IEEE P802.11
Wireless LANs

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| Resolution for CIDs related to 35.17.3 (LB266) |
| Date: Oct 14, 2022 |
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 Abstract

This submission proposes resolutions for following 9 CIDs received for TGbe LB266: 10473, 10474, 10888, 10889, 14086, 10701, 11991, 11992, 11246

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Added comment resolution for CID 11246.
* Rev 2: Updated text of e) and CR to CID 11991 per offline comments.
* Rev 3: Updated the text related to CID 10474, 10888, 10889 per comments in the 802.11be MAC Ad Hoc and offline discussions, and added 10473.

**Discussions**

1. Why it needs to update EPCS EDCA parameters?
2. After the EPCS service is enabled in the BSS and neighbour BSS, the non-EPCS devices would get lower priority which ends up that most traffic in BSS and/or OBSS in the EPCS managed network would come from EPCS devices (not from non-EPCS devices).
3. If many EPCS devices require higher priority access, it would create the access congestion caused by EPCS devices (not from non-EPCS devices).
4. The current 802.11be D2.0 does not allow the EPCS AP MLD to transmit the updated EPCS EDCA parameters carried in EPCS Priority Access Request message in the enabled state (refer to 35.17.2.2.3 Procedures at the originating AP MLD). Therefore, there is no other way to resolve the EPCS devices’ access congestion issue except for tearing-down the EPCS service.
5. Why it needs to update EPCS EDCA parameters via broadcast frames?
6. Using broadcast frame to update legacy EDCA parameters has already been supported in 802.11 spec.
7. When the access congestion is caused by EPCS devices, the EPCS AP MLD would not be able to know which EPCS devices are contending to the media and causing the access congestion, and whom the unicast an EPCS Priority Access Request frame should be sent to.
8. It could take a long time to use unicast EPCS Priority Access Request frame to update EPCS EDCA parameters of all EPCS enabled devices in the EPCS network.
9. Reliability concern for broadcast EPCS Priority Access Request message
10. Broadcast message is already used in 802.11, like Beacon frame, Probe Request/Response frame and broadcast Action frame. Current 802.11 supports to carry EDCA parameters in the Beacon frame. Therefore, the reliability should not be an issue for carrying the EPCS EDCA parameters in the broadcast EPCS Priority Access Request frames in the service provider managed Wi-Fi networks.
11. In addition, the EPCS AP MLD can be configured to schedule multiple broadcast frames of EPCS Priority Access Request to carry the updated EPCS EDCA parameters for improving the delivery success ratio, if needed.

