IEEE P802.11
Wireless LANs

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| Resolution of EPCS-Related CIDs in Clause 35.16 (LB271) |
| Date: March 2023 |
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 Abstract

This submission proposes resolutions for 17 comments from clause 35.16 related to EPCS submitted during TGbe LB271.

CIDs: 16702, 15425, 15426, 17371, 15427, 15428, 15429, 15430, 15431, 15432, 15584, 15433, 15434, 15435, 15436, 15441, 15442

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Incorporated changes based on offline comments
* Rev 2: Incorporated changes to address offline comments on deferred CIDs. Changes highlighted

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.

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| **CID** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 16702 | 35.16.2.2.1 | 646.50 | change "EPCS priority access shall be in a torn down..." to "EPCS priority access enablement shall be in a torn down..." | See in the comment | RejectedThe description at the start of Clause 35.16.2.1 makes clear that “EPCS priority access” has two states. The addition of the word “enablement” is inconsistent with that. |
| 15425 | 35.16.2.2.3 | 648.42 | There may be cases where an AP MLD might want to enable EPCS for a non-AP MLD that is not authorized to invoke EPCS. For example, a higher-layer function might instruct the AP MLD to enable EPCS for a non-AP MLD that is not authorized to invoke EPCS in order to provide end-to-end priority for an authorized priority voice call that is destined for that non-AP MLD. | Remove item a) and NOTE 2 from the list. Also, remove "If the verification is successful (See NOTE 2 above)," from the beginning of item b). | RevisedAgree with commenter. Suggested edits clarify that in such cases, authorization for non-AP MLD to use EPCS priority access is provided by the higher layer function. **TGbe editor please implement changes labelled as #15425 in document 802.11-23-0330r2** |
| 17371 | 35.16 | 648.59 | There is no guarantee that the non-AP MLD "will employ" since the non-AP MLD can reject the request. Please fix (couple of instances). | As in comment. | RevisedAgree with commenter. Edits shown below address the comment in the first instance. The second involves the response frame being sent by the AP MLD, which the non-AP MLD cannot reject.**TGbe editor please implement changes labelled as #17371 in document 802.11-23-0330r1** |
| 15426 | 35.16.2.2.3 | 648.56 | The specification does not make clear why an AP MLD would include EPCS EDCA or MU EDCA parameters in the Enable Request frame | Add the following to the end of item i): "The AP MLD selects EDCA and MU EDCA parameter values that provide the EPCS non-AP STA with preferential access to the wireless medium compared to non-AP STAs that do not have EPCS priority access in the enabled state using a selection method that is outside the scope of this standard." | RevisedAgree with commenter. Suggested edits are applied below for clarity with other changes to the adjacent text.**TGbe editor please implement changes labelled as #15426 in document 802.11-23-0330r2** |
| 15427 | 35.16.2.2.4 | 649.48 | The text restricts this verification to AP MLDs with dot11SSPNInterfaceActivated equal to true, but the requirement to populate this field (page 646, line 15) does not have a similar restriction. | Remove the text "For an AP MLD with dot11SSPNInterfaceActivated equal to true," from bullets i) and ii). Also, remove Note 1. | RejectedNote on the next page indicates that situations where dot11SSPNInterfaceActivated are false are out of scope. |
| 15429 | 35.16.2.2.4 | 650.16 | The specification does not make clear why an AP MLD would include EPCS EDCA or MU EDCA parameters in the Enable Resopnse frame | Add the following to the end of item i): "The AP MLD selects EDCA and MU EDCA parameter values that provide the EPCS non-AP STA with preferential access to the wireless medium compared to non-AP STAs that do not have EPCS priority access in the enabled state using a selection method that is outside the scope of this standard." | RevisedAgree with commenter. Suggested edits are applied below for clarity.**TGbe editor please implement changes labelled as #15429 in document 802.11-23-0330r2** |
