IEEE P802.11
Wireless LANs

|  |
| --- |
| LB 266 - CR for Reconfiguration ML element  |
| Date: October 28, 2022 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Binita Gupta | Meta Platforms, Inc. |  |  | binitagupta@meta.com |
| Chunyu Hu |  |  |  |
| M. Kumail Haider  |  |  |  |
| Morteza Mehrnoush |  |  |  |

 Abstract

This submission proposes resolutions for following 21 CIDs received for TGbe LB266:

10567 13480 13759 13762 11042 11401 11520 12603 13757 13265

12604 12778 13262 13263 13264 13266 13479 13758 13761 13481

13760

CIDs SP’d in r1:

13266 13479 13758 13761 12778 13262 12603 13757 13265

CIDs SP’d in r3:

12604 13263 13264

CIDs remaining for SP:

10567 13480 13759 13762 11042 11401

11520 10565 11400

13481 13760

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Changed resolution of CID 11042 from Accepted to Revised
* Rev 2: Added CIDs 10565 and 11400. Revision to resolution for other CIDs per feedback received during the TGbe conf call and offline.
* Rev 3: Updates to resolution for CIDs 10567 and 11520 based on offline feedback.
* Rev 4: Updates based on feedback during the call and offline feedback
* Rev 5: Updates to CR doc reference in the CID table

