IEEE P802.11
Wireless LANs

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| LB 271 CR for Non-AP MLD Operation parameter update |
| Date: 2023-03-13 |
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Abstract

This submission proposes resolutions for following 21 CIDs received for TGbe LB271:

15416 15475 15874 16048 16049

16050 16051 16052 16053 16444

16450 16867 16868 16869 16872

16874 16875 17870 17873 17874

17324 15476

Revision History:

* Rev 0: Initial version of the document
* Rev 1: Added green tags and adopted offline comments from members.
* Rev 2: Highlighted deferred/missed CIDs and editorial change during the online discussion
* Rev 3: Add resolution of 16052 and update resolutions of deferred CIDs. Take CID15476 from Yunbo.
* Rev 4: Update some resolutions.
* Rev 5: Update text change from CID 16049

***TGbe editor: The baseline for this document is 11be D3.0***

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).***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 15416 | John Wullert | 35.3.16.2.2 | 552.40 | It is not clear what word "otherwise" is suggesting an exception to. It seems most likely it is refering to the frame the field is carried in. | Replace "... otherwise, ..." with "... when carried in other frames, ..." | **Revised**Revise the text to make the subfield setting simply dependent on the MIB variable. TGbe editor: please implement changes as shown in this document tagged 15416. |
| 15475 | Xiandong Dong | 35.3.16.2.2 | 553.37 | When there are more than one link are requested to update the parameters, namely more than one Per-STA Profile subfield included of the Reconfiguration Multi-link element of a Multi-Link Operation Update Request frame, the associated AP MLD can only accept or reject all the requests indicated by the Per-STA Profile subfield at the same time, and cannot respond to the request corresponding to each link individualy. | The response process that can respond individually to the request of each link should be detailed. | **Rejected.**If a non-AP MLD plans to request parameter change of multiple links, these requests may correlate with one another, but only the non-AP MLD knows the relation. For example, link1’s memory is to be allocated to link2 so that the decreased max MPDU length of link1 is related to link2’s increase. If AP just approves link2’s request, it causes conflict to the non-AP MLD’s internal setup. In addition, individual response to each link’s update brings extra complexity. |
| 15476 | Xiandong Dong | 35.3.16.2.3 | 553.37 | If the Status Code in the Multi-Link Operation Update Response frame is equal to DENIED\_OPERATION\_PARAMETER \_UPDATE sent by a AP MLD, the operation parameters request contained in the Multi-Link Operation Update Request frame fails. It is inefficient for the non-AP MLD to resent a new  Multi-Link Operation Update Request frame with new parameters for update request. Therefore, a more efficient operation parameter update process is needed. | When the operation parameters request contained in the Multi-Link Operation Update Request frame is unacceptable, the AP MLD can suggest setting alternative parameters in the Multi-Link Operation Update Response frame to avoid duplicate requests, rather than just rejecting it. | **Rejected.**AP MLD has no information of how the non-AP MLD determining the operation parameters, so it is not possible for an AP MLD to give a proper suggestion to the non-AP MLD. |
| 15874 | Chunyu Hu | 35.3.16.2.2 | 552.35 | 35.3.16.2.2 describes the maximum MPDU/AMSDU length update, and is irrelevant to the channel access as 35.3.16 intends to. | Move this subclause as part of the link management subclause (35.3.7). | **Revised.**Agree with the comment in principle. Relocate the subclause to 35.3.7 as a new subclause.TGbe editor: please implement changes as shown in this document tagged 15874. |
| 16048 | Binita Gupta | 35.3.16.2.2 | 552.52 | If the associated AP MLD removes an affiliated AP with which the non-AP MLD did not have a setup link established, removal of such an AP will not cause any impact to operation parameters of the non-AP MLD. Clarify in the 2nd bullet. | Clarify the 2nd condition to be:"the associated AP MLD removes at least one of its affiliated AP with which the non-AP MLD had a setup link established;" | **Revised.**Agree with the comment in principle. Revise the 2nd condition with description that the removed AP is corresponding to a setup link between the AP MLD and the non-AP MLD.TGbe editor: please implement changes as shown in this document tagged 16048. |
