IEEE P802.11
Wireless LANs

|  |
| --- |
| LB 266 Resolution for CIDs related ML IE rules – Part 2 |
| Date: July 21, 2022 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc |  |  | appatil@qti.qualcomm.com |
| Gaurang Naik |  |  |  |
| George Cherian |  |  |  |
| Alfred Asterjadhi |  |  |  |
| Duncan Ho |  |  |  |
| Yanjun Sun |  |  |  |
| Abdel Karim |  |  |  |

 Abstract

This submission proposes resolutions for following 33 CIDs received for TGbe LB266:

14081 11182 12229 13978 11714 10942 10304 11715 10598 10736 11717 10915 13604 12795 13258 12794 10306 13603 14107 13730 13731 13259 12796 14063 13346 13892 13614 13260 11258 12375 14106 10562 11504

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Revised based on feedback various TTT members
* Rev 2: Revised based on feedback from Rojan
* Rev 3: Additional changes based on feedback from a couple of TTT members
* Rev 4: Changes made during TGbe MAC call on 8/11
	1. - CIDs 11714 10942 are deferred for offline discussion
	2. - Resolution for CID 11182 is slightly modified (removed the term ‘general’)
	3. - Resolution for CID 10304 is updated to include the subclause title in the new references that were added in other subclauses.
	4. - Resolution for CID 10736 was slightly modified 🡪 removed ‘can’ from NOTE 4
	5. - Discussed until CID 13731
* Rev 5: Revised resolution for CID 14107 based on discussion with Po-Kai and Duncan.
	1. - includes ‘green’ tagged CIDs per chair’s guidance
* Rev 6: Minor update to the proposed text in 35.3.3.1a (Link ID)
* CID 12796 is deferred for further discussion
* Rev 7: Minor update to the text in the resolution column
* CID 13346 is deferred

