IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LB271 Comment Resolution Clause 35 MLTI  (Part 1) | | | | |
| Date: 2023-3-20 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Minyoung Park | Intel Corporation |  |  | Minyoung.park@intel.com |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes comment resolutions for the following 25 CIDs received in LB271 on TGbe D3.0 related to

* 35.3.12.4 Traffic Indication and
* 9.4.2.315 Multi-Link Traffic Indication element:

CIDs:

15083 16040 15544 16528 16529 17840 15084 16042 15870 15615

15633 17745 15091 17740 16824 15376 17741 16531 17292 18267

15545 16532 16533 16534 15614

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Added green tags; transferred CID 16312 to Juseong Moon

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 15083 | Minyoung Park | 35.3.12.4 | 539.01 | The paragraph in P539L1 is too long. Revise the paragraph into small paragraphs and sub-bullet points for better readability. | Please revise the paragraph as follows:  "An AP affiliated with an AP MLD shall include the Multi-Link Traffic Indication element (see 9.4.2.315 (Multi-Link Traffic Indication element)) in a Beacon frame it transmits if all the following conditions are met: - at least one of the associated non-AP MLD has successfully negotiated a TID-to-link mapping (see 35.3.7.1.3 (Negotiation of TID-to-link mapping)) with the AP MLD for DL or bidirectional traffic and not all TIDs are mapped to all enabled links - the AP MLD has buffered BU(s) with TID(s) that are not mapped to all the enabled links for the non-AP MLD(s).  The Multi-Link Traffic Indication element includes Per-Link Traffic Indication Bitmap subfield(s) in the Per-Link Traffic Indication Bitmap List field. The Per-Link Traffic Indication Bitmap subfield(s) corresponds to the AID(s) of the non-AP MLD(s) or STA(s), starting from the bit number k of the traffic indication virtual bitmap. The AID Offset subfield of the Multi-Link Traffic Indication Control field of the Multi-Link Traffic Indication element contains the value k. The order of the Per-Link Traffic Indication Bitmap subfield(s) follows the order of the bits that are set to 1 in the Partial Virtual Bitmap subfield of the TIM element that corresponds to the AID(s) of the non-AP MLD(s) or STA(s).  If a non-AP MLD has successfully negotiated a TID-to-link mapping with an AP MLD with a nondefault mapping, the bit position i of the Per-Link Traffic Indication Bitmap subfield that corresponds to the link with the link ID that is equal to i on which a non-AP STA of the non-AP MLD is operating shall be set to 1 if the AP MLD has buffered BU(s) with TID(s) that are mapped to that link or MMPDU(s) for that non-AP MLD, otherwise the bit shall be set to 0." | Revised.  Agree with the commenter. The paragraph is broken down into 3 paragraphs.  TGbe editor to make the changes with the CID tag (#15083) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 16040 | Binita Gupta | 35.3.12.4 | 539.01 | Does AP MLD also include TIM element along with the Multi-Link Traffic Indication element always or can the later be included without the TIM element? Clarify this req. in the text. | As in comment | Rejected.  This is invalid comment. The commenter is asking questions.  TIM element is always included in a Beacon frame (please refer to the Beacon frame format) |
| 15544 | Chaoming Luo | 35.3.12.4 | 539.05 | "and not all TIDs are mapped to all enabled links" " and the AP MLD has buffered BU(s) with TID(s) that are not mapped to all the enabled links for the non-AP MLD(s)." The second condition covers the first, so the first is redundant. | Remove "and not all TIDs are mapped to all enabled links" | Rejected.  It is needed to clarify that a non-AP MLD has a non-default TID-to-link mapping and the AP MLD has buffered BU with TID that is not mapped to all the enabled links. |
| 16528 | Arik Klein | 35.3.12.4 | 539.09 | Need to clarify that "STAs" actually refers to "non-MLD non-AP STAs". Please modify the sentence, as suggested. | Please revise the sentence as follows: "The Per-Link Traffic Indication Bitmap subfield(s) corresponds to the AID(s) of the non-AP MLD(s) or \*non-MLD non-AP\* STA(s), starting from the bit number k ..." | Revised.  Agree with the commenter.  TGbe editor to make the changes with the CID tag (#16528) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 16529 | Arik Klein | 35.3.12.4 | 539.14 | Need to clarify that "STAs" actually refers to "non-MLD non-AP STAs". Please modify the sentence, as suggested. | Please revise the sentence as follows: "The order of the Per-Link Traffic Indication Bitmap subfield(s) follows the order of the bits that are set to 1 in the Partial Virtual Bitmap subfield of the TIM element that corresponds to the AID(s) of the non-AP MLD(s) or \*non-MLD non-AP\* STA(s)." | Revised.  Agree with the commenter.  TGbe editor to make the changes with the CID tag (#16529) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |

**35.3.12.4 Traffic indication**

**…**

**TGbe Editor to change the two paragraphs in P539L1 and in P539L25 into 7 paragraphs as follows in Subclause 35.3.12.4 (Traffic Indication) in TGbe D3.0: (#15083)**

An AP affiliated with an AP MLD shall include the Multi-Link Traffic Indication element (see 9.4.2.315 (Multi-Link Traffic Indication element)) in a Beacon frame it transmits if (#15083)all the following conditions are met:

* (#15083)At least one of the associated non-AP MLD has successfully negotiated a TID-to-link mapping (see 35.3.7.1.3 (Negotiation of TID-to-link mapping)) with the AP MLD for DL or bidirectional traffic and not all TIDs are mapped to all enabled links
* (#15083)The AP MLD has buffered BU(s) with TID(s) that are not mapped to all the enabled links for the non-AP MLD(s).

The Multi-Link Traffic Indication element includes Per-Link Traffic Indication Bitmap subfield(s) in the Per-Link Traffic Indication Bitmap List field. The Per-Link Traffic Indication Bitmap subfield(s) corresponds to the AID(s) of the non-AP MLD(s) or (#16528)non-MLD non-AP STA(s), starting from the bit number *k* of the traffic indication virtual bitmap. The AID Offset subfield of the Multi-Link Traffic Indication Control field of the Multi-Link Traffic Indication element contains the value *k*. The order of the Per-Link Traffic Indication Bitmap subfield(s) follows the order of the bits that are set to 1 in the Partial Virtual Bitmap subfield of the TIM element that corresponds to the AID(s) of the non-AP MLD(s) or (#16529)non-MLD non-AP STA(s).

If a non-AP MLD has successfully negotiated a TID-to-link mapping with an AP MLD with a nondefault mapping, the bit position *i* of the Per-Link Traffic Indication Bitmap subfield that corresponds to the link with the link ID that is equal to *i* on which a non-AP STA of the non-AP MLD is operating shall be set to 1 if the AP MLD has buffered BU(s) with TID(s) that are mapped to that link or MMPDU(s) for that non-AP MLD, otherwise the bit shall be set to 0.

The Bitmap Size subfield of the Multi-Link Traffic Indication Control field should be set to *m*, where *m* is equal to the largest link ID value minus the smallest link ID value amongst the bits that are set to 1 in the Per-Link Traffic Indication Bitmap subfield(s).