| 16049 | Binita Gupta | 35.3.16.2.2 | 552.53 | It is not clear how adding an affiliated AP to the AP MLD could result in operation parameters change of the non-AP MLD, since the non-AP MLD does not have any setup link with the new affiliated AP. The operation parameters may change if the non-AP MLD (Re)Associates and establishes new set of links including the newly added AP, but just adding an AP would not lead to operation parameter changes for a non-AP MLD. | Either move the condition in the last bullet or clarify how it results in changes to the operation parameters of the non-AP MLD. | **Revised.**Agree with the commenter in principle. Remove the 3rd condition and add a new condition that the non-AP MLD adds or deletes a setup link.TGbe editor: please implement changes as shown in this document tagged 10649.  |
| 16050 | Binita Gupta | 35.3.16.2.2 | 552.62 | The Multi-Link Operation Update Request frame need to indicate the MLD MAC Address of the non-AP MLD sending the request. Hence the MLD MAC Address Present subfield shall be set to 1. | Modify requirement to include MLD MAC Address in the Common Info field of the Reconfig ML element carried in the Multi-Link Operation Update Request frame. | **Rejected.**Adding the MLD MAC address is not needed because the recipient AP does not require the address to forward the frame to its affiliated AP MLD if necessary.  |
| 16051 | Binita Gupta | 35.3.16.2.2 | 552.48 | Clarify that a single Per-STA Profile subelement is included in the Multi-Link Operation Update Request frame, since the Reconfiguration ML element in this case only provides updated operation parameters for the non-AP STA sending the request. | Modify to "...by transmitting a Multi-Link Operation Update Request frame including a Reconfiguration Multi-Linkelement containing one Per-STA Profile subelement with Operation Update Type subfield set to 0..." | **Rejected.**It is possible that multiple Per-STA profile subelements are included in the ML Operation Update Request frame so that operation parameters of multiple non-AP STAs can be updated at the same time.  |
| 16052 | Binita Gupta | 35.3.16.2.2 | 553.02 | The Operation Parameters Present subfield is not needed. The Operation Update Type value 0 can indicate the presence of Operation Parameters field. | Remove the Operation Parameters Present subfield from the clause. Use Operation Update Type value = 0 as indication for presence of Operation Parameters in this clause. | **Revised.**Agree with the commenter. Remove the Operation Parameters Present subfield and use Operation Update Type value = 0 as the indicator of the presence of Operation Parameters.TGbe editor: please implement changes as shown in this document tagged 16052. |
| 16053 | Binita Gupta | 35.3.16.2.2 | 553.07 | The Operation Parameters subfield provides updated operation parameters for the link identified by the Link ID. | Modify to "the Operation Parameters subfield shall indicate the updated operation parameters (as applicable) for the link identified by the Link ID." | **Accepted.** |
| 16444 | Laurent Cariou | 35.3.16.2.2 | 552.36 | This procedure only allows to update a very limited set of parameters, which makes it of very low usefulness. In order to increase the chances of this mode being actually used and deployed, there is a clear need to make it generic so that any element/field of a STA can be updated. A clear example where that would be helpful is after a Channel Switch from one band to another one. | Make this update procedure fully generic so that any element/fields can be updated. By reusing the Reconfiguration ML element, this would be very easy to do. | **Rejected.**Non-AP STA’s operation parameter or capability update after association needs a specific usage scenario and also the update can bring benefits. Currently, only specific subfields require such update procedures after link disablement/enablement or after a link reconfiguration negotiation followed by a channel switch procedure. In addition, current operation parameter subfield has reserved space for adopting new subfields requiring such update. New operation parameter or capability need to be updated can be added if there are promising use cases. |
| 16450 | Laurent Cariou | 35.3.16.2.2 | 553.16 | Why is the AP allowed to deny a change of parameters on the STA side? this does not seem to be useful. Please remove that. | as in comment | **Rejected.**For a case that while receiving the request, AP may have enqueued MPDUs with original parameters, so AP needs some time to transmit those MPDUs first and to reject the request at this time. Allowing the AP to deny a request is useful in a such case. |