| 15430 | 35.16.2.2.4 | 650.26 | The statement is missing the words "in the" before "enabled state. | Rephrase as "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 **in the** enabled state..." | Accepted |
| 15431 | 35.16.2.2.4 | 650.40 | The text says "a EPCS non-AP MLD" rather than "an EPCS non-AP MLD" | Change "a EPCS non-AP MLD" to "**an** EPCS non-AP MLD" | Accepted |
| 15428 | 35.16.2.2.4 | 650.15 | The reference to MLME-EPCSPRIACCESSENABLE.response is not necessary and adds undue complexity. | Remove the text "in the MLME-EPCSPRIACCESSENABLE.response primitive" from items c) and d). | Rejected The referenced text clearly describes the source of the Status Code  |
| 15432 | 35.16.2.2.5 | 650.45 | The reference to MLME-EPCSPRIACCESSENABLE.response is not necessary and adds undue complexity. | Remove the text "in the MLME-EPCSPRIACCESSENABLE.response primitive" from items b) and c). | Rejected The referenced text clearly describes the source of the Status Code  |
| 15584 | 35.16.2.2.5 | 650.62 | The text 'so it does not only apply to subsequently transmitted traffic' is confusing and useless, does it imply there is any case that the agreement is still in effect after it is torn down? | Remove 'so it does not only apply to subsequently transmitted traffic'. | RevisedAgree with the commenter.**TGbe editor please implement changes labelled as #15584 in document 802.11-23-0330r1** |
| 15433 | 35.16.2.2.5 | 651.02 | The text says "a EPCS non-AP MLD" rather than "an EPCS non-AP MLD" | Change "a EPCS non-AP MLD" to "**an** EPCS non-AP MLD" | Accepted |
| 15434 | 35.16.3.1 | 651.16 | The terms "EPCS AP MLD" and "EPCS non-AP MLD" are used earlier in clause 35.16, before these definitions appear. These definitions should be moved earlier in the document. | Move descriptions of the terms "EPCS AP MLD" and "EPCS non-AP MLD" to clause 35.16.1 | Revised Agree with comment. Moved definitions from 35.16.3.1 to 35.16.1 and modified similar definition text that was already present in clause 35.16.1.**TGbe Editor: Please implement changes labelled as #15434 in document 802.11-23-0330r1** |
| 15435 | 35.16.3.1 | 651.22 | The text refers to a non-AP STA applying EPCS priority access on all enabled links, but a STA is associated with only a single link | Rephrase as "If EPCS priority access is in the enabled state for an EPCS non-AP MLD, then the non-AP STAs affiliated with the non-AP MLD apply EPCS priority access to traffic on their respective enabled links using the procedure described below." | RevisedAgree with comment. **TGbe editor please implement changes labelled as #15435 in document 802.11-23-0330r1** |
| 15436 | 35.16.3.2 | 651.39 | The requirements for handling EDCA parameters and MU EDCA parameters should be similar, but they are written very differently. | Revise first bullet to read "update the dot11EDCATable to the respective values in each category to" | RevisedAgree with comment. **TGbe editor please implement changes labelled as #15436 in document 802.11-23-0330r1** |
| 15441 | 35.16.3.2 | 652.59 | Text refers to AP having EPCS in the torn-down state, but the state of EPCS is mantained at the MLD level | Rephrase as "If all the MLDs associated with an EPCS AP MLD have EPCS priority access in the torn down state, APs affiliated with the EPCS AP MLD announce EDCA parameters in the management frames (e.g., Beacon and Probe Response) that they transmit following the procedures in 10.2.3.2 (HCF contention based channel access (EDCA))." | RevisedAgree with comment. **TGbe editor please implement changes labelled as #15441 in document 802.11-23-0330r1** |
| 15442 | 35.16.3.2 | 652.64 | The specification makes no mention of how the APs affiliated with an EPCS AP MLD treat traffic that is destined for EPCS non-AP MLDs with EPCS priority access in the enabled state. | Add the following text "APs affiliated with EPCS AP MLDs should prioritize scheduling transmission of downlink frames destined for non-AP STAs affiliated with EPCS non-AP MLDs with EPCS Priority Access in the enabled state. The methods by which they do this are implementation dependent and outside the scope of this standard. | RevisedAgree with comment. The referenced clause is not a suitable location for the suggested change. Edits proposed below make similar change in Clause 4.5.13.**TGbe editor please implement changes labelled as #15442 in document 802.11-23-0330r2** |

