### IEEE P802.11Wireless LANs

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| 11ax D3.2 MAC Comment Resolution for CID 16668 |
| Date: 2018-11-07 |
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Abstract

This submission proposes resolutions for comments of TGax Draft D3.2 with the following CIDs:

16668

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Accommodate changes based on the presentation.
* Rev 2: Further editorial revision marked with 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 D3.2 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D3.0 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** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 16668 | Robert Stacey | 286.50 | 27.5.3.3 | This statement requires that a STA transmit an HE TB PPDU in response to a Trigger frame or RTS Control, however, there is insufficient implementation guidance on what the A-MPDU should contain if the STA has no frames pending. | Add a statement "A STA that transmits an HE TB PPDU shall include at least one MPDU in the A-MPU. If the STA has no frames pending or is unable to include pending frames because the allocated resource is insufficient, then the STA shall include a QoS Null frame with any TID and with Ack Policy field No Ack." Add an additional constraint on the AP to ensure that it always allocates enough space for a QoS Null frame. | **Revised**Agree in principe with the commentAdded a paragraph in 27.5.3.2.1 to cover the rules on AP side to allocate enough resources by considering the following aspects:* all variants of Trigger frame
* typical HE TB response or UORA response
* from associated or unassociated STAs.

For UL MU response from an associated non-AP STA, we add a sentence to say that the non-AP STA shall include a QoS Null frame when other frames can not be included.For UORA response from an unassociated STA, we observe that it is hard to standardize the required time for probe request frame or association request frame. We suggest to leave this consideration to implementation specific and allow unassociated STA not to respond in UORA manner if there is no enough resources sending frames like probe request frame or assocation request frame. TGax editor, please make changes as shown in doc 11-18/1799r2 |

**Discussion:** *None.*

**Propose:** Revised for CID 16688 per discussion and editing instructions in 11-18/1799r2.

* Rules for soliciting UL MU frames

***TGax Editor: Please add the following new subclause as shown below:***

**27.5.3.2.1a Requirement for allocating resources**

An AP that sends a Basic Trigger frame, a BQRP Trigger frame or a BSRP Trigger frame without aggregating with Data frame(s) with the Ack Policy subfield equal to HTP Ack or a Management frame that solicits an acknowledgment shall at least allocate sufficient resources for the respondingSTA indicated by each User Info field for the solicited associated non-AP STA or the UORA response from an associated non-AP STA to send at least one QoS Null frame with HT Control field.(#16668)

NOTE - An AP that sends a Basic Trigger frame uses an implementation specific method to decide the amount of resources indicated for UORA allocations. (#16668)

An AP that intends to solicit an Ack or BlockAck frame carried in an HE TB PPDU from a non-AP STA shall at least allocate sufficient resources for the solicited  non-AP STA to send the expected acknowledgement. If the AP solicits a BlockAck frame, the allocated resource shall be sufficient for the associated non-AP STA to send the BlockAck frame with the size of the Block Ack Bitmap subfield(s) equal to at least the negotiated block ack bitmap length (see 27.4.3 (Negotiation of block ack bitmap lengths)). (#16668)

An AP that sends a BFRP Trigger frame shall at least allocate sufficient resources for the HE beamformee to send all the solicited feedback, including when the feedback is split into segments and including HT Control fields for each MPDU, in the HE TB PPDU that is sent in response to the BFRP Trigger frame. (#16668)

* A-MPDU contents in an HE TB PPDU

***TGax Editor: Please modify the following text in the location as shown below:***

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 the rule defined (#16668)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.

 (#16668)

(…existing texts)

A 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 TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame is 0, the Trigger frame is contained in an A-MPDU, and 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 TID Aggregation Limit field of the User Info field addressed to the non-AP STA(#16592) in the Trigger frame is 0 and 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.
* Table 9-429 (A-MPDU contents in the S-MPDU 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 only one MPDU in the A-MPDU, where the MPDU is preceded by a nonzero length MPDU delimiter with EOF equal to 1. The MPDU is subject to the following restrictions:
* 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 BlockAck 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.
* Table 9-529 (A-MPDU contents in the data enabled immediate response 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 9-529 (A-MPDU contents in the data enabled immediate response 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.

If the associated non-AP STA has no frames pending or is unable to include pending frames in response to a Basic Trigger frame because the allocated resource is insufficient, then the associated non-AP STA shall include in the A-MPDUat least one QoS Null frame with HT Control field. (#16668)

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 MPDUs 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)(#16668).

