IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11be D2.0 Cooment Resolution 35.3.18 Part 2 | | | | |
| Date: September 2022 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Liwen Chu | NXP |  |  | Liwen.chu@nxp.com |

Abstract

Proposed draft text for enhancements to TID mapping.

The submission proposes text changes to resolve the following CIDs

13708, 10369, 10509, 11465, 10043, 12875, 12876, 10162, 13877, 10159,

10160, 10161, 12684, 12452, 12166, ~~12167,~~ 11466, 10868, 10910, 12294,

13949, 11584, 13594, 13595.

# Revision History

|  |  |  |
| --- | --- | --- |
| **Date** | **Revision** | **Changes** |
| 2022-09-02 | 0 | Initial draft |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed Resolution** |
| 13708 | 467 | 3 | add "if present" after "otherwise, the MLD shall set the EMLMR Support subfield to 0" | as in comment. | Accepted |
| 10369 | 467 | 6 | "An MLD with dot11EHTEMLMROptionImplemented equal to true shall indicate the number of spatial streams NSS that a non-AP MLD supports ..." "An MLD" at the beginning should be the same with "a non-AP MLD" in the middle of the sentence. | Change it to read "An non-AP MLD with dot11EHTEMLMROptionImplemented equal to true shall indicate the number of spatial streams NSS that the non-AP MLD supports ...". | Accepted |
| 10509 | 467 | 6 | "shall indicate the number of spatial streams N SS that a non-AP MLD supports". Is this per link (and a field per link) or a single value for all links? | clarify | Rejected  Discussion: as mentioned in the sentence, the MCS, Nss are used for EMLMR operation, i.e. all the EMLMR links. |
| 11465 | 467 | 6 | This statement applies only to a non-AP MLD. Replace 'An MLD with dot11EHTEMLMROptionImplemented...' to 'A \*non-AP\* MLD with ...' | As in comment | Revised  The change is covered by the accepted CID 10369 |
| 10043 | 467 | 8 | From the current text, it's not clear what is the RX Max NSS and TX Max NSS should be set for NSS in EMLMR Supported MCS and NSS Set subfield. Is the max RX and TX NSS should be larger than or sum of each links RX and TX spatial streams? | please specify what is the max TX/RX NSS in EMLMR mode of operation | Revised  Discussion: the announced Rx Nss and Tx Nss are the capabilitites after the radio switch from the other EMLMR links to the EMLMR link where the initial frame is received from the AP affiliated with the associated AP MLD on the EMLMR link. The value of the announced Rx and TX Nss are more than the Rx and Tx Nss of each EMLMR link.  TGbe editor to make change in THIS DOCUMENT with CID tag 10043 |
| 12875 | 467 | 23 | It is not clear that how the EML Operating Mode Notification frame is sent on the link to enable or disable EMLMR mode. Is it to enable one link or multiple links of EMLMR? | Please clarify the procedures. | Rejected  Discussion: the EML Operating Mode Notification frame is same as the other MLD level management frame. All the links indicated in EMLMR Link Bitmap field are enabled. |
| 12876 | 467 | 24 | "to" is missing between "switch" and "EMLMR mode" | "If a non-AP MLD with dot11EHTEMLMROptionImplemented equal to true intends to switch to EMLMR mode after MLD association, then a non-AP STA affiliated with the non-AP MLD shall transmit an EML Operating Mode Notification frame with EMLMR Mode subfield equal to 1 or 0 to enable or disable EMLMR mode, respectively." | Revised  Discussion: the paragraph covers the case of switch to EMLMR mode and the case of switch to MLMR mode per the value of EMLMR Mode subfield.  TGbe editor to make change in THIS DOCUMENT with CID tag 12876 |
| 10162 | 467 | 27 | An AP MLD has not the possibility to propose to a non-AP MLD to disabled the EMLMR mode | Specify a procedure allowing an AP to transmit an EML Operating Mode Notification frame for proposing to a non-AP STA to disable its EMLMR mode. | Rejected  Discussion: the EMLMR operation is like dynamic/static SM power save operation. It is the decision of the client side whether the feature is enabled or disabled. |
| 13877 | 467 | 27 | It should allow AP to initiate and send EML Operating Mode Notification frame, please complete this case | please complete the missing case | Rejected  Discussion: the EMLMR operation is like dynamic/static SM power save operation. It is the decision of the client side whether the feature is enabled or disabled. |
