### IEEE P802.11Wireless LANs

|  |
| --- |
| 11be D1.0 CR for MLD individually addressed Management frame delivery |
| Date: 2021-11-15 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel Corporation | 2200 Mission College Blvd, Santa Clara, CA 950542200  |  | po-kai.huang@intel.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes resolutions for the following CIDs:

6244, 4038, 4251, 6618

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D1.0 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** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 6244 | Ming Gan | 35.x |  | the mechanism for crosslink management transmission is missing | as in the comment | Resvied – Agree in principle with the commenter. TGbe editor to make the changes shown in 11-21/1877r0 under all headings that include CID 6244. |
| 4038 | Abhishek Patil | 35.3.3 | 251.06 | The rules for setting the Address 3 and Address 4 fields of Management frames sent over the air by a transmitting STA affiliated with an MLD are missing | Clarify that the Address 3 (BSSID) is the address of the intended link. | Resvied – Agree in principle with the commenter. TGbe editor to make the changes shown in 11-21/1877r0 under all headings that include CID 6244. |
| 4251 | Alfred Asterjadhi | 35.3.3 | 251.06 | What about MGMT frames? I think they have A3 field as well. Please clarify | As in comment. | Resvied – Agree in principle with the commenter. TGbe editor to make the changes shown in 11-21/1877r0 under all headings that include CID 6244. |
| 6618 | Po-Kai Huang | 35.3.3 | 251.06 | A3 field of management frame shall be set based on 9.3.3.1 Format of (PV0) Management frames. | Add a descripton that A3 field of management frame shall be set based on 9.3.3.1 Format of (PV0) Management frames. | Resvied – Agree in principle with the commenter. TGbe editor to make the changes shown in 11-21/1877r0 under all headings that include CID 6244. |

**Discussion:**

**Propose for CID 6244:**

*TGbe editor: Modify 10.28.5 Operation of the Dialog Token field as follows: (#6244)*

**10.28.5 Operation of the Dialog Token field**

A dialog token is an integer value that assists a STA or an MLD in grouping Management frames sent or received at
different times as part of the same dialog. The algorithm by which the integer value for the dialog is selected
is implementation specific, but should be selected in a manner that minimizes the probability of a frame
associated with one dialog being incorrectly associated with another dialog.

*TGbe editor: Add 35.3.13.1 general at the beginning of 35.3.13 and add paragraphs in 35.3.13 Multi-link device individually addressed Management frame delivery* *as follows: (#6244)*

35.3.13 Multi-link device individually addressed Management frame delivery

35.3.13.1 General

(…existing texts….)

Between an AP MLD and a non-AP MLD associated with the AP MLD, an MLD may transmit an individually addressed MMPDU with the Frame Body field that is intended for one STA affiliated with the associated MLD with a setup link to another STA affiliated with the associated MLD with a setup link if the MMPDU satisfies all the following conditions:

* The MMPDU is a class 3 frame
* The MMPDU is not a Measurement MMPDU
* The MMPUD is not a response to a Measuremnt MMPDU
* The MMPDU is classified as a bufferable MMPDU
* The MMPDU is not a TWT information frame for flexible wake time

Otherwise, an MLD with dot11EHTBaseLineFeaturesImplementedOnly equal to true shall not transmit an individually addressed MMPDU with the Frame Body field that is intended for one STA affiliated with the associated MLD with a setup link to another STA affiliated with the associated MLD with a setup link.

NOTE - TPC Request and Link Measurement Request frames are Measurement MMPDUs.

A non-AP MLD may transmit an individually addressed MMPDU that is an Authentication frame that includes a Basic multi-link element or a (Re)Association Request frame that includes a Basic multi-link element or a Probe Request frame that includes a Probe Request Multi-Link element or a ML Probe Request frame or a Deauthentication frame or a Disassociation frame to any AP affiliated with the AP MLD.

An AP MLD may transmit an individually addressed MMPDU that is a Deauthentication frame or a Disassociation frame to any non-AP STA affiliated with the non-AP MLD.