(…existing texts)

* Non-AP STA(#16562) behavior for UL MU operation
* General

(…existing texts)

A non-AP STA(#16592) shall not transmit an HE TB PPDU that is not an HE TB NDP feedback PPDU if all the following conditions are satisfied:

* The non-AP STA(#16592) is operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior (see Table E-1).
* The HE TB PPDU would be in response to one of the following:
* A Trigger frame containing a User Info field with AID12 subfield carrying the 12 LSBs of the AID of the STA.
* A frame addressed to the non-AP STA(#16592) that includes a TRS Control subfield.
* A Trigger frame allocating at least one RA-RU.
* The RU is a 26-tone RU.
* If the non-AP STA(#16592) has received at least one Beacon frame within the past dot11ObssNbRuToleranceTime from an AP with which the non-AP STA(#16592) is not associated and the Beacon frame meets any of the following conditions:
* The Extended Capabilities element is not present.
* The OBSS Narrow Bandwidth RU In OFDMA Tolerance Support field in the Extended Capabilities element is not present.
* The OBSS Narrow Bandwidth RU In OFDMA Tolerance Support field in the Extended Capabilities element is 0.

(…existing texts)

If a non-AP STA does not satisfy the conditions specified in 27.5.3.3.1 (General) that prevents the non-AP STA from transmitting an HE TB PPDU, the a(#16668) non-AP STA(#16592) shall transmit an HE TB PPDU a SIFS after a received PPDU, if all the following conditions are met:

* The received PPDU contains either a Trigger frame (that is not an MU-RTS variant) with a User Info field addressed to the non-AP STA(#16592), or an MPDU addressed to the non-AP STA(#16592) that contains an TRS Control subfield. A(#16754) User Info field in the Trigger frame is addressed to a non-AP STA(#16592) if one of the following conditions are met:
* The AID12 subfield is equal to the 12 LSBs of the AID of the non-AP STA(#16592) and the Trigger frame is sent by the AP with which the non-AP STA(#16592) is associated with or by the AP corresponding to the transmitted BSSID if the non-AP STA(#16592) is associated with a nontransmitted BSSID and has indicated support for receiving Control frames with TA field set(#15959) to the transmitted BSSID by setting the Rx Control Frame To MultiBSS subfield to 1 in the HE Capabilities element that the STA transmits.
* The AID12 subfield is 0, the non-AP STA(#16592) supports the UL OFDMA-based random access procedure (see 27.5.5 (UL OFDMA-based random access (UORA))) and the Trigger frame is sent by the AP with which the STA is associated.
* The AID12 subfield is 2045, the non-AP STA(#16592) supports the UL OFDMA-based random access procedure (see 27.5.5 (UL OFDMA-based random access (UORA))), the non-AP STA(#16592) is not associated with the AP, and the non-AP STA is able to include the pending frame due to sufficient allocated resource.(#16668).
* The CS Required subfield in the Trigger frame is 1 and the UL MU CS condition described in 27.5.3.5 (UL MU CS mechanism) indicates the medium is idle, or the CS Required subfield in a Trigger frame is 0 or the response was solicited by a frame containing a TRS Control subfield(18/1455r3).
* The UL MU Disable subfield is 0 and the UL MU Data Disable subfield is 0 in the most recent OM Control subfield (if any) sent by the non-AP STA to the AP or the UL MU Disable subfield is 0 and the UL MU Data Disable subfield is 1 in the most recent OM Control subfield (if any) sent by the non-AP STA(#16592) to the AP and the frame that is being triggered is an acknowledgment(#17029) (see 27.8.3 (Transmit operating mode (TOM) indication)).

(…existing texts)

* UL OFDMA-based random access (UORA)
* General

(…existing texts)

An HE AP may transmit a Basic Trigger frame, a(#16668) BQRP Trigger frame or a BSRP Trigger frame that contains
one or more RUs for random access.

An AP that sends a Trigger frame variant other than Basic, BQRP, or BSRP shall not set the AID12 subfield of any User Info field of the frame equal to 0 or 2045. (#16668)

(…existing texts)

* Additional considerations for unassociated STAs

An AP shall transmit a Trigger frame that allocates one or more RA-RUs with AID12 set to 2045 in an HE
PPDU so that an unassociated non-AP STA(#16592) can determine the BSS color.(#15353)

An HE AP shall not transmit a(#16668) BQRP Trigger frame or a(#16668) BSRP Trigger frame that contains RA-RUs for unassociated non-AP STAs(#16592).

(…existing texts)

* Rules for generating segmented feedback

(…existing texts)

(#16668)

(…existing texts)