***TGbe editor: The baseline for this document is REVme D1.3 and 11be D2.1***

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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 14081 | Ming Gan |   | 0.00 | The case of TDLS direct link over a single link is missing | Please complete the missing case | **Revised**The issue pointed out by this comment is already addressed in doc 11-22/1003r4 as a resolution to CID 10298 and the changes appear in TGbe D2.1**TGbe editor: please implement changes as shown in 11-22/1003r4 tagged 10298** |
| 11182 | Joseph Levy | 9.2.2.312.2 | 214.02 | The Basic Multi-Link element is referred to throughout the specification but there is no format for the Basic Multi-Link element, there is a format for the Multi-Link element and one of the types of the Multi-Link element is Basic (type 0). However, it is not stated that the Basic Multi-Link element is a Multi-Link element with of Type subfield equal to 0 and with the Multi-Line Control field, the Common Info field, and the Link Info field as defined in 9.4.2.312.2. The Basic Multi-Link element should be clearly defined. | Add the following under 9.4.2.312.2:"The Basic Multi-Link element is a Multi-Link element with of Type subfield equal to 0 and with the Presence Bitmap subfield of the Multi-Link Control field, the Common Info field, and the Link Info field as defined in 9.4.2.312.2.1, 9.4.2.312.2.2, 9.4.2.312.2.3, respectively."Also move the first paragraph from 9.4.2.312.2.1 to follow the above paragraph and also modify the second paragraph in 9.4.2.312.2.1 to clearly state that the Presence Bitmap is in the Multi-Link Control field as follows:"The format of the Presence Bitmap subfield of the Multi-Link Control field of the Basic Multi-Link element is defined in Figure 9-1002g (Presence Bitmap subfield of the Basic Multi-Link element format)."Also rename Figure 9-1002g to be: "Figure 9-1002g--Presence Bitmap subfield of the Multi-Link Control field of the Basic Multi-Link element format" | **Revised**Agree in principle. The text in 9.4.2.312.1 is revised to clarify that the format shown in that clause is the general form for Multi-Link element and that variant specific format is covered in subclauses specific to each type. Furthermore, the text in other subclauses is updated to provide additional clarification.**TGbe editor, please implement changes as shown in doc 11-22/1182r7 tagged 11182** |
| 12229 | Stephen McCann | 9.4.2.312.5 | 226.47 | Missing articles in this clause | Change "The usage of TDLS Multi-Link element" to "The usage of the TDLS Multi-Link element".At P226L52 change "is reserved in TDLS Multi-link element" to "is reserved in a TDLS Multi-link element".At P227L7 change "Link Info field" to "The Link Info field". | **Accepted** |
| 13978 | Geonjung Ko | 35.3.1 | 404.54 | MLO is defined in 3.2 and 3.4. Therefore, it does not need to unravel the abbreviation. | As in comment | **Revised**Agree in principle. The sentence is updated to remove multi-link operation.**TGbe editor, please implement changes as shown in doc 11-22/1182r7 tagged 13978** |
| 11714 | Gaurav Patwardhan | 35.3.2.1 | 406.01 | "A STA" and "A non-AP STA" is used interchangeably many times during Clause 35. Need to replace all the relevant occurences of "A STA" with "A non-AP STA". Commenting on this particular line as a placeholder. | as in comment | **Rejected**The group discussed the CIDs and decided to keep the current terminology. The affiliated ‘STA’ and affiliated ‘AP’ on a setup link do not introduce any ambiguity. |
| 10942 | Graham Smith | 35.3.2.1 | 406.38 | I see many instances of "STA affilicted with a non-AP MLD". Is this really also for an AP with a non-AP MLD? Just checking. Should it be" non-AP STA affiliated with a non-AP MLD"? | Just check if this is for both a "non AP STA affililiated with a non-AP MLD" AND a "AP affililiated with a non-AP MLD"? | **Rejected**The group discussed the CIDs and decided to keep the current terminology. The affiliated ‘STA’ and affiliated ‘AP’ on a setup link do not introduce any ambiguity.  |
| 10304 | Michael Montemurro | 35.3.2.1 | 406.11 | Wording could be improved | Change "to every" to "for each" | **Revised**Agree in principle. The cited text is updated to say ‘each AP’ is assigned a unique link ID. Also, since the usage of link ID is not limited to Basic ML IE, cited text was updated to include Reconfiguration and Priority Access variants. Furthermore, since the concept of link ID is important for MLO and is called out in several subclauses, the cited paragraph is moved to a subclause of its own. Appropriate changes and references are made to other subclauses to point to the new subclause.**TGbe editor, please apply changes as proposed for CID 10304 in doc 11-22/1182r7** |
| 11715 | Gaurav Patwardhan | 35.3.2.1 | 406.12 | Add "that" to make the sentence ".... of that AP affiliated with... " | as in comment | **Revised**Agree with the comment. The cited location is updated as suggested by the comment. Note, the cited paragraph has undergone changes as a resolution to CID 10304.**TGbe editor, please apply changes as proposed for CID 11715 in doc 11-22/1182r7** |
| 10598 | Abhishek Patil | 35.3.2.1 | 406.14 | Clarify that the link ID value for a link operated by an AP affiliated with the AP MLD is the same across all non-AP MLDs (i.e., the value is assigned by an AP MLD) and that a non-AP MLD uses the link id value it gathers during discovery procedure to identify the link for ML setup and other operations. | As in comment | **Revised**Agree in principle. A NOTE was added to clarify this behavior.**TGbe editor, please apply changes as proposed for CID 10598 in doc 11-22/1182r7**  |
| 10736 | Insun Jang | 35.3.2.1 | 406.21 | In addition to this case, in Basic ML IE a STA affiliated with an MLD (corresponding to TxBSSID) may include a complete or partial profile of a STA affiliated with the same MLD as a nonTXBSSID (in the same MBSSID set as the TxBSSID). | As in the comment, we need to add the case of ML probe request/response for NonTxBSSID throughout 35.3.2 | **Revised**Agree in principle. The cited paragraph was split to cover the AP MLD and non-AP MLD case separate. A new sentence is added to cover the case of TxBSSID providing information of AP MLD of the AP corresponding to the nonTxBSSID and the affiliated APs of that MLD. In addition, the text in ML Reconfiguration clause is updated to cover the case where the AP MLD corresponding to nonTxBSSID either adds or removes affiliated AP(s). Similarly, text in EPCS (35.17.2) is updated to clarify that the frame exchange is between the intended AP and the non-AP STA operating on the link when the AP belongs to a multiple BSSID set.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 10736** |
| 11717 | Gaurav Patwardhan | 35.3.2.1 | 406.40 | The verb "associate" is used to mean different things within clause 35.3. For example, here we have: "... as if it had received that field in the corresponding frame transmitted by its associated AP...". There is no association between AP and non-AP STA, but there is one between non-AP MLD and AP MLD. This confusion is due to overloading of the verb "associate". Need to fix it throughout clause 35.3. Commenting on this particular line as a place holder. | as in comment | **Revised**The issue pointed out by this comment is already addressed in doc 11-22/1003r4 as a resolution to CID 13979 and the changes appear in TGbe D2.1**TGbe editor: please implement changes as shown in 11-22/1003r4 tagged 13979** |