An MLD may transmit an individually addressed MMPDU that is a classs 3 frame with the Frame Body field that is intended for an associated MLD through any STA affiliated with the associated MLD with a setup link.

Between an AP MLD and a non-AP MLD associated with the AP MLD, the Frame Body field of the following individually addressed MMPDUs shall be intended for an MLD:

* Authentication frame that includes a Basic multi-link element
* (Re)Association Request/Response frame that includes a Basic multi-link elementDeauthentication frame
* Disassociation frame
* Block Ack Action frame
* SA Query Action frame
* Probe Request frame that includes a Probe Request Multi-Link element
* ML Probe Request/Response frame
* WNM Sleep Mode Request/Response frame
* TID-To-Link Mapping Request/Response/Teardown frame
* NSEP Priority Access Enable Request/Enable Response/Teardown frame
* EML Operating Mode Notification frame
* SCS Request/Response frame
* MSCS Request/Response frame

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed TWT information frame for individual TWT that is intended for one STA affiliated with the associated MLD with a setup link is transmitted to another STA affiliated with the associated MLD with a setup link and an acknowledgement in response to the TWT information frame is received, then the TWT requesting STA of the intended link shall consider the corresponding TWT agreement of the intended link suspended starting from the TWT SP of the respective TWT agreement that occurs immediately after the TWT information frame exchange rather than immediately as described in 26.8.4.2 (TWT Information frame exchange for individual TWT).

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed TWT information frame for broadcast TWT that is intended for one STA affiliated with the associated MLD with a setup link is transmitted by another STA affiliated with the associated MLD with a setup link and an acknowledgement in response to the TWT information frame is received, then the TWT scheduled STA of the intended link shall consider all the broadcast TWT schedules as suspended starting from the broadcast TWT schedule of the intended link that occurs immediately after the TWT information frame exchange rather than immediately as described in 26.8.4.3 (TWT Information frame exchange for broadcast TWT).

35.3.13.2 Identification of the Intended STA

-------------------------------------Option 1: Link information in the framebody--------------------------------------------

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed MMPDU that is not a TWT Setup frame that includes a LinkID Bitmap subfield in its TWT element and has the Frame Body field that is intended for one STA affiliated with the associated MLD with a setup link is transmitted to another STA affiliated with the associated MLD with a setup link, then the individually addressed MMPDU shall include Multi-Link Link Information element that identifies the intended link of the Frame Body field of the MMPDU.

Between an AP MLD and a non-AP MLD associated with the AP MLD, an individually addressed MMPDU with the Frame Body field that is intended for an associated MLD shall not include Multi-Link Link Information element.

Between an AP MLD and a non-AP MLD associated with the AP MLD, an individually addressed MMPDU with the Frame Body field that is intended for more than one STA affiliated with an associated MLD shall not include Multi-Link Link Information element.

NOTE – See 35.6.1 (Individual TWT Agreements) for the case when an individually address MMPDU is a TWT Setup frame that includes a LinkID Bitmap subfield in its TWT element. In such case, the Link ID bitmap provides an indication of the link(s) for which the TWT setup applies to instead of the A3 field.

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed MMPDU that carries Multi-Link Link Information element is received by an affiliated STA of the MLD, then the MLD shall determine the intended link of the Frame Body field of the MMPDU based on the Multi-Link Link Information element and shall discard the MMPDU if the Multi-Link Link Information indicates a link without being set up.

***TGbe editor: Add a new subclause 9.4.2.xxx Multi-Link Link Information element as follows: (#6244)***

**9.4.2.xxx Multi-Link Link Information element**

The Multi-Link Link Information element contains the link ID that identifies the intented link of the framebody of the MMPDU that carries the element.

The Multi-Link Link Information element is defined in Figure 9-xxxx (Multi-Link Link Information element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Link ID |
| Octets: | 1 | 1 | 1 | 1 |

**Figure 9-xyz1—Multi-Link Traffic element format**

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

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

*TGbe editor: Modify 35.3.3 Multi-link device addressing as follows: (#6244)*

35.3.3 Multi-link device addressing

(…existing texts….)