***TGbe editor: The baseline for this document is 11be D2.3 + 22/1453r2.***

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*** | ***Clause*** | ***Page*** | ***Comment*** | ***Proposed Change*** | ***Resolution*** |
| 10567 | Abhishek Patil | 9.4.2.312.4 | 225.63 | What is the purpose of MAC Address field in STA Info field? The Link ID subfield is sufficient to identify the AP that is being removed from the AP MLD. | Delete the MAC Address Present subfield from STA Control field and remove MAC Address subfield from the STA Info field. | RevisedAgree that the STA MAC Address field is not required in the STA Info field for AP Removal case since the Link ID field is sufficient to identify the AP being removed. However, the STA MAC Address field is used by the ML Reconfig add/delete link procedure in 22/1709, hence it is preferred to keep this field, instead of removing and adding it back. There is a presence bit which is set to 0 to not include this field for AP Removal case.**TGbe editor, please make the changes tagged by CID #10567 in 22/1890r5.** |
| 13480 | Liwen Chu | 9.4.2.312.4 | 226.08 | Clarify why STA Address is needed for deleting a link | As in comment | RevisedThe STA MAC Address field is not required in the STA Info field for AP Removal case since the Link ID field is sufficient to identify the AP being removed. However, the STA MAC Address field is used by the ML Reconfig add/delete link procedure in 22/1709, hence it is preferred to keep this field, instead of removing and adding it back. There is a presence bit which is set to 0 to not include this field for AP Removal case.**TGbe editor, please make the changes tagged by CID #10567 in 22/1890r5.** |
| 13759 | Yuchen Guo | 9.4.2.312.4 | 225.60 | Why is the "MAC Address Present" subfield needed for the Reconfiguration Multi-Link element? The Link ID subfield can uniquely identify the AP to be removed, and the STA can figure out the AP's MAC address using the Link ID subfield | remove the "MAC Address Present" subfield from the figure, or make it reserved. | RevisedAgree that the STA MAC Address field is not required in the STA Info field for AP Removal case since the Link ID field is sufficient to identify the AP being removed. However, the STA MAC Address field is used by the ML Reconfig add/delete link procedure in 22/1709, hence it is preferred to keep this field, instead of removing and adding it back. There is a presence bit which is set to 0 to not include this field for AP Removal case**TGbe editor, please make the changes tagged by CID #10567 in 22/1890r5.** |
| 13762 | Yuchen Guo | 9.4.2.312.4 | 226.09 | The "MAC Address Present" subfield is redundant because the STA can figure out the AP's MAC address using the Link ID subfield | delete this paragraph, and also delete the paragraph in Line 23 of this page | RevisedAgree that the STA MAC Address field is not required in the STA Info field for AP Removal case since the Link ID field is sufficient to identify the AP being removed. However, the STA MAC Address field is used by the ML Reconfig add/delete link procedure in 22/1709, hence it is preferred to keep this field, instead of removing and adding it back. There is a presence bit which is set to 0 to not include this field for AP Removal case**TGbe editor, please make the changes tagged by CID #10567 in 22/1890r5.** |
| 11042 | Po-Kai Huang | 9.4.2.312.4 | 225.58 | change "MAC Address Present" in STA Control field format for the Reconfiguration Multi-Link element to "STA MAC Address Present". This aligns with the naming of Baisc Multi-link element. | change "MAC Address Present" in STA Control field format for the Reconfiguration Multi-Link element to "STA MAC Address Present". | RevisedAgree and made suggested change.**TGbe editor, please make the changes tagged by CID #11042 in 22/1890r5.** |
| 11401 | Gaurang Naik | 9.4.2.312.4 | 225.61 | Rename the subfield to 'STA MAC Address Present'. | As in comment | RevisedAgree and made suggested change.**TGbe editor, please make the changes tagged by CID #11042 in 22/1890r5.** |
| 11520 | Xiaofei Wang | 9.4.2.312.4 | 225.04 | MLD MAC address should always be included to ensure that reconfiguration is correct | as in comment | RevisedIn management frames carrying Reconfiguration ML element, the MLD MAC Address can be obtained from the included Basic ML element for the same MLD, hence MLD MAC Address does not need to be included in Reconfig element. Added text to indicate how MLD MAC Address shall be determined for Reconfig ML element from the MLD MAC Address of the Basic ML element for different cases.**TGbe editor, please make the changes tagged by CID #11520 in 22/1890r5**  |
| 10565 | Abhishek Patil | 9.4.2.312.4 | 225.07 | Beacon frame and Probe Response frame always includes Basic Multi-Link element. Therefore, the MLD MAC Address field is not needed in the ML Reconfiguration element. | Set 'Presence Bitmap' subfield to reserved (including bit B0). Update the description and figure of Common Info field to show only Common Info Length subfield in this field. | RevisedIn management frames carrying Reconfiguration ML element, the MLD MAC Address can be obtained from the included Basic ML element for the same MLD, hence MLD MAC Address does not need to be included in Reconfig element. Added text to indicate how MLD MAC Address shall be determined for Reconfig ML element from the MLD MAC Address of the Basic ML element for different cases.**TGbe editor, please make the changes tagged by CID #11520 in 22/1890r5**  |
| 11400 | Gaurang Naik | 9.4.2.312.4 | 225.20 | There seems to be no frames other than Beacon and Probe Response which carries the Reconfig ML element. These frames already carry the Basic ML element with MLD MAC address. So MLD MAC address in the Reconfig ML element is duplicate information. | Please remove MLD MAC address subfield from the Reconfig ML element. Also its presence indicator. Note that Common Info Length will still be required to ensure future compatibility. | RevisedIn management frames carrying Reconfiguration ML element, the MLD MAC Address can be obtained from the included Basic ML element for the same MLD, hence MLD MAC Address does not need to be included in Reconfig element. Added text to indicate how MLD MAC Address shall be determined for Reconfig ML element from the MLD MAC Address of the Basic ML element for different cases.**TGbe editor, please make the changes tagged by CID #11520 in 22/1890r5**  |
