IEEE P802.11
Wireless LANs

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| 11ax D3.0 Comment Resolution 27.5.3.4 |
| Date: 2018-08-28 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D3.0 with the following CIDs:

* 15087, 15088, 16597, 16610, 16664, 16665, 16666, 16667, 16670, 16671.

Revisions:

* R4 change (one editorial change) is highlighted in green.

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** |
| 15087 | 291 | 29 | The section covers A-MPDU content in an HE TB PPDU while note 1 covers AP side action and the contents of the soliciting PPDU. | Move the note to 27.5.3.2.1 | **Revised****Generally agree with the commenter.** **TGax editor to make changes in 11-18/1975r4 under CID 15087** |
| 15088 | 291 | 45 | The power headroom value is carried in UPH Control subfield not TRS Control | Change TRS Control to UPH Control | **Agreed** |
| 16597 | 290 | 13 | It needs to be clarified that the description starting from line 13 for STA resposne to basic Trigger frame is for the "asspcoated" STA. It needs to be clarified that for unassociated STA response to basic Trigger frame, only management frame is allowed for response. | Clarify that the description starting from line 13 is for associated STA. Add a sentence that only allows management frame to be included in response to basic Trigger frame for unassociated STA. | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/1975r4 under CID 16597** |
| 16610 | 291 | 45 | Transmission of UL Power Headroom in TRS Control subfield seems incorrect | The subfield used to transmit UL power headroom should be the UPH Subfield | **Revised** **See 15088** |
| 16664 | 283 | 1 | This list of conditions is poorly formated and difficult to follow. Some of the requirements are conditional on "intent", which is not testable. And some of the conditions are hard to parse since they pile on additional conditions. Since the conditions are on the Trigger frame, the list is better formated as a set of statements using the connanical form: "If a STA responds to a Basic Trigger frame with <condition>, then the content of the A-MPDU shall be as defined in Table 9-X" | Replace bullet with statement "If a STA responds to a Basic Trigger frame where the TID Aggregation Limit field of the User Info field addressed to the STA is 0 and the Trigger frame is in an A-MPDU that includes a frame that solicits immediate acknowledgment, then the content of the A-MPDU sent by the STA shall be as defined in Table 9-428". | **Revised****Discussion: “intent” is used through 802.11 baseline. Since subclause 9.7.3 is changed, the referred Tables should be updated accordingly.** **TGax editor to make changes in 11-18/1975r4 under CID 16664** |
| 16665 | 283 | 6 | This list of conditions is poorly formated and difficult to follow. Some of the requirements are conditional on "intent", which is not testable. And some of the conditions are hard to parse since they pile on additional conditions. Since the conditions are on the Trigger frame, the list is better formated as a set of statements using the connanical form: "If a STA responds to a Basic Trigger frame with <condition>, then the content of the A-MPDU shall be as defined in Table 9-X" | Replace bullet with statement "If a STA responds to a Basic Trigger frame where the TID Aggregation Limit field of the User Info field addressed to the STA is 0 and the Trigger frame is either not in an A-MPDU or is in an A-MPDU that does not include a frame that solicits immedaite acknowledgment, then the content of the A-MPDU sent by the STA shall be as defined in Table 9-426". | **Revised****See 16664** |
| 16666 | 283 | 16 | A requirement (shall/should/may statement) must never be dependent on "intent" since intent is not testable. We don't care what the intent is, we just care about the A-MPDU content. This entire bullet is unnecessary since we do not have "S-MPDU" in an HE PPDU; we just have EOF-MPDUs and sometimes there is one EOF-MPDU and it is the only MPDU in the A-MPDU. | Remove bullet. | **Revised.****Generally agree with the commenter.** **TGax editor to make changes in 11-18/1975r4 under CID 16666.** |
| 16667 | 283 | 26 | This list of conditions is poorly formated and difficult to follow. Some of the requirements are conditional on "intent", which is not testable. And some of the conditions are hard to parse since they pile on additional conditions. Since the conditions are on the Trigger frame, the list is better formated as a set of statements using the connanical form: "If a STA responds to a Basic Trigger frame with <condition>, then the content of the A-MPDU shall be as defined in Table 9-X" | Replace this bullet and the one at L39 with the statement: "If a STA responds to a Basic Trigger frame where the TID Aggregation Limit in the User Info field addressed to the STA is greater than 0, then the content of the A-MPDU sent in response is as defined in Table 9-425 with the following additional restrictions: - If a Management frame that solicits acknowledgement is not present, then number of different TIDs in the QoS Data frames and QoS Null frames present in the A-MPDU shall be less than or equal to the value of the TID Aggregation Limit field. - If a Management frame that solicits acknowledgement is present, then the number of different TIDs in the QoS Data frames and QoS Null frames present in the A-MPDU shall be less than the value of the TID Aggregation Limit field." | **Revised****See 16664** |
| 16670 | 289 | 1 | The response to TRS Control is not "A-MPDU contents in the data enabled no immediate response context". The response to TRS Control is an A-MPDU that always includes an Ack or BlockAck frame and possibly some no ack QoS Nulls. | Remove this bullet. | **Rejected****Discussion: the A-MPDU with QoS Null solicited by TRS doesn’t ask for Ack. So it is A-MPDU enabling no immediate response context.** |
| 16671 | 289 | 35 | We need a rule to the effect that a TRS Control field must only be present on a frame that solicits acknowledgement. Otherwise we run into issues. For example, if we allow TRS Contol on all frames in an A-MPDU, both those that solicit ack and those that don't then if the ones that solicit ack are not received the response might be an empty A-MPDU. In this case I don't see an issue with the STA not sending a response at all. TRS Control should never be present if an ack is not being solicited. | Add a statement "An HE STA shall not transmit a frame that carries a TRS Control subfield unless the frame solicits immediate acknowledgement" | **Rejected****Discussion: in 802.11 baseline, the frames with same type should have same HT Control field.** |

