSPriorityAccessAuthorized for the non-AP MLD in the dot11InterworkingEntry is set to true. The verification by an AP MLD with dot11SSPNInterfaceActivated equal to false is out of scope of this standard.

If the verification is successful (see NOTE 2 above), an AP that is operating on an enabled link and is affiliated with the initiating AP MLD shall transmit an EPCS Priority Access Enable Request frame (9.6.35.5 (EPCS Priority Access Enable Request frame format)) to the corresponding non-AP STA affiliated with an associated EPCS non-AP MLD, with EPCS priority access in the torn down state for that non-AP MLD. The destination of the EPCS Priority Access Enable Request frame is the non-AP EHT STA indicated by the value of the PeerSTAAddress parameter in the MLME- EPCSPRIACCESSENABLE.request primitive or the MAC address of the non-AP STA that is operating on the same link on which the EPCS Priority Access Enable Request frame is transmitted and is affiliated with the non-AP MLD whose MAC address value is indicated by the value of the PeerSTAAddress parameter in the MLME-EPCSPRIACCESSENABLE.request primitive.

If an AP affiliated with the initiating AP MLD receives an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) with a matching dialog token and a value of SUCCESS in the Status Code field, then the initiating AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.confirm primitive (#10326, #12695) for the specified service type with a value of SUCCESS in the Status Code field indicating successful transition of EPCS priority access to the enabled state. The initiating AP MLD shall change EPCS priority access to the enabled state so that subsequently transmitted traffic receives EPCS priority access treatment using the procedure defined in [35.17.3](#bookmark126) [(EPCS priority access procedure)](#bookmark126).

The initiating EPCS AP MLD may include the Priority Access Multi-Link element in the EPCS Priority Access Enable Request frame to allow the destination EPCS non-AP MLD to employ priority access (#10326, #12695, #12696) for the specified service type using the TID-To-Link mapping (if present) and the included EDCA parameter set and/or MU EDCA parameter set on the corresponding links.

If an AP affiliated with the initiating AP MLD receives an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) with a matching dialog token and a value not equal to SUCCESS in the Status Code field, then the initiating AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.confirm primitive (#10326, #12695) for the specified service type with the status code from the response frame indicating a failure to change EPCS priority access to the enabled state. The initiating AP MLD shall not apply the EPCS priority access procedure (#10326, #12695, #12696) using the parameters defined for the specified service type in the Priory Access Multi-Link element. The external interface that triggers the EPCS priority access (#10326, #12695) for the specified service type is responsible for managing reattempts after receiving responses with a status code value other than SUCCESS.

When triggered via an external interface, and upon receipt of an MLME- EPCSPRIACCESSTEARDOWN.request primitive, an EPCS AP MLD shall use the following procedure for changing the EPCS priority access state to torn down

NOTE 3—An AP MLD can initiate the teardown procedure regardless of whether the AP MLD or the non-AP MLD initiated the process to enable EPCS priority access.

1. An AP affiliated with the tearing down AP MLD shall transmit an EPCS Priority Access Teardown frame (9.6.35.7 (EPCS Priority Access Teardown frame details)) to a non-AP STA affiliated with an associated EPCS non-AP MLD. The destination of the EPCS Priority Access Teardown frame is the non-AP EHT STA indicated by the value of the PeerSTAAddress parameter in the MLME- EPCSPRIACCESSTEARDOWN.request primitive or the MAC address of the non-AP STA that is operating on the same link on which the EPCS Priority Teardown frame is transmitted and is affiliated with the non- AP MLD whose MAC address value indicated by the value of the PeerSTAAddress parameter in the MLME-EPCSPRIACCESSTEARDOWN.request primitive. The tearing down AP MLD shall change the EPCS priority access state corresponding to the EPCS non-AP MLD to torn down.

NOTE 4—The definition of the external interface is out of scope of this standard.

##### Procedure at the receiving AP MLD

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

Upon receipt of an EPCS Priority Access Enable Request frame (9.6.35.5 (EPCS Priority Access Enable Request frame format)), an EPCS AP MLD shall use the following procedure to enable EPCS priority access for the requesting non-AP MLD.

The receiving AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.indication primitive (#10326, #12695) for the service type specified in the EPCS Control field.