| 12603 | Arik Klein | 9.4.2.312.4 | 225.46 | According to section 35.3.6.2.2 (P426L16) regarding the Reconfiguration Multi-Link element: "The Per-STA Profile subelement shall not include a STA Profile field". However, Figure 9-1002w (Per-STA Profile subelement for the Reconfiguration Multi-Link element) does include the STA Profile field. Please update the figure accordingly. | Please remove the STA Profile field from Figure 9-1002w (Per-STA Profile subelement for the Reconfiguration Multi-Link element) | RevisedThe STA Profile field is already removed in D2.2 as per resolution for CID 13478. TGbe editor implement changes for CID 13478. |
| 13757 | Yuchen Guo | 9.4.2.312.4 | 225.47 | For the Reconfiguration Multi-Link element, the Per-STA Profile subelement shall not include a STA Profile field | Remove the STA Profile field from the figure | RevisedThe STA Profile field is already removed in D2.2 as per resolution for CID 13478. TGbe editor implement changes for CID 13478. |
| 13265 | Binita Gupta | 9.4.2.312.4 | 226.42 | Add description of what information is included in the STA Profile field of Per-STA Profile subelement for the Reconfiguration Multi-Link element. | As in comment | RevisedAs per resolution for CID 13478, the STA Profile field is removed in D2.2. No description is needed for STA profile field.TGbe editor implement changes for CID 13478. |
| 12604 | Arik Klein | 9.4.2.312.4 | 226.28 | The designated name "Delete timer" is too general/vague and does not directly imply for the purpose of this timer: indicating the timing of the Affiliated AP removal (in units of TBTT). Please consider revising the name as proposed. | 1. Please consider designating this field as "Affiliated AP Expected Removal Timer"2. Please consider designating the corresponding subfield "Delete Timer Present" to "Affiliated AP Expected Removal Timer Present" as well (in P225L59) | RevisedRenamed field to AP Removal Timer.**TGbe editor, please make the changes tagged by CID #12604 in 22/1890r3.****TGbe editor, please also change the ‘DeleteTimer’ to “APRemovalTimer” in all occurrences of “DeleteTimer” for resolution to CID 13284 in CR doc 11-22/1765r1.**  |
| 12778 | Romain GUIGNARD | 9.4.2.312.4 | 225.43 | Missing space between in and Figure 9-1002w | As in comment | Accepted |
| 13262 | Binita Gupta | 9.4.2.312.4 | 226.11 | In the text "A STA sets this subfield to 1 when the element carries complete profile.", please clarify if the subfield is referring to MAC Address Present subfield and also why setting of this subfield is related to carrying complete profile. Also clarify which element is referred in that text. | As in comment | RevisedAgree in principle. The text in D2.0 was not clear and has now been revised to clarify the points mentioned in this CID as part of the resolution for CID 10568. TGbe editor implement changes for CID 10568 |
| 13263 | Binita Gupta | 9.4.2.312.4 | 226.15 | The Delete Timer Present subfield description should be simplified to remove the text "and that the AP corresponding to the Per-STA Profile subelement will be removed at the timeindicated by the Delete Timer subfield; ", since the Delete Timer Present subfield does not indicate this second part of the sentence. | Modify the Delete Timer Present subfield description as follows: "The Delete Timer Present subfield is set to 1 to indicate the presence of the Delete Timer subfield in the STA Info field and it is set to 0 otherwise." | **Revised**Agree in principle. Text for a present subfield should indicate the presence of that subfield. The text for Delete Timer Present subfield is revised to indicate just that. This aligns with text for other Present bits in Basic ML element. **TGbe editor, please make the changes tagged by CID #13263 in 22/1890r3.** |
| 13264 | Binita Gupta | 9.4.2.312.4 | 226.19 | Missing a Figure indicating format of the STA Info field for the Reconfiguration Multi-Link element, which can include STA MAC Address and/or Delete Timer. Add the missing figure. | As in comment | **Revised**Agree in principle. D2.2 is already revised to include a Figure showing format for STA Info field as part of the resolution for CID 10568. No further changes needed.  |
| 13266 | Binita Gupta | 9.4.2.312.4 | 226.43 | Clarify where Vendor Specific subelements are included for the Reconfiguration Multi-Link element. | As in comment | RevisedClarified in the text that the Vendor Specific subelements are included in the Link Info field.**TGbe editor, please make the changes tagged by CID #13266 in 22/1890r0.** |
| 13479 | Liwen Chu | 9.4.2.312.4 | 226.04 | Clarify why Complete Profile is needed for deleting a link | As in comment | **Revised**In D2.2 text is already revised to indicate that the Complete Profile subfield is set to 0, as part of the resolution for CID 10568. TGbe editor implement changes for CID 10568 |
| 13758 | Yuchen Guo | 9.4.2.312.4 | 225.60 | Is the "Complete Profile" subfield needed for the Reconfiguration Multi-Link element? If not, remove it from the figure, or make it reserved. | remove the "Complete Profile" subfield from the figure, or make it reserved. | **Revised**In D2.2 text is already revised to indicate that the Complete Profile subfield is set to 0 for AP Removal, as part of the resolution for CID 10568. TGbe editor implement changes for CID 10568 |
| 13761 | Yuchen Guo | 9.4.2.312.4 | 226.04 | According to 35.3.6.2.2, the Per-STA Profile subelement shall not include a STA Profile field, it seems that the Per-STA Profile subelement of the Reconfiguration Multi-Link element will never carry complete profile. | delete this paragraph | **Revised**In D2.2 text is already revised to indicate that the Complete Profile subfield is set to 0 for AP Removal, as part of the resolution for CID 10568. TGbe editor implement changes for CID 10568 |
| 13481 | Liwen Chu | 9.4.2.312.4 | 224.48 | The Reconfiguration Multi-Link IE can't be used to announce the link deleting of the reporting link | update the element to suuport the announcement of the reporting link | RevisedAgree in principle that the Reconfiguration ML element need to also announce AP removal of the reporting AP. Added text to clarify that the Link ID can indicate either reported AP or reporting AP.**TGbe editor, please make the changes tagged by CID #13481 in 22/1890r5.** |
| 13760 | Yuchen Guo | 9.4.2.312.4 | 226.01 | Could the reporting AP be identified by the Link ID subfield? Need to Clarify that. | Add "the reporting AP or" before "the reported AP" | RevisedAgree in principle that the Reconfiguration ML element need to also support announcing AP removal of the reporting AP. Added text to clarify that the Link ID can indicate either reported AP or reporting AP.**TGbe editor, please make the changes tagged by CID #13481 in 22/1890r5.** |