An example of the construction of the Multi-Link Traffic Indication element is shown in Figure 35-22 (Example of Multi-Link Traffic Indication element construction).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 15084 | Minyoung Park | 35.3.12.4 | 539.20 | For this sentence on setting the Bitmap Size subfield to work, there needs to be information about 'link id offset' that indicates the starting link id index of the Per-Link Traffic Indication Bitmap subfields. | Either remove the sentence or add a subfield that indicates the Link ID offset that indicates the starting Link Id index in each Per-Link Traffic Indication Bitmap subfield. | Revised.  Link IDs are expected to be assigned from value 0 in a sequential manner (e.g., 0, 1, 2,…). For Link ID offset to be set to 1, B0 of all the Per-Link Traffic Indication Bitmap subfields in MLTI element need to be equal to 0 and this seems to a rare case. Basically if there is just one non-AP MLD that has buffered BUs on Link ID=0, there is no overhead saving with the Link ID Offset subfield. Therefore, adding the Link ID Offset subfield might end up increasing additional complexity for parsing the MLTI element without saving overhead. For these reasons, to fix the inconsistency, “minus the smallest link ID value” is deleted from the cited sentence.  TGbe editor to make the changes with the CID tag (#15084) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 17840 | Yunbo Li | 35.3.12.4 | 539.17 | The indication of Per-Link Traffic Indication Bitmap always start from Link 0. Considering some Link ID may not used (e.g. link removed), Link ID offset could be used to save the signaling overhead. | Introduce link ID offset for Per-Link Traffic Indication Bitmap to save overhead. | Revised.  Link IDs are expected to be assigned from value 0 in a sequential manner (e.g., 0, 1, 2,…). For Link ID offset to be set to 1, B0 of all the Per-Link Traffic Indication Bitmap subfields in MLTI element need to be equal to 0 and this seems to a rare case. Basically if there is just one non-AP MLD that has buffered BUs on Link ID=0, there is no overhead saving with the Link ID Offset subfield. Therefore, adding the Link ID Offset subfield might end up increasing additional complexity for parsing the MLTI element without saving overhead. For these reasons, to fix the inconsistency, “minus the smallest link ID value” is deleted from the cited sentence.  TGbe editor to make the changes with the CID tag (#15084) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 16042 | Binita Gupta | 35.3.12.4 | 539.20 | This sentence about setting value of m does not align with the previous sentence which states that bit i in Per-Link Traffic Indication Bitmap subfield corresponds to the link with Link Id=i. This will not be true if m = (largest Link ID - smallest Link ID value). | Fix the inconsistency. Either remove the 'should' requirement or specify what link ID is indicated by bit i when m is equal to the largest link ID value minus the smallest link ID value. Also need to specify how a non-AP MLD determines what rule is used by AP MLD for setting m. | Revised.  Link IDs are expected to be assigned from value 0 in a sequential manner (e.g., 0, 1, 2,…). For Link ID offset to be set to 1, B0 of all the Per-Link Traffic Indication Bitmap subfields in MLTI element need to be equal to 0 and this seems to a rare case. Basically if there is just one non-AP MLD that has buffered BUs on Link ID=0, there is no overhead saving with the Link ID Offset subfield. Therefore, adding the Link ID Offset subfield might end up increasing additional complexity for parsing the MLTI element without saving overhead. For these reasons, to fix the inconsistency, “minus the smallest link ID value” is deleted from the cited sentence.  TGbe editor to make the changes with the CID tag (#15084) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 15870 | Chunyu Hu | 35.3.12.4 | 539.22 | The smallest link ID value is not indicated anywhere in the element. Without this info, the bitmap cannot be properly parsed. | Fix the issue. | Revised.  Link IDs are expected to be assigned from value 0 in a sequential manner (e.g., 0, 1, 2,…). For Link ID offset to be set to 1, B0 of all the Per-Link Traffic Indication Bitmap subfields in MLTI element need to be equal to 0 and this seems to a rare case. Basically if there is just one non-AP MLD that has buffered BUs on Link ID=0, there is no overhead saving with the Link ID Offset subfield. Therefore, adding the Link ID Offset subfield might end up increasing additional complexity for parsing the MLTI element without saving overhead. For these reasons, to fix the inconsistency, “minus the smallest link ID value” is deleted from the cited sentence.  TGbe editor to make the changes with the CID tag (#15084) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 16824 | Mark RISON | 35.3.12.4 | 539.20 | "The Bitmap Size subfield of the Multi-Link Traffic Indication Control field should be set to m," and presumaby has to be at least m? | Add "and shall be at least m," with m italic | Revised.  Changed ‘should’ to ‘shall’.  TGbe editor to make the changes with the CID tag (#16824) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 15615 | Sanghyun Kim | 9.4.2.315 | 295.15 | Because the Bitmap Size subfield can be set to the difference between the largest and smallest link ID value amongst the bits that are set to 1 in the Per-Link Traffic Indication Bitmap subfield(s), interpretation of the Per-Link Traffic Indication Bitmap subfield needs to be corrected. For example, if the Bitmap size subfield is determined to be 3-1 = 2 (the largest link ID set to 1 is 3, and the smallest is 1), then B0 in the Per-Link Traffic Indication Bitmap subfield should correspond to Link ID 1, and B2 should correspond to Link ID 3. | Link ID offset information should be provided along with the Bitmap size subfield, and the link ID corresponding to B0 in the Per-Link Traffic Indication Bitmap subfield should be determined based on the information. | Revised.  Link IDs are expected to be assigned from value 0 in a sequential manner (e.g., 0, 1, 2,…). For Link ID offset to be set to 1, B0 of all the Per-Link Traffic Indication Bitmap subfields in MLTI element need to be equal to 0 and this seems to a rare case. Basically if there is just one non-AP MLD that has buffered BUs on Link ID=0, there is no overhead saving with the Link ID Offset subfield. Therefore, adding the Link ID Offset subfield might end up increasing additional complexity for parsing the MLTI element without saving overhead. For these reasons, to fix the inconsistency, “minus the smallest link ID value” is deleted from the cited sentence.  TGbe editor to make the changes with the CID tag (#15084) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 15633 | Atsushi Shirakawa | 9.4.2.315 | 294.26 | Two octets are assigned to Multi-link Traffic Indication Control field and its main objective is to indicate AID offset. But other indication may be helpful depending on situation. For example doc 22/1381 introduces Link ID offset. If combination of AID offset and other information is allowed, more flexible and efficient indication may be achieved. Extend Multi-Link Traffic Indiation Control field for future flexible use, like preparing more reserved bits. | as in comment | Revised.  Link IDs are expected to be assigned from value 0 in a sequential manner (e.g., 0, 1, 2,…). For Link ID offset to be set to 1, B0 of all the Per-Link Traffic Indication Bitmap subfields in MLTI element need to be equal to 0 and this seems to a rare case. Basically if there is just one non-AP MLD that has buffered BUs on Link ID=0, the Link ID offset subfield is set to 0 and there is no overhead saving with the Link ID Offset subfield. Therefore, adding the Link ID Offset subfield might end up increasing additional complexity for parsing the MLTI element without saving overhead. For these reasons, to fix the inconsistency, “minus the smallest link ID value” is deleted from the cited sentence.  TGbe editor to make the changes with the CID tag (#15084) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 17745 | Brian Hart | 9.4.2.315 | 295.16 | There is language for Beacon frames and LR frames, but the paragraph breaks don't highlight this. | Insert end of para marker before "In a Beacon frame" so that we have two paras starting "In Beacon frames" then "In a LR frame" | Revised.  The paragraph in P295L15 is broken down into two paragraphs as suggested.  TGbe editor to make the changes with the CID tag (#17745) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 15091 | Minyoung Park | 9.4.2.315 | 295.15 | For better readability, revise the following paragraph into shorter paragraphs:" Each bit in the Per-Link Traffic Indication Bitmap subfield corresponds to a link and the bit position i of the bitmap, Bi, corresponds to a link with link ID equal to i. In a Beacon frame when the Per-Link Traffic Indication Bitmap subfield corresponds to a non-AP MLD that has successfully negotiated TID-to-link mapping and not all TIDs are mapped to all the enabled links, a value of 1 in the bit position i in the bitmap that corresponds to a link on which a non-AP STA affiliated with a non-AP MLD is operating indicates that there is buffered BU(s) with TID(s) mapped to the link with the link ID equal to i or MMPDU(s); a value of 0 in a bit position in the bitmap indicates that there is no buffered BU(s) with TID(s) mapped to the corresponding link nor MMPDU(s). In a Beacon frame when the Per-Link Traffic Indication Bitmap subfield corresponds to a non-AP MLD that is in the default mapping mode or has negotiated a TID-to-link mapping with an AP MLD and all TIDs are mapped to all the enabled links, a value of 1 in the bit position i in the bitmap indicates that the link with the link ID equal to i is recommended for retrieving buffered BU(s)." | "Each bit in the Per-Link Traffic Indication Bitmap subfield corresponds to a link and the bit position i of the bitmap, Bi, corresponds to a link with link ID equal to i.  In a Beacon frame when the Per-Link Traffic Indication Bitmap subfield corresponds to a non-AP MLD that has successfully negotiated TID-to-link mapping and not all TIDs are mapped to all the enabled links, a value of 1 in the bit position i in the bitmap that corresponds to a link on which a non-AP STA affiliated with a non-AP MLD is operating indicates that there is buffered BU(s) with TID(s) mapped to the link with the link ID equal to i or MMPDU(s); a value of 0 in a bit position in the bitmap indicates that there is no buffered BU(s) with TID(s) mapped to the corresponding link nor MMPDU(s).  In a Beacon frame when the Per-Link Traffic Indication Bitmap subfield corresponds to a non-AP MLD that is in the default mapping mode or has negotiated a TID-to-link mapping with an AP MLD and all TIDs are mapped to all the enabled links, a value of 1 in the bit position i in the bitmap indicates that the link with the link ID equal to i is recommended for retrieving buffered BU(s)." | Revised.  The paragraph in P295L15 is broken down into two paragraphs as suggested.  TGbe editor to make the changes with the CID tag (#17745) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 17740 | Brian Hart | 9.4.2.315 | 294.31 | What does "encoded to m" mean? Also bad antecedent of "subfield" since BS subfield is intended not PLTIB subfield. | Merge with previous sentence, via "The Bitmap Size subfield is set to the size of each Per-Link Traffic Indication Bitmap subfield minus 1, in bits. | Revised.  The paragraph is revised as suggested by the commenter.  TGbe editor to make the changes with the CID tag (#17740) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |

**35.3.12.4 Traffic indication**

**…**

**TGbe Editor to change the sentence in P539L20 as follows in Subclause 35.3.12.4 (Traffic Indication) in TGbe D3.0:**

The Bitmap Size subfield of the Multi-Link Traffic Indication Control field (#16824)shall be set to *m*, where *m* is equal to the largest link ID value (#15084)amongst the bits that are set to 1 in the Per-Link Traffic Indication Bitmap subfield(s).

**9.4.2.315 Multi-Link Traffic Indication element**

**…**

**TGbe Editor to make the following changes in the paragraph in P294L29 in Subclause 9.4.2.315 (Multi-Link Traffic Indication element) in TGbe D3.0:**

(#17740)The Bitmap Size subfield is set to the size of each Per-Link Traffic Indication Bitmap subfield minus 1, in bits. A value of 0 in the Bitmap Size subfield is reserved.

**TGbe Editor to make the paragraph in P295L15 into two paragraphs (#17745) and make the following changes in Subclause 9.4.2.315 (Multi-Link Traffic Indication element) in TGbe D3.0:**

Each bit in the Per-Link Traffic Indication Bitmap subfield corresponds to a link and the bit position *i* of the bitmap, B*i*, corresponds to a link with link ID equal to *i*.

In a Beacon frame when the Per-Link Traffic Indication Bitmap subfield corresponds to a non-AP MLD that has successfully negotiated TID-to-link mapping and not all TIDs are mapped to all the enabled links, a value of 1 in the bit position *i* in the bitmap that corresponds to a link on which a non-AP STA affiliated with a non-AP MLD is operating indicates that there is buffered BU(s) with TID(s) mapped to the link with the link ID equal to *i* or MMPDU(s); a value of 0 in a bit position in the bitmap indicates that there is no buffered BU(s) with TID(s) mapped to the corresponding link nor MMPDU(s). In a Beacon frame when the Per-Link Traffic Indication Bitmap subfield corresponds to a non-AP MLD that is in the default mapping mode or has negotiated a TID-to-link mapping with an AP MLD and all TIDs are mapped to all the enabled links, a value of 1 in the bit position *i* in the bitmap indicates that the link with the link ID equal to *i* is recommended for retrieving buffered BU(s).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 15376 | John Wullert | 9.4.2.315 | 294.34 | The sentence "The AID Offset subfield indicates a bit numbered k of the traffic indication virtual bitmap." is not clear. The value of k is not defined and the phrase "a bit numbered k" does not clearly define its purpose. | Rephrase the sentence to clarify "k" and it's purpose. | Revised.  Agree with the commenter.  TGbe editor to make the changes with the CID tag (#15376) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 17741 | Brian Hart | 9.4.2.315 | 294.34 | What does "The AID Offset subfield indicates a bit numbered k of the traffic indication virtual bitmap." mean? "indicates" is usually used when we mean "indicative of but not the same as" but no encoding is provided - is just "set to" / "contains" meant? Then, "a bit numbered k" sounds like "pick some random number that doesn't exceed the size of the VB and call it k" when surely more is going on. Finally, at L47 we see it is not used just in conjunction with tivb. | Rewrite to address confusion identified in comment. Try "The AID Offset subfield is a bit index, k, for a bitmap, and is used in the definition of the Per-Link Traffic Indication List field." | Revised.  Agree with the commenter.  TGbe editor to make the changes with the CID tag (#15376) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |

**9.4.2.315 Multi-Link Traffic Indication element**

…

**TGbe Editor to make the following changes in the paragraph in P294L34 in Subclause 9.4.2.315 (Multi-Link Traffic Indication element) in TGbe D3.0:**

(#15376)The AID Offset subfield is set to the AID of the non-AP MLD that corresponds to the first Per-Link Traffic Indication Bitmap subfield in the Per-Link Traffic Indication List field when the Multi-Link Traffic Indication element is included in a Beacon frame.

**35.3.12.4 Traffic indication**

**…**

**TGbe Editor to make the following changes in the paragraph in P539L7 in Subclause 35.3.12.4 (Traffic indication) in TGbe D3.0:**

The Multi-Link Traffic Indication element includes Per-Link Traffic Indication Bitmap subfield(s) in the Per-Link Traffic Indication Bitmap List field. The Per-Link Traffic Indication Bitmap subfield(s) corresponds to the AID(s) of the non-AP MLD(s) or STA(s), (#15376)and the first Per-Link Traffic Indication Bitmap subfield corresponds to the AID of the non-AP MLD contained in the AID Offset subfield of the Multi-Link Traffic Indication Control field of the Multi-Link Traffic Indication element. The order of the Per-Link Traffic Indication Bitmap subfield(s) follows the order of the bits that are set to 1 in the Partial Virtual Bitmap subfield of the TIM element that corresponds to the AID(s) of the non-AP MLD(s) or STA(s).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 16531 | Arik Klein | 35.3.12.4 | 539.37 | Figure 35-22 shows different ranges of AIDs that are assigned for non-AP MLD with default mapping and for non-AP MLD with non-default mapping. It seems to be incorrect since AID is assigned as one-time value once the non-AP MLD has became associated with the AP MLD (till this association is torn-down) while having default mapping or non-default mapping may be changed frequently during the association period (so the AID will not be re-assigned for each change).  Moreover, it contradicts with the following sentence in section 9.4.2.315(P294L65):"When a Per-Link Traffic Indication Bitmap subfield corresponds to an AID of a STA that is not affiliated with a non-AP MLD, the Per-Link Traffic Indication Bitmap subfield is reserved" (which means that the adjacent bits in the Partial Virtual bitmap of the TIM may corresponds to non-AP MLDs and non-MLD STAs) | Please remove the captions "AID assigned to Pre-EHT STAs or Non-AP MLDs (default mapping)" and "AIDs assigned to Non-AP MLDs (non default mapping)" from Figure 35-22 or alternatively explain why these distinct "ranges" are required. | Revised.  Removed the cited captions that had two ranges and updated the figure.  TGbe editor to make the changes with the CID tag (#16531) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 17292 | Hanqing Lou | 35.3.12.4 | 539.56 | "Multi-link Traffic Indication Bitmap" is used in the Figure, but "Per-Link Traffic Indication Bitmap" is used in the text. | Change "Multi-link Traffic Indication Bitmap" to "Per-Link Traffic Indication Bitmap" | Revised.  Fixed the name of the subfields.  TGbe editor to make the changes with the CID tag (#16531) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 18267 | Yunbo Li | 35.3.12.4 | 539.58 | the "Multi-link Trafic Indication Bitmap" in Figure 35-22 should changed to "Per-Link Traffic Indication Bitmap". | as in comment | Revised.  Fixed the name of the subfields.  TGbe editor to make the changes with the CID tag (#16531) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |

**TGbe Editor to replace Figure 35-22 (Example of Multi-Link Traffic Indication element construction) with the following figure in Subclause 35.3.12.4 (Traffic indication) in TGbe D3.0:**



**Figure 35-22—Example of Multi-Link Traffic Indication element construction**(#16531)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 15545 | Chaoming Luo | 35.3.12.4 | 540.01 | It sounds like the condition in this paragraph covers the condition in the next paragraph, why we need the next one? | Either remove the next paragraph, or exclude the condition in the next paragraph from the first paragraph. | Revised.  Clarified the condition for the paragraph in P540L1 (TGbe D3.0).  TGbe editor to make the changes with the CID tag (#15545) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |
| 16532 | Arik Klein | 35.3.12.4 | 540.03 | The non-AP STA affiliated with the non-AP MLD has to be in PS mode / awake state in order to issue a PS-Poll frame or a U-APSD trigger frame. Please add this condition to the sentence, as suggested. | The sentence should be revised as follows: "... any non-AP STA affiliated with the non-AP MLD \*which is in PS mode and in awake state\* may issue a PS-Poll frame, or a U-APSD trigger frame ..." | Rejected.  The fact that the corresponding AID is equal to 1 in the TIM element indicates that all the STAs affiliated with the non-AP MLD is in PS mode. |
| 16533 | Arik Klein | 35.3.12.4 | 540.11 | The non-AP STA affiliated with the non-AP MLD has to be in PS mode / awake state in order to issue a PS-Poll frame or a U-APSD trigger frame. Please add this condition to the sentence, as suggested. | The sentence should be revised as follows: "... any non-AP STA affiliated with the non-AP MLD that operates on the link(s) indicated as 1 in the Per-Link Traffic Indication Bitmap subfield \*and which is in PS mode and in awake state\* may issue a PS-Poll frame, or a U-APSD trigger frame ..." | Rejected.  The fact that the corresponding AID is equal to 1 in the TIM element indicates that all the STAs affiliated with the non-AP MLD is in PS mode. |
| 16534 | Arik Klein | 35.3.12.4 | 540.11 | In case the Multi-Link Traffic Indication element is present in a Beacon frame and carries a Per-Link Traffic Indication Bitmap subfield that corresponds to the non-AP MLD, any non-AP STA affiliated with the non-AP MLD that operates on the link(s) indicated as 1 in the Per-Link Traffic Indication Bitmap subfield may issue a PS-Poll frame, or a U-APSD trigger frame only on any of the links indicated in the corresponding Per-Link Traffic Indication Bitmap subfield. Please add this condition to the sentence, as suggested. | The sentence should be revised as follows: "... any non-AP STA affiliated with the non-AP MLD that operates on the link(s) indicated as 1 in the Per-Link Traffic Indication Bitmap subfield may issue a PS-Poll frame, or a U-APSD trigger frame \*only on any of the links indicated in the corresponding Per-Link Traffic Indication Bitmap subfield\*..." | Rejected.  “…any non-AP STA affiliated with the non-AP MLD that operates on the link(s) indicated as 1 in the Per-Link Traffic Indication Bitmap subfield may…” already indicates that those non-AP MLDs operate on the corresponding links. |
| 15614 | Sanghyun Kim | 35.3.12.4 | 540.16 | Even if a non-AP MLD has successfully negotiated TID-to-Link mapping, the Per-Link Traffic Indication subfield might not be indicated depending on the TID of the BU for that non-AP MLD. It is neccessary adding a rule for the non-AP MLD that has successfully negotiated TID-to-link mapping and does not receive ML-TIM element. | Please add the following rule:  When a non-AP MLD that has successfully negotiated TID-to-link mapping and not all TIDs are mapped to all the enabled links detects that the bit corresponding to its AID is equal to 1 in the TIM element and does not receive the corresponding Per-Link Traffic Indication Bitmap subfield, any non-AP STA affiliated with the non-AP MLD may issue a PS-Poll frame, or a U-APSD trigger frame if the STA is using U-APSD and all ACs are delivery enabled, to retrieve buffered BU(s) from the AP MLD. | Revised.  Agree with the commenter.  TGbe editor to make the changes with the CID tag (#15614) in doc.: IEEE 802.11-23/0504r1  [https://mentor.ieee.org/802.11/dcn/22/11-23-0504-01-00be-lb271-cr-cl9-emlsr.docx] |

