IEEE P802.11
Wireless LANs

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| Resolution of EPCS-Related CIDs for BSS Transition (LB271) |
| Date: March 2023 |
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 Abstract

This submission proposes resolutions for 6 comments submitted during TGbe LB271 that request a means of caching and transferring authority to use EPCS during BSS transitions.

CIDs: 18337, 15423, 15097, 16711, 18339, 18340

Revisions:

* Rev 0: Initial version of the document.

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.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 18337 | 35.16.2 | 645.27 | STA may need to roam to other APs. There needs to be a procedure or an extenstion to an existing procedure (e.g., Fast BSS Transition) to transfer the EPCS authorization information and other EPCS parameters from current AP MLD to target AP MLD | Define a procedure or modify an existing procedure to enable transfer of EPCS related information from current AP MLD to target AP MLD | RevisedAgree in principle with the comment. Added text in clause 35.16 to describe procedure and updated Multi Domain Element to include EPCS in fast transition process.**TGbe editor please implement changes labelled as #18337 in document 802.11-22-0915r0.** |
| 15097 | 35.16.2 | 646.23 | When an EPCS enabled STA performs handover between APs, EPCS services should be recovered as soon as possible. Fast BSS Transition (FT) procedure can be used to transfer the EPCS authorization information from current AP to target AP, in order to avoid requesting authorization from NSEP service provider via interworking procedures. | Add EPCS related (e.g., EPCS authorization) information into FT frames. | RevisedAgree in principle with the comment. Added text in clause 35.16 to describe procedure and updated Multi Domain Element to include EPCS in fast transition process.**TGbe editor please implement changes labelled as #18337 in document 802.11-22-0915r0.** |
| 16711 | 35.16.2 | 646.45 | When an EHT STA or an MLD supporting EPCS (and authorized) moves from one BSS to another BSS within the same ESS when a fast BSS transition is used, it is important that the STA or an MLD receives the similar priority access in the target BSS. The fast BSS transition procedures for EPCS priority access is thus required. | As in comment | RevisedAgree in principle with the comment. Added text in clause 35.16 to describe procedure and updated Multi Domain Element to include EPCS in fast transition process.**TGbe editor please implement changes labelled as #18337 in document 802.11-22-0915r0.** |
| 15423 | 35.16 | 645.51 | When an EPCS non-AP MLD performs a BSS transition, it is desirable that its authority to use EPCS transitions with it. In addition, it would be desirable to retain the state of EPCS priority access (e.g., enabled) across BSS transitions | Add a subclause to 35.16 that describes a mechanism to transfer the authority to use EPCS and the state of EPCS priority access during BSS transition. This could be built on the Fast Transition concept | RevisedAgree in principle with the comment. This comment is addressed in part by revisions associated with #18337. In addition, added text in clause 35.16 to describe procedure to automatically enable EPCS after fast transition.**TGbe editor please implement changes labelled as #15423in document 802.11-22-0915r0.** |
| 18339 | 35.16.2.2 | 646.50 | The AP MLD should be able to cache authorization information locally for subsequent EPCS authorization during (re)association/BSS transition | as in the comment | RevisedAgree in principle with the comment. Added text in clause 35.16 to describe caching and distribution of authorization information in conjunction with FT**TGbe editor please implement changes labelled as #18339 in document 802.11-22-0915r0.** |
| 18340 | 35.16.2.2 | 646.50 | The AP MLD should also be able to share cached authorization information with other APs that are a part of the network for EPCS authorization when a device undergoes BSS transition. | as in the comment | RevisedAgree in principle with the comment. Added text in clause 35.16 to describe caching and distribution of authorization information in conjunction with FT**TGbe editor please implement changes labelled as #18339 in document 802.11-22-0915r0.** |