| 10915 | Kiseon Ryu | 35.3.2.2 | 406.63 | Text "(subject to exceptions discussed later in this subclause)" is not clear. | Clarify the text. | **Revised**Agree with the comment. The sentence was updated to include references to inheritance and exception subclauses.**TGbe editor, please implement changes as shown in 11-22/1182r7 tagged as 10915** |
| 13604 | Rubayet Shafin | 35.3.2.2 | 406.63 | The definition of "complete profile" still does not read well and has some vagueness. | Please try to work on improving the clarity of this sentence. | **Rejected**The comment fails to identify the exact issue or provide specific changes that are needed to address the comment. |
| 12795 | Laurent Cariou | 35.3.2.2 | 407.29 | Isn't the mandatory statement described in this paragraph already described in 35.3.5? | If it is already described, then point to the reference and remove the duplication of same mandatory statement | **Revised**Agree with comment. The cited paragraph is deleted along with the paragraph (and NOTE) describing inclusion of Basic ML IE in Beacon and non-ML probe response. The reference in clause 35.3.3.1 is updated to cover all subclauses under 35.3.4 and 35.3.5 since they cover the rules and exceptions for inclusion of Basic ML IE in various mgmt. frames.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 12795** |
| 13258 | Binita Gupta | 35.3.2.2 | 409.29 | In the (Re)Association Response frame, an AP shall include complete profile(s) of other APs affiliated with the same AP MLD as the transmitting AP only for links which were requested in the corresponding (Re)Association Request frame. Update text to clarify this. | Update as follows "When an AP affiliated with an AP MLD transmits a (Re)Association Response frame, it shall include complete profile(s) of other APs affiliated with the same AP MLD as the transmitting AP, that are operating on the links which were requested as part of a multi-link setup (also see 35.3.5.4 (Usage and rules of Basic Multi-Link element in the context of multi-link (re)setup)) in the corresponding (Re)Association Request frame. | **Revised**Agree with the comment. However, the cited paragraph is being deleted as a resolution to CID 12795. Therefore, no further changes are needed to resolve this comment.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 12795** |
| 12794 | Laurent Cariou | 35.3.2.1 | 407.23 | Isn't the mandatory statement described in this paragraph already described in 35.3.5? | If it is already described, then point to the reference and remove the duplication of same mandatory statement | **Revised**Agree with comment. The cited paragraph is deleted as suggested by the comment. The reference in clause 35.3.3.1 is updated to cover all subclauses under 35.3.5 since they cover the rules and exceptions for inclusion of Basic ML IE in (Re)Association Request frame.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 12794** |
| 10306 | Michael Montemurro | 35.3.2.2 | 407.09 | This requirement is difficult to parse and understand. Please consider re-wording to make the requirement clearer. | Commenter is willing to collaborate on a submission with a set of changes. | **Revised**The cited paragraph is being deleted as a resolution to CID 12794. Therefore, no further changes are needed to resolve this comment.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 12794** |
| 13603 | Rubayet Shafin | 35.3.2.2 | 408.12 | It is not clear how a STA affliated with a non-AP MLD and operating on a non-primary link of an NSTR Mobile AP MLD would retrieve the information pertaining to these field and element. | Please clarify how the STA operating on the non-primary link would deal with the absence of the information on that link since there is no beaconing on the non-primary link. | **Revised**Agree with the comment. The NOTE in 35.3.3.3 is updated to clarify the behavior for nSTR mobile AP MLD. Additional modifications were made to the (same) NOTE to remove the term ‘reported link’ since we do not have a definition for it.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 13603** |
| 13730 | Yunbo Li | 35.3.2.3 | 409.12 | "for a reported AP" is redudant, because all the Per-STA Profile subelement of a Basic Multi-Link element are for reported Aps. | remove "for a reported AP" | **Accepted****Note to TGbe editor: Since there are other changes being made to this paragraph, the proposed changes are shown in 11-22/1182r7** |
| 13892 | Ming Gan | 35.3.2.4.1 | 410.07 | this part is not clear and make contradicting meaning. For the excluded elements, like SSID element and BSS Max Idle Period element, please list the corresponding elements here | please update this bullet | **Revised**Agree in principle. The paragraph containing the cited bullet and subclause 35.3.3.3 were updated as a resolution to several CIDs and to provide clarification on the excluded elements. Clarification related to SSID element was missing and provided as a resolution to this CID.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 13892** |
| 13614 | Rubayet Shafin | 35.3.2.4.1 | 410.07 | Citation of clause 35.3.2.3 is missing here for exclusion from inheritance consideration. | Please include the citation of clause 35.3.2.4.1 | **Revised**Same resolution as CID 13892.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 13892** |
| 13731 | Yunbo Li | 35.3.2ã‚3 | 409.16 | "corresponding to a reported STA" is redudant, because all the Per-STA Profile subelement of a Basic Multi-Link element are corresponding to reported STAs. | remove "corresponding to a reported STA" | **Accepted****Note to TGbe editor: Since there are other changes being made to this paragraph, the proposed changes are shown in 11-22/1182r7** |
| 14107 | Li-Hsiang Sun | 35.3.2.2 | 407.53 | "does not include the Timestamp field, Beacon Interval field, AID field, SSID element, and BSSMax Idle Period element."Should also add RSNE, RSNXE, FTE as not included in case of (re)association request or response | As in comment | **Revised**Agree in principle. A new paragraph and a NOTE were added to provide guidance on the inclusion/exclusion of FTE, MDE, RSNE and RSNXE in (Re)Association Request/Response frames.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 14107** |
| 14063 | Pooya Monajemi | 35.3.2.4.1 | 409.62 | Elements carried inside the Basic Multi-Link element of a Management frame are still technically carried in that Management frame but should not be considered for inheritance. | Ammend to "...is carried in a Management frame transmitted by the reporting STA, is not inside a Basic Multi-Link element, and there is no element ..." | **Revised**Agree in principle. The cited sentence was updated to clarify that the inherited elements are not carried in Basic ML IE. In addition, since the text on exclusion of elements is moved to a dedicated subclause, the second bullet is updated to point to the subclause on exclusion.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 14063** |