***TGbe editor: Please update following subclause as shown below:***

* + - * 1. **Reconfiguration Multi-Link element**

The Reconfiguration Multi-Link element is used to announce an ML reconfiguration operation (see 35.3.6 (Multi-Link reconfiguration)).

The format of the Presence Bitmap subfield of the (#11182)Multi-Link Control field in a Reconfiguration Multi-Link element is defined in [Figure 9-1002u (Presence Bitmap subfield of the Reconfiguration Multi-](#bookmark169) [Link element format)](#bookmark169).

B0 B1 B11

 Reserved

MLD MAC Address Present

Bits: 1 11

**Figure 9-1002u—Presence Bitmap subfield of the Reconfiguration Multi-Link element format**

The MLD MAC Address Present subfield is set to 1 if the MLD MAC Address field is present in the Com- mon Info field. Otherwise, the subfield is set to 0.

The format of the Common Info field of the Reconfiguration Multi-Link element is defined in [Figure 9-](#bookmark170) [1002v (Common Info field of the Reconfiguration Multi-Link element format(#13478))](#bookmark170).

Octets: 1 0 or 6

MLD MAC Address

Common Info Length

**Figure 9-1002v—Common Info field of the Reconfiguration Multi-Link element for- mat(#13478)**

(#13478)The Common Info Length subfield indicates the number of octets in the Common Info field, including one octet for the Common Info Length subfield.

The MLD MAC Address subfield specifies the MAC Address of the MLD (#11520)forwhich information is provided in the Reconfiguration Multi-Link element.