**TGbe editor: Please note baseline documents are 11be D3.2 and REVme D3.0**

**Editor: Please add the following text in a new clause immediately at the end of clause 35.16 (EPCS Priority Access)**

[#18337] **35.16.X EPCS Priority Access with Fast BSS Transition**

An EPCS FT non-AP MLD is an EPCS non-AP MLD that supports the functionality to transfer EPCS priority access with Fast BSS transition. An EPCS FT non-AP MLD shall support both EPCS and FT and shall have a value of true for dot11EPCSFTOptionImplemented. An EPCS FT AP MLD is an EPCS AP MLD that supports the functionality to transfer EPCS priority access with Fast BSS transition. An EPCS FT AP MLD shall support both EPCS and FT shall have a value of true for dot11EPCSFTOptionImplemented. An EPCS FT AP MLD shall set the EPCS Authorization subfield to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) in the Beacon and Probe Response frames it transmits.

An EPCS FTO is an EPCS FT non-AP MLD operating as an FTO and an EPCS FTR is an EPCS FT AP MLD operating as an FTR, where FTO and FTR are as defined in Clause 13 (Fast BSS transition).

**35.16.X.1 EPCS Priority Access and FT Initial Mobility Domain Association: Behavior of the EPCS FT non-AP MLD**

In order to enable the transfer of the authority to use EPCS during BSS transitions, an EPCS FT non-AP MLD shall use the FT initial mobility domain association in an RSN (13.4.2 (FT initial mobility domain association in an RSN)) when performing its initial (re)association within a mobility domain. An EPCS FT non-AP MLD that includes the mobility domain element (9.4.2.46 (MDE)) in the (Re)Association Request that it transmits via an affiliated STA shall set the EPCS Authorization subfield to 1 in the FT Capability and Policy field. The EPCS FT non-AP MLD shall only send a (Re)Association Request with the EPCS Authorized field set to 1 to an EPCS AP MLD that sets the EPCS Authorization subfield to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) in the Beacon and Probe Response frames it transmits via an affiliated AP.

After successful initial (re)association in a mobility domain, an EPCS FT non-AP MLD that received an Association Response frame that has the EPCS Authorization subfield set to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) may use the operations described below to transfer its authority to use EPCS priority access as part of its fast BSS transition operations. An EPCS non-AP MLD that received an Association Response frame with the EPCS Authorization subfield set to 0 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) shall not use the procedures described below for transferring authority to use EPCS priority access as part of its fast BSS transition operations.

**35.16.X.2 EPCS Priority Access and Fast BSS Transition: Behavior of the EPCS FTO**

To transfer authority to use EPCS priority access as part of its fast BSS transition, an EPCS FTO shall use the over-the-air FT protocol in an RSN (13.5.2 (Over-the-air FT protocol authentication in an RSN)) with the following modifications. The EPCS FTO shall set the EPCS Authorization subfield to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) in the Authentication Request frame that it transmits via an affiliated STA to the target EPCS FTR.

[#15423]To request that EPCS priority access be enabled upon successful conclusion of the BSS transition process, the EPCS FTO shall set the EPCS Enabled subfield to 1 in the EPCS Control subelement of the fast BSS transition element (9.4.2.46 (FTE)) in the Authentication Request that it transmits to the target EPCS FTR via an affiliated STA. Otherwise, the EPCS FTO shall set the EPCS Enabled field to 0. After the BSS transition, an EPCS FTO that received an Authentication Response frame with 1 in the EPCS Enabled field in the EPCS Control subelement of the fast BSS transition element (9.4.2.46 (FTE)) shall set its EPCS priority access state to enabled and apply EPCS priority access as described in 35.16.3 (EPCS priority access procedure) using the default EDCA parameters found in Table 9-155 (Default EDCA Parameter Set element parameter values if dot11OCBActivated is false or the STA is a non-sensor STA).

[#18337]**35.16.X.3 EPCS Priority Access and FT Initial Mobility Domain Association: Behavior of the EPCS FT AP MLD**

An EPCS FT AP MLD shall set the EPCS Authorization subfield to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) in the Beacon and Probe Response frames that it transmits.

