IEEE P802.11  
Wireless LANs

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| Resolution for MISC CIDs | | | | |
| Date: December 16, 2022 | | | | |
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Abstract

This submission proposes resolutions for following 11 CIDs received for TGbe LB266:

11138 11844 10578 11953 12418 13428 13863 13959 13272 14053 14062

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Resolves 3 more CIDs + bugfixes
* Rev 2: Includes another bugfix (related to content and interpretation of Mapping Switch Time field in T2LM IE).
* Rev 3: Includes bugfix for subelements in Neighbor Report element
* Rev 4:
  + All bugfixes are tagged with CID [11138]
  + Additional explanation for issue #3 (Mapping Switch Time field in T2LM IE).
* Rev 5: Live updates when the doc was discussed TGbe call 1/5/23
  + CIDs 11138 and 13863 are deferred
  + Bugfixes are deferred
* Rev 6:
  + Updated, based on offline discussions, to address deferred CIDs and bugfix item #3
  + Also added two more bug fixes #5 & #6

***TGbe editor: Please note baseline is REVme D2.0 and 11be D2.3***

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** |
| 11138 | Brian Hart | 9.4.2.312.2.3 | 223.13 | STA Profile field is defined in clause 35, not clause 9. | Move definition to clause 9. And define it properly, with traditional clause-9 figures (such as a concatenation of fixed fields and subelements). | **Revised**  The contents of the STA Profile field depend on whether the reported profile carries complete or partial profile. Furthermore, the contents for a partial profile can be different as they depend on various conditions. In addition, the contents of STA Profile field are subject to inheritance when the Per-STA Profile subelement carries complete profile. All these cases are captured in clause 35.3 in various subclauses which are references from clause 35.3.3.3. Therefore, the proposed resolution clarifies these aspects and points to clause 35.3.3.3.  As part of the resolution the proposed changes also update the caption for the figures in clause 9.4.2.312.2.4 to remove any ambiguity with respect to other variants of the Multi-Link element.  The resolution also adds a reference to clause 35.16 (EPCS Priority Access) in the description for STA Profile field of Priority Access Multi-Link element for conditions on when (MU) EDCA Parameter Set element is carried in the field.  This comment is also used to fix a few bugs that were found in the TGbe draft.  **TGbe editor, please make changes as shown in 11-22/1978r6 tagged 11138** |
| 11844 | Alfred Asterjadhi | 10.12.4 | 295.31 | how does a mesh STA declare that it is an EHT STA? Please clarify. | As in comment. | **Revised**  Agree with the comment. EHT Cap and EHT Op are added to Mesh Peer Open and Mesh Peer Confirm frames.  **TGbe editor, please make changes as shown in 11-22/1978r5 tagged 11844** |
| 10578 | Abhishek Patil | 10.12.4 | 295.31 | EHT Cap & EHT Op are missing in mesh peer open and confirm frames. | As in comment | **Revised**  Agree with the comment. EHT Cap and EHT Op are added to Mesh Peer Open and Mesh Peer Confirm frames.  **TGbe editor, please make changes as shown in 11-22/1978r5 tagged 11844** |
| 11953 | Jarkko Kneckt | 35.3.12.2 | 441.52 | A STA MLD operating in (a long term) power save should be able to signal to the associated AP MLD the link that it most likely uses to receive a Beacon and the buffered frames. When AP knows this link, the AP may prepare buffered frames transmission in this link. This reduces overheads and STA power consumption, because all frames are ready to be received within the same link. | Please, allow an associated STA MLD to define the link in which it likely receives a Beacon and buffered data frames. The STA MLD expects that AP prepares buffered DL frames ready for transmission in this link. | **Rejected**  The spec allows a non-AP MLD to signal PM=1 on all links except one. Furthermore, an AP MLD duplicated group addressed data frames on each link. This will achieve what the comment is asking for. Therefore, no further changes are needed to address this comment. |
| 12418 | Juseong Moon | 35.3.12.2 | 441.56 | In base spec, U-APSD can be also setup using ADDTS (TSPEC). However, 11be doesn't support TSPEC, U-APSD setup procedure using QoS characteristics element or similar element should be defined in order to be consistent with base spec. | As in comment | **Rejected**  U-APSD advertisement doesn’t depend on TSPEC – as such it can be used independently of TSPEC and QoS Characteristic. Furthermore, TGbe is not deprecating TSPEC. Therefore, no further changes are needed. |