| 10159 | 467 | 31 | An AP MLD has not the possibility to refuse an EML Operating Mode Notification frame and shall accept that the non-AP MLD operates in EMLMR Mode which is not necessarly possible if the the AP MLD is a NSTR mobile AP MLD. | Specify a procedure allowing an AP to refuse an EML Operating Mode Notification frame transmitted by the non-AP MLD initiating an EMLMR mode | Rejected  Discussion: the EMLMR operation is like dynamic/static SM power save operation. It is the decision of the client side whether the feature is enabled or disabled. |
| 10160 | 467 | 31 | An AP MLD has not the possibility to propose different EMLMR links that the EMLMR links specified by the non-AP MLD in the EML Operating Mode Notification frame | Specify a procedure allowing an AP MLD to propose other EMLMR links that the EMLMR links specified by the non-AP MLD in the EML Operating Mode Notification frame | Rejected  Discussion: the EMLMR operation is like dynamic/static SM power save operation. It is the decision of the client side the links there the EMLMR is enabled. |
| 10161 | 467 | 31 | An AP MLD has not the possibility to propose/initiate to a non-AP MLD to operate in EMLMR mode | Specify a procedure allowing an AP to transmit an EML Operating Mode Notification frame for proposing to a non-AP STA to initiate its EMLMR mode. | Rejected  Discussion: the EMLMR operation is like dynamic/static SM power save operation. It is the decision of the client side whether the feature is enabled or disabled. |
| 12684 | 467 | 31 | The AP affiliated with the AP MLD can't update a value according to the MLE received from itself, as implies from the following sentence: "After successful transmission ...the non-AP STA and the AP initialize the transition timeout timer with the Transition Timeout subfield value in the EML Capabilities subfield of the Basic Multi-Link element \*received from the AP\*" | Split the sentence into two sentences where one refers for the non-AP STA and the other refers to the AP, as follows: "After successful transmission ...the non-AP STA initializes the transition timeout timer with the Transition Timeout subfield value in the EML Capabilities subfield of the Basic Multi-Link element received from the AP and the AP initializes the transition timeout timer with the Transition Timeout subfield value in the EML Capabilities subfield of the Basic Multi-Link element carried in the most recent Beacon or Probe response frames it transmits" | Revised  Generally agree with the commenter.  TGbe editor to make change in THIS DOCUMENT with tag 12684. |
| 12452 | 467 | 48 | Required time for the EMLMR link switching depends on operating channels of each EMLMR links, etc. Therefore, the non-AP STA may not be capable of receiving a PPDU that is sent using more than one spatial stream within the specified time, if the non-AP MLD indicates only minimum padding duration in common info field. | Add indication of EMLMR delay for each link pairs. | Rejected  Discusison: the minimum padding duration in Common Info field is the miminal time required for the radio switch for all EMLMR links of a non-AP MLD. |
| 12166 | 467 | 57 | How to select a link from the EMLMR links in the case where a frame exchange sequence is initiated on the EMLMR links is not described. | Please clarify how MLD selects a link for initial frame exchange out of plural EMLMR links. | Rejected  Discussion: The selection of an EMLMR link is the implementation choice. |
| 11466 | 467 | 58 | Replace 'AP of an AP MLD' with 'An AP affiliated with an AP MLD'. | As in comment | Revised  Generally agree with the commenter. “AP of an AP MLD” will be replaced by “an AP affiliated with an AP MLD”  TGbe editor to make changes in THIS DOCUMENT with CID tag 11466 |

**35.3.18 Enhanced multi-link multi-radio operation**

***TGbe editor: Change 35.3.18 as follows(the paragraphs net shown in the document are not changed):***

……

10043 option 1:

An MLD with dot11EHTEMLMROptionImplemented equal to true shall indicate the number of spatial streams NSS that a non-AP MLD supports for reception and transmission during EMLMR operation in the EMLMR Supported MCS And NSS Set subfield of the EML Control field of the EML Operating Mode Notification frame. The Tx Nss and Rx Nss in the EMLMR Supported MCS And NSS Set subfield of the most recent EML Operating Mode Notification frame sent by the non-AP MLD shall be set to a value greater than the Tx Nss and Rx Nss of each EMLMR link as defined in 35.15(PPDU format, BW, MCS, NSS, and DCM selection rules), 35.9 (Operating mode indication), and 26.9 (Operating mode indication). (#10043)