(#8227)For an individually addressed frame sent on a link between two MLDs, the following applies:

* (#8230)(#1158)the value of the Address 2 (TA) field (if present) in the MAC header of the frame
shall be the MAC address of the transmitting STA affiliated with the MLD corresponding to that link
except for(#2474) the Individual/Group bit, which is set to 1 when the TA field value is a bandwidth
signaling TA and set to 0 otherwise.
* (#8227)the value of the Address 1 (RA) field in the MAC header of the frame shall be the MAC
address of the receiving STA affiliated with the MLD corresponding to that link.
* (#6185)(#8228)(#1670)the value of the Address 3 field and the Address 4 field (if present) in the
MAC header of a data frame shall be set based on Table 9-30 (Address field contents) and the
settings of the To DS and From DS bits, where the BSSID is the MAC address of the AP affiliated
with the AP MLD corresponding to that link.
* the value of the A3 field in the MAC header of a management frame shall be set based on 9.3.3.1 Format of (PV0) Management frames).

(…existing texts….)

-------------------------------------Option 2: Link information in A3--------------------------------------------

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed MMPDU that is not a TWT Setup frame that includes a LinkID Bitmap subfield and has the Frame Body field that is intended for one STA affiliated with the associated MLD with a setup link is transmitted to another STA affiliated with the associated MLD with a setup link, then the individually addressed MMPDU shall set the A3 field to the BSSID of the intended link of the Frame Body field of the MMPDU. Otherwise, the value of the A3 field in the MAC header of the individually addressed MMPDU shall be set based on 9.3.3.1 Format of (PV0) Management frames.

NOTE – See 35.6.1 (Individual TWT Agreements) for the case when an individually address MMPDU is a TWT Setup frame that includes a LinkID Bitmap subfield in its TWT element. In such case, the Link ID bitmap provides an indication of the link(s) for which the TWT setup applies to instead of the A3 field.

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed MMPDU that is not a TWT Setup frame that includes a LinkID Bitmap subfield in its TWT element and that satisfies all the conditions described in 35.3.13.1 (General) (related to transmission of an individually addressed MMPDU with the Frame Body field that is intended for one STA affiliated with the associated MLD with a setup link to another STA affiliated with the associated MLD with a setup link) is received by an affiliated STA of the MLD, then the MLD shall determine the intended link of the Frame Body field of the MMPDU based on the BSSID value set in the A3 field of the MMPDU and shall discard the MMPDU if the BSSID is the MAC address of an AP affiliated with an AP MLD without setup link.

NOTE – If an individually addressed MMPDU is encrypted, the content of the A3 field can not be used to identify the intended link until the MMPDU is decrypted successfully and replay check is passed.

*TGbe editor: Modify 35.3.3 Multi-link device addressing as follows: (#6244)*

35.3.3 Multi-link device addressing

(…existing texts….)

(#8227)For an individually addressed frame sent on a link between two MLDs, the following applies:

* (#8230)(#1158)the value of the Address 2 (TA) field (if present) in the MAC header of the frame
shall be the MAC address of the transmitting STA affiliated with the MLD corresponding to that link
except for(#2474) the Individual/Group bit, which is set to 1 when the TA field value is a bandwidth
signaling TA and set to 0 otherwise.
* (#8227)the value of the Address 1 (RA) field in the MAC header of the frame shall be the MAC
address of the receiving STA affiliated with the MLD corresponding to that link.
* (#6185)(#8228)(#1670)the value of the Address 3 field and the Address 4 field (if present) in the
MAC header of a data frame shall be set based on Table 9-30 (Address field contents) and the
settings of the To DS and From DS bits, where the BSSID is the MAC address of the AP affiliated
with the AP MLD corresponding to that link.
* the value of the A3 field in the MAC header of a management frame shall be set based on 35.3.13.2 (Identification of the Intended STA).

(…existing texts….)