An EPCS FT AP MLD that receives an (Re)Association Request frame as part of an initial mobility domain association in an RSN (13.4.2 (FT initial mobility domain association in an RSN)) with the EPCS Authorization subfield set to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) shall verify the authority of the requesting non-AP MLD to use EPCS priority access as part of the association process. The method that the EPCS FT AP MLD uses to perform this verification is outside the scope of this specification.

[#18339] The EPCS FT AP MLD associated with R0KH caches the EPCS authorization information for use during subsequent fast BSS transition operations. As part of the operation where the R0KH delivers the PMK-R1 to the R1KH, the EPCS FT AP MLD associated with R0KH transfers the information confirming the authority of the requesting EPCS FT non-AP MLD to use EPCS priority access to the EPCS FT AP MLD that received the (Re)Association Request. As per 13.2.2 (Authentication key holders), the protocol for distribution of keying material, which might also be used for distribution of EPCS authorization information, from the R0KH to the R1KH(s) is outside the scope of this standard.

[#18337] If the association process is successful and the EPCS FT non-AP MLD is authorized to enable EPCS priority access, the EPCS FT AP MLD shall set the EPCS Authorization subfield to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) in the (Re)Association Response that the EPCS FT AP MLD transmits via an affiliated AP to the EPCS FT non-AP MLD.

**35.16.X.4 EPCS Priority Access and Fast BSS Transition: Behavior of the EPCS FTR**

A target EPCS FTR that receives an Authentication Request as part of the fast BSS transition protocol (13.5.2 (Over-the-air FT protocol authentication in an RSN)) with the EPCS Authorization subfield set to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) shall verify the authority of the EPCS FTO to enable EPCS priority access [#18339] using the information cached by the EPCS AP MLD associated with R0KH.

[#18337]If the authentication process is successful and the EPCS FTO is authorized to enable EPCS priority access the EPCS FTR shall set the EPCS Authorization subfield to 1 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)) in the Authentication Response frame that the EPCS FTR transmits to the EPCS FTO. If the authentication process is successful and the EPCS FTO is not authorized to enable EPCS priority access, the EPCS FTR shall set the EPCS Authorization subfield to 0 in the FT Capability and Policy field of the mobility domain element (9.4.2.46 (MDE)).

In addition, if the authentication process is successful and the EPCS FTO is authorized to enable EPCS priority access:

* [#15423]If the EPCS Enabled subfield was set to 1 in the EPCS Control subelement of the fast BSS transition element (9.4.2.46 (FTE)) in the Authentication Request as part of the fast BSS transition process, the transition process was successful, the EPCS FTO is authorized to enable EPCS priority access, and the target EPCS FTR accepts the request to enable EPCS priority access for the EPCS FTO, the target EPCS FTR shall set the EPCS Enabled subfield to 1 in the EPCS Control subelement of the fast BSS transition element (9.4.2.46 (FTE)) in the Authentication Response that it transmits via an affiliated AP.
* If the EPCS Enabled subfield was set to 0 in the EPCS Control subelement of the fast BSS transition element (9.4.2.46 (FTE)) in the Authentication Request or the EPCS FTR did not accept the request to enable EPCS priority access for the EPCS FTO, the EPCS FTR shall set the EPCS Enabled subfield to 0 in the EPCS Control subelement of the fast BSS transition element (9.4.2.46 (FTE)) in the Authentication Response that it transmits via an affiliated AP.

**Editor: Please make the indicated changes to clause 9.4.2.45**

**9.4.2.45 MDE**

…

The FT Capability and Policy field is 1 octet. The FT Capability and Policy field is defined in Figure 9-416 (FT Capability and Policy field format).

[#18337]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | ~~B2~~B3 B7 |
|  | Fast BSSTransitionover DS | Resource RequestProtocol Capability | EPCS Authorization | Reserved |
| Bits | 1 | 1 | 1 | ~~6~~5 |

**Figure 9-416—FT Capability and Policy field format**

Bits 0–~~1~~2 of the FT Capability and Policy field control the behavior of STAs performing fast BSS transitions (see 13.3 (Capability and policy advertisement)). The STA might use information from the MDE to determine the transition methods recommended by the AP and protocols supported by the AP. The choice of executing any specific transition method is outside the scope of this standard.

