IEEE P802.11
Wireless LANs

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| CC36 Resolution for CID 4002 |
| Date: October 21, 2021 |
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 Abstract

This submission proposes resolutions for following CIDs received for TGbe CC36:

4002, 5279, 5984, 6278, 5176

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Minor changes to the baseline text based on offline feedback.
* Rev 2: Added a discussion section. Added CIDs 5279, 5984, 6278, 5176

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** | **Commenter** | **Section** | **Pg.Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 4002 | Abhishek Patil | 9.3.3.11 | 108.40 | Update Table 9-40, Table 9-41 and 35.3.5.4 to specify the condition under which Basic variant ML IE is carried in the Auth frame. For example, it is carried in the frames that require the MLD MAC address of the MLD. This would likely be the first frame i.e., the Authentication frames with Authentication Transaction Sequence Numbers set to 1 and 2. | As in comment | **Revised**Agree in principle with the commenter. There is discrepancy in the text related to inclusion of Multi-Link element in Authentication frames. While clause 35.3.5.4 indicates that it is always present, Table 9-40 indicates that it is optionally present. The discrepancy is removed by making the ML element mandatory in all Authentication frames. Furthermore, the only subfield that is useful in the ML element when carried in Authentication frames is the MLD MAC address. Therefore, normative text is provided to indicate that all other presence indicators shall be set to 0.**TGbe editor: please implement the changes shown in doc 11-21/1659r2 tagged as 4002.** |
| 5279 | Insun Jang | 35.3.5.4 | 257.51 | In current draft, more subfields in Common Info field were defined, which needs to be considered further for Authentication frame. And the descriptions for Link Info field are also needed | As in the comment | **Revised**Agree with the commenter. The only subfield of the Basic Multi-Link element that is useful in Authentication frames is the MLD MAC address. The normative text is updated to clarify that when included in an Authentication frame, the Basic Multi-Link element only carries the MLD MAC address.**TGbe editor: please implement the changes shown in doc 11-21/1659r2 tagged as 4002.** |
| 5984 | Liwen Chu | 35.3.5.4 | 257.51 | the text should be clear about whether the information other than MLD address is needed in Association frames. | As in comment | **Revised**Agree with the commenter. The only subfield of the Basic Multi-Link element that is useful in Authentication frames is the MLD MAC address. The normative text is updated to clarify that when included in an Authentication frame, the Basic Multi-Link element only carries the MLD MAC address.**TGbe editor: please implement the changes shown in doc 11-21/1659r2 tagged as 4002.** |
| 6278 | Ming Gan | 35.3.5.4 | 257.51 | Please specify which part of ML element besides MLD MAC address will be carried in Authentication frame | as in the comment | **Revised**Agree with the commenter. The only subfield of the Basic Multi-Link element that is useful in Authentication frames is the MLD MAC address. The normative text is updated to clarify that when included in an Authentication frame, the Basic Multi-Link element only carries the MLD MAC address.**TGbe editor: please implement the changes shown in doc 11-21/1659r2 tagged as 4002.** |
| 5176 | Guogang Huang | 9.3.3.11 | 108.40 | The Basic Variant Multi-link element includes a lot of parameters. I think the most part of them is not needed during authentication except of the MLD MAC address. | Please clarify which info needs to be carried in the Basic variant Multi-link element in the Authentication frame | **Revised**Agree with the commenter. The only subfield of the Basic Multi-Link element that is useful in Authentication frames is the MLD MAC address. The normative text is updated to clarify that when included in an Authentication frame, the Basic Multi-Link element only carries the MLD MAC address.**TGbe editor: please implement the changes shown in doc 11-21/1659r2 tagged as 4002.** |

**DISCUSSION**

The reason for the inclusion of the Multi-Link element in Authentication frames is to provide the MLD MAC address. The MLD MAC address plays the same role as the STA MAC address in the legacy case since for MLO, authentication is at the MLD level. Thus, the need for MLD MAC address is in all those Authentication frames where the STA MAC address is used in an Authentication algorithm operation.

There are two options:

* Option-1: Include the Multi-Link element in **all** Authentication frames. This will keep the design simple at the expense of a fixed overhead of 12 octets in all Auth frames.
	+ Element ID (1) + Length (1) + Element ID Extension (1) + ML Control (2) + Common Info (Length (1) + MLD MAC address (6)) = 12 octets
* Option-2: Inspect the spec and insert MLD MAC address in only those frames where an Authentication algorithm operation **uses** the STA MAC address.
	+ This would need a detailed investigation of the implications of not including the ML IE in a particular Auth frame.

Based on the above two options, it seems reasonable to select Option-1 because the overhead is small, and it is not error-prone in the sense that we won’t encounter a situation later where the MLD MAC address is required but the spec does not include it. Additionally, just like the STA MAC address (which is always present in the MAC header), the MLD MAC address will always be at the recipient’s disposal at every stage of the Authentication algorithm.

**CHANGES**

***TGbe editor: Please note Baseline is 11be D1.2***

**9.3.3.11 Authentication frame format**

***TGbe editor: Please update Table 9-40 and Table 9-41 as shown below [CID 4002]***

**Table 9-40 – Authentication frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <Last assigned + 1> | Multi-Link | The Basic Multi-Link element is present if the STA is affiliated with an MLD and the frame exchange is with a peer STA that is affiliated with an MLD. Otherwise it is not present. |

**Table 9-41 – Presence of fields and elements in Authentication frames**

|  |  |  |  |
| --- | --- | --- | --- |
| **Authentication algorithm** | **Authentication transaction sequence number** | **Status Code** | **Presence of fields and elements from order 4 onward** |
| FT | 1 | Reserved | The Mobility Domain element is present.The Fast BSS Transition element and RSNEs are present if dot11RSNAActivated is true. (#4002) |
| FT | 2 | Not REJECTED\_WITH\_SUGGESTED\_BSS\_TRANSITION | The Mobility Domain element is present if the Status Code field is 0.The Fast BSS Transition element and RSNEs are present if the Status Code field is 0 and dot11RSNAActivated is true.(#4002) |
| FT | 2 | REJECTED\_WITH\_SUGGESTED\_BSS\_TRANSITION | One or more Neighbor Report element(s) is present (#4002) |
| FT | 3 | Reserved | The Mobility Domain element is present.The Fast BSS Transition element and RSNEs are present if dot11RSNAActivated is true.The RIC element is optionally present. (#4002) |
| FT | 4 | Any | The Mobility Domain element is present if the Status Code field is 0.The Fast BSS Transition element and RSNEs are present if dot11RSNAActivated is true.The RIC element is optionally present if the Status Code field is 0.The TIE (reassociation deadline) is present if a RIC element is present. (#4002) |

**35.3.5.4 Usage and rules of Basic Multi-Link element in the context of multi-link (re)setup**

***TGbe editor: Please revise the following statement as shown below (P334L30) [CID 4002]***

A STA affiliated with an MLD shall include a Basic Multi-Link element in an Authentication frame that it transmits with the following rules:

* the STA shall include the MLD MAC address of the MLD with which the STA is affiliated in the Common Info field of the element
* the STA shall set all subfields in the Presence Bitmap subfield of the Multi-Link Control field of the element to 0
* the STA shall not include the Link Info field of the element. (#4002)

**9.4.2.295b.2 Basic Multi-Link element**

***TGbe editor: Please delete the following statement as shown below (P169L50) [CID 4002]***

The Link ID Info subfield and the BSS Parameters Change Count subfield are present in the Common Info field of the Basic Multi-Link element carried in a Beacon frame, Probe Response frame that is ML probe response, and (Re)Association Response frame. (#4002)

***TGbe editor: Please delete the following statement as shown below (P172L43) [CID 4002]***

The MLD Capabilities subfield is present in the Common Info field of the Basic Multi-Link element carried in a Beacon, Probe Response, (Re)Association Request, and (Re)Association Response frames. (#4002)

**35.3.15 Multi-link channel access**

**35.3.15.2 Multi-link capability signaling**

***TGbe editor: Please delete the following statement as shown below (P354L61) [CID 4002]***

 (#4002)

**35.3.15.8 Medium access recovery procedure**

**35.3.15.8.1 General**

***TGbe editor: Please delete the following statement as shown below (P361L42) [CID 4002]***

An AP affiliated with an AP MLD may include the Medium Synchronization Delay Information field in a Basic Multi-Link element carried in an Association Response, Beacon, or Probe Response frame. (#4002) A STA affiliated with a non-AP MLD shall not include the Medium Synchronization Delay Information field in any Basic Multi-Link element it transmits.