10043 option 2:

An MLD with dot11EHTEMLMROptionImplemented equal to true shall indicate the number of spatial streams NSS that a non-AP MLD supports for reception and transmission during EMLMR operation in the EMLMR Supported MCS And NSS Set subfield of the EML Control field of the EML Operating Mode Notification frame. The Tx Nss and Rx Nss in the EMLMR Supported MCS And NSS Set subfield of the most recent EML Operating Mode Notification frame sent by the non-AP MLD shall be set to a value greater than the Tx Nss and Rx Nss of at least one EMLMR link as defined in 35.15(PPDU format, BW, MCS, NSS, and DCM selection rules), 35.9 (Operating mode indication), and 26.9 (Operating mode indication). (#10043)

……

Which option do you support to address CID 10043 in 11-22/1504r4?

Option 1

Option 2

Abstain

44 Option1, 16 Option2, 11 Abstain

When a non-AP MLD with dot11EHTEMLMROptionImplemented equal to true (re)associates with an AP MLD, the EMLMR mode is disabled by default. If a non-AP MLD with dot11EHTEMLMROptionImplemented equal to true intends to enable or disable EMLMR mode (#12876)after MLD association with an AP MLD that sets its EMLMR Support subfield to 1(#12876), then a non-AP STA affiliated with the non-AP MLD shall transmit an EML Operating Mode Notification frame with EMLMR Mode subfield equal to 1 or 0, respectively.(#12876)

……

(#12684)After successful transmission of the EML Operating Mode Notification frame from the non-AP STA affiliated with the non-AP MLD to an AP affiliated with an AP MLD, the non-AP STA initializes the transition timeout timer with the value in the Transition Timeout subfield of the Basic Multi-Link element received from the AP MLD. After transmitting Ack solicited by the EML Operating Mode Notification frame from a non-AP STA affiliated with the non-AP MLD, the AP MLD initializes the transition timeout timer with the value in the Transition Timeout subfield of the Basic Multi-Link element announced by the AP MLD. The transition timeout timer begins counting down from the end of the PPDU containing the Ack solicited by the EML Operating Mode Notification frame. The AP should send an EML Operating Mode Notification frame for confirming the mode switch at the AP MLD side to the non-AP STA with EML Control field set to the same value as EML Control field in the received EML Operating Mode Notification frame from the non-AP STA before the transition timeout expires.

……

When an AP affiliated with (#11466) an AP MLD transmits a PPDU that initiates a frame exchange with a non-AP MLD operating in EMLMR mode, the AP shall ensure that the padding duration of the PPDU is longer than or equal to the minimum padding duration value indicated by the EMLMR Delay field of the Basic Multi-Link element received from the non-AP MLD.