If the Resource Request Protocol Capability subfield is 1, then the STA might perform the FT resource request protocol as described in 13.6 (FT resource request protocol).

[#18337]An EPCS non-AP MLD sets the EPCS Authorization subfield to 1 to assert that it has EPCS priority access activated and to request that its authority to use EPCS priority access be confirmed during the (re)association and fast BSS transition processes. An EPCS AP MLD sets the EPCS Authorization subfield to 1 to advertise its support for including EPCS in the fast BSS transition process and to indicate to an EPCS non-AP MLD that its authority to enable EPCS priority access has been verified.

When sent by ~~a STA~~ an FTO to a target FTR ~~AP~~, the Fast BSS Transition over DS and the Resource Request Protocol Capability fields in the FT Capability and Policy field match~~es~~ the values advertised by that target FTR ~~AP~~. See 13.8 (FT authentication sequence).

**Editor: Please make the indicated changes to Table 9-219**

 [#15423]**Table 9-219—Subelement IDs**

|  |  |
| --- | --- |
|  Value | Contents of Data Field |
| … |  |
| 7 | MLO GTK |
| 8 | MLO IGTK |
| 9 | MLO BIGTK |
| 10 | EPCS Control |
| ~~10~~11-255 | Reserved |

…

**Editor: Please insert the following text at the end of Clause 9.4.2.46**

**9.4.2.46 FTE**

…

[#15423]The EPCS Control subelement contains the EPCS subfield that is used to control the transfer of the authority to use EPCS during fast BSS transition.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Subelement ID | Length | EPCS |
| Octets  | 1 | 1 | 1 |

**Figure 9-XX1—EPCS Control subelement format**

The EPCS Control subelement’s EPCS subfield is defined in Figure 9-XX2 (EPCS Control subelement’s EPCS field format).

|  |  |  |
| --- | --- | --- |
|  | B0 | B2 B7 |
|  | EPCS Enabled | Reserved |
| Bits | 1 | 7 |

**Figure 9-XX2—EPCS Control subelement’s EPCS subfield format**

An EPCS non-AP MLD sets EPCS Enabled subfield to 1 to request that the EPCS AP MLD enable EPCS priority access at the end of the fast BSS transition operation. An EPCS AP MLD sets the EPCS Enabled subfield to 1 to indicate the EPCS non-AP MLD can put EPCS priority access in the enabled state at the end of the fast BSS transition operation.

**Editor: Please update the dot11EHTStationConfig table as shown.**

**C.3 MIB Detail**

…

Dot11EHTStationConfigEntry ::=

SEQUENCE {

dot11EHTPPEThresholdsRequiredTruthValue,

dot11TIDtoLinkMappingActivatedTruthValue,

dot11EHTEPCSPriorityAccessActivatedTruthValue,

dot11MSDTimerDurationUnsigned32,

dot11MSDTXOPMAXUnsigned32,

dot11MultiLinkActivatedTruthValue,

dot11MLDAssociationSAQueryMaximumTimeoutUnsigned32,

dot11EHTMCSFeedbackOptionImplementedINTEGER,

dot11EHTEMLSROptionImplementedTruthValue,

dot11EHTEMLSROptionActivatedTruthValue,

dot11EHTEMLMROptionImplementedTruthValue,

dot11EHTEMLMROptionActivatedTruthValue,

dot11OperationParameterUpdateImplementedTruthValue

[18337]dot11EPCSFTOptionImplemented

}

**Editor: Please add the following just before the end of the dot11EHTStationConfig table.**

[18337]

dot11EPCSFTOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity. Changes take effect as soon as practical in the implementation.

This attribute, when true, indicates the ability of the MLD to support functionality to transfer the authority to use EPCS priority access as part of the Fast BSS transition operation. If the attribute is false, the MLD does not support the transfer of the authority to use EPCS priority access during Fast BSS transition."

DEFVAL { false }

::= { dot11EHTStationConfigEntry 14 }