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.***

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| **CID** | **Section** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 10473 | 35.17 | 0.00 | The EPCS priority access operation should allow the EPCS enabled AP MLD to update EPCS EDCA parameters in broadcast way when access congestion is caused by many EPCS enabled non-AP MLDs performing priority channel access at same time. This is because when this happens, the EPCS enabled AP MLD does not know which EPCS enabled non-AP MLDs are contending or will contend the media. Especially when all EPCS enabled non-AP MLDs use high priority access at same time, it can cause more access congestion than regular EDCA channel access. | Please define a method to allow an AP MLD to update EPCS EDCA parameters in groupcast/broadcast way to control EPCS enabled non-AP MLDs priority access. | **Revised**Agree in principle with the comment.When EPCS priority is enabled, EPCS enabled AP MLD may transmit to an EPCS Priority Enable Request which contains the EDCA parameters carried in Priority Access Multi-Link element to update EPCS priority access.**TGbe editor please implement changes labelled as #10474 in this doc.** |
| 10474 | 35.17.3 | 540.36 | EPCS AP MLD should be allowed to update EPCS EDCA/MU EDCA parameters in broadcast when EPCS is enabled. | Please specify the rules for update of EPCS EDCA/MU EDCA parameters by an EPCS enabled AP MLD in broadcast way. | **Revised**Agree in principle with the comment.When EPCS priority is enabled, EPCS enabled AP MLD may transmit to an EPCS Priority Enable Request which contains the EDCA parameters carried in Priority Access Multi-Link element to update EPCS priority access.**TGbe editor please implement changes labelled as #10474 in this doc.** |
| 10888 | 35.17.3.2 | 540.47 | Please specify the management frames that can be used to announce EDCA parameters that result in higher priority for those STAs with EPCS priority access in the enabled state. | as in comment | **Revised**Agree in principle with the comment. See proposed changes.**TGbe editor please implement changes labelled as #10888 in this doc.** |
| 10889 | 35.17.3.2 | 540.47 | If the STAs that are affiliated with EPCS non-AP MLDs are already in enabled state but do not have EDCA parameters with higher priority, sending new management frames may result in a delay on EPCS traffic transmission? When should the EPCS traffic transmission start if the STA enters enabled state? | as in comment | **Revised**Agree in principle with the comment.After EPCS is enabled, the EPCS AP MLD can update EDCA parameters via sending an EPCS Priority Access Enable Request to update the EPCS EDCA parameters or priority access. The STAs that are affiliated with EPCS non-AP MLDs can use the updated EDCA parameters for priority access once the EPCS Priority Access Enable Request is received. The EPCS AP MLD can also lower the EDCA parameters carried in Beacon or Probe Response frame for transmitted BSSID, which is used by regular non-AP MLD. Therefore, it makes EPCS non-AP MLDs have relative higher access priority. **TGbe editor please implement changes labelled as #10889 in this doc.** |
| 14086 | 35.17.3 | 539.16 | The EPCS procedure for the case when an STA affiliated with an EPCS enabled non-AP MLD is operating on a corresponding to a nontransmitted BSSID is not clear from the current spec. | Please provide clarification on the EPCS priority access procedure with nontransmitted BSSID. | **Revised**Agree in principle with the comment.If a STA affiliated with the EPCS non-AP MLD operates on a BSS corresponding to a non-transmitted BSSID, the corresponding AP shall announce EDCA parameters included 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 STAs affiliated with non-EPCS non-AP MLDs.**TGbe editor please implement changes labelled as #14086 in this doc.** |
| 10701 | 35.17.3.1 | 539.28 | Do we need a mechanism to differentiate EPCS traffic from regular traffic at MAC layer? If so, SCS setup can be reused. | As comment | **Rejected**The SCS is used by a non-AP MLD to request an AP MLD to classify incoming individually addressed MSDUs based on QoS parameters in the traffic characteristics provided by the non-AP MLD. EPCS, however, enables the priority access to the EPCS capable non-AP MLD with the Priority Access EDCA parameter set.Therefore, SCS and EPCS are independent. It has no need to differentiate an EPCS traffic from a regular QoS traffic. |
| 11991 | 35.17.3.1 | 539.32 | Is OBSS\_PD allowed to be used when an AP has an associated EPCS enabled nonAP MLD operating on one or more links? | The SPATIAL\_REUSE subfield in the HE-SIG-A (if present) of the PPDUs transmitted to an EPCS enabled nonAP MLD or transmitted by an EPCS enabled nonAP ML on EPCS enabled links shall be set to PSR\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED. | **Rejected**EPCS is a priority access feature for EPCS enabled non-AP MLDs. It is independent from spatial reuse. If the radio condition is allowed, an EPCS non-AP MLD can perform EPCS priority access over the existing EPCS traffic through spatial reuse.In addition, an OBSS traffic may be from an EPCS non-AP MLD associated with a neighbour EPCS AP MLD. If setting PSR\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED in SPATIAL\_REUSE subfield, it would block an OBSS EPCS traffic to share the media via spatial reuse. Whether to allow the spatial reuse in an EPCS network can be left to the network configuration in deployment.  |
| 11992 | 35.17.3.2 | 539.39 | Can an EPCS enabled nonAP MLD communicate with a peer nonAP MLD with the EPCS EDCA parameters? | Define the constraints and operation of P2P traffic when one or both the peers are EPCS enabled. | **Rejected**An EPCS enabled non-AP MLD can communicate with a peer non-AP MLD or EPCS non-AP MLD using EPCS EDCA parameters. A non-AP MLD can communicate with a peer EPCS enabled non-AP MLD using EDCA parameters. No additional change required.  |
| 11246 | 35.17.3.2 | 539.39 | Is EDCA parameter set based prioritization enough to guarantee priority access to EPCS devices? | Spec needs to consider other methods for prioritization for EPCS devices | **Rejected**After EPCS is enabled, the EPCS AP MLD can update EDCA parameters via sending an EPCS Priority Access Enable Request to update the EPCS EDCA parameters for priority access when necessary. STAs that are affiliated with EPCS non-AP MLDs can use the updated EDCA parameters for priority access once the EPCS Priority Access Enable Request is received. The EPCS AP MLD can also lower the EDCA parameters carried in Beacon or Probe Response frame, which is used by regular non-AP MLD. Therefore, it makes EPCS non-AP MLDs have relative higher access priority.In addition, the current 802.11be spec does not preclude other mechanisms for EPCS devices. The EPCS AP MLD can send a trigger frame to a STA affiliated with the EPCS non-AP MLD to trigger uplink transmission, or setup TWT with the EPCS non-AP MLD and schedule TWT SP for the non-AP MLD’s transmission. Those mechanisms are EPCS AP MLD implementation dependent. |