**27.5.3.4 A-MPDU contents in an HE TB PPDU**

***TGax editor: make the following changes in subclause 27.5.3.4:***

A non-AP STA(#16592) that receives a Trigger frame or a frame that carries a TRS Control subfield and that transmits an HE TB PPDU response shall follow MAC padding procedure described in 27.10.3 (A-MPDU padding for an HE TB PPDU) and construct the A-MPDU carried in the HE TB PPDU as described below provided the AP allocates sufficient resources for the non-AP STA to include MPDUs in the A-MPDU. Otherwise, the non-AP STA(#16592) is not required to include MPDUs in the A-MPDU.

NOTE—The MU-RTS Trigger frame and the NFRP Trigger frame are exempt from these construction rules since the MU-RTS Trigger frame does not solicit an HE TB PPDU and the NFRP Trigger frame solicits an HE TB PPDU that does not carry an A-MPDU.

A non-AP STA(#16592) transmitting an HE TB PPDU follows the rules in 27.10.3 (A-MPDU padding for an HE TB PPDU) for constructing the PSDU carried in the HE TB PPDU.

An unassociated non-AP STA(#16592) shall not include more than one Management frame in the HE TB PPDU that is sent in response to a Basic Trigger frame that contains RA-RUs with AID12 subfield set to 2045.

A non-AP STA(#16592) that responds to a DL MU PPDU containing MPDU(s) addressed to it that include TRS Control subfield(s) follows the rules defined in 10.3.2.9 (Ack procedure) for generating the Ack frame, the rules defined in 10.24.7.5 (Generation and transmission of BlockAck frames by an HT STA or DMG STA) for generating the BlockAck frame, and the rules defined in 27.4 (HE acknowledgment procedure) for generating the Multi-STA BlockAck frame if at least one of the received MPDUs solicits an immediate acknowledgment. The contents of the A-MPDU carried in the HE TB PPDU shall be as defined in:

* Table 9-532 (A-MPDU contents MPDUs in the control response context) if at least one of the received MPDUs solicits an immediate acknowledgment.

Table 9-530 (A-MPDU contents in the data enabled no immediate response context) with the exception that the A-MPDU does not contain QoS Data frames, if none of the received MPDUs solicit an immediate acknowledgment.NOTE 1—The non-AP STA(#16592) additionally follows the rules in 27.3.2 (Dynamic fragmentation) if(#15341) fragments are present in the soliciting (A-)MPDU(s).

