IEEE P802.11
Wireless LANs

|  |
| --- |
| LB271: CR for Basic Multi-Link element – part 1 |
| Date: March 14, 2023 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Gaurang Naik | Qualcomm Inc. |  |  | gnaik@qti.qualcomm.com |
| Abhishek Patil | Qualcomm Inc. |  |  | appatil@qti.qualcomm.com |
| Alfred Asterjadhi | Qualcomm Inc. |  |  | aasterja@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  | gcherian@qti.qualcomm.com |
| Duncan Ho | Qualcomm Inc. |  |  | dho@qti.qualcomm.com |
| Yanjun Sun | Qualcomm Inc. |  |  | yanjuns@qti.qualcomm.com |
| Abdel Karim Ajami | Qualcomm Inc. |  |  | aajami@qti.qualcomm.com |

 Abstract

This submission proposes resolutions for following 25 CIDs received for TGbe LB271:

16857, 15365, 16393, 17611, 15367, 17614, 15368, 17615, 15948, 17619, 17620, 17622, 17651, 17652, 17653, 16581, 17655, 17656, 17658, 17659, 17661, 17665, 17664, 17670, 17668

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Added green tags. Changes for all Accepted resolutions are shown.
* Rev 2: Added resolution for CID 15365

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** | **Section** | **Pg.Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 16857 | Mark RISON | 9.4.2.312.2.2 | 0.00 | "MLD Capabilities and Operations" -- field names should have all words start with uppercase | Change to "MLD Capabilities And Operations" throughout (21x) | **Revised**Agree with the commenter.TGbe editor: please replace all instances of “MLD Capabilities and Operations” with “MLD Capabilities And Operations” throughout D3.0.  |
| 15365 | John Wullert | 9.4.2.312.1 | 251.06 | The sentence would be clearer if the location of the Type subfield was specified | Rephrase as "The format of the Multi-Link element is defined in Figure 9-1002e (Multi-Link element format). Depending on the variant of this element (indicated by the Type subfield of the Multi-Link Control field)..." | **Revised**Agree with the commenter.TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 15365. |
| 16393 | Massinissa Lalam | 9.4.2.312.1 | 251.08 | Clarify that the "Type" subfield belongs to the "Multi-Link Control" field, e.g. "indicated by the Type subfield carried by the Multi-Lin Control field" | As in comment | **Revised**Agree with the commenter.TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 16393. |
| 17611 | Brian Hart | 9.4.2.312.1 | 251.64 | Missing article | "has a different format" | **Revised**Agree with the commenter.TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 17611. |
| 15367 | John Wullert | 9.4.2.312.1 | 252.30 | Need to make noun and verb plural after "one or more" | Revise as "One or more Fragment subelements are present ..." | **Revised**Agree with the commenter.TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 15367. |
| 17614 | Brian Hart | 9.4.2.312.1 | 252.31 | Normally use plural with "one or more" due to the "more" being next to the verb. | Try "One or more Fragment \*subelements\* \*are\* present ....The format of \*the\* Fragment subelement" | **Revised**Agree with the commenter.TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 15367. |
| 15368 | John Wullert | 9.4.2.312.2 | 252.43 | Tthe subject/verb combination in this sentence should be plural to make it clear that the fields have different formats. | Revise as "The formats 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 are defined..." | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 15368. |
| 17615 | Brian Hart | 9.4.2.312.2.1 | 252.44 | 3 different subfields have 3 different formats so "format" should be plural | Try "The formats of ... are defined in ... respectively" | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 15368. |
| 15948 | Binita Gupta | 9.4.2.312.2.2 | 253.57 | Change "Extended MLD Capabilities And Operations" to "Extended MLD Capabilities and Operations" | As in comment | **Rejected**Since all field names must have each word starting with uppercase, the current text is correct.  |
| 17619 | Brian Hart | 9.4.2.312.2.3 | 255.26 | "to be" in "dot11MSDOFDMEDthreshold to be used by a STA during medium synchronization recovery" is redundant because of the "during subclause | Try "dot11MSDOFDMEDthreshold used by a STA during medium synchronization recovery" | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17619. |
| 17620 | Brian Hart | 9.4.2.312.2.3 | 255.45 | "a STA ... the STA" not "A STA ... a STA". Also an extra "that" wouldn't go amiss and "the value of" doesn't align with the style guide | Try "The Medium Synchronization Maximum Number Of TXOPs subfield contains \*\* the maximum number of TXOPs (dot11MSDTXOPMAX) \*that\* a STA is allowed to attempt to initiate while the MediumSyncDelay timer is running at \*the\* STA minus 1, except that the value 15 indicates any number of TXOPs as long as the MediumSyncDelay timer is nonzero." | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17620. |