| 13428 | Liwen Chu | 35.3.20 | 470.47 | An AP can carry the critical update of the reported AP through All Updates Included indication | Change the text per the comment. | **Rejected**  The comment is unclear about the exact issue. All-Updates-Included flag is set to 1 when the transmitting AP includes all the updates in the same frame. |
| 13863 | Sanghyun Kim | 35.16.1 | 531.41 | When the EHT STA transmits the Supported Channel Width Set subfield in the Per-STA profile corresponding to the other STA, the subfield shall be set in consideration of the capabilities of the other STA. | As in comment. | **Revised**  Agree with the comment. A NOTE was added to clarify that only elements that are applicable to the EHT STA are included in its frame. Furthermore, a paragraph was added to state that a reporting EHT STA includes the applicable elements in the per-STA profile of the reported STA and the values of the corresponding fields are set to the same as that advertised by the reported STA.  **TGbe editor, please make changes as shown in 11-22/1978r6 tagged 13863** |
| 13959 | Geonjung Ko | 35.16.1 | 530.47 | Since (N+48) bits from 2^(MaxBSSID Indicator subfield value) can be used for group addressed frame indication, the AID range should be changed correspondingly. | (N+48) values from 2^(MaxBSSID Indicator subfield) shall not be assigned as an AID. | **Revised**  The latest draft (D2.3) has incorporated text that addresses this comment. Therefore, no further changes are needed. See resolution for CIDs 13899 and 12825. |
| 13272 | Binita Gupta | 35.3.5.4 | 425.07 | What is the reason for including complete STA profile in the STA Profile subfield if the link is not accepted as indicated by a failure cause in the Status Code in the STA Profile subfield. Clarify this in complete STA profile needs to be included in this case. | As in comment | **Rejected**  The group had discussed this topic in the past and the consensus was to carry complete profile of a rejected link to be consistent with the baseline (single link) behavior. Today when a pre-11be AP rejects an association request, it sets the Status Code field to a nonzero value and include all the elements that it would have otherwise included if it had accepted the association. |
| 14053 | Pooya Monajemi | 35.3.5.4 | 425.01 | If the AP MLD rejects ML setup because the link on which Association Request was transmitted was not accepted, then we must add a method for the AP MLD to signal which link ID is preferred such that the non-AP STA can send another assoc request on that link and expect to be accepted. | Indicate how to set the per-STA profile status codes to signal preferred links. Any other method to signal the same information is also acceptable. | **Rejected**  The group had discussed this topic in the past and the consensus was to carry complete profile of a rejected link to be consistent with the baseline (single link) behavior. Today when a pre-11be AP rejects an association request, it sets the Status Code field to a nonzero value and include all the elements that it would have otherwise included if it had accepted the association. |
| 14062 | Pooya Monajemi | 35.3.5.4 | 425.06 | There is no need for an AP MLD to transmit complete profiles in association response frames for links that are requested but not accepted | Mandate inclusion of complete profile only for the links that are accepted, Only the status code is needed for links that are not accepted. Also update in 35.3.2.2 pg 407 line 31 | **Rejected**  The group had discussed this topic in the past and the consensus was to carry complete profile of a rejected link to be consistent with the baseline (single link) behavior. Today when a pre-11be AP rejects an association request, it sets the Status Code field to a nonzero value and include all the elements that it would have otherwise included if it had accepted the association. |

x-x-x-x-x-x Begin changes for CID 11138 x-x-x-x-x-x

**9.4.2.312.2.4 Link Info field of the Basic Multi-Link element**

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

The contents of the STA Profile field are determined based on whether the Per-STA Profile subelement carries complete or partial profile. When carrying partial profile, the contents of the STA Profile field are determined based on condition in 35.3.4.2 or 35.3.11. When carrying complete profile, the contents of the STA Profile field are subject to rules defined in 35.3.3.3 (Advertisement of complete or partial per-link information).

