IEEE P802.11
Wireless LANs

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| LB275 CR for ML Reconfiguration part 5  |
| Date: October 15, 2023 |
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 Abstract

This submission proposes resolutions for following CIDs received for TGbe LB275:

19677, 19853, 19928, 19929, 19930, 19942, 20016, 20017, 20026, 20073

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Fixed old title. Revision to CID 19677 resolution description.
* Rev 2: Revision for CIDs 19853, 20073 and 20017.
* Rev 3: Revision for CID 20073.
* Rev 4: Revision for CID 19853.
* Rev 5: Revision for CID 20073.
* Rev 6: Revision for CID 20073 per offline discussion.

***TGbe editor: The baseline for this document is 11be D4.1.***

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** | **Clause** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 19677 | Arik Klein | 35.3.6.3 | 513.35 | Need to clarify the relationship between the usage of Reconfiguration MLE (in Beacon and Probe Response frames )and the usage of BTM Request frame in case of the removal of affiliated AP:Option 1: You may use either of them at a time (but not both of them) for the non-AP MLD and the BTM Request frame is also used to notify the BSS termination for the non-MLD non-AP STA associated with the affiliated AP (if exist).Option 2: The Reconfiguration MLE is used to announce the removal/addition of affiliated AP and the BTM Request frame is used only to notify the BSS termination for the non-MLD non-AP STA associated with the affiliated AP (if exist). | Please revise the following, per the selected option:Option 1: Revise the following sentence (P512L39)"The AP MLD \*may\* announce the removal of any affiliated AP through either a Reconfiguration Multi-Link element (see 9.4.2.312.4 (Reconfiguration Multi-Link element)) in all Beacon and Probe Response frames transmitted by its affiliated APs \*or a BSS Transition Management Request frame transmitted by the AP affiliated with the AP MLD and operating on the BSS to be removed\* , until the affiliated AP is removed "Option 2: Please remove the following part from the sentence in P513L37 "or to notify of the termination of its BSS to non-AP MLDs that are associated with the APMLD of the affiliated AP" | RevisedAgree with the commenter. Option 2 is the intended approach for the usage of Reconfig ML IE and BTM for the AP removal case and the indicated text for Option 2 is removed from D4.1. No further changes needed. |
| 19853 | Rojan Chitrakar | B.4.40.2 | 938.58 | Status of ML reconfiguration is blank | Add the status. | RevisedAgree in principle. Revised text related to ML reconfiguration in Annex B and clause 4.3.16a.TGbe editor, please make the changes tagged by CID #19853 in 11-23/1769r4. |
| 19928 | Rubayet Shafin | 35.3.6.2 | 511.63 | The newly added AP shall also be beaconing (assuming the newly added AP does not correspond to a nontransmitted BSSID). So technically not only the other APs but also the newly added AP shall be announcing itself. Please revise the sentence to clarify this and separate the case with RNR-based announcement, which indeed will be used by the other APs for the annoucement of the new AP. | as in comment. | RejectedText in clause 35.3.6.2 already captures the behavior for the newly added AP. See P521L33-38 in D4.1. It is obvious that the newly added AP will be sending out beacons. No text clarification needed for that. |
| 19929 | Rubayet Shafin | 35.3.6.2 | 512.01 | We cannnot refer an AP as an "affiliated AP" before the the AP is added to the AP MLD (see the definition of affiliated STA). Please revise the sentence accordingly. | as in comment. | RevisedThe affiliated AP refers to the AP which is added to the AP MLD. Revised text slightly to clarify.TGbe editor, please make the changes tagged by CID #19929 in 11-23/1769r1. |
| 19930 | Rubayet Shafin | 35.3.6.2 | 511.55 | From the client's perspective, if the non-AP MLD could know ahead of time when the AP MLD intends to add the link, it could better plan its course of action in terms link management and power saving. | add a mechanism for the AP MLD to announce, ahead of time, when the new AP would be added. | Rejected Addition of an AP is announced once AP is added through Basic ML element and in RNR by other affiliated APs. It does not seem critical to announce AP addition in advance since the occurrence of an AP addition event may not be that frequent and this event does not impact any ongoing exchanges, unlike the AP Removal case, where the link may be actively used and therefore it is more critical that the non-AP MLD is notified of the removal in advance.  |
| 19942 | Rubayet Shafin | 35.3.6.3 | 512.31 | There is a need to clarify the PS/TWT state information preservation for a link if the link is disabled and the corresponding AP is brought back later on. If PS/TWT information is not preserved, spell it out. | as in comment. | RejectedClause 35.3.6.3 is for the AP Removal and not for link/AP disablement. The AP Removal removes the affiliated AP from the AP MLD and BSS is terminated, no state is preserved once the BSS is terminated. No additional text is needed.  |
| 20016 | Binita Gupta | 35.3.6.2 | 511.57 | Modify text to indicate that AP addition is triggered by MLME-START.request primitive. See text in 35.3.6.3. | Change"An AP MLD may add one or more affiliated APs to the AP MLD (see 6.5.11.2 (MLME-START.request))." to"An AP MLD may add one or more affiliated APs to the AP MLD by initiating the MLME-START.request primitive for each AP to be added (see 6.5.11.2 (MLME-START.request))." | RevisedAgree in principle. Revised text as per suggestion.TGbe editor, please make the changes tagged by CID #20016 in 11-23/1769r1. |
| 20017 | Binita Gupta | 35.3.6.2 | 512.21 | Modify text to indicate that a non-AP MLD identifies that a new AP has been added to its associated AP MLD from the Basic ML element or from RNR. This behavior is independent of whether the non-AP MLD initiates any Link Reconfiguration for the added AP, hence should be indicated as a separate text and not linked with Link Reconfiguration. | Modify existing text as follows:"A non-AP MLD identifies that an affiliated AP has been added to its associated AP MLD from the BasicMulti-Link element or from the Reduced Neighbor Report element contained in the Beacon or Probe Response frames transmitted by any of the APs affiliated with the AP MLD. When the non-AP MLD detects that a new Affiliated AP has been added to its associated AP MLD it may use the ML reconfiguration procedure as defined in 35.3.6.4 (ML reconfiguration to the ML setup) to ..." | RevisedAgree in principle. Revised text as per suggestion.TGbe editor, please make the changes tagged by CID #20017 in 11-23/1769r3. |
| 20026 | Binita Gupta | 35.3.6.3 | 515.06 | A non-AP MLD which has only a single setup link with an AP which is being removed can use the ML reconfiguration operation in ï»¿35.3.6.4 (ML reconfiguration to the ML setup) to establish a setup link with another affiliated AP of the AP MLD. | Add a NOTE to clarify the point mentioned in the comment. | RevisedAgree in principle. Added a NOTE as per suggestion.TGbe editor, please make the changes tagged by CID #20026 in 11-23/1769r1. |
| 20073 | Li-Hsiang Sun | 11.1 | 363.04 | advertised TTLM element and Reconfiguration ML element for AP removal for the transmitted BSSID should not be inherited by non-transmitted BSSIDs because link ID space are independent between MLD associated with transmitted BSSID and MLD associated with non-transmitted BSSID | add procedures in 11.1.3.8 that the two elements are not subject to inheritance and the use of non-inheritance element for the 2 elements are not required | RevisedThis was discussed in the last round for TTLM and rules have been added for advertised TTLM in D4.0 P524L57. Adding text to specify that the ML element is not inherited, since Basic ML is always different for TxBSSID and Non-TxBSSID. TGbe editor, please make the changes tagged by CID #20073 in 11-23/1769r6. |