Upon receipt of the MLME-EPCSPRIACCESSENABLE.response primitive, the receiving AP MLD shall reply to the initiating non-AP MLD with an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) (#10326, #12695) for the requested service type using the following procedure:

1. For an AP MLD with dot11SSPNInterfaceActivated equal to true, if the dot11EPCSPriorityAccessAuthorized for the requesting non-AP MLD (#10326, #12695) and the requested service type in the dot11InterworkingEntry is set to true indicating the requesting non-AP MLD is verified (#10326, #12695) for the requested service type of EPCS priority access, the AP MLD shall set the Status Code field to a value of SUCCESS.
2. For an AP MLD with dot11SSPNInterfaceActivated equal to true, if the dot11EPCSPriorityAccessAuthorized for the requesting non-AP MLD (#10326, #12695) and the requested service type in the dot11InterworkingEntry is set to false, the AP MLD shall set the Status Code field to a value of EPCS\_DENIED\_UNAUTHORIZED.
3. If the receiving AP MLD cannot support EPCS priority access for (#10326, #12695, #12696) the service type requested by the initiating non-AP MLD for any other reason, the receiving AP MLD shall set the Status Code field with a value of EPCS\_DENIED\_OTHER\_REASON as defined in 9.4.1.9 (Status Code field).

NOTE 4—The verification for AP MLD with dot11SSPNInterfaceActivated equal to false is out of scope of this standard.

If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive is equal to SUCCESS, the receiving AP MLD STA shall set the state of the EPCS priority access to enabled for the requesting non-AP MLD.

The receiving AP MLD may include the Priority Access Multi-Link element in the EPCS Priority Access Enable Response frame to allow the requesting non-AP MLD to employ priority access (#10326, #12695) for the requested service type using the (#12696) TID-To-Link mapping, if present and included EDCA parameter set and/or MU EDCA parameter set on the corresponding links.

If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive is equal to a value other than SUCCESS, the receiving AP MLD shall maintain EPCS priority access in the torn down state for the requesting non-AP MLD.

Upon receipt of an EPCS Priority Access Teardown frame (9.6.35.7 (EPCS Priority Access Teardown frame details)), an EPCS AP MLD with EPCS priority access enabled state shall use the following procedure to tear down EPCS priority access.

1. The receiving AP MLD shall issue an MLME-EPCSPRIACCESSTEARDOWN.indication primitive.
2. The receiving AP MLD shall change the EPCS priority access state to torn down for the requesting non-AP MLD.

##### Procedures at the receiving non-AP MLD

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

Upon receipt of an EPCS Priority Access Enable Request frame (9.6.35.5 (EPCS Priority Access Enable Request frame format)), an EPCS non-AP MLD with EPCS priority access in the torn down state shall use the following procedure to enable EPCS priority access.

The receiving non-AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.indication primitive (#10326, #12695, #12696) for the requested service type (specified in the EPCS Control field).

Upon receipt of the MLME-EPCSPRIACCESSENABLE.response primitive (#10326, #12695, #12696) for the requested service type, a non-AP STA affiliated with the receiving non-AP MLD shall reply to the initiating AP MLD with an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) (#10326, #12695, #12696) for the requested service type. The receiving non-AP MLD should set the Status Code field to a value of SUCCESS unless the non-AP MLD is unable to support EPCS priority access, in which case the non-AP MLD shall set the Status Code field with a value of EPCS\_DENIED\_OTHER\_REASON as defined in 9.4.1.9 (Status Code field).

If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive (#10326, #12695, #12696) for the requested service type is equal to SUCCESS, the receiving non-AP MLD shall change the state of the EPCS priority access to enabled so that subsequently transmitted traffic receives EPCS priority access treatment using the procedure defined in [35.17.3 (EPCS priority access procedure)](#bookmark126) (#10326, #12695, #12696) with the parameters defined for the requested service type in the Priory Access Multi-Link element.

If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive (#10326, #12695, #12696) for the requested service type is equal to a value other than SUCCESS, the receiving non-AP MLD shall maintain the torn down state of the EPCS priority access so it does not only apply to subsequently transmitted traffic (#10326, #12695, #12696) using the parameters defined for the requested service type in the Priory Access Multi-Link element.

Upon receipt of an EPCS Priority Access Teardown frame (9.6.35.7 (EPCS Priority Access Teardown frame details)), an EPCS non-AP MLD with EPCS priority access enabled shall use the following procedure to tear down EPCS priority access.

1. The receiving non-AP MLD shall issue an MLME-EPCSPRIACCESSTEARDOWN.indication primitive.
2. The receiving non-AP MLD shall change the EPCS priority access state to torn down so that subsequently transmitted traffic does not receive EPCS priority access treatment (#10326, #12695, #12696) using the parameters defined for the requested service type in the Priory Access Multi-Link element.