| 17622 | Brian Hart | 9.4.2.312.2.3 | 256.18 | "the EMLSR operation" sounds like a specific event. Here we mean the ongoing capability, and then it is clearer if no article is used | Try "if the MLD supports EMLSR operation" | **Revised**Agree with the commenter. TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 17622. |
| 17651 | Brian Hart | 9.4.2.312.2.4 | 261.05 | "optional elements" but this is a table of subelements | "optional subelements" | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17651. |
| 17652 | Brian Hart | 9.4.2.312.2.4 | 261.08 | Troubling article, since we are talking about every Per-STA Profile subelement | Try "The format of the Per-STA Profile subelement". Ditto P264L27, P269L38 | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17652. |
| 17653 | Brian Hart | 9.4.2.312.2.4 | 261.48 | Missing verb | Try "and otherwise is set to 0". Ditto P261L52.5, P261L62.5 and many other times in this subclause (i.e., please search & replace); and afterwards: e.g. P266L65 | **Revised**Agree with the commenter. The corresponding changes are made at the identified locations.TGbe editor: please implement changes shown in document 11-23/358r2 tagged as 17653. |
| 16581 | Arik Klein | 9.4.2.312.2.3 | 262.11 | MLD Capabilities and Operations is a subfield (in the Common Info field of the Basic MLE) and not a field.Please revise as suggested. | Please revise the sentence as follows:" If the value of the Maximum Number Of Simultaneous Links subfield in the MLD Capabilities and Operations \*subfield\* is greater than 0, ...." | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 16581. |
| 17655 | Brian Hart | 9.4.2.312.2.4 | 262.55 | Wrong tense | "that transmits" | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17655. |
| 17656 | Brian Hart | 9.4.2.312.2.4 | 262.60 | "the value of" doesn't follow the style guide | "carries the beacon interval". Ditto P263L13. ditto P253L18 should be "with a Link ID subfield equal ... " | **Revised**TGbe editor: please implement the changes shown in document 11-23/358r2 tagged as 17656. |
| 17658 | Brian Hart | 9.4.2.312.2.4 | 263.30 | Wrong number for "condition" | "conditions" | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17658. |
| 17659 | Brian Hart | 9.4.2.312.2.4 | 263.33 | Missing article | "the rules" | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17659. |
| 17661 | Brian Hart | 9.4.2.312.2.4 | 264.57 | Probably unintendedly ambiguous antecedent (the subfield => Link ID subfield) | Try "Otherwise the Complete Profile Requested subfield is set ..." | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17661. |
| 17665 | Brian Hart | 9.4.2.312.2.4 | 266.02 | Inconsistent number: "The subfields ... their corresponding presence subfield" | Try "Each subfield in the STA Info field appears in the same order as its corresponding presence subfield in the STA Control field." | **Revised**TGbe editor: please implement the changes shown in document 11-23/358r2 tagged as 17665. |
| 17664 | Brian Hart | 9.4.2.312.2.4 | 266.38 | Probably unintendedly ambiguous antecedent (it => STA Info field) | Try "otherwise the STA MAC Address Present subfield is set to 0." Make equivalent changes at P266L44 | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17664. |
| 17670 | Brian Hart | 9.4.2.312.2.4 | 267.26 | Spurious preposition / missing "equal" | Try "make the length of the Operation Parameter Info subfield 2 octets." or better "make the length of the Operation Parameter Info subfield equal to 2 octets." | **Revised**TGbe editor: please implement the changes shown in document 11-23/358r2 tagged as 17670. |
| 17668 | Brian Hart | 9.4.2.312.2.4 | 267.32 | Missing article x2, extra article x1 | Try "on the primary link" x2; "the number of TBTTs" x1 | **Accepted**TGbe editor: please note that the changes are shown in document 11-23/358r2 tagged as 17668. |

***TGbe editor: Please note Baseline is 11be D3.0***

**9.4.2.312 Multi-Link element**

**9.4.2.312.1 General**

***TGbe editor: please revise the following paragraph as shown below [CID 15365, 16393]***

The format of the Multi-Link element is defined in Figure 9-1002e (Multi-Link element format). Depending on the variant of this element (#15365) (indicated by the Type subfield of the Multi-Link Control field (#16393)) 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 revise the following paragraph as shown below [CID 17611]***

The Presence Bitmap subfield is used to indicate the presence of various subfields in the Common Info field and has a (#17611) different format for different variants of the Multi-Link element as described in the subclauses below.

***TGbe editor: please revise the following paragraph as shown below [CID 15367, 17614]***

One or more Fragment subelements are (#15367) present if the contents of a subelement exceed 255 octets (see 35.3.3.7 (Subelement fragmentation in the Link Info field of a Multi-Link element)). 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.

**9.4.2.312.2 Basic Multi-Link element**

**9.4.2.312.2.1 General**

***TGbe editor: please revise the following paragraph as shown below [CID 15368, 17615]***

The formats 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 are (#15368) defined in 9.4.2.312.2.2 (Presence Bitmap subfield of the Multi-Link Control field in a Basic Multi-Link element), 9.4.2.312.2.3 (Common Info field of the Basic Multi-Link element), and 9.4.2.312.2.4 (Link Info field of the Basic Multi-Link element), respectively.

**9.4.2.312.2.2 Common Info field of the Basic Multi-Link element**

***TGbe editor: please revise the following paragraph as shown below [CID 17619]***

The Medium Synchronization OFDM ED Threshold subfield indicates the value of dot11MSDOFDMEDthreshold (#17619) used by a STA during medium synchronization recovery and is defined in Table 9-401d (Medium Synchronization OFDM ED Threshold subfield).

***TGbe editor: please revise the following paragraph as shown below [CID 17620]***

The Medium Synchronization Maximum Number Of TXOPs subfield contains the maximum number of TXOPs (dot11MSDTXOPMAX) that a STA is allowed to attempt to initiate while the MediumSyncDelay timer is running at the STA minus 1, except that the value 15 indicates any number of TXOPs as long as the MediumSyncDelay timer is nonzero (#17620).

***TGbe editor: please revise the following paragraph as shown below [CID 17622]***

The EMLSR Support subfield indicates whether the MLD supports EMLSR operation (#17622). The EMLSR Support subfield is set to 1 if the MLD supports the EMLSR operation; otherwise it is set to 0. For a non-AP MLD, the EMLSR Support subfield is set to 0 if the EMLMR Support subfield is set to 1.

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

***TGbe editor: please revise the following paragraph as shown below [CID 17651]***

If the Link Info field is present, it consists of one or more Per-STA Profile subelements along with other optional subelements (#17651) in Table 9-401c (Optional subelement IDs for Link Info field of the Multi-Link element).

***TGbe editor: please revise the following paragraph as shown below [CID 17652]***

The format of the (#17652) Per-STA Profile subelement is defined in Figure 9-1002m (Per-STA Profile subelement format of the Basic Multi-Link element).

***TGbe editor: please revise the following paragraphs as shown below [CID 17653]***

The 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; and otherwise is set to 0 (#17653). A STA sets this subfield to 1 when the element carries complete profile.

The Beacon Interval Present subfield indicates the presence of the Beacon Interval subfield in the STA Info field and is set to 1 if the Beacon Interval subfield is present in the STA Info field; and otherwise is set to 0 (#17653). A non-AP STA sets the Beacon Interval Present subfield to 0 in the transmitted Basic Multi-Link element. An AP affiliated with an AP MLD that is not an NSTR mobile AP MLD sets this subfield to 1 when the element carries complete profile. The AP affiliated with an NSTR mobile AP MLD operating on the primary link sets this subfield to 0 in the Per-STA Profile subelement corresponding to the AP affiliated with the same NSTR mobile AP MLD that is operating on the nonprimary link.

The TSF Offset Present subfield indicates the presence of the TSF Offset subfield in the STA Info field and is set to 1 if the TSF Offset subfield is present in the STA Info field; and otherwise is set to 0 (#17653). A non-AP STA sets the TSF Offset Present subfield to 0 in the transmitted Basic Multi-Link element. An AP sets this subfield to 1 when the element carries complete profile.

The DTIM Info Present subfield indicates the presence of the DTIM Info subfield in the STA Info field and is set to 1 if the DTIM Info subfield is present in the STA Info field; and otherwise is set to 0 (#17653). A non-AP STA sets the DTIM Info Present subfield to 0 in the transmitted Basic Multi-Link element. An AP affiliated with an AP MLD that is not an NSTR mobile AP MLD sets this subfield to 1 when the element carries complete profile. The AP affiliated with an NSTR mobile AP MLD operating on the primary link sets this subfield to 0 in the Per-STA Profile subelement corresponding to the AP affiliated with the same NSTR mobile AP MLD that is operating on the nonprimary link.

***TGbe editor: please revise the following paragraph as shown below [CID 16581, 17653]***

If the value of the Maximum Number Of Simultaneous Links subfield in the MLD Capabilities and Operations subfield (#16581) is greater than 0, the NSTR Link Pair Present subfield in the STA Control field indicates if at least one NSTR link pair is present in the MLD that contains the link corresponding to that STA. It is set to 1 if there is at least one NSTR link pair; and otherwise is set to 0 (#17653).

***TGbe editor: please revise the following paragraph as shown below [CID 17653]***

The BSS Parameters Change Count Present subfield indicates the presence of the BSS Parameters Change Count subfield in the STA Info field and is set to 1 if the BSS Parameters Change Count subfield is present in the STA Info field; and otherwise is set to 0 (#17653). A non-AP STA sets the BSS Parameters Change Count Present subfield to 0 in the transmitted Basic Multi-Link element. If the Basic Multi-Link element carries complete profile and is carried in the (Re)Association Response frame, an AP sets this subfield to 1. Otherwise, an AP sets this subfield to 0.

***TGbe editor: please revise the following paragraph as shown below [CID 17655]***

The STA MAC Address subfield of the STA Info field carries the MAC address of the STA that operates on the link identified by the Link ID subfield and is affiliated with the same MLD as the STA that transmits (#17655) the Basic Multi-Link element.

***TGbe editor: please revise the following paragraph as shown below [CID 17656]***

The Beacon Interval subfield of the STA Info field is defined in 9.4.1.3 (Beacon Interval field) and carries the (#17656) beacon interval for the reported AP.

***TGbe editor: please revise the following paragraph as shown below [CID 17656]***

The DTIM Count subfield and the DTIM Period subfield are as defined in 9.4.2.5 (TIM element) and carry the (#17656) DTIM count and DTIM period, respectively, for the reported AP.

***TGbe editor: please revise the following paragraph as shown below [CID 17656]***

Each bit Bj (j ≠ i) in the NSTR Indication Bitmap subfield included in the Per-STA Profile subelement with Link ID subfield equal to i (where 0 ≤ i < 15) is set to 1 if the link pair corresponding to Link IDs equal to <I,j> is NSTR and the Basic Multi-Link element contains a Per-STA Profile subelement with Link ID subfield (#17656)equal to j; otherwise it is set to 0. Bit Bi in the NSTR Indication Bitmap subfield included in the Per-STA Profile subelement with Link ID subfield value equal to i is reserved.

***TGbe editor: please revise the following paragraph as shown below [CID 17658, 17659]***

The contents of the STA Profile field are determined based on whether the Per-STA Profile subelement carries complete or partial profile. When carrying partial profile, the contents of the STA Profile field are determined based on conditions (#17658) in 35.3.4.2 (Use of multi-link probe request and response) or 35.3.11 (Multi-link procedures for channel switching, extended channel switching, and channel quieting). When carrying complete profile, the contents of the STA Profile field are subject to the (#17659) rules defined in 35.3.3.3 (Advertisement of complete or partial per-link information).

**9.4.2.312.3 Probe Request Multi-Link element**

***TGbe editor: please revise the following paragraph as shown below [CID 17652]***

The format of the (#17652) Per-STA Profile subelement is defined in Figure 9-1002s (Per-STA Profile subelement of the Probe Request Multi-Link element format).

***TGbe editor: please revise the following paragraph as shown below [CID 17661]***

The Complete Profile Requested subfield is set to 1 when complete profile of the AP identified by the Link ID subfield is requested as defined in 35.3.4.2 (Use of multi-link probe request and response). Otherwise, the Complete Profile Requested (#17661) subfield is set to 0.

**9.4.2.312.4 Reconfiguration Multi-Link element**

***TGbe editor: please revise the following paragraph as shown below [CID 17664]***

The 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 the STA MAC Address Present subfield (#17664) is set to 0.

***TGbe editor: please revise the following paragraph as shown below [CID 17653]***

The Operation Parameters Present subfield is set 1 to indicate the presence of the Operation Parameters subfield in the STA Info field; and otherwise is set to 0 (#17653).

***TGbe editor: please revise the following paragraph as shown below [CID 17665]***

The STA Info field consists of fields whose presence is indicated by the subfields of the STA Control field. Each subfield in the STA Info field appears in the same order as its corresponding presence subfield in the STA Control field. (#17665)

***TGbe editor: please revise the following paragraph as shown below [CID 17668]***

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 the primary link and only the AP on the primary link is transmitting beacons (see 35.3.19 (NSTR mobile AP MLD operation)), so the AP Removal Timer subfield indicates the number of TBTTs corresponding to the AP operating on the primary link until the AP specified in the Per-STA Profile subelement is removed. (#17668)

***TGbe editor: please revise the following paragraph as shown below [CID 17670]***

The Pad subfield contains all 0s. The number of bits in the Pad subfield is the number of bits required to make the length of the Operation Parameter Info subfield (#17670) 2 octets.

**9.4.2.312.6 Priority Access Multi-Link element**

***TGbe editor: please revise the following paragraph as shown below [CID 17652]***

The format of the(#17652) Per-STA Profile subelement is defined in Figure 9-1002ae (Per-STA Profile subelement format for the Priority Access Multi-Link element).