| 16867 | Mark RISON | 35.3.16.2.2 | 552.37 | "An MLD shall set the Operation Parameter Update Support subfield in the Common Info field of the BasicMulti-Link element it transmits in a Beacon, Probe Response, (Re)Association Request, and(Re)Association Response frames to 1 if its dot11OperationParameterUpdateImplemented is true; otherwisethe MLD shall set it to 0. " duplicates Clause 9 | Delete the cited text | **Rejected.**In addition to the information provided in Table 9-401j, the text here provides normative behaviors of which device is to set such subfield. Thus, the text here is not fully duplicated to the information provided in Clause 9. |
| 16868 | Mark RISON | 35.3.16.2.2 | 552.46 | "of change in" missing article | As it says in the comment | **Revised.**Updated as “of a change in…” TGbe editor: please implement changes as shown in this document tagged 16868. |
| 16869 | Mark RISON | 35.3.16.2.2 | 552.51 | "one of its affiliated AP" should be "one of its affiliated APs" | As it says in the comment | **Revised.**Updated as “one of its affiliated APs”TGbe editor: please implement changes as shown in this document tagged 16869. |
| 16872 | Mark RISON | 35.3.16.2.2 | 553.15 | "set to one of 0 (SUCCESS) or<ANA> (DENIED\_ OPERATION\_PARAMETER \_UPDATE)" should be just "set to indicate SUCCESS or DENIED\_ OPERATION\_PARAMETER \_UPDATE". Ditto explicit numbers later on in this subclause | As it says in the comment | **Revised.**Replace <ANA> by the status code.TGbe editor: please implement changes as shown in this document tagged 16872. |
| 16874 | Mark RISON | 35.3.16.2.2 | 553.45 | "received in VHT Capabilities element (if applicable) or inHE 6 GHz Band Capabilities element (if applicable) or in EHT Capabilities element [...] in HT Capabilities element transmitted" missing articles | As it says in the comment | **Revised.**Add articles.TGbe editor: please implement changes as shown in this document tagged 16874. |
| 16875 | Mark RISON | 35.3.16.2.2 | 553.45 | "update the Maximum MPDU Length subfield" -- it is not clear how one updates a subfield. Ditto next para | Talk of superseding the value previously indicated | **Revised.**Revise the description to “…is to update the value of the Maximum MPDU Length subfield…”Similar change is applied to next paragraph as well.TGbe editor: please implement changes as shown in this document tagged 16875. |
| 17870 | Gaurang Naik | 35.3.16.2.2 | 552.45 | "Multi-Link Operation Update" does not intuitively suggest what this framework is trying to do. The Multi-Link Reconfiguration framework is ideal for this type of parameter update. | Update "Multi-Link Operation Update Request/Response" to "Multi-Link Reconfiguration Request/Response". Also move this subclause as a new subclause under 35.3.6. For example (35.3.6.x Configuration Update) | **Revised.**Naming part:Using ML reconfig. Request/Response may bring misleading information that the framework is to define link addition or removal procedures other than to focus on operation parameter or capability update. Also, ML reconfig. Request/Response may be confused with the newly added Link Request/Response EHT action frames. Subclause location part:Agree with the comment in principle. Relocate the subclause to 35.3.7 as a new subclause. This part has been implemented throught CR of CID 15874.TGbe editor: No further change needed to this comment. |
| 17873 | Gaurang Naik | 35.3.16.2.2 | 552.41 | shall set \*it\* to 0 --> shall set \*the subfield\* to 0 | As in comment | **Revised.**Replace it to the full name of the subfield.TGbe editor: please implement changes as shown in this document tagged 17873. |
| 17874 | Gaurang Naik | 35.3.16.2.2 | 552.56 | Capitalize the subfield name (operation update type) | As in comment | **Revised.**Update the subfiled name by capital first letters.TGbe editor: please implement changes as shown in this document tagged 17874. Please apply this change through all the draft |
| 17324 | Alfred Asterjadhi | 10.11 | 347.42 | HT Capabilities element requirement, and Reconfiguration ML element with update is optional. Please make sure it stays that way. And also add a reference to the EHT subclause where the behavior is defined. | As in comment. | **Revised.**As the comment suggested, define a successful operation parameter update and add corresponding references in 10.11 and 35.15.1.TGbe editor: please implement changes as shown in this document tagged 17324. |