##### EPCS priority access procedure

* + - 1. **General**

EPCS priority access procedure allows EPCS non-AP MLDs with priority access in the enabled state to gain priority access to medium. If the negotiation to enable EPCS priority access between an EPCS AP MLD and an EPCS non-AP MLD (#10326, #12695) for the requested service type is successful, then the STA affiliated with the non-AP MLD applies EPCS priority access to its EPCS traffic (#12696) using the TID-To-Link mapping (if present in the EPCS Priority Access Multi-Link element) on all or subset of the setup links using the procedures described below.

An EPCS non-AP MLD shall apply EPCS priority access procedures only when its EPCS priority access state is set to enabled. An EPCS AP MLD may apply EPCS priority access to EPCS traffic using the procedure described below prior to completion of the negotiation to enable EPCS priority access.

An EPCS AP MLD is an AP MLD with dot11EHTEPCSPriorityAccessActivated set to true.

An EPCS non-AP MLD is a non-AP MLD with dot11EHTEPCSPriorityAccessActivated set to true.

##### EDCA operation using EPCS EDCA parameters

As part of the EPCS priority access procedure, a STA affiliated with an EPCS non-AP MLD shall manage its EDCA parameter sets as follows:

* During the process of enabling EPCS priority access (#10326, #12695) for the requested service type, the STA affiliated with the EPCS non-AP MLD shall
	+ update its CWmin[AC], CWmax[AC], AIFSN[AC], and TXOP Limit [AC] state variables of each access category to
		- (#12699)the values carried in the EDCA Parameters Set element included in the per-STA profile, with the Link ID corresponding to the AP with which the STA is associated, carried in the Priority Access Multi-Link element contained in an EPCS Priority Access Enable Request or an EPCS Priority Access Enable Response frame sent by an AP affiliated with the EPCS AP MLD, if the corresponding per-STA profile is present and contains an EDCA Parameters Set element or,
		- the default EDCA parameter values found in Table 9-155 (Default EDCA Parameter Set element parameter values if dot11OCBActivated is false or the STA is a non-sensor STA) otherwise.
	+ (#12700)update the dot11MUEDCATable to respective values that correspond to fields in the MU EDCA Parameter Set element included in the per-STA profile, with the Link ID corresponding to the AP with which the STA is associated, carried in the Priority Access Multi-Link element contained in an EPCS Priority Access Enable Request or an EPCS Priority Access Enable Response frame sent by an AP affiliated with the EPCS AP MLD, if the corresponding Per-STA Profile is present and contains an MU EDCA Parameter Set element.
* While EPCS priority access is enabled, each STA affiliated with an EPCS non-AP MLD shall,
	+ (#12701)use the latest EDCA parameter set, included in the per-STA profile, with the Link ID corresponding to the AP which the STA is associated with, carried in the Priority Access Multi- Link element contained in an EPCS Priority Access Enable Request or an EPCS Priority Access Enable Response frame sent by an AP affiliated with the EPCS AP MLD, if the Per-STA Profile corresponding to the AP with which the STA is associated is included in the Priority Access Multi-Link element, and
	+ ignore the part of the procedures defined in 10.2.3.2 (HCF contention based channel access (EDCA)) that concerns the update of the EDCA parameters and the part of the procedures defined in 26.2.7 (EDCA operation using MU EDCA parameters) that concerns the update of the MU EDCA parameters that are sent by the corresponding AP in its Beacon and Probe Response frames
	+ follow the rules defined in 26.2.7 (EDCA operation using MU EDCA parameters), except that
		- If the corresponding Per-STA Profile is present and contains an MU EDCA Parameter Set element, (#12702)update the dot11MUEDCATable to respective values that correspond to fields in the MU EDCA Parameter Set element included in the per-STA profile, with the Link ID corresponding to the AP with which the STA is associated, carried in the Priority Access Multi-Link element, if the corresponding per-STA profile is carried in the Priority Access Multi-Link element contained in an EPCS Priority Access Enable Request or an EPCS Priority Access Enable Response frame sent by an AP affiliated with the EPCS AP MLD.
		- if the corresponding per-STA profile is contained in an EPCS Priority Access Enable Request or an EPCS Priority Access Response frame sent by the AP affiliated with the EPCS AP MLD and the Per-STA Pro- file contains an EDCA Parameter Set element, then. (#12704)if the MUEDCATimer[AC] of the STA reaches 0, either by counting down or due to a reset following the reception of an MU EDCA Reset frame, the STA affiliated with EPCS non-AP MLD shall update CWmin[AC], CWmax[AC], and AIFSN[AC] to the values that are contained in the EDCA Parameters Set element included in the per- STA profile, with the Link ID corresponding to the AP which the STA is associated with, carried in the Priority Access Multi-Link element,.