| 13259 | Binita Gupta | 35.3.2.4.1 | 410.10 | It is not clear what aspect this otherwise text is describing "Otherwise, the STA receiving the Management frame shall not consider the element to be part of the reported STA's profile", since the previous two sub bullets already describe otherwise conditions when the element is not considered part of the reported STAs profile. Either remove this text or clarify what case this covers. | As in comment | **Revised**Agree in principle. A NOTE is added to clarify the intention of the otherwise clause. In addition, as a resolution to this CID, Figure 35-4 was updated to fix the text on the side to say “STA(s)” instead of “AP(s)” so that the figure applies to both AP and non-AP STA as the reported STA. Resolution includes additional bug fixes in 35.3.3.4.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 13259** |
| 12796 | Laurent Cariou | 35.3.2.4.1 | 409.62 | An ML Probe response describing a non-transmitted BSSID is sent by the transmitted BSSID. In such case, the non-transmitted BSS is described in the Multiple BSSID element, and the APs affiliated with the same AP MLD as the non-transmitted BSSID are described in a User Info field in the ML element in the core of the ML probe response. How is the inheritence of the user info field of the ML element done. Is it in reference to the transmitted BSSID (reporting AP), or is it in reference to the non-transmitted BSSID (AP reported in the M-BSSID element)? | Please define clear inheritence procedure for this specific case. | **Revised**Agree with the comment. Added a paragraph to clarify the inheritance behavior for the case when ML probe response is sent on behalf of a nonTxBSSID by the AP corresponding to the TxBSSID. In addition, the text in 35.3.3.3 (excluded fields and elements) is updated to clarify the scenario when SSID and BSS Max Idle time is carried in the profile if it is an ML probe response on behalf of a nonTxBSSID. In such case, the SSID and (possibly) the BSS Max Idle Time elements will have different value as that for the TxBSSID. Furthermore, two NOTEs are added to 35.3.4.2 to clarify that an ML probe response frame always carries a single Basic ML IE (this is consistent with normative text). The NOTEs describe the contents of such Probe Response frame and how a non-AP MLD can determine which MLD the contents of the Basic ML IE correspond to.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 12796** |
| 13346 | Liwen Chu | 35.3.2.4.1 | 410.04 | another exception should be added, i.e. the element identified by the element ID is not applicable in reported link (6GHz related Capabilities element in 6GHz reporting link, or VHT, HT Capabilities element in 5GHz reporting link). | As in comment | **Revised**The inheritance mechanism is designed for this very purpose. Therefore, the standard does not need to define additional procedures to handle scenarios where certain elements apply to the reporting STA (and appear in the reporting STA’s frame outside the Basic ML IE) and do not apply to a reported STA. A NOTE is added to clarify the non-inheritance behavior when the reporting STA is operating on 6 GHz and a reported STA is operating on a sub-6 GHz band.**TGbe Editor, please add the following NOTE after the paragraph starting P210 L59 of D2.1: “NOTE – For example, if the reporting STA is operating on 6 GHz, then the 6 GHz specific elements (such as HE 6 GHz Band Capabilities element) do not apply to a reported STA that operates on 2.4 GHz or 5 GHz. Therefore, the Element ID or Element ID Extension (if present) for such elements is included in the Non-Inheritance element carried in the profile of the reported STA”.** |
| 13260 | Binita Gupta | 35.3.2.4.1 | 410.20 | Is it possible that for a reported STA exact same set of elements are applicable as for the reporting STA? Clarify if this is possible in the text and if yes, then indicate how is this signaled in the Basic Multi-Link element. | As in comment | **Rejected**It is possible, although unlikely, that a reported STA affiliated with the same MLD has the exact same set of elements. Even in such case, the Complete Profile subfield of the STA Control field will be set to 1, the STA Info field will include subfields related to the reported STA while the STA Profile field will carry only the Capability Information field and any other field that would be present as if the reported STA were to transmit the frame. This behavior is consistent with the inheritance rules described in 35.3.3.5. Therefore, no additional clarification is needed in the standard. |
| 11258 | Sigurd Schelstraete | 35.3.2.4.1 | 410.23 | "parenthesis" should be plural | Change "parenthesis" to "parentheses" | **Accepted** |
| 12375 | Rojan Chitrakar | 35.3.2.5 | 411.60 | This clause should apply for all subelements of the ML element and not just for Per-STA Profile subelement. | Make the clause more generic so as to apply to all relevant subelement fragmentation (e.g., also applicable to Vendor specific subelement). For examples, it is fine to keep to Per-STA Profile subelement. | **Revised**Agree in principle. A paragraph is added at the beginning of the subclause to clarify that the procedure would apply to any other subelement of any variant of the ML IE when the contents of the subelement exceed 255 octets. In addition, a NOTE was added to clarify that a subelement having a size less than or equal to 255 will not be fragmented instead the ML element carrying such a subelement will be fragmented.**TGbe editor, please apply changes as shown in 11-22/1182r7 tagged 12375** |
| 14106 | Li-Hsiang Sun | 35.3.2.5 | 412.24 | FragEID in Fig 35-6, 35-7 should be FragID | change FragEID to FragID | **Accepted****Note to TGbe editor: Visio & emf files for the updated figures can be provided.** |
| 10562 | Abhishek Patil | 9.4.2.312.2.3 | 223.15 | The format of the Fragment subelement is not defined. Add a sentence and figure that describes the format consistent with that shown in Figure 35-7. Describe which other variants of ML IE could include Fragment subelement. For the ones that could include, make reference to the text and figure related to Fragment subelement format described under Basic ML IE. | As in comment | **Revised**Agree in principle. The resolution adds a paragraph after Table 9-401d to describe the presence and format of the Fragment subelement.**TGbe editor, please add the following sentence after Table 9-401d: “One or more Fragment Subelement is present if the contents of a subelement exceed 255 octets (see 35.3.3.6). The format of Fragment subelement is the same as that shown in Figure 9-1003 (Subelement format) with the Data field carrying a portion of the subelement that is fragmented.”** |
| 11504 | Xiaofei Wang | 9.4.1.9 | 180.40 | Status code 135 is confusing. If an association is denied because EHT is not supported, at least currently, that would be to a legacy STA, but a legacy STA would not be able to understand it; only an EHT STA can understand the status code | suggest to remove this code since a STA not supporting EHT will not be able to understand this anyway | **Rejected**Baseline spec provides status code for rejection if the requesting client device is unable to support certain feature set associated with a particular amendment. In REVme D1.3, please see rows in Table 9-78 corresponding to Status Code value of 27, 104, 124. The commenter is encouraged to submit a comment against baseline spec (REVme) to remove the above cited status codes. If baseline is updated, TGbe can discuss the removal of status code 135 to be in line with the updated baseline. |