One or more Per-STA Profile subelements are included in the list of subelements in the Link Info field (see [Table 9-401c (Optional subelement IDs for Link Info field of the Multi-Link element)](#bookmark142)).

Each Per-STA Profile subelement starts with a STA Control field, followed by a variable number of fields and elements, as defined in 35.3.6 (Multi-Link reconfiguration).

The format of a Per-STA Profile subelement is defined in [Figure 9-1002w (Per-STA Profile subelement for](#bookmark171) [the Reconfiguration Multi-Link element(#13478))](#bookmark171).

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

Octets: 1 1 2 variable

**Figure 9-1002w—Per-STA Profile subelement for the Reconfiguration Multi-Link element(#13478)**

The format of the STA Control field is defined in [Figure 9-1002x (STA Control field format for the Recon-](#bookmark172) [figuration Multi-Link element)](#bookmark172).

B0 B3 B4 B5 B6 B7 B15

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  Link ID | Complete Profile | (#11042) STA MAC Address Present | (#12604)AP Removal Timer Present |  Reserved |

Bits: 4 1 1 1 9

**Figure 9-1002x—STA Control field format for the Reconfiguration Multi-Link element**

The Link ID subfield specifies a value that uniquely identifies the link that the reported AP (#13481)or the reporting AP is operating on.

(#10568)The Complete Profile subfield is set to 0.

The (#11042)STA 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 (#11042)it is set to 0(#10568).

(#12604)The AP Removal Timer Present subfield is set to 1 to indicate the presence of the (#12604)AP Removal Timer subfield in the STA Info field, (#13263)otherwise it is set to 0.

The STA Info field consists of (#10568)fields whose presence is indicated by the subfields of the STA Con- trol field. The subfields in the STA Info field appear in the same order as their corresponding presence sub- field in the STA Control field.

(#10568)The format of the STA Info field is defined in [Figure 9-1002y (STA Info field format for the](#bookmark173) [Reconfiguration Multi-Link element(#10568))](#bookmark173).

|  |  |  |
| --- | --- | --- |
| STA Info Length | STA MAC Address | (#12604)AP Removal Timer |

Octets: 1 0 or 6 0 or 2

**Figure 9-1002y—STA Info field format for the Reconfiguration Multi-Link element(#10568)**

(#10568)The STA Info Length subfield indicates the number of octets in the STA Info field, including one octet for the STA Info Length subfield.

The STA MAC Address subfield of the STA Info field carries the MAC address of the AP that can operate on the link identified by the Link ID subfield and is affiliated with the same MLD as the STA that transmitted the Reconfiguration Multi-Link element

(#10568)The (#12604)AP Removal Timer subfield indicates the number of TBTTs of the AP corresponding to the (#13481)Link ID in the Per-STA Profile subelement until the AP is removed.

(#14014)NOTE—In an NSTR mobile AP MLD, the TSF timer of the AP operating on the nonprimary link
is the same as the AP operating on primary link and only the AP on primary link is transmitting beacons (see
35.3.19 (NSTR mobile AP MLD operation)), so the (#12604)AP Removal Timer subfield indicates the number of the TBTTs corresponding to the AP operating on the primary link until the AP specified in the Per-STA Profile subelement is removed.

The Vendor Specific subelements have the same format as their corresponding elements (see 9.4.2.25 (Vendor Specific element)). Zero or more Vendor Specific subelements are included in the list of optional subelements (#13266)in the Link Info field.

**35.3.6.2.2 Removing affiliated APs**

***TGbe editor: Please add following paragraph after 2nd paragraph in this subclause:***

(#11520)In the Reconfiguration Multi-Link element the MLD MAC Address Present subfield shall be set to 0.

(#11520)When a Reconfiguration Multi-Link element is carried outside of a Multiple BSSID element in a Beacon or Probe Response frame, the AP MLD for which AP removal information is provided in the Reconfiguration Multi-Link element shall be determined from the MLD MAC Address subfield of the Basic Multi-Link element carried in the same management frame outside of Multiple BSSID element and which does not have an AP MLD ID subfield included.