After the EPCS priority access is torn down, each STA affiliated with an EPCS non-AP MLD

* shall update its CWmin[AC], CWmax[AC], AIFSN[AC], and TXOP Limit [AC] state variables following the procedures in 10.2.3.2 (HCF contention based channel access (EDCA)).
* shall update the dot11MUEDCATable following the procedures in 26.2.7 (EDCA operation using MU EDCA parameters).

An AP affiliated with an EPCS AP MLD manages the EDCA parameter set and the MU EDCA parameter set for (#10326, #12695) the requested service type for EPCS non-AP MLD with the EPCS priority access in the enabled state and non-EPCS non-AP MLDs as follows:

* If the EPCS priority access state is in the enabled state by at least one associated EPCS non-AP MLD, then
	+ if the EDCA parameters previously sent out by an AP affiliated with an EPCS AP MLD in Management frames it transmits (see 10.2.3.2 (HCF contention based channel access (EDCA))) do not result in higher priority for STAs that are affiliated with EPCS non-AP MLDs in the enabled state, that AP shall announce EDCA parameters in Management frames that result in higher priority for those STAs with EPCS priority access in the enabled state;
* Otherwise,
	+ an AP affiliated with an EPCS AP MLD with its EPCS priority access state set to the torn down state for all its associated STAs announces the EDCA parameter set corresponding to the link in Management frames (e.g., Beacon or Probe Response) that it transmits following the procedure in 10.2.3.2 (HCF contention based channel access (EDCA)).

##### EDCA operation using EPCS TID-To-Link mapping parameters (#12696)

As part of EPCS priority access procedure, the AP MLD may uniquely map the EPCS traffic to any of the links that were setup between the AP MLD and the non-AP MLD during the ML setup procedure (or subset of thereof). The AP MLD may apply the default mapping or a specified mapping of each TID to one or more links.

In that case, the AP MLD shall set the following values in the Priority Access Multi-Link element carried either in the EPCS Priority Access Enable Request frame or EPCS Priority Access Enable Response frame:

* The TID-To-Link Mapping Present subfield is set to 1 in the Presence bitmap of the Multi-Link control field.
* The Direction subfield value of the TID-To-Link Mapping Control field is set to 2.
* The Mapping Switch Time Present subfield value of the TID-To-Link Mapping Control field is set to 0.
* The Expected Duration Present subfield value of the TID-To-Link Mapping Control field is set to 0.
* If the default TID-To-Link mapping is applied, the Default Link Mapping value of the TID-To-Link Mapping Control field is set to 1.
* If the non-default TID-To-Link mapping is applied, the Default Link Mapping value of the TID-To-Link Mapping Control field is set to 0 and the Link Mapping Presence Indicator subfield is set to 1 in each of its bits. Moreover, each of the Link Mapping of TID n fields indicates which of the setup links is mapped for each TID n.

If the TID-To-Link Mapping Present subfield is set to 1 in the Priority Access Multi-Link element carried either in the EPCS Priority Access Enable Request frame or EPCS Priority Access Enable Response frame, the following shall be applied:

* During the process of enabling EPCS priority access (#10326, #12695) for the requested service type, the EPCS AP MLD and the EPCS non-AP MLD:
	+ Shall keep the most recent TID-To-Link mapping successfully negotiated between them, as defined in 35.3.7.1.3 (Negotiation of TID-to-link mapping), if applicable.
	+ Shall update their TID-To-Link mapping with the parameters set in the TID-To-Link Mapping Control field and in any of the Link Mapping of TID n (if present).
* While EPCS priority access is enabled, the EPCS AP MLD and the EPCS non-AP MLD shall apply the TID-To-Link mapping on EPCS traffic both in UL and DL.
* After the EPCS priority access is torn down, each of the EPCS AP MLD and EPCS non-AP MLD shall retrieve its TID-To-Link mapping using the saved values of the most recent TID-To-Link mapping successfully negotiated between them, as defined in 35.3.7.1.3 (Negotiation of TID-to-link mapping), or apply the default TID-To-Link mapping.
	+ - 1. **MLME-EPCSPRIACCESSENABLE.response**
				1. **Function**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

This primitive is generated by the MLME to send a response. (#12697) This may in response to a (#12697) MLME-EPCSPRIACCESSENABLE.indication primitive or an unsolicited response to modify the parameters of an existing EPCS priority access service.