NOTE 2—An AP might transmit an HE MU PPDU with an RU allocated to STA-ID 2045 with an A-MPDU that includes a Management frame addressed to an unassociated non-AP STA(#16592), that solicits an acknowledgment and that carries a TRS Control subfield. The TRS Control subfield allocates resources for the unassociated non-AP STA(#16592) to respond with an HE TB PPDU that carries the acknowledgment.

(#16597,16664, 16665, 16667) An associated non-AP STA(#16592) that responds to a Basic Trigger frame addressed to it shall construct the A-MPDU carried in the HE TB PPDU as defined in:

* Table 9-532 (A-MPDU contents MPDUs in the control response context), if the Trigger frame is contained in an A-MPDU, the non-AP STA(#16592) receives at least another MPDU that solicits an immediate acknowledgment.
* Table 9-530 (A-MPDU contents in the data enabled no immediate response context) with the exception that the A-MPDU does not contain QoS Data frames, if the Trigger frame is either not carried in an A-MPDU or is carried in an A-MPDU but the non-AP STA(#16592) receives no other MPDUs that solicit an immediate acknowledgment.
* (#16666)Table 9-aaa1(A-MPDU contents in the non-ack-enabled single TID A-MPDU (data enabled immediate response) or Table 9-aaa3 (A-MPDU contents in the non-ack-enabled multi-TID A-MPDU (data enabled immediate response) in HE PPDU context) if(#15342) the TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame is greater than 0 and the non-AP STA(#16592) intends to carry one or more MPDUs, each preceded by nonzero length MPDU delimiter with EOF equal to 0 (see 10.13 (A-MPDU operation)) and 27.10.4.2 (Non-ack enabled multi-TID A-MPDU operation)). The A-MPDU is subject to the following restrictions:
* It shall contain a control response frame if the non-AP STA(#16592) received at least one other MPDU that solicits an immediate acknowledgment.
* The number of TIDs present in the A-MPDU shall count towards reaching the TID aggregation limit indicated by the TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame.
* Table 9-aaa2 (A-MPDU contents in the ack-enabled A-MPDU (data enabled immediate response) in HE PPDU context) or Table 9-aaa4 (A-MPDU contents in the ack-enabled multi-TID A-MPDU (data enabled immediate response) in HE PPDU context) if the TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame is greater than 0 and the non-AP STA(#16592) intends to carry an ack-enabled A-MPDU (see 27.10.4.1 (General) and 27.10.4.3 (Ack-enabled multi-TID A-MPDU operation). The A-MPDU is subject to the following restrictions:
* It shall contain a control response frame if the non-AP STA(#16592) receives at least another MPDU that solicits an immediate acknowledgment.
* The number of TIDs present in the A-MPDU, in either QoS Data or BlockAckReq frames, shall count towards reaching the TID aggregation limit that is obtained from the TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame.

(#16666) An associated non-AP STA that responds to a Basic Trigger frame with a User Info field addressed to it and where the TID Aggregation Limit field of the User Info field is greater than 0 may construct the A-MPDU carried in the HE TB PPDU as defined in Table 9-429 (A-MPDU contents in the S-MPDU context):

* It shall be a control response frame if the non-AP STA(#16592) received at least one other MPDU that solicits an immediate acknowledgment.
* If the MPDU is a Multi-TID BlockAckReq frame then the number of TIDs present in the Multi-TID BlockAckReq frame shall not exceed the TID aggregation limit indicated by the TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame.

An unassociated non-AP STA may transmit an S-MPDU in the HE TB PPDU that is Management frame belonged to Class 1 and Class 2 using the UORA procedure. (#16597)

A non-AP STA(#16592) that responds to a BFRP Trigger frame addressed to it shall construct the A-MPDU carried in the HE TB PPDU as defined in Table 9-532 (A-MPDU contents in the control response context), except that only HE Compressed Beamforming/CQI frames(#15948) shall be allowed in the A-MPDU; other frames shall not be allowed in the A-MPDU. The non-AP STA(#16592) includes at least one HE Compressed Beamforming/CQI frame(#15948) in the A-MPDU as defined in 27.6 (HE sounding protocol) if the AP allocates sufficient resources for the non-AP STA(#16592) to include the frame in the A-MPDU; otherwise the non-AP STA(#16592) is not required to include the frame.