***TGbe editor: Please note baseline is 11be D2.0.***

*TGbe editor: Please change 35.17.3 as follows (track change on):*

* + - 1. **EDCA operation using EPCS EDCA parameters**

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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 (e.g., Beacon or Probe Response)(#10888) 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
	+ to an EPCS non-AP MLD~~s~~ in the enabled state using an EPCS Priority Access Enable Request in the Per-STA Profile, with the Link ID corresponding to the AP, carried in Priority Access Multi-Link element, ~~contained frame that result in higher~~ to update the priority for the STA 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 a Beacon or a Probe Response frame for transmitted BSSID in the EDCA Parameter Set element as described in 9.4.2.28 (EDCA Parameter Set element), which lowers the priority for those STAs (#10474, #10888, #10889); 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 (#14086).
* 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))

*TGbe editor: Please change 35.17.2.2 as follows (track change on):*

**35.17.2.2.3 Procedures at the originating 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 AP MLD that supports this functionality shall follow the procedure below to request the change of the EPCS priority access for an associated non-AP MLD to the enabled state.

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

1. 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.
2. ….
3. ….
4. ….
5. An AP affiliated with the AP MLD that has at least one associated EPCS non-AP MLD with EPCS Priority Access in the enabled state may transmit an ~~broadcast~~ EPCS Priority Access Enable Request frame which contains updated EDCA parameters carried in Priority Access Multi-Link element to one or all EPCS non-AP MLDs in the enabled state (#10474, #10888, #10889).

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.

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

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1. 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 the torn down state of the EPCS priority access so it does not only apply to subsequently transmitted traffic.

(#10474, #10888, #10889) 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 in EPCS Priority Access enabled state shall use the following procedure to update EPCS priority access.

1. The receiving non-AP MLD shall issue an MLME-EPCSPRIACCESSENABLE.indication primitive.
2. The receiving non-AP MLD shall not generate a response to an EPCS Priority Access Enable Request frame.

*TGbe editor: Please change 6.3.131.2 as follows (track change on):*

**6.3.131.2 MLME-EPCSPRIACCESSENABLE.request**

**6.3.131.2.1 Function**

This primitive initiates a request to a peer MAC entity to enable EPCS priority access.

**6.3.131.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-EPCSPRIACCESSENABLE.request(

PeerSTAAddress,

Dialog Token,

EDCAParameterSet

)

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| **Name** | **Type** | **Valid range** | **Description** |
| PeerSTAAddress | MAC address | Any valid individual MAC address or the broadcast address (#10474) | Specifies the address of the peer MAC entity or the broadcast address with which the EPCS priority access procedure is performed.NOTE: For the broadcast address, refer to 35.17.2.2.3 (Procedures at the originating AP MLD) (#10474) |
| Dialog Token | Integer | 0–255 | The dialog token to identify the EPCS priority access procedure. |
| EDCAParameterSe t | EDCA Parameter Set element | As defined in9.4.2.28 (EDCA Parameter Set element) | Specifies service parameters for the EPCS EDCA parameter set. |

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