x-x-x-x-x-x Begin changes for CID 11182 x-x-x-x-x-x

**9.4.2.312 Multi-Link element**

**9.4.2.312.1 General**

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

The format of the Multi-Link element is defined in Figure 9-1002e (Multi-Link element format). Depending on the variant (indicated by the Type subfield) of this element, particular field(s) or subfield(s) within a field can be absent. The frames carrying this element and usage of this element are described in 35.3.3 (Advertisement of multi-link information in Multi-Link element).

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

The format of the Multi-Link Control field is defined in Figure 9-1002f (Multi-Link Control field).

***TGbe editor: Please update the Table 9-401c in this subclause as shown below:***

**Table 9-401c—Type subfield encoding**

|  |  |  |
| --- | --- | --- |
| **Type subfield value** | **Multi-Link element variant name** | **Variant specific format** |
| 0 | Basic  | See 9.4.2.312.2 (Basic Multi-Link element) |
| 1 | Probe Request  | See 9.4.2.312.3 (Probe Request Multi-Link element) |
| 2 | Reconfiguration  | See 9.4.2.312.4 (Reconfiguration Multi-Link element) |
| 3 | TDLS  | See 9.4.2.312.5 (TDLS Multi-Link element) |
| 4 | Priority Access  | See 9.4.2.312.6 (Priority Access Multi-Link element) |
| 5–7 | Reserved |  |

**9.4.2.312.2 Basic Multi-Link element**

***TGbe editor: Please insert the following paragraph to this subclause as shown below:***

The format of the Presence Bitmap subfield of the Multi-Link Control field, the Common Info field, and the Link Info field of the Basic Multi-Link element is defined in 9.4.2.312.2.1, 9.4.2.312.2.2, 9.4.2.312.2.3, respectively.

The Basic Multi-link element carries information related to an MLD and its affiliated STAs that is advertised during multi-link discovery (see 35.3.4 (Discovery of an AP MLD)) and multi-link setup (see 35.3.5 (Multi-link (re)setup)).

**9.4.2.312.2.1 Presence Bitmap subfield of the Multi-Link Control field in a Basic Multi-Link element**

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

The format of the Presence Bitmap subfield of the Multi-Link Control field in a Basic Multi-Link element is defined in Figure 9-1002g (Presence Bitmap subfield of the Basic Multi-Link element format).

**9.4.2.312.3 Probe Request Multi-Link element**

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

The Probe Request Multi-Link element is used to request an AP to provide information of other APs affiliated with the same AP MLD as the AP. The inclusion of a Probe Request Multi-Link element in a Probe Request frame identifies it as a Multi-Link probe request (see 35.3.4 (Discovery of an AP MLD)).

The format of the Presence Bitmap subfield of the Multi-Link Control field in a Probe Request Multi-Link element is defined in Figure 9-1002q (Presence Bitmap field of the Probe Request Multi-Link element format).

**9.4.2.312.4 Reconfiguration Multi-Link element**

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

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

**35.3.4.4 Multi-Link element usage rules in the context of discovery**

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

If an AP affiliated with an AP MLD is not in a multiple BSSID set or the AP corresponds to a transmitted BSSID in a multiple BSSID set, the AP shall include, in a Beacon frame or a Probe Response frame, which is not a Multi-Link probe response, only the Common Info field of the Basic Multi-Link element for the AP MLD as defined in 9.4.2.312.2 (Basic Multi-Link element) unless conditions in 35.3.11 (Multi-link procedures for channel switching, extended channel switching, and channel quieting) are satisfied.

If an AP affiliated with an AP MLD 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 include, in the nontransmitted BSSID profile corresponding to the nontransmitted BSSID in a Beacon frame or a Probe Response frame, which is not a Multi-Link probe response, only the Common Info field of the Basic Multi-Link element for the AP MLD as defined in 9.4.2.312.2 (Basic Multi-Link element) unless conditions in 35.3.11 (Multi-link procedures for channel switching, extended channel switching, and channel quieting) are satisfied.

x-x-x-x-x-x End of changes for CID 11182 x-x-x-x-x-x

**35.3 Multi-link operation**

**35.3.1 General**

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

An EHT STA that is affiliated with an MLD supports MLO[13978]. An EHT AP supports MLO.

x-x-x-x-x-x Begin changes for CID 10304 (with an exception for CIDs 11715 & 10598) x-x-x-x-x-x

**35.3.3 Advertisement of multi-link information in Multi-Link element**

**35.3.3.1 General**

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

The value carried in the Link ID subfield of the Per-STA Profile subelement carried in a Basic, Reconfiguration, or Priority Access Multi-Link element identifies a reported AP affiliated with [11715]that AP MLD (see 35.3.3.1a (Link ID)). The value carried in the Link ID subfield of the Common Info field of the Basic Multi-Link element identifies the link ID of the transmitting AP.

***TGbe editor: Please insert a new subclause after 35.3.3.1 as shown below:***

**35.3.3.1a** **Link ID**

A link ID is a numeric value that corresponds to a tuple consisting of Operating Class, Operating Channel, and BSSID of the AP affiliated with the AP MLD. An AP MLD shall assign a unique link ID, that is lower than 15, to each of its affiliated APs and shall not change the assigned link IDs during the lifetime of each of the BSSes setup by the AP MLD.

NOTE 1 – The Link ID subfield in Reduced Neighbor Report element is set to 15 to indicate an AP that is not affiliated with an AP MLD or if the reporting AP does not have information of the reported AP (see 9.4.2.170.2 (Neighbor AP Information field)). Therefore, an AP MLD does not assign link ID value 15 to any of its affiliated AP.

NOTE 2 – Since a link ID identifies an affiliated AP’s BSS and does not change throughout the lifetime of the BSS, the link ID remains unchanged if the AP moves its BSS to a different channel by performing channel switch procedure described in 11.8.8 (Selecting and advertising a new channel) or 11.9 (Extended channel switching). In addition, the link ID for an AP affiliated with an AP MLD is the same across all non-AP MLDs.