***TGbe editor: Please update the following figure captions as shown below in this section:***

**Figure 9-1002m—Per-STA Profile subelement format of the Basic Multi-Link element**

**Figure 9-1002n—STA Control field format of the Basic Multi-Link element**

**Figure 9-1002o—STA Info field format of the Basic Multi-Link element**

**35.3.3.3 Advertisement of complete or partial per-link information**

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

NOTE 1—Only Management frames belonging to subtypes (Re)Association Request or (Re)Association Response can include complete profile of a reported STA (see 35.3.5.4 (Usage and rules of Basic Multi-Link element in the context of multi-link (re)setup and authentication between two MLDs)). A multi-link probe response can include complete profile of a reported AP (see 35.3.4.2 (Use of multi-link probe request and response)).

**9.4.2.312.6 Priority Access Multi-Link element**

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

The STA Profile subfield optionally (see 35.16 (EPCS priority access) for conditions) contains the following two elements:

x-x-x-x-x-x End of changes for CID 11138 x-x-x-x-x-x

**9.6.15.2 Mesh Peering Open frame format**[11844]

**9.6.15.2.2 Mesh Peering Open frame details**

***TGbe editor: Please add the following two rows to Table 9-519 as shown below:***

**Table 9-519 – Mesh Peering Open frame Action field format**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | EHT Capabilities | The EHT Capabilities element is present when dot11EHTOptionImplemented is true; otherwise, it is not present. |
| <ANA> | EHT Operation | The EHT Operation element is present when dot11EHTOptionImplemented is true; otherwise, it is not present. |

**9.6.15.3 Mesh Peering Confirm frame format**

**9.6.15.3.2 Mesh Peering Confirm frame details**

***TGbe editor: Please add the following two rows to Table 9-520 as shown below:***

**Table 9-520 – Mesh Peering Confirm frame Action field format**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | EHT Capabilities | The EHT Capabilities element is present when dot11EHTOptionImplemented is true; otherwise, it is not present. |
| <ANA> | EHT Operation | The EHT Operation element is present when dot11EHTOptionImplemented is true; otherwise, it is not present. |

**35.15.1 Basic EHT BSS operation**

***TGbe editor: Please update the contents of the following paragraph (and add a NOTE) in this subclause as shown below:***

[13863]An EHT STA shall set

* the Supported Channel Width Set subfield in the HT Capabilities element (carried outside the Multi-Link element),
* the Supported Channel Width Set and the Extended NSS BW Support subfields in the VHT Capabilities element (carried outside the Multi-Link element),
* the Supported Channel Width Set subfield in the HE Capabilities element (carried outside the Multi-Link element), and
* the Support For 320 MHz in 6 GHz subfield in the EHT Capabilities element (carried outside the Multi-Link element)

as shown in Table 35-7 (Indication of supported channel widths by an EHT STA) to include the channel widths it is capable of supporting.

[13863]NOTE – An EHT STA includes, in Management frame that it transmits, only the elements applicable to its BSS based on the conditions specified in clause 9.3.3. Furthermore, an EHT STA includes elements applicable to a reported STA, in the reported STA’s Per-STA Profile subelement of the Multi-Link element, based on the reported STA’s capabilities and other conditions described in 35.3.3.3.