……

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed Resolution** |
| 10868 | 466 |  | Please provide an example figure to show the procedure of EMLMR operation. | as in comment | Revised  TGbe editor to make changes in THIS DOCUMET with CID tag 10868 |
| 10910 | 466 | 55 | To understand the difference between EMLMR, EMLSR, and normal MLO, some figures that clarify the differences should be needed. | As in the comment. | Revised  Discussion: an example of frame exchanges in EMLMR mode is added. Through the added example and the examples of the EMLSR in 35.3.17, the difference between EMLSR and EMLMR can be figured out, i.e. the first frame exchange of a TXOP initiated by the AP affiliated with AP MLD with a STA affiliated with an EMLSR non-AP MLD as the TXOP responder can’t include QoS Data frame, Management frame, Control frame other than MU-RTS, BSRP Trigger frame, the first frame exchange of a TXOP initiated by the AP affiliated with AP MLD with a STA affiliated with an EMLMR non-AP MLD as the TXOP responder can include QoS Data frame, Management frame, Control frame other than MU-RTS, BSRP Trigger frame. The MLO without EMLSR and EMLMR doesn’t require the initial frame exchange for radio switch.  TGbe editor to make changes in THIS DOCUMET with CID tag 10910 |
| 12294 | 466 | 55 | To understand the difference between EMLMR, EMLSR, and normal MLO, some figures that clarify the differences should be needed. | As in the comment. | Revised  Discussion: an example of frame exchanges in EMLMR mode is added. Through the added example and the examples of the EMLSR in 35.3.17, the difference between EMLSR and EMLMR can be figured out, i.e. the first frame exchange of a TXOP initiated by the AP affiliated with AP MLD with a STA affiliated with an EMLSR non-AP MLD as the TXOP responder can’t include QoS Data frame, Management frame, Control frame other than MU-RTS, BSRP Trigger frame, the first frame exchange of a TXOP initiated by the AP affiliated with AP MLD with a STA affiliated with an EMLMR non-AP MLD as the TXOP responder can include QoS Data frame, Management frame, Control frame other than MU-RTS, BSRP Trigger frame. The MLO without EMLSR and EMLMR doesn’t require the initial frame exchange for radio switch.  TGbe editor to make changes in THIS DOCUMET with CID tag 12294 |
| 13949 | 467 | 58 | A figure of a frame exchange sequence between AP MLD and non-AP MLDs for EMLMR and supporting text is missing. See EMLSR Figure 35-21 P465 L43 as a reference example. | As in comment | Revised  TGbe editor to make changes in THIS DOCUMET with CID tag 13949 |
| 11584 | 468 | 5 | it is not very clear what the difference is between EMLSR and EMLMR, both can only tx/rx on one link and both can rx/tx using more than 1 spatial stream. Please clarify the difference. More clarifying text and examples may be helpful. | as in comment | Revised  Discussion: an example of frame exchanges in EMLMR mode is added. Through the added example and the examples of the EMLSR in 35.3.17, the difference between EMLSR and EMLMR can be figured out, i.e. the first frame exchange of a TXOP initiated by the AP affiliated with AP MLD with a STA affiliated with an EMLSR non-AP MLD as the TXOP responder can’t include QoS Data frame, Management frame, Control frame other than MU-RTS, BSRP Trigger frame, the first frame exchange of a TXOP initiated by the AP affiliated with AP MLD with a STA affiliated with an EMLMR non-AP MLD as the TXOP responder can include QoS Data frame, Management frame, Control frame other than MU-RTS, BSRP Trigger frame. The MLO without EMLSR and EMLMR doesn’t require the initial frame exchange for radio switch.  TGbe editor to make changes in THIS DOCUMET with CID tag 11584 |
| 13594 | 468 | 8 | Similar to the EMLSR (Figure 35-21, 35-22), please include examples about the basic sequences of the EMLMR mode. | As in the comment. | Revised  TGbe editor to make changes in THIS DOCUMET with CID tag 13594 |
| 13595 | 468 | 8 | Similar to the EMLSR (Figure 35-23, 35-24, 35-25), please clarify the NDP sounding procedure in the EMLMR mode. | As in the comment. | Revised  TGbe editor to make changes in THIS DOCUMET with CID tag 13595 |

**35.3.18 Enhanced multi-link multi-radio operation**

*TGbe editor: Please add the following at the end of 35.3.18:*

(#10868, 10910, 12294, 13949, 11584, 13594, 13595) Figure 35-xx (An example of a frame exchange sequence between an AP affiliated with an AP MLD and an EMLMR STA affiliated with a non-AP MLD) gives an example of frame exchange sequences that starts with the QoS Null frame between an AP affiliated with an AP MLD and an EMLMR STA affiliated with a non-AP MLD. The AP selects the NSS, MCS of the PPDU carrying the QoS Null that are no more than the MCS, Nss in EHT Capabilities element announced by the EMLMR STA. The AP selects the NSS, MCS of the PPDU carrying the A-MPDU that are no more than the MCS, Nss in the EML Control field announced by the EMLMR STA.

Figure 35-xx An example of a frame exchange sequence between an AP affiliated with an AP MLD and an EMLMR STA affiliated with a non-AP MLD

QoS Null

Ack

A-MPDU

BA

AP affiliated with AP MLD

EMLMR STA affiliated with

non-AP MLD

SIFS

SIFS

SIFS