(#11520)When the Reconfiguration Multi-Link element is carried in the nontransmitted BSSID profile of a Multiple BSSID element, the AP MLD for which AP removal information is provided shall be determined from the MLD MAC Address subfield of the Basic Multi-Link element if such an element is carried in the same nontransmitted BSSID profile of the Multiple BSSID element. If no Basic Multi-Link element is carried in the same nontransmitted BSSID profile, then the AP MLD for which AP removal information is provided shall be determined from the MLD MAC Address subfield of the Basic Multi-Link element included in the same management frame outside of the Multiple BSSID element which has AP MLD ID subfield set to the same value as the BSSID Index subfield of the Multiple-BSSID Index element carried in the same nontransmitted BSSID profile.

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

For each affiliated AP that the AP MLD intends to remove, the Reconfiguration Multi-Link element shall include a Per-STA Profile subelement with the subfields of the (#13481)STA Control field set as following: The Link ID subfield shall identify the AP (#13481)being removed, the Complete Profile subfield shall be set to 0, (#10567)the STA MAC Address Present subfield shall be set to 0, the (#12604)AP Removal Timer Present subfield shall be set to 1, and the (#12604)AP Removal Timer subfield shall be set to the number of TBTTs of that affiliated AP before it is removed (#14015)(#13901)or for NSTR mobile AP MLD the (#12604)AP Removal Timer subfield shall be set to the number of the TBTTs of the AP operating on the primary link. The initial value of the (#12604)AP Removal Timer subfield (#12082)should point to a TBTT value that provides sufficiently large enough time to announce the removal of affiliated AP such that all associated non-AP MLDs including the ones in power save mode have the opportunity to receive Reconfiguration Multi-Link element at least once before the AP
is removed. The Per-STA Profile subelement shall not include a STA Profile field.

***TGbe editor: Please update following paragraphs in this subclause to replace Delete Timer with AP Removal Timer:***

— The Disassociation Timer field is set to the number of TBTTs of the affiliated AP before it
transmits a Disassociation frame to the STA(s) receiving the BSS Transition Management
Request frame. The Disassociation Timer field value shall point to a TBTT at or later than the
TBTT pointed to by the value of the (#12604)AP Removal Timer field of the Reconfiguration Multi-Link element in transmitted beacons.

(#13278)When the affiliated AP being removed is not transmitting BSS Transition Management Request
frame(s) to notify the termination of the corresponding BSS, the SME of the affiliated AP shall terminate the
corresponding BSS at the TBTT indicated by the value of the (#12604)AP Removal Timer.

(#11040)At the TBTT indicated by the value of the (#12604)AP Removal Timer subfield in transmitted Reconfiguration
Multi-Link elements, the AP MLD shall remove the affiliated AP indicated by the Link ID subfield in the
STA Control field of the Per-STA Profile subelement that includes the (#12604)AP Removal Timer subfield.

(#11040)(#10371)At the TBTT indicated by the value of the (#12604)AP Removal Timer subfield in transmitted
Reconfiguration Multi-Link elements, the AP MLD shall disassociate a non-AP MLD if the link
corresponding to the removed AP is the only setup link between the AP MLD and the non-AP MLD.

At the TBTT indicated by the value of the (#12604)AP Removal Timer subfield in transmitted Reconfiguration Multi-Link
elements, an associated non-AP MLD shall consider the link corresponding to the removed AP nonexistent,
and the SME of the affiliated (#11041)non-AP STA associated with the removed affiliated AP shall delete
any information maintained for that link. After a non-AP MLD deletes any information maintained for the
link corresponding to the removed AP, if there are no other setup links with the AP MLD, then the non-AP
MLD shall (#13278)consider that it has been disassociated from the AP MLD and shall delete MLD
association information.