IEEE P802.11
Wireless LANs

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| 11ax D4.0 MAC miscellaneous CIDs |
| Date: 2019-08-12 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D4.0 with the following CIDs:

* 20299, 20770, 20755, 20767, 20956, 21486, 20187, 21598

Revisions:

* .

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 TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

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| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | **Resolution** |
| 20299 | 249 | 59 | The HE capabilites element doesn't include Maximum A-MPDU Length Exponent field. Delete the word "and HE Capabilites elements" | As in comment. | Accepted  |
| 20770 |  |  | Re CID 16253: if this is not a new requirement, and it already exists in the baseline, then it should not be duplicated. Any clarification should be taken to REVmd | Revert the change proposed at 215.47 | RejectedDiscussion: The commenter is challenging the text of “All of the MPDUs within an A-MPDU have the same TA.” Being added by 11ax. The reason for this text is that in DL HE MU PPDU, several APs can transmit DL A-MPDUs. The added text clearifies that in this case, frames from different APs can’t be in same A-MPDU, i.e. same RU.  |
| 20755 |  |  | Re CID 16163: OK, then a "non-ack-enabled single TID" A-MPDU is just an A-MPDU | Change "HE non-ack-enabled single TID" to "A-MPDU in HE PPDU" throughout | Reject.Discussion: HE PPDU carries various kinds of A-MPDU. Using A-MPDU in HE PPDU creates ambigurity. |
| 20767 | 215  | 21 | Re CID 16228: if that's the argument, then "zero or more" needs to be added everywhere where there's no multiplicity qualifier | As it says in the comment | RejectedDiscussion: in baseline, spec, “aero or more” is used in baseline, but not all places use “zero or more”.  |
| 20956 |  |  | Re CID 16210: still some left | Fix "data enabled A-MPDU context" at 216.13, "ack enabled A-MPDU" at 311.2 (missing hyphen) | RevisedDiscussion:Data enabled A-MPDU context is from 802.11baseline. It should be resolved in 11md. ***TGax editor: change “ack enabled A-MPDU” in P311L2 of 11ax D4. To “single-TID ack-enabled A-MPDU”*** |
| 21486 | 295 | 14 | The sentence "A successfullyacknowledged frame transmitted by a non-AP STA in response to a Basic Trigger is a successful frame exchange initiated by the STA as referred to in Clause 11 and Clause 12." doesn't belong to the introduction section 26.1 and should be moved to other sections. | move the sentence "A successfullyacknowledged frame transmitted by a non-AP STA in response to a Basic Trigger is a successful frame exchange initiated by the STA as referred to in Clause 11 and Clause 12. " to other relevant sections. | RevisedDiscussion: the success of frame exchange related to Trigger frame is defined in subclause 26, e.g. 26.5.1.1 about DL MU, 26.5.3.2.5 about UL MU. The sentence mentioned by the commenter should be still in clause 26. However since it related to Basic Trigger, we can move it to subclause 26.5.3.***TGax editor: Change the paragraph in 26.1 to*** “An HE STA supports the MAC and MLME functions defined in Clause 26 in addition to the MAC functions defined in Clause 10, the MLME functions defined in Clause 11, and the security functions defined in Clause 12 except when the functions in Clause 26 supersede the functions in Clause 10 or Clause 11. (21486)” ***TGax editor: Add the following paragraph at the end of subclause 25.5.2.1*** “A successfully acknowledged frame transmitted by a non-AP STA in response to a Basic Trigger is a successful frame exchange initiated by the STA as referred to in Clause 11 and Clause 12. (#21486)” |
| 20187 | 337 | 24 | In the scenario described in "If the associated non-AP STA has no frames pending or is unable to include pending frames in response to aBasic Trigger frame because the allocated resource is insufficient, then the associated non-AP STA shallinclude in the A-MPDU at least one QoS Null frame.", AP is lack of information to figure out minimum resource. AP can guess or allocate maximum resource but it incurrs overhead/delay to do it heuristically. | Introduce an explicit signaling mechanism to tell AP minimum resource, e.g. add an A-control field to specify current minimum buffer size. The non-AP STA can respond with this info in the QoS-null frame. AP would adjust resource allocation in next trigger frame immediately. | Option 1:RejectedDiscusison: it depends on the AP’s implementation about how often what the commenter described happen. One method to avoid the situation is that an AP tries its best to allocate the resource to satisfy the STA’s requirement of transmit all STA’s buffered frame. Option 2:RevisedDiscussion: the commenter is right that with QoS Control field and BSR Control field, an AP can’t figure out the minimum buffer size that the AP’s UL resource allocation for HE TB PPDU transmission should deal with. The resource of HE TB PPDU may be wasted if the resource can’t satisfy the transmission of a single frame.TGax editor to make changes in 11-19/1387r1 under CID20187 |
| 21598 | 337 | 24 | In the scenario described in "If the associated non-AP STA has no frames pending or is unable to include pending frames in response to aBasic Trigger frame because the allocated resource is insufficient, then the associated non-AP STA shallinclude in the A-MPDU at least one QoS Null frame.", AP is lack of information to figure out minimum resource. AP can guess or allocate maximum resource but it incurrs overhead/delay to do it heuristically. | Introduce an explicit signaling mechanism to tell AP minimum resource, e.g. add an A-control field to specify current minimum buffer size. The non-AP STA can respond with this info in the QoS-null frame. AP would adjust resource allocation in next trigger frame immediately. | Option 1:RejectedDiscusison: it depends on the AP’s implementation about how often what the commenter described happen. One method to avoid the situation is that an AP tries its best to allocate the resource to satisfy the STA’s requirement of transmit all STA’s buffered frame. Option 2:RevisedDiscussion: the commenter is right that with QoS Control field and BSR Control field, an AP can’t figure out the minimum buffer size that the AP’s UL resource allocation for HE TB PPDU transmission should deal with. The resource of HE TB PPDU may be wasted if the resource can’t satisfy the transmission of a single frame.TGax editor to make changes in 11-19/1387r1 under CID20187 |