***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.***

**No Discussion:**

TGbe editor: Relocate the following subcluse to 35.3.7 as a new subcluse (#15874, 17870)

TGbe editor: M***ake the following changes in the subclause as below.***

**35.3.16.2.2 Non-AP MLD operation parameter update**

(#15416) An MLD that has dot11OperationParameterUpdateImplemented equal to true shall set the Operation Parameter Update Support subfield in the Common Info field of the Basic Multi-Link element that it transmits to 1. The MLD shall set (#17873) the Operation Parameter Update Support subfield to 0 if it has dot11OperationParameterUpdateImplemented equal to false. A STA affiliated with an MLD in which dot11OperationParameterUpdateImplemented is true is referred to as *operation parameter update capable*.

An operation parameter update capable non-AP STA affiliated with a non-AP MLD may notify an operation parameter update capable AP affiliated with the associated AP MLD of (#16868) a change in its operation parameters by transmitting a Multi-Link Operation Update Request frame including a Reconfiguration Multi-Link element with Operation Update Type subfield set to 0 after one of the following conditions occurs:

* at least one link is enabled or disabled for the non-AP MLD;
* the associated AP MLD removes at least one of its affiliated (#16869)APs (#16048) and at least one of the removed APs corresponds to a setup link between the AP MLD and the non-AP MLD.
* (#16049)
* (#16049)the non-AP MLD adds at least one setup link or deletes at least one setup link with the associated AP MLD

Otherwise, the non-AP STA shall not transmit a Multi-Link Operation Update Request frame with(#17874) Operation Update Type subfield set to 0.

In the Reconfiguration Multi-Link element of a Multi-Link Operation Update Request frame with Operation Update Type subfield set to 0 transmitted by a non-AP STA affiliated with a non-AP MLD:

* all subfields in the Presence Bitmap subfield of the Multi-Link Control field in the Reconfiguration Multi-Link element shall be set to 0;
* all subfields of the STA Control field in the Reconfiguration Multi-Link element except the Link ID (#16052) subfield shall be set to 0;
* the Link ID subfield shall be set to the identifier of the link to which the operation parameters apply;
* (#16052)
* the Operation Parameters subfield shall indicate the updated operation parameters (as applicable) (#16053) for the link identified by the value of the Link ID subfield.

An AP affiliated with an AP MLD shall not transmit a Multi-Link Operation Update Request frame.

An operation parameter update capable AP affiliated with an AP MLD that received a Multi-Link Operation Update Request frame including a Reconfiguration Multi-Link element with Operation Update Type subfield equal to 0 shall respond with a Multi-Link Operation Update Response frame. The Status Code subfield of the Multi-Link Operation Update Response frame shall be set to one of 0 (SUCCESS) or (#16872) 141 (DENIED\_ OPERATION\_PARAMETER \_UPDATE).

Before the AP affiliated with the AP MLD transmits the corresponding Multi-Link Operation Update Response frame with the Status Code subfield set to 0, the AP affiliated with the AP MLD shall not apply the operation parameters of the non-AP STA affiliated with the non-AP MLD indicated in the Operation Parameter Info subfield in the Reconfiguration Multi-Link element of the Multi-Link Operation Update Request frame.

Before receiving the Multi-Link Operation Update Response frame, the non-AP STA affiliated with the non- AP MLD shall not apply the operation parameters indicated in the Reconfiguration Multi-Link element of the corresponding Multi-Link Operation Update Request frame.

After receiving the Multi-Link Operation Update Response frame in which the Status Code is equal to the value 0 (SUCCESS), the non-AP STA affiliated with the non-AP MLD shall apply the operation parameters indicated in the Operation Parameter Info subfield in the Reconfiguration Multi-Link element of the corresponding Multi-Link Operation Update Request frame.

(#17324)An operation parameter update is successful if a STA affiliated with an MLD receives or transmits an Multi-Link Operation Update Response frame with the Status Code equal to the value 0 (SUCCESS).

After receiving the Multi-Link Operation Update Response frame in which a Status Code is equal to the value (#16872) 141 (DENIED\_OPERATION\_PARAMETER \_UPDATE), the non-AP STA affiliated with the non-AP MLD shall not apply the operation parameters indicated in the Operation Parameter Info subfield in the Reconfiguration Multi-Link element of the corresponding Multi-Link Operation Update Request frame.

(#16875, 16874)The value of the Maximum MPDU Length subfield carried in the Operation Parameter Info subfield in the Reconfiguration Multi-Link element of the Multi-Link Operation Update Request frame is to update the value of the Maximum MPDU Length subfield received in the VHT Capabilities element (if applicable) or in the HE 6 GHz Band Capabilities element (if applicable) or in the EHT Capabilities element (if applicable) transmitted by the non-AP STA.

(#16875, 16874)The value of the Maximum A-MSDU Length subfield carried in the Operation Parameter Info subfield in the Reconfiguration Multi-Link element of the Multi-Link Operation Update Request frame is to update the value of Maximum A-MSDU Length subfield received in the HT Capabilities element transmitted by the non-AP STA.

TGbe editor: M***ake the following changes in the subclause as below.***

# 10.11 A-MSDU operation

A STA shall not transmit an A-MSDU in an HT PPDU if the A-MSDU length exceeds the value indicated by the Maximum A-MSDU Length field of the HT Capabilities element or in Reconfiguration Multi-Link element with operation update type equal to 0 (#17324)of a successful operation parameter update (see 35.3.16.2.2 Non-AP MLD operation parameter update) received from the recipient STA.

TGbe editor: M***ake the following changes in the subclause as below(#17324).***

**35.15.1 Basic EHT BSS operation**

…

In the 2.4 GHz band, an EHT STA shall not transmit an EHT PPDU to a recipient EHT STA that carries a frame that is not an EHT Compressed Beamforming/CQI frame (see 35.7.3 (Rules for EHT sounding protocol sequences)) and that exceeds the maximum MPDU length capability indicated in the EHT Capabilities element or in Reconfiguration Multi-Link element with operation update type equal to 0 of a successful operation parameter update (see 35.3.16.2.2 Non-AP MLD operation parameter update) last received from the recipient EHT STA.

In the 5 GHz band, an EHT STA shall not transmit an EHT PPDU to a recipient EHT STA that carries a frame that is not an EHT Compressed Beamforming/CQI frame (see 35.7.3 (Rules for EHT sounding protocol sequences)) and that exceeds the maximum MPDU length capability indicated in the VHT Capabilities element or in Reconfiguration Multi-Link element with operation update type equal to 0 of a successful operation parameter update (see 35.3.16.2.2 Non-AP MLD operation parameter update) last received from the recipient STA.

In the 6 GHz band, an EHT STA shall not transmit an EHT PPDU to a recipient EHT STA that carries a frame that is not an EHT Compressed Beamforming/CQI frame (see 35.7.3 (Rules for EHT sounding protocol sequences)) and that exceeds the maximum MPDU length capability indicated in the HE 6 GHz Band Capabilities element or in Reconfiguration Multi-Link element with operation update type equal to 0 of a successful operation parameter update (see 35.3.16.2.2 Non-AP MLD operation parameter update) last received from the recipient EHT STA.

In the 2.4 GHz band, an EHT STA shall not transmit an HE PPDU to a recipient EHT STA that carries a frame that is not an HE Compressed Beamforming/CQI frame (see 26.7.3 (Rules for HE sounding protocol sequences)) and that exceeds the maximum MPDU length capability indicated in the EHT Capabilities element or in Reconfiguration Multi-Link element with operation update type equal to 0 of a successful operation parameter update (see 35.3.16.2.2 Non-AP MLD operation parameter update) last received from the recipient EHT STA.

TGbe editor: M***ake the following changes in the subclause as below.***

## 9.4.2.311.1 Reconfiguration Multi-Link element

…

The format of the STA Control field is defined in [Figure 9-1002x (STA Control field format for the Recon-](#bookmark199) [figuration Multi-Link element)](#bookmark199).

B0 B3 B4 B5 B6 B7 B10 (#16052) B11 B15

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Link ID | Complete Profile | STA MACAddress Present | APRemoval Timer Present | Operation Update Type |  | Reserved |

Bits: 4 1 1 1 4 5

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

The Link ID subfield is as defined in [9.4.1.75 (Link ID Info field)](#bookmark105) and specifies a value that uniquely identi- fies the link that the reported AP is operating on.

The Complete Profile subfield is set to 0.

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 it is set to 0.

The AP Removal Timer Present subfield is set to 1 to indicate the presence of the AP Removal Timer sub- field in the STA Info field, otherwise it is set to 0 otherwise.

The Operation Update Type subfield is set to indicate the type of multi-link operation update in the Multi- Link Operation Update Request frame for the link indicated by the Link ID subfield as per [Table 9-401k](#bookmark200) [(Operation Update Type subfield encoding)](#bookmark200).

**Table 9-401k—Operation Update Type subfield encoding**

|  |  |
| --- | --- |
| **Value** | **Name** |
| 0 | Operation Parameter Update |
| 1–15 | Reserved |

(#16052) If The Operation Update Type subfield is set 0, the Operation Parameters subfield in the STA Info field is present; otherwise, the Operation Parameters subfield in the STA Info field is not present.