[11138] x-x-x-x-x-x Bug fixes x-x-x-x-x-x

**Issue 1:** The current description of MLD MAC Address in Basic, Reconfiguration and Priority Access Multi-Link element is inaccurate as it does not cover the case of nonTxBSSID. The proposed change updates the description so that it applies to all cases.

**9.4.2.312.2.3 Common Info field of the Basic Multi-Link element**

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

The MLD MAC Address subfield specifies the MAC Address of the MLD described by the Basic Multi-Link element.

**9.4.2.312.4 Reconfiguration Multi-Link element**

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

The MLD MAC Address subfield specifies the MAC Address of the MLD described by the Reconfiguration Multi-Link element.

**9.4.2.312.6 Priority Access Multi-Link element**

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

The AP MLD MAC Address subfield specifies the MAC Address of the AP MLD described by the Priority Access Multi-Link element.

**Issue 2:** The text describing EHT Op, EHT Cap and Basic ML IE subelements in Neighbor Report elements is not clear enough to state that the subelement does not include Element ID Extension field. In other words, the spec needs to be clear that only the Data field of the subelement has the same format as the Information field of the corresponding element. Furthermore (and consistent with the Multiple BSSID subelement), the standard can provide guidance on when the Basic Multi-Link subelement is not carried in the Neighbor Report element. Standard does not provide guidance when the Basic Multi-Link subelement is included (same as other subelements).

**9.4.2.36 Neighbor Report element**

***TGbe editor: Please update the following paragraphs in this subclause as shown below:***

The Data field of the EHT Capabilities subelement has the same format as the Information field of the EHT Capabilities element defined in 9.4.2.313 (EHT Capabilities element).

The Data field of the EHT Operation subelement has the same format as the Information field of the EHT Operation element defined in 9.4.2.311 (EHT Operation element).

The Data field of the Basic Multi-Link subelement has the same format as the Information field of the Basic Multi-Link element defined in 9.4.2.312.2 (Basic Multi-Link element). The Basic Multi-Link subelement is not present if the reported AP is not affiliated with an AP MLD.

**Issue 3:** The text “rem(|\_TSF / 1024, 65536\_|)” is not clear. It is sufficient to say that Mapping Switch Time field represents bits 10:25 (2 octets) of TSF.

**9.4.2.314 TID-To-Link Mapping element**

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

The Mapping Switch Time field is present when the TID-To-Link Mapping element is transmitted by an AP affiliated with an AP MLD in a Beacon or Probe Response frame and the indicated TID-to-link mapping is not yet established; otherwise, it is not present. The absence of Mapping Switch Time field in the TID-To-Link Mapping element in a Beacon or Probe Response frame transmitted by an AP affiliated with an AP MLD indicates that the indicated TID-to-link mapping is already established. The 2 octet Mapping Switch Time field has units of TUs and is set to the time at which the new mapping is established using as a timebase the value of the TSF corresponding to the BSS identified by the BSSID of the frame containing the TID-To-Link Mapping element: i.e., bits 10 to 25 of the TSF.

**35.3.7.1.7 Advertised TID-to-link mapping in Beacon and Probe Response frames**

***TGbe editor: Please update the following paragraph and add a figure in this subclause as shown below:***

An AP that advertises a TID-to-link mapping shall include the Mapping Switch Time field and sets it to the time, in units of TUs, of a DTIM Beacon of one of the APs affiliated with the AP MLD. Beginning at the indicated time, the indicated TID-to-link mapping is established and the Mapping Switch Time field is no longer included. Figure 35-xx explains the procedure via an example consisting of an AP MLD having three affiliated APs with different DTIM intervals and with TBTTs that are not aligned.

Diagram

Description automatically generated

**Figure 35-xx: An illustration of an advertised TID-To-Link mapping taking effect on all links**

**Issue 4:** This statement in 35.3.21.2 is inaccurate. The baseline spec (11.20.3) allows a non-AP STA to send a TDLS Setup Request frame without going thru the TDLS discovery step or send an unsolicited TDLS Discovery Response frame. Therefore, the text in the parenthesis is modified to include ‘typically’. Furthermore, a clarification NOTE is added pointing to baseline behavior. In addition, since this is general behavior, the text is to its own paragraph in the general clause.

**35.3.21.2 TDLS direct link over a single link**

***TGbe editor: Please move the first sentence in the following paragraph to 35.3.21.1 as shown below:***

Frames that traverse the intermediate AP (MLD) are sent or received by a STA affiliated with a non-AP MLD. Frames sent over the direct link are sent or received by a TDLS non-AP STA affiliated with the non-AP MLD. The TDLS direct link, when successfully established, is between the TDLS non-AP STA affiliated with the non-AP MLD and a TDLS peer STA at the other end of the direct link.

**35.3.21.1 General**

***TGbe editor: Please add the following paragraph at the end of this subclause as shown below:***

typically

NOTE – As an alternative to transmitting a TDLS Discovery Request frame, a non-AP MLD can discover a TDLS peer by sending an unsolicited TDLS Discovery Response frame or a TDLS Setup Request frame without exchanging TDLS discovery frames (see 11.20.3 (TDLS discovery)).

**Issue 5:** Resolution for CID 10453 replaced MLD ID with AP MLD ID throughout the draft. However, there are a few instances that were missed.

***TGbe editor: Please replace MLD ID to AP MLD ID at the following locations in TGbe D2.3:***

P450L60, P452L32, P453L52, P528L8, P528L16

Figure 35-10b, Figure 35-12b, Figure 35-12c [If needed, the author can provide updated Visio files]

**Issue 6:** At the time of FT roaming, when a non-AP MLD send a Reassociation Request frame to a neighboring AP MLD, the AP affiliated with that AP MLD is required to include GTK, IGTK and BIGTK for each link supported by the AP MLD (see 9.4.2.47 in TGbe D2.3). This will cause the length of the FTE IE to exceed 255 octets. The ‘Fragmentable’ column for FTE needs to be updated to address this scenario. Additionally, the MIC computation for FT needs to account for the Fragment element(s) for FTE (if present).

**9.4.2 Elements**

**9.4.2.1 General**

***TGbe editor: Please update the entry for FTE in Table 9-128 and add NOTE 2 in the end as shown below:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Element IDs | | | | |
| Element | Element ID | Element ID Extension | Extensible | Fragmentable |
| … |  |  |  |  |
| FTE (see 9.4.2.47 (FTE)) | 55 | N/A | No | See Note 2 |
| … |  |  |  |  |
| Reserved | 255 | 117–255 |  |  |
| NOTE 1 —See 10.28.6 (Element parsing) on the parsing of elements.  NOTE 2 – Yes for a Reassociation Response frame transmitted during ML resetup by an AP affiliated with an AP MLD, in response to a Reassociation Request frame received from a non-AP STA affiliated with a non-AP MLD. No otherwise. | | | | |

**9.4.2.47 FTE**

***TGbe editor: Please update the 5th paragraph in this subclause as shown below:***

The Element Count subfield of the MIC Control field contains the number of elements that are included in the message integrity code (MIC) calculation. It does not include the Fragment element(s) if the FTE is fragmented.

**13.8.5 FT authentication sequence: contents of fourth message**

***TGbe editor: Please update the 11th bullet in the followingx paragraph in this subclause as shown below:***

If present, the FTE shall be set as follows:

…

* The MIC shall be calculated on the concatenation of the following data, in the order given here:
* FTO’s MAC address (6 octets)
* Target AP’s MAC address (6 octets)
* Transaction sequence number (1 octet), which shall be set to the value 5 if this is a Reassociation Request frame and, otherwise, set to the value 3
* RSNE
* MDE
* FTE and corresponding Fragment element(s) (if FTE is fragmented), with the MIC field of the FTE set to 0
* Contents of the RIC-Request (if present)
* RSNXE (if present)

…