[10598]NOTE 3– A non-AP MLD includes the link ID obtained during discovery for identifying an affiliated AP to be requested as part of the multi-link setup with the AP MLD.

**35.3.4.4 Multi-Link element usage rules in the context of discovery**

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

The value of the Link ID field of the Per-STA Profile subelement of the Probe Request Multi-Link element identifies the AP affiliated with an AP MLD that is requested and shall be set to the link ID that is assigned to this AP (see 35.3.3.1a (Link ID)).

**9.4.2.312.2.3 Link Info field of the Basic Multi-Link element**

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

The Link ID subfield specifies a value that uniquely identifies the link where the reported STA is operating on (see 35.3.3.1a (Link ID)).

**9.4.2.47 Fast BSS Transition element (FTE)**

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

The Link ID subfield contains the link identifier for the link (see 35.3.3.1a (Link ID)).

**9.4.2.170.2 Neighbor AP Information field**

***TGbe editor: Please update the contents of the following NOTE in this subclause as shown below:***

NOTE 3—The link identifier is unique to an AP affiliated an AP MLD (see 35.3.3.1a (Link ID)).

**9.6.13.20 WNM Sleep Mode Response frame format**

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

The Link ID subfield identifies the link on which an AP affiliated with an AP MLD is operating on (see 35.3.3.1a (Link ID)).

x-x-x-x-x-x End of changes for CID 10304 x-x-x-x-x-x

x-x-x-x-x-x Begin changes for CID 10736 x-x-x-x-x-x

**35.3.3 Advertisement of multi-link information in Multi-Link element**

**35.3.3.1 General**

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

An AP affiliated with an AP MLD may include the Link Info field (see Figure 9-1002e (Multi-Link element format)) in the Basic Multi-Link element that it transmits to carry complete or partial profile as defined in 35.3.3.2 (Advertisement of complete or partial per-link information) of another AP that is affiliated with the same AP MLD as the transmitting AP. An AP corresponding to the transmitted BSSID may include Link Info field in the Basic Multi-Link element that it transmits to carry complete or partial profile of another AP that is affiliated with an AP MLD with which an AP corresponding to the nontransmitted BSSID in the same multiple BSSID is affiliated.

***TGbe editor: Please insert the following NOTEs and a new paragraph in this subclause after the above modified paragraph as shown below:***

NOTE 1 – In a Beacon frame or a Probe Response frame that is not an Multi-Link probe response transmitted by the transmitted BSSID, the Basic Multi-Link element carrying information of an AP MLD with which an AP corresponding to a nontransmitted BSSID is affiliated with is contained within the nontransmitted BSSID profile of the Multiple BSSID element in a Beacon frame (see 35.3.20 (Multi-link operation in a multiple BSSID set or co-hosted BSSID set)).

NOTE 2 – In a Multi-Link probe response sent by the transmitted BSSID in response to a Multi-Link probe request directed to an AP corresponding to a nontransmitted BSSID, the Basic Multi-Link element carrying information of an AP MLD with which an AP corresponding to a nontransmitted BSSID is affiliated with is contained outside the Multiple BSSID element (see 35.3.4.2 (Use of Multi-Link probe request and response)).

NOTE 3 – Also see 35.3.6 (Multi-Link reconfiguration) for inclusion of Reconfiguration Multi-Link element within a nontransmitted BSSID profile of the Multiple BSSID element carried in a Beacon frame or Probe Response frame transmitted by the transmitted BSSID in a multiple BSSID set.

NOTE 4 – A non-AP STA affiliated with a non-AP MLD does not include Link Info field in a Basic Multi-Link element when carried in the Authentication frame and includes Link Info field containing complete profile of the non-AP STA that is operating on a requested link in a (Re)Association Request frame that it transmits during ML (re)setup. Also see 35.3.5 (Multi-link (re)setup).

**35.3.6.2.1 Adding new affiliated APs**

***TGbe editor: Please insert the following NOTE before the current NOTE at the end of this subclause as shown below:***

NOTE – See 35.3.4.2 (Use of Multi-Link probe request and response), 35.3.4.4 (Multi-Link element usage rules in the context of discovery), and 35.3.20 (Multi-link operation in a multiple BSSID set or co-hosted BSSID set) for rules related to the location where the Basic Multi-Link element is included in Beacon frame and Probe Response frame (i.e., conditions when it is within the Multiple BSSID element or not).

**35.3.6.2.2 Removing affiliated APs**

***TGbe editor: Please insert the following paragraph after the 1st paragraph in this subclause as shown below:***

When an AP MLD with which an AP corresponding to a nontransmitted BSSID in a multiple BSSID set is affiliated with removes one or more affiliated APs, the Reconfiguration Multi-Link element carrying information of the removed AP(s) shall be included within the nontransmitted BSSID profile of the Multiple BSSID element contained in the Beacon frame and Probe Response frame transmitted by the transmitted BSSID in the same multiple BSSID set.

**35.17.2.2 Setup procedures for EPCS priority access**

**35.17.2.2.1 General**

***TGbe editor: Please insert the following NOTE as the last paragraph in this subclause as shown below:***

NOTE—When a non-AP STA, that is affiliated with a non-AP MLD, is associate with an AP affiliated with an AP MLD with which the non-AP MLD has performed ML setup and the AP belongs to a multiple BSSID set, the EPCS frame exchanges are performed between the intended AP (which can correspond to a transmitted BSSID or a nontransmitted BSSID in the set) and the non-AP STA.

