IEEE P802.11
Wireless LANs

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| CR for CIDs Related to STA MAC Address of Non-AP MLD |
| Date: 2021-04-1 |
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Abstract

This submission proposes resolutions for CIDs 2297 on TGbe D0.3 regarding the STA MAC address of the non-AP MLD.

Revisions:

- Rev 0: Initial version of the document.

- Rev 1: Update based on Draft P802.11\_D1.0

- Rev 2: Update based on the received comments

* Add the text to explain how to constuct AAD for the individual Management frame

**Introduction**

***Editing instructions formatted like this are intended to be copied into the TGbe Draft 0.4 (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** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2297 | Michael Montemurro | 128.46 | 35.3.3 | This should not be a requirements for a STA affiliated with a non-AP MLD since the MAC address of the AP affiliated with the non-AP MLD is different and links are based on link pairs of MAC addresses. | At cited location, delete"each non-AP STA affiliated with the non-AP MLD shall have different MAC addresses" | **Revised**Agree in principle with the commenter. The non-AP MLD can use a single MAC address, i.e. the non-AP MLD MAC address is the same as the MAC address of any affiliated STA. So a corresponding Single MAC Address Mode Enable subfield is added in the ML element. **TGbe editor to make the changes shown in 11-21/0594r2 tagged as 2297** |

***Non-AP MLD with a single MAC Address, i.e. the non-AP MLD MAC address is the same as the MAC address of any affiliated STA***

**Discussion 1:**

**AAD construction for individual Management frame**

 (Draft 1.0 Page 268) If a buffered BU is an MMPDU that is intended for one STA affiliated with a non-AP MLD and that is not a Measurement MMPDU, and if it is transmitted on a link where another STA affiliated with the same non-AP MLD is operating on, following the procedure above, the frame shall carry information to determine the intended destination STA affiliated with the non-AP MLD.

According to the above text, we can see that the current draft already has allowed the individual Management frame to be transmitted through any link. Considering that the PTK is derived based on the MLD MAC address, it is reasonable to respectively set both A1 and A2 fields to the corresponding MLD MAC address when constructing AAD for the individual Management frame, regardless of link-level and MLD-level.

For the link-level Management frame, it shall carry link information to determine the intended link. Generally, there are two options. For either option 1 or option 2, the AAD shall not be changed when retransmitted on another link.

* Option 1. Use A3 to carry the intended link info. Then A3 of the AAD is set to MMPDU Address 3 field
* Option 2. Carry the intended link info within the frame body. Then A3 is set to the MLD MAC address when constructing AAD

This will bring the following benefits:

* The individually addressed MMPDU that is not a Measurement MMPDU can be transmitted through any link just like the Data frame, regardless of the individual link-level or MLD-level Management frame.
* When retransmitted on another link, the AAD will not change and thus no need to re-encrypt it.
* Fully decouple the encryption with selecting which link to send it.

**SP 1. In R1, do you support that the AAD shall not be changed when an individually addressed MMPDU that is allowed to be transmitted on any enabled link? Specifically,**

**1. Replacing Addresses A1 and A2 with MLD MAC Addresses for AAD computation,**

**2. Using MLD MAC address in A2 for constructing Nonce.**

**3. A3 is TBD.**

**Result: Yes/No/Abstain**

**SP 2. Do you support using Address 3 to carry the intended link info for the individually addressed link specific MMPDU?**

**Result: Yes/No/Abstain**

**Discussion 2:**

If the non-AP MLD uses the single MAC address mode, there is no any security issue when the MMPDU is retransmitted on another link. In addition, the single MAC address for the non-AP MLD has the following benefits:

* For the AP MLD side, there is no need to do address conversion for the non-AP MLD
* No addressing issue, e.g.
	+ It simplifies the non-AP MLD’s roaming between a legacy AP and an AP MLD [1].
	+ It simplifies the TDLS addressing proposed in [2]
* Signaling overhead reduction
	+ E.g. no need to advertise the affiliated STA MAC addresses for the non-AP MLD during the association and 4-way handshake [3]

The single MAC address for the non-AP MLD is just a special case of the non-AP MLD with multiple MAC addresses. So no big change to the current draft text.

**SP 1: Do you support the single MAC address mode for a non-AP MLD in R2?**

**Result: Yes/No/Abstain**

**References**

[1] 11-20-0669-04-00be-mld-transition

[2] 11-20-1692-01-00be-tdls-handling-in-mlo.pptx

[3] 11-20-0727-00-00be-mla-link-mac-addresses-security.pptx

**Proposed spec text:**

***TGbe editor: modify the following text in page 132***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B3 | B4 | B5 B6 | B7 B11 |  B12 | B13 B15 |
| Maximum Number Of Simultaneous Links | SRS Support | TID-To-Link Mapping Negotiation Supported | Frequency Separation For STR | Single MAC Address Mode Enable | Reserved |
| Bits: |  | 4 |  | 1 | 2 | 5 | 1 | 3 |

 **Figure 9-788em—MLD Capabilities subfield format(#1078)(#1475)(#2981) (#2297)**

(#2139)The subfields of the MLD Capabilities subfield are defined in [Table 9-322ao (Subfields of the MLD](#bookmark100) [Capabilities field(#1078)(#1475)(#2981)](#bookmark100) **[(#2297)](#bookmark100)**[)](#bookmark100).

**Table 9-322ao—Subfields of the MLD Capabilities field(#1078)(#1475)(#2981)**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Maximum Number Of Simultaneous Links | Indicates the maximum number of affiliated STAs in the MLD that sup- port simultaneous transmission or reception of frames. | Set to the maximum number of affiliated STAs in the MLD that support simultaneous trans- mission or reception of frames minus 1. |
| SRS Support | Indicates support for the reception of a frame that carries an SRS Control sub- field. | For an EHT AP:Set to 1 to indicate that an AP MLD with which the AP is affiliated is capable of receiving a frame with SRS Control sub- field. Set to 0 otherwise.For a non-AP EHT STA: Set to 0. |
| TID-To-Link Map- ping Negotiation Sup- ported | Indicates support for TID-to-link mapping negotiation. | Set to 0 if dot11TIDtoLinkMappingActivated is false.Set to 1 if dot11TIDtoLinkMappingActivated is true and the MLD supports mapping each TID to the same or different link set.Set to 2 if dot11TIDtoLinkMappingActivated is true and the MLD supports mapping all TIDs to the same link set.The value 3 is reserved.(See 35.3.6.1.3 (Negotiation of TID-to-link mapping)) |
| Frequency Separation For STR | Indicates the minimum frequency gap between any two links that is recom- mended by the non-AP MLD for STR operation. The frequency gap is speci- fied as the difference between the nearest frequency edges of the two links. | For a non-AP EHT STA:Set to 0 to indicate no frequency separation information is provided.Set to a nonzero value to indicate the STR frequency gap, in units of 80 MHz, minus 80 MHz.For an EHT AP: Set to 0. |
| Single MAC Address Mode Enable | Indicates the single MAC address mode is used by a non-AP MLD. The single MAC address mode means that the non-AP MLD MAC address is the same as the MAC address of any affiliated STAs. | For a non-AP MLD:Set to 1 to indicate the single MAC address mode is used. Set to 0 otherwise.For an AP MLD:Set to 0.  |

***TGbe editor: Please update the following paragraphs in page 133 as follows:***

Each Per-STA Profile subelement starts with STA Control field followed by a variable number of fields and elements as defined in 35.3.2 (Advertisement of multi-link information in Multi-Link element(#2294)).

(#1035)(#2183)(#2451)(#1799)(#1050)(#1778)(#2165)The format of a Per-STA Profile subelement is defined in [Figure 9-788en (Per-STA Profile subelement format)](#bookmark102).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subelement ID | Length | STA Control | STA Info | STA Profile |

Octets: 1 1 2 variable variable

**Figure 9-788en—Per-STA Profile subelement format**

The format of the STA Control field is defined in [Figure 9-788eo (STA Control field for-](#bookmark103) [mat(#1906)(#1907)(#1078)(#1475)(#2981))](#bookmark103).

B0 B3 B4 B5 B6 B7 B8 B9 B10 B15

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Link ID | Complete Profile | MACAddress Present | Beacon Interval Present | DTIM Info Present | NSTRLink Pair Present | NSTRBitmap Size | Reserved |

Bits: 4 1 1 1 1 1 1 6

**Figure 9-788eo—STA Control field format(#1906)(#1907)(#1078)(#1475)(#2981)**

The Link ID subfield specifies a value that uniquely identifies the link where the reported STA is operating on. The usage of link ID is defined in 35.3.2.1 (General)(#1776).

(#2436)The Complete Profile subfield is set to 1 when the Per-STA Profile subelement of the Multi-Link element carries the complete profile as defined in 35.3.2.2 (Advertisement of complete or partial per-link information (#1859)). Otherwise the subfield is set to 0.

(#1035)(#2183)(#2451)(#1799)(#1050)(#1778)(#2165)The MAC Address Present subfield indicates the presence of the STA MAC Address subfield in the STA Info field and is set to 1 if the STA MAC Address subfield is present in the STA Info field; otherwise set to 0. (#2297)For a non-AP MLD, this field is set to 1 if both the Complete Profile subfield and the Single MAC Address Mode Enable subfield are set to 1; otherwise, this subfield is set to 0. For an AP MLD, this field is set to 1 if the Complete Profile subfield is set to 1; otherwise, this field is set to 0.

***TGbe editor: Please update the following paragraphs in Subclause 35.3.3:***

* + 1. **Multi-link device addressing**

An MLD has an MLD MAC address that singly identifies the MLD.

(#1156)The MAC address of each AP affiliated with an AP MLD shall be different from each other.

(#2297)The non-AP MLD MAC address is different from the MAC address of any affiliated STA and the MAC address of each affiliated STA is different from each other. If the single MAC address mode is used, the non-AP MLD MAC address is the same as the MAC address of any affiliated STA;