* + - * 1. **Semantics of the service primitive**

The primitive parameters are as follows:

MLME-EPCSPRIACCESSENABLE.response(

PeerSTAAddress, Dialog Token, Status Code, EDCAParameterSet

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MAC address | Any valid individual MAC address | Specifies the address of the peer MAC entity with which the EPCS priority access procedure is performed. |
| Dialog Token | Integer | 0–255 | The dialog token to identify the EPCS priority access procedure. |
| Status Code | As defined in frame format | As defined in 9.4.1.9 (Status Code field) | Indicates the status of the request procedure |
| EDCAParameterSe t | EDCA Parameter Set element | As defined in9.4.2.28 (EDCAParameter Set element) | Specifies service parameters for the EPCS EDCA parameter set. |

* + - * 1. **When generated**

This primitive is generated by the SME as a response to an MLME-EPCSPRIACCESSENABLE.indication primitive (#12697) or a request to transmit a response in an unsolicited mode (i.e. unsolicited response).

* + - * 1. **Effect of receipt**

This primitive initiates transmission of an EPCS Priority Access Enable Response frame to the peer MAC entity that requested the change to EPCS priority access (#12697) or to a peer MAC entity with a EPCS priority access service to modify the parameters of the service.

* + - 1. **EPCS Priority Access Enable Response frame format**

***TGbe editor: Please update the contents of the following paragraph in this subclause as shown below:***

The EPCS Priority Access Enable Response frame is an Action frame of category Protected EHT. It is trans- mitted in response to an EPCS Priority Access Enable Request frame. (#12697) It can also be transmitted in an unsolicited mode by the AP MLD to modify parameters of an existing EPCS Priority Access service (for a specified service type). The Action field of the EPCS Priority Access Enable Response frame contains the information shown in [Table 9-623h (EPCS Priority Access](#bookmark234) [Enable Response frame Action field format)](#bookmark234).

**Table 9-623h—EPCS Priority Access Enable Response frame Action field format**

|  |  |
| --- | --- |
| **Order** | **Meaning** |
| 1 | Category |
| 2 | Protected EHT |
| 3 | Dialog Token |
| 4 | Status Code |
| 5 | Priority Access Multi-Link element |

The Category field is defined in [9.4.1.11 (Action field)](#bookmark81).

The Protected EHT Action field is defined in [9.6.35.1 (Protected EHT Action field)](#bookmark228).

(#12697) When the EPCS Priority Access Enable Response frame is sent as a response to the EPCS Priority Access Enable Request frame, the Dialog Token field value is copied from the Dialog Token field in the corresponding EPCS Priority Access Enable Request frame.

The Status Code field values are defined in [Table 9-78 (Status codes)](#bookmark80).

The Priority Access Multi-Link field is defined in [9.4.2.312.6 (Priority Access Multi-Link element)](#bookmark172).

***TGbe editor: Please add the following subclause and its contents as shown below:***

(#12697)

##### Maintenance procedures for EPCS priority access

##### Procedures at the initiating AP MLD

When instructed to do so by a higher layer function triggered via an external interface, and upon receipt of an MLME-EPCSPRIACCESSENABLE.response primitive, an EPCS AP MLD that supports this functionality shall follow the procedure below to update the parameters of an existing EPCS priority access for a specified service type with an associated non-AP MLD.

An AP that is operating on any of the setup links corresponding to the established EPCS priority access for the specified service type with the non-AP MLD and is affiliated with the initiating EPCS AP MLD shall transmit an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) to the corresponding non-AP STA affiliated with an associated EPCS non-AP MLD, containing updated values carried in Priority Access Multi-Link element.

##### 35.16.2.4.2 Procedures at the receiving non-AP MLD

Upon receipt of an EPCS Priority Access Enable Response frame (9.6.35.6 (EPCS Priority Access Enable Response frame format)) (#10326, #12695, #12696) with matching service type, an EPCS non-AP MLD with EPCS priority access in the enabled state (#10326, #12695) for the requested service type shall use the following procedure to update the parameters of the existing EPCS priority access.

The non-AP MLD shall update the EDCA parameters according to the rules in 35.16.2.2.

If the TID-To-Link Mapping Present subfield is set to 1, the non-AP MLD shall update the EDCA parameters according to the rules in 35.16.2.3

Straw Poll:

Do you support to incorporate the proposed draft text in this document 11-22/1671r2 to the next revision of TGbe Draft 2.2, for addressing the following CIDs: 10326, 12695, 12696, 12697?

Result: Yes/No/Abstain