﻿**4.3.16a Extremely high throughput (EHT) STA**

…

***TGbe editor: Please add following in this subclause as shown below (19853):***

The main MAC features in an EHT STA that are not present in HE STA or VHT STA or HT STA are the following:

* Mandatory support for GCMP-256
* …
* …
* ﻿In an MLD, optional support for non-AP MLD operation parameter update
* In an MLD, optional support for ML traffic indication
* (#19853)In an MLD, support for ML reconfiguration procedures
* ﻿Optional support for EPCS priority access operation
* Optional support for QoS Characteristics element in SCS
* Optional support for BlockAck Bitmap field lengths of 512 and 1024
* Optional support for R-TWT
* Optional support for triggered TXOP sharing procedure

﻿Annex B

**B.4.4.2 MAC frames**

***TGbe editor: Please make following changes in the Table below (19853):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **MAC frame** | **References** | **Status** | **Support** |
| FT75.11 | Link Reconfiguration Notify frame | 9.6.35.12 | CFEHTM- LDAP AND EHTM10.14.4: M | Yes  No  N/A  |
| FT75.12 | Link Reconfiguration Request frame | 9.6.35.13 | CFEHTMLD-nonAP AND EHTM10.14.3: M | Yes  No  N/A  |
| FT75.13 | Link Reconfiguration Response frame | 9.6.35.14 | CFEHTM- LDAP AND EHTM10.14.3: M | Yes  No  N/A  |
| … | … | … | … | … |
| FR76.11 | Link Reconfiguration Notify frame | 9.6.35.12 | CFEHTMLD-nonAP AND EHTM10.14.4: M | Yes  No  N/A  |
| FR76.12 | Link Reconfiguration Request frame | 9.6.35.13 | CFEHTM- LDAP AND EHTM10.14.3: M | Yes  No  N/A  |
| FR76.13 | Link Reconfiguration Response frame | 9.6.35.14 | CFEHTMLD-nonAP AND EHTM10.14.3: M | Yes  No  N/A  |

﻿**B.4.40 Extremely High Throughput (EHT) features**

﻿**B.4.40.2 EHT MAC features**

***TGbe editor: Please make following changes in the Table below (19853):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Protocol capability** | **References** | **Status** | **Support** |
| EHTM10.1 4 | ML reconfiguration | 35.3.6 |  |  |
| EHTM10.14.1 | Adding affiliated APs | 35.3.6.2 | CFEHTMLDAP: OCFEHTMLDnonAP: O | Yes  No  N/A  |
| EHTM10.14.2 | Removing affiliated APs | 35.3.6.3 | CFEHTMLDAP: OCFEHTMLDnonAP: M | Yes  No  N/A  |
| EHTM10.14.3 | Link reconfiguration to the ML setup  | 35.3.6.4 | CFEHTMLD: O | Yes  No  N/A  |
| EHTM10.14.4 | ﻿AP MLD recommendation for link reconfiguration | 35.3.6.5 | CFEHTMLD: O | Yes  No  N/A  |

﻿35.3.6.2 Adding affiliated APs

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

﻿An AP MLD may add one or more affiliated APs to the AP MLD (#20016)by initiating the MLME-START.request primitive (see 6.5.11.2 (MLME-START.request)) for each AP to be added. The added affiliated AP(s) shall be announced through the Basic Multi-Link element by incrementing the Maximum Number Of Simultaneous Links subfield of the MLD Capabilities And Operations subfield by 1 for each added affiliated AP, and through the Reduced Neighbor Report element by including a TBTT Information field carrying the MLD Parameters subfield for the added AP, in the Beacon and Probe Response frames transmitted by other APs affiliated with the same AP MLD.

﻿If an existing AP of the AP MLD where the affiliated AP is (#19929)added corresponds to a nontransmitted

BSSID in a multiple BSSID set, then the AP that corresponds to the transmitted BSSID in the same multiple

BSSID set shall follow the procedures in 35.3.4.4 (Multi-Link element usage in the context of discovery)

and 35.3.4.1 (AP behavior) to announce the added affiliated AP through the Basic Multi-Link element and

the Reduced Neighbor Report element.

<…>

﻿(#20017) A non-AP MLD identifies that an affiliated AP has been added to its associated AP MLD from the Basic Multi-Link element or from the Reduced Neighbor Report element contained in the Beacon or Probe Response frames transmitted by any of the APs affiliated with the AP MLD. When the non-AP MLD detects that an affiliated AP has been added to its associated AP MLD , it may use the ML reconfiguration procedure as defined in 35.3.6.4 (ML reconfiguration to the ML setup) to add a new link to the added affiliated AP in its ML setup, if it has dot11EHTLinkReconfigurationOperationActivated equal to true and the associated AP MLD has the Link Reconfiguration Operation Support subfield set to 1 in the MLD Capabilities And Operations subfield of the Basic Multi-Link element that it transmits.

**35.3.6.3 Removing affiliated APs**

***TGbe editor: Please add following NOTE in this subclause just before NOTE5 on pg525 ln3 in D4.1.***

(#20026) NOTE —If a non-AP MLD has only one setup link with the AP MLD and the AP MLD is announcing that the affiliated AP operating on that setup link ﻿is being removed using the Reconfiguration Multi-Link element, the non-AP MLD can maintain association with the AP MLD by performing a link reconfiguration operation (see 35.3.6.4 (ML reconfiguration to the ML setup)) to establish a setup link with another affiliated AP of the AP MLD.

﻿35.3.20 Multi-link operation in a multiple BSSID set or co-hosted BSSID set

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***TGbe editor: Please add following new paragraphs in this subclause after the 4th paragraph (#20073):***

The inheritance rules specified in 11.1.3.8.4 (Inheritance of element values) shall not be applied to a Multi-Link element, and as a result a Multi-Link element shall not be inherited from a transmitted BSSID to a nontransmitted BSSID profile of a multiple BSSID set (see explanatory NOTE below).

NOTE: The Basic Multi-Link element for an AP corresponding to the transmitted BSSID is always included in a Beacon frame and a Probe Response frame that it transmits. The content of the Basic Multi-Link element for each AP in a multiple BSSID set will always be different since at least the AP MLD MAC address is different for each AP. As a result, the Basic Multi-Link element cannot be inherited. Also, since all variants of the Multi-Link element (see Table 9-404b) share the same Element ID and Element ID Extension (see Table 9-128), no variant of Multi-Link element can be inherited.

﻿11.1.3.8.4 Inheritance of element values(11ax)

…

***TGbe editor: Please add following NOTE at the end of this subclause (#20073).***

NOTE: The inheritance rules described in this subclause do not apply to the Multi-Link element (see 35.3.20 (Multi-link operation in a multiple BSSID set or co-hosted BSSID set)).