**9.2.4.6a.4 BSR Control**

***TGax editor: Change 9.2.4.6a.4 as follows:***

If the Control ID subfield in a Control subfield in an A-Control subfield is 3, the Control Information subfield of the Control subfield contains buffer status information used for UL MU operation (see 26.5.3 (MU cascading sequence)). The format of the subfield is shown in Figure 9-22e (Control Information subfield for BSR Control).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0            B3 | B4         B5 | B6        B7 | B8        B9 | B10    B17 | B18    B25 |
|  | ACI Bitmap | Delta TID | ACI High | Scaling Factor | Queue Size High | Queue Size All |
| Bits: | 4 | 2 | 2 | 2 | 8 | 8 |
| * Control Information subfield for BSR Control
 |

The ACI Bitmap subfield indicates the access categories for which the buffer status is reported and its encoding is shown in Table 9-24c (ACI Bitmap subfield encoding). Each bit of the ACI Bitmap subfield is set to 1 to indicate the buffer status of the corresponding AC, and set to 0 otherwise. If the ACI Bitmap subfield is 0 and the Delta TID subfield is 3 it indicates that there is buffered traffic for all 8 TIDs (see Table 9-24d (Delta TID subfield encoding)).

|  |
| --- |
| * ACI Bitmap subfield encoding
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| B0 | B1 | B2 | B3 |
| AC\_BE | AC\_BK | AC\_VI | AC\_VO |

The Delta TID subfield, together with the values of the ACI Bitmap subfield, indicate the number of TIDs for which the STA is reporting the buffer status. The encoding of the Delta TID subfield is defined in Table 9-24d (Delta TID subfield encoding).

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| --- |
| * Delta TID subfield encoding
 |
| Number of bits in the ACI Bitmap subfield that are set to 1 | Mapping of Delta TID subfield value and number of TIDs, *NTID* |
| 0 | Values 1 and 2 are not applicable;Value 0 indicates the minimal frame size that will be transmitted in HE TB PPDU; (#20187, 21598)Value 3 indicates 8 TIDs (i.e., all ACs have traffic) |
| 1 | Value 0 indicates 1 TID; Value 1 indicates 2 TIDs;Values 2 to 3 are not applicable; |
| 2 | Value 0 indicates 2 TID; Value 1 indicates 3 TIDs;Value 2 indicates 4 TIDs; Value 3 is not applicable; |
| 3 | Value 0 indicates 3 TID; Value 1 indicates 4 TIDs;Value 2 indicates 5 TIDs; Value 3 indicates 6 TIDs; |
| 4 | Value 0 indicates 4 TID; Value 1 indicates 5 TIDs;Value 2 indicates 6 TIDs; Value 3 indicates 7 TIDs; |
| NOTE—The number of TIDs can be obtained as *NTID* = *Nones* + *DVal*, where *Nones* is the number of bits set to one in the AC Bitmap subfield, and *DVal* is the value of the Delta TID subfield except if *Nones* is equal to 0 for which there is the *NTID* = 8 case. |

The ACI High subfield indicates the ACI of the AC for which the BSR is indicated in the Queue Size High subfield. The ACI to AC mapping is shown in Table 9-24c (ACI Bitmap subfield encoding).