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

***TGbe editor: Please insert the following paragraph and a NOTE at the end of this subclause as shown below:***

NOTE – If a Multi-Link probe request is directed towards an AP corresponding to a nontransmitted BSSID in a multiple BSSID set, then the Multi-Link probe response is sent by the AP corresponding to the transmitted BSSID in the same multiple BSSID set carrying the Basic Multi-Link element outside the Multiple BSSID element and containing information of the AP MLD (and possibly its affiliated APs) with which an AP corresponding to a nontransmitted BSSID is affiliated with (see 35.3.4.2 (Use of Multi-Link probe request and response)).

x-x-x-x-x-x End changes for CID 10736 x-x-x-x-x-x

**35.3.3.2 Advertisement of complete or partial per-link information**

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

[10915]The complete profile of a reported STA consists of all the elements and fields (subject to inheritance rules defined in 35.3.3.5.1 (Inheritance in the per-STA profile of Basic Multi-Link element) and exceptions specified in 35.3.3.3 (Fields and elements not carried in a per-STA profile)) that would be included in a Management frame, that is of the same subtype as that transmitted by the reporting STA carrying the Basic Multi-Link element, if the reported STA were to transmit the frame.

[12795][12795][12795][12794][12795]

**35.3.3 Advertisement of multi-link information in Multi-Link element**

**35.3.3.1 General**

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

The requirements for including a Basic Multi-Link element in a Beacon frame or in a Probe Response frame are described in [12795]35.3.4 (Discovery of an AP MLD). The requirements for including a Basic Multi-Link element in a (Re)Association Response frame, in a (Re)Association Request frame, or in an Authentication frame are described in [12795, 12794]35.3.5 (Multi-link (re)setup).

**35.3.3.3 Fields and elements not carried in a per-STA profile**

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

An AP affiliated with an AP MLD shall not include a Timestamp field, a Beacon Interval field, AID field, an SSID element, a BSS Max Idle Period element, a Neighbor Report element, a Reduced Neighbor Report element, a Multiple BSSID element, TIM element, Multiple BSSID-Index element, Multiple BSSID Configuration element or another Multi-Link element in the Per-STA Profile subelement of the Basic Multi-Link element[13730].

[13892]

NOTE [13892]1—[13603]For an NSTR mobile AP MLD, only the AP on the primary link transmits a Beacon frame. In addition, the TSF timer of the nonprimary link is the same as that of the primary link (see 35.3.19 (NSTR mobile AP MLD operation)). For an AP MLD that is not an NSTR mobile AP MLD, the Timestamp field is specific to each link and the value for each can be obtained on the respective link (i.e., Beacon frame [13603]includes Timestamp field and TIM element and Probe Response frame [13603]includes Timestamp field). The content of the TIM element for a non-AP MLD are consistent across all links. Beacon Interval field is an explicit subfield in STA Info field for the reported AP. AID field and BSS Max Idle Period element apply at the MLD level and have the same value for all links.

A non-AP STA affiliated with a non-AP MLD shall not include a Listen Interval field, a Current AP Address field, an SSID element or another, a Multi-Link element in the Per-STA Profile subelement of the Basic Multi-Link element[13731].

NOTE [13892]2—Listen Interval field and Current AP Address field apply at the MLD level and have the same value for all links.

[13892]3 and therefore, the same (SSID) value applies to a reported (AP or non-AP) STA

***TGbe editor: Please insert the following paragraph and NOTE as the last paragraph in this subclause as shown below:***

[14107]A STA affiliated with an MLD shall not include FTE and MDE for each reported STA in the reported STA’s Per-STA Profile subelement of the Basic Multi-Link element carried in a (Re)Association Request frame or a (Re)Association Response frame that it transmits. Also see 13.4.2 (FT initial mobility domain association in an RSN) and 13.7 (FT reassociation).

[14107]Note – There is no RSNE/RSNXE included in the Basic Multi-Link element carried in a (Re)Association Request frame because there is only one RSNE/RSNXE provided by non-AP MLD during ML (re)setup. See 12.6.3.1 (General). An AP MLD can have different MFPR carried in RSNE for each of its affiliated AP and in such case, the (Re)Association Response frame includes RSNE in the corresponding Per-STA Profile subelement of Basic Multi-Link element. See 12.6.2 (RSNA selection).

**35.3.3.5.1 Inheritance in the per-STA profile of Basic Multi-Link element**

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

If an element, identified by an Element ID and Element ID Extension (if applicable), is carried in a Management frame transmitted by the reporting STA, and there is no element having the same Element ID and Element ID Extension (if applicable) in a complete profile of a reported STA [14063]carried in the Basic Multi-Link element, then the element is considered to be part of the reported STA’s profile and the value to use is the same as that of the corresponding element carried in the reporting STA’s frame unless any of the following are true:

1. the complete profile carries the Non-Inheritance element (see 9.4.2.240 (Non-Inheritance element)) and the element is listed in the Non-Inheritance element.
2. the element is excluded from being included in the Per-STA Profile subelement as described in [14063]35.3.3.3 (Fields and elements not carried in a per-STA profile).

Otherwise, the STA receiving the Management frame shall not consider the element to be part of the reported STA’s profile.

***TGbe editor: Please insert the following NOTE after the paragraph “Otherwise, the STA receiving the Management frame …” in this subclause as shown below:***

[13259]NOTE – The above otherwise condition applies when an element, identified by an Element ID and Element ID Extension (if applicable), is carried in a Management frame transmitted by a reporting STA, and is outside the Basic Multi-Link element, and there exists at least one element having the same Element ID and Element ID Extension (if applicable) in the complete profile of a reported STA (i.e., the element is specific to the reported STA as described in the previous paragraph).