NOTE—It is not always possible to fragment an HE compressed beamforming/CQI report(#16328) (see 27.6.4 (Rules for generating segmented feedback)). If the length is insufficient to contain the HE compressed beamforming/CQI report(#16328) requested by a BFRP Trigger frame, no feedback is sent.

A non-AP STA(#16592) that responds to an MU-BAR Trigger frame addressed to it shall construct the A-MPDU carried in the HE TB PPDU as defined in Table 9-532 (A-MPDU contents MPDUs in the control response context). The non-AP STA(#16592) includes either a BlockAck frame or a Multi-STA BlockAck frame in the A-MPDU as defined in 27.4 (HE acknowledgment procedure).

A non-AP STA(#16592) that responds to a GCR MU-BAR Trigger frame addressed to it shall construct the A-MPDU carried in the HE TB PPDU as defined in Table 9-532 (A-MPDU contents MPDUs in the control response context). The non-AP STA(#16592) includes a GCR BlockAck frame in the A-MPDU as defined in 10.24.10 (GCR and GLK-GCR block ack).

A non-AP STA(#16592) that responds to a BSRP or BQRP Trigger frame addressed to it shall construct the A-MPDU carried in the HE TB PPDU as defined in Table 9-530 (A-MPDU contents in the data enabled no immediate response context) with the exception that the A-MPDU does not contain QoS Data frames. The non-AP STA(#16592) shall include in the A-MPDU at least one QoS Null frame.

 (#15087)NOTE 1—The frame type of MPDUs may be different across A-MPDUs within the same HE TB PPDU. (#15087)

NOTE 2—A non-AP STA(#16592) follows the rules in 27.10.4 (Multi-TID A-MPDU and ack-enabled A-MPDU) for aggregating the QoS Data frames with multiple TIDs in HE TB PPDUs. (#15087)

A non-AP STA(#16592) may set the dot11HEUPHControlActivated to false if the most recent OM Control field sent (if any) to the AP had the UL MU Disable field equal to 1; otherwise, the non-AP STA(#16592) shall set the dot11HEUPHControlActivated to true.

A non-AP STA(#16592) with dot11HEUPHControlActivated equal to true that is scheduled in a Trigger frame or is the intended receiver of an TRS Control subfield transmits the dB value of its UL power headroom, *HRSTA*, in the UPH Control subfield of MPDUs carried in the HE TB PPDU sent in response to assist in the AP's MCS selection. The UL power headroom for the assigned MCS is defined in Equation (27-1). (#15088, 16610)

*

where

 represents the maximum UL transmit power of an HE TB PPDU with the assigned MCS after considering hardware capability, regulatory requirements and local maximum transmit power levels (see 11.8.5 (Specification of regulatory and local maximum transmit power levels)), as well as non-802.11 in-device coexistence requirements

 represents the current UL transmit power of the HE TB PPDU for the assigned MCS, which is determined by power control and subject to the non-AP STA's(#16592) capabilities and other requirements as defined in 28.3.14.2 (Power pre-correction)

*HRSTA* is the UL headroom, in dB, of the HE TB PPDU, the encoding of which is specified in 9.2.4.6a.5 (UPH Control).

NOTE—If the Minimum Transmit Power Flag subfield in the UPH Control subfield is 1, then the non-AP STA(#16592) is transmitting the HE TB PPDU at its minimum  for the assigned MCS.

The non-AP STA(#16592) shall include an HE variant HT Control field containing the UPH Control subfield in the MPDUs carried in the A-MPDU of the HE TB PPDU unless one of the following apply:

* The remaining space in the A-MPDU, after inclusion of solicited MPDUs that cannot contain an HE variant HT Control field, is not sufficient to contain MPDU(s) that contain an HE variant HT Control field.
* The non-AP STA(#16592) includes other Control fields in the HE variant HT Control field and the available space in the HE variant HT Control field is not sufficient to contain an additional UPH Control subfield.
* The MPDU is a Control frame(#16235).

**27.5.3.2 Rules for soliciting UL MU frames**

**27.5.3.2.1 General**

***TGax editor: Change the 1st paragraph in 25.5.3.2.1 as follows:***

An AP shall not send a frame that carries a TRS Control subfield to a STA that has not set the TRS Support subfield to 1 in the HE MAC Capabilities Information field of the HE Capabilities element it transmits.