**35.3.12.4 Traffic indication**

**…**

**TGbe Editor to make the following changes in the paragraph in P540L1 in Subclause 35.3.12.4 (Traffic indication) in TGbe D3.0:**

When a non-AP MLD that is in the default mapping mode (see 35.3.7.1.2 (Default mapping mode)) detects that the bit corresponding to its AID is 1 in the TIM element (#15545)and the Multi-Link Traffic Indication element is not present in a Beacon frame or the Multi-Link Traffic Indication element is present in a Beacon frame but the Multi-Link Traffic Indication element does not include a Per-Link Traffic Indication Bitmap subfield that corresponds to the non-AP MLD, any non-AP STA affiliated with the non-AP MLD may issue a PS-Poll frame, or a U-APSD trigger frame if the STA is using U-APSD and all ACs are delivery enabled, to retrieve buffered BU(s) from the AP MLD.

When a non-AP MLD that is in the default mapping mode (see 35.3.7.1.2 (Default mapping mode)) detects that the bit corresponding to its AID is 1 in the TIM element and the Multi-Link Traffic Indication element is present in a Beacon frame and the Multi-Link Traffic Indication element includes a Per-Link Traffic Indication Bitmap subfield that corresponds to the non-AP MLD, any non-AP STA affiliated with the non-AP MLD that operates on the link(s) indicated as 1 in the Per-Link Traffic Indication Bitmap subfield may issue a PS-Poll frame, or a U-APSD trigger frame if the STA is using U-APSD and all ACs are delivery enabled, to retrieve buffered BU(s) from the AP MLD.

When a non-AP MLD that has successfully negotiated TID-to-link mapping (see 35.3.7.1.3 (Negotiation of TID-to-link mapping)) and not all TIDs are mapped to all the enabled links detects that the bit corresponding to its AID is equal to 1 in the TIM element and any bit of the Per-Link Traffic Indication Bitmap subfield that corresponds to a link on which a non-AP STA affiliated with the non-AP MLD is operating is equal to 1 in the Multi-Link Traffic element, the non-AP STA affiliated with the non-AP MLD that operates on that link may issue a PS-Poll frame, or a U-APSD trigger frame if the STA is using U-APSD and all ACs are delivery enabled, to retrieve buffered BU(s) from the AP MLD.

**TGbe Editor to insert the following paragraph after the 3rd paragraph in P540 in Subclause 35.3.12.4 (Traffic indication) in TGbe D3.0:**

(#15614)When a non-AP MLD that has successfully negotiated TID-to-link mapping (see 35.3.7.1.3 (Negotiation of TID-to-link mapping)) and not all TIDs are mapped to all the enabled links detects that the bit corresponding to its AID is equal to 1 in the TIM element and does not detect the Per-Link Traffic Indication Bitmap subfield that corresponds to the AID of the non-AP MLD, any non-AP STA affiliated with the non-AP MLD may issue a PS-Poll frame, or a U-APSD trigger frame if the STA is using U-APSD and all ACs are delivery enabled, to retrieve buffered BU(s) from the AP MLD.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
|  |  |  |  |  |  |  |