NOTE—It is up to the non-AP STA that reports the buffer status to determine which queue deserves higher priority with respect to the other queues. The determination might be based on the time the traffic has been outstanding, QoS delay requirements, amount of buffered traffic, etc., and is out of scope for this standard.

The Scaling Factor subfield indicates the unit *SF*, in octets, of the Queue Size High and Queue Size All subfields. The encoding of the Scaling Factor subfield is shown in Table 9-24e (Scaling Factor subfield encoding).

|  |
| --- |
| * Scaling Factor subfield encoding
 |
| Scaling Factor subfield | Scaling factor, *SF,* in octets |
| 0 | 16 |
| 1 | 256 |
| 2 | 2 048 |
| 3 | 32 768 |

The Queue Size High subfield indicates the amount of buffered traffic, in units of *SF* octets, for the AC identified by the ACI High subfield that is intended for the STA identified by the receive address of the frame containing the BSR Control subfield.

The Queue Size All subfield indicates the minimum frame size, in units of SF octets, that shoulded be satisfied for the STA that transmit the BSR Control subfield to transmit the frames in HE TB PPDU or the amount of buffered traffic, in units of *SF* octets, for all the ACs identified by the ACI Bitmap subfield that is intended for the STA identified by the receive address of the frame containing the BSR Control subfield. (#20187, 21598)

The queue size values in the Queue Size High and Queue Size All subfields are the total sizes, rounded up to the nearest multiple of *SF* octets, of all MSDUs and A-MSDUs buffered at the STA (including the MSDUs or A-MSDUs in the same PSDU as the MPDU containing the BSR Control subfield) in the delivery queues used for MSDUs and A-MSDUs with AC(s) that are specified in the ACI High and ACI Bitmap subfields, respectively. A queue size value of 254 in the Queue Size High and Queue Size All subfields indicates that the amount of buffered traffic is greater than 254 ×*SF* octets. A queue size value of 255 in the Queue Size High and Queue Size All subfields indicates that the amount of buffered traffic is an unspecified or unknown size. If the fragments are carried in non-A-MPDU frames or S-MPDUs, the queue size value of the MPDUs containing the fragments might remain constant in all fragments even if the amount of queued traffic changes as successive fragments are transmitted. If the fragments are carried in the A-MPDU, the queue size values of the MPDUs containing the fragments are set according to the rules in 10.13.1 (A-MPDU contents). The queue size value in Queue Size All subfield, when indicates the minimal frame size that will be transmitted in HE TB PPDU has the same encoding as the queue size in Queue Size All subfield, when indicates the size of ACI Bitmap subfields. (#20187, 21598)

**26.5.5 Buffer status report operation**

***TGax editor: Change 26.5.5 as follows:***

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A non-AP STA reports its buffer status (unsolicited BSR) to the AP to which it is associated in the QoS Control field in QoS Null and QoS Data frames and in the BSR Control subfield (if present) in QoS Null, QoS Data and Management frames as defined below:(#21343)

* The HE STA shall report the buffer status for a given TID in the Queue Size subfield of the QoS Control field in QoS Data or QoS Null frames it transmits; the STA may set the Queue Size subfield to 255 to indicate an unknown/unspecified BSR for that TID.
* The HE STA may aggregate multiple QoS Data frames or QoS Null frames in an A-MPDU to report the buffer status for different TIDs. The HE STA shall follow the A-MPDU aggregation rules defined in 26.6.4 (Multi-TID A-MPDU and ack-enabled A-MPDU) for aggregating QoS Data frames with multiple TIDs. The HE STA does not follow the rules defined in 26.6.4 (Multi-TID A-MPDU and ack-enabled A-MPDU) for QoS Null frames whose Ack Policy subfield is No Ack.
* The HE STA may report the buffer status in the BSR Control subfield of frames it transmits if the AP has indicated its support in the BSR Support subfield of its HE Capabilities element; otherwise the STA shall not report the buffer status in the BSR Control subfield.
* The HE STA shall report the buffer status for its preferred AC, indicated by the ACI High subfield, in the Queue Size High subfield of the BSR Control subfield; the STA may set the Queue Size High subfield to 255 to indicate an unknown/unspecified BSR for that AC.
* The HE STA shall report the buffer status for the(#20530) ACs or the minimum frame size, indicated by the ACI Bitmap subfield, in the Queue Size All subfield of the BSR Control subfield; the STA may set the Queue Size All subfield to 255 to indicate an unknown/unspecified BSR for those ACs. (#20187, 21598)
* The HE STA shall set the Delta TID subfield according to Table 9-24d (Delta TID subfield encoding), and the Scaling Factor subfield as defined in 9.2.4.6a.4 (BSR Control).

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