**TGbe editor: Please note baseline is 11be D3.0**

**TGbe editor: Please make the indicated changes to the definition in Clause 35.16.3.1**

**35.16.3.1 General**

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.

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 is successful, then the non-AP STA affiliated with the non-AP MLD applies EPCS priority access to its EPCS traffic on all enabled links using the procedure 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.

**TGbe editor: Please make the indicated changes to the definition in Clause 35.16.2.2.3**

**35.16.2.2.3 Procedures at the initiating EPCS AP MLD**

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 EPCS AP MLD shall follow the procedure below to request the change of the EPCS priority access for an associated EPCS non-AP MLD to the enabled state.

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

(#15425)NOTE 2: The higher layer function that triggers the EPCS AP MLD to enable EPCS priority access for a specific target EPCS non-AP MLD will identify the non-AP MLD and authorize that non-AP MLD to use EPCS priority in access such an instance.

1. The initiating EPCS AP MLD shall transmit an EPCS Priority Access Enable Request frame (9.6.35.5 (EPCS Priority Access Enable Request frame format)) via an affiliated STA 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.
	1. The initiating EPCS AP MLD may include the Priority Access Multi-Link element in the EPCS Priority Access Enable Request frame to provide EDCA parameter set(s) and/or MU EDCA parameter set(s) that the destination EPCS non-AP MLD (#17371)employs on the corresponding setup links if EPCS priority access is successfully enabled.

(#15426) Note: The AP MLD selects EDCA and MU EDCA parameter values that result in the non-AP STAs affiliated with EPCS non-AP MLDs with EPCS in the enabled state having higher priority than other non-AP STAs when gaining access to the wireless medium. The selection mechanism is implementation specific and outside the scope of this standard.

1. …

**TGbe editor: Please make the indicated changes to the definition in Clause 35.16.2.2.4**

**35.16.2.2.4 Procedure at the receiving AP MLD**

**…**

1. If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive is equal to SUCCESS, the receiving AP MLD shall set the state of the EPCS priority access to enabled for the requesting non-AP MLD.
	1. The receiving AP MLD may include the Priority Access Multi-Link element in the EPCS Priority Access Enable Response frame to provide the EDCA parameter set(s) and/or the MU EDCA parameter set(s) that the initiating EPCS non-AP MLD will employ on the corresponding links.

(#15429) Note: The AP MLD selects EDCA and MU EDCA parameter values that result in the non-AP STAs affiliated with EPCS non-AP MLDs with EPCS in the enabled state having higher priority than other non-AP STAs when gaining access to the wireless medium. The selection mechanism is implementation specific and outside the scope of this standard.

**TGbe editor: Please make the indicated changes to the definition in Clause 35.16.2.2.5**

**35.16.2.2.5 Procedures at the receiving non-AP MLD**

…

1. If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive 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 35.16.3 (EPCS priority access procedure).
2. If the Status Code in the MLME-EPCSPRIACCESSENABLE.response primitive is equal to a value other than SUCCESS, the receiving non-AP MLD shall keep (#15584)EPCS priority access in the torn-down state.

**TGbe editor: Please make the indicated changes to the definition in Clause 35.16.1**

**35.16.1 General**

EPCS priority access is a mechanism that provides prioritized access to the wireless medium for authorized users to increase their probability of successful communication during periods of network congestion.

(#15434)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.

A STA affiliated with an EPCS MLD shall set to 1 the EPCS Priority Access Support subfield of the EHT Capabilities element that it transmits. A STA affiliated with an MLD that is not an EPCS AP MLD or an EPCS non-AP MLD shall set to 0 the EPCS Priority Access Support subfield of the EHT Capabilities element that it transmits.

**TGbe editor: Please make the indicated changes to the definition in Clause 35.16.3.1**

**35.16.3.1 General**

(#15434)

EPCS priority access procedure allows EPCS non-AP MLDs with priority access in the enabled state to gain priority access to medium. (#15435) If EPCS priority access is in the enabled state for an EPCS non-AP MLD, then each non-AP STA affiliated with the non-AP MLD applies EPCS priority access to traffic on its enabled link using the procedure described below.

**35.16.3.2 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, the STA affiliated with the EPCS non-AP MLD shall
	+ (#15436) update its dot11EDCATable to the respective values in each category to
		- 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.
	+ 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.

…

An AP affiliated with an EPCS AP MLD manages the EDCA parameter set and the MU EDCA parameter set 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; or
	+ to non-AP STAs and STAs affiliated with non-AP MLDs that do not have EPCS in the enabled state in nontransmitted BSSID Profile as described in 9.4.2.45 (Multiple BSSID element), carried in a Beacon or Probe Response frame that lowers the priority for those STAs.
* Otherwise,
	+ (#15441)If all the non-AP MLDs associated with an EPCS AP MLD have EPCS priority access in the torn down state, the APs affiliated with the EPCS AP MLD announce EDCA parameters in the management frames (e.g., Beacon and Probe Response) that they transmit following the procedure in 10.2.3.2 (HCF contention based channel access (EDCA)).

**TGbe editor: Please make the indicated changes to Clause 4.5.13**

**4.5.13 EPCS priority access**

…

While the EPCS priority access is enabled, all traffic to and from the non-AP MLD is treated with a higher priority. (#15442)Traffic transmitted by STAs affiliated with the non-AP MLD is prioritized as described in 35.16.3 (EPCS priority access procedure). The scheduling of traffic transmitted to non-AP STAs affiliated with the non-AP MLD by APs affiliated with its associated AP MLD is implementation specific and outside the scope of this specification. EPCS priority access is applied individually for each link within an MLD. Either the AP MLD or the non-AP MLD can tear down EPCS priority access by transmitting an EPCS Priority Access Teardown frame (see 9.6.35.7 (EPCS Priority Access Teardown frame details)).