***TGbe editor: Please update Figure 35-4 as shown below:***



**Figure 35-4—Example of inheritance in a complete per-STA profile**[13259]

x-x-x-x-x-x Begin changes for CID 12796 x-x-x-x-x-x

**35.3.3.5.1 Inheritance in the per-STA profile of Basic Multi-Link element**

***TGbe editor: Please insert the following paragraph before the paragraph “A Fragment element (see 9.4.2.188 (Fragment element))…” in this subclause as shown below:***

When an AP corresponding to a transmitted BSSID in a multiple BSSID set transmits a Multi-Link probe response in response to a Multi-Link probe request directed to an AP corresponding to a nontransmitted BSSID in the same multiple BSSID set (see 35.3.4.2 (Use of Multi-Link probe request and response)) and the Basic Multi-Link element corresponding to the AP MLD of the nontransmitted BSSID carries complete per-STA profile of the requested AP(s), then the inheritance (or non-inheritance) for each per-STA profile is with respect to the elements carried in the Probe Response frame and outside the Multiple BSSID element.

**35.3.3.3 Fields and elements not carried in a per-STA profile**

***TGbe editor: Please update the following paragraph (including insertion of a new paragraph) in this subclause as shown below:***

An AP affiliated with an AP MLD shall not include a Timestamp field, a Beacon Interval field, AID field, a Neighbor Report element, a Reduced Neighbor Report element, a Multiple BSSID element, TIM element, Multiple BSSID-Index element, Multiple BSSID Configuration element or another Multi-Link element in the Per-STA Profile subelement of the Basic Multi-Link element for a reported AP.

An AP affiliated with an AP MLD shall not include SSID element and a BSS Max Idle Period element in the Per-STA Profile subelement of the Basic Multi-Link element for a reported AP unless both the conditions are satisfied for the element:

* The element carries complete profile of the reported AP
* The element is contained in an Multi-Link probe response send by the transmitted BSSID in a multiple BSSID set in response to an Multi-Link probe request directed to the nontransmitted BSSID in the same multiple BSSID set.

**35.3.4.2 Use of Multi-Link probe request and response**

***TGbe editor: Please insert the following NOTEs after the paragraph starting “A Multi-Link probe response shall carry information of no more than one AP MLD …” in this subclause as shown below:***

NOTE - If an AP corresponding to a transmitted BSSID in a multiple BSSID set transmits a Multi-Link probe response in response to a Multi-Link probe request directed to an AP corresponding to a nontransmitted BSSID in the same multiple BSSID set, then the Probe Response frame carries only one Basic Multi-Link element corresponding to the AP MLD with which the AP corresponding to that nontransmitted BSSID is affiliated with and the MLD ID subfield of the Common Info field of the Basic Multi-Link element is set to the BSSID Index of the nontransmitted BSSID. The Probe Response frame includes Reduced Neighbor Report element containing information of the other AP(s) affiliated with the transmitting AP’s (transmitted BSSID’s) AP MLD and the information of other AP(s) affiliated with the AP MLD(s) of all the nontransmitted BSSIDs in the same multiple BSSID set.

NOTE - A non-AP STA affiliated with a non-AP MLD that receives such a Multi-Link probe response identifies that the Basic Multi-Link element in the frame corresponds to an AP MLD with which the AP corresponding to the nontransmitted BSSID is affiliated with based on the value carried in the MLD ID subfield.

x-x-x-x-x-x End changes for CID 12796 x-x-x-x-x-x

**35.3.3.6 Subelement fragmentation in the Link Info field of a Multi-Link element**[12375]

***TGbe editor: Please insert the following paragraph and NOTE as the 1st paragraph in this subclause as shown below:***

[12375]This section describes the procedure for splitting the contents of a subelement that is carried within a Link Info field of a Multi-Link element, across multiple subelements, when the length of the content of the subelement exceeds 255 octets. The procedure is described with respect to the Per-STA Profile subelement of the Basic Multi-Link element. However, the same procedure applies to any subelement except the Fragment subelement (see Table 9-401d (Optional subelement IDs for Link Info field of the Multi-Link element)) and to any variant of Multi-Link element.

[12375]NOTE – When the length of the subelement is less than or equal 255 octets but exceeds the remaining size of the Multi-Link element, the subelement is not fragmented. Instead, the Multi-Link element is fragmented by following the procedure described in 10.28.11 (Element fragmentation), and the subsequent Fragment element (see 9.4.2.188 (Fragment element)) carries the portion of the subelement that exceeded the remaining size of the element.

x-x-x-x-x-x Bugfix / additional clarification x-x-x-x-x-x [13259]

**35.3.3.4 Processing of Per-STA Profile subelement of Multi-Link element**

***TGbe editor: Please update the 1st paragraph in this subclause as shown below:***

A non-AP STA (STA 1) affiliated with a non-AP MLD shall follow the procedures (if any) that are applicable to a field carried (directly or within an element) in a Management frame received on another link, from an AP (AP2), as if it (STA 1) had received that field in the corresponding frame transmitted by a reported AP (AP 1) operating on the same link as the non-AP STA (STA 1), if all of the following conditions are satisfied:

***TGbe editor: Please update the 3rd paragraph in this subclause as shown below:***

An AP (AP 1) affiliated with an AP MLD shall follow the procedures (if any) that are applicable to a field carried (directly or within an element) in a (Re)Association Request frame received on another link, from a non-AP STA (STA 2), as if it (AP 1) had received that field in the corresponding frame transmitted by a reported non-AP STA (STA 1) operating on the same link as the AP (AP 1), if all of the following conditions are satisfied: