IEEE P802.11
Wireless LANs

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| Comment resolutions for 27.5.3.4 |
| Date: 2018-01-05 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D2.0 with the following CIDs:

* 11159, 11160, 11321, 11322, 12144, 13283, 13744, 13918, 13919 (9 CIDs)

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Incorporated changes that derive from discussions during the presentation at the Ad-hoc meeting. Changes are hightlighted in green. CID 13918 is not part of the resolution list because it may need more discussions. There will be a Rev 2 version of the document to address this CID.
* Rev 2: Fixed editorially the resolution for CID 13918. Changes highlighted in this color.

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** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 11159 | Adrian Stephens | 251.20 | "A STA that is the intended receiver of a Trigger frame" -- ug.I can live with "intended recipient/receiver" when talking about transmitter behavior, because we might be talking about setting fields prior to transmission.But when we talk about the receiver viewpoint, it has either received or has not received. "Intended" here is used as a shortcut to values of specific fields in the frame matching certain criteria. What are those criteria? | Reword "A STA that receives a Trigger frame that <condition that identifies it as the intended receiver> ..." | Revised –Agree in principle with the comment. Removed the “intended” and specified the additional condition as “and generates an HE TB PPDU in response”.TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 11159. |
| 11160 | Adrian Stephens | 252.13 | "shall not exceed the TID aggregation limit" -- where is this limit defined? | Reference here how this limit is known to the STA. Ditto throughout this subclause. | Revised –Agree with comment. Proposed resolution specifies that this limit is obtained from the TID Aggregation Limit field in the User Info field addressed to the STA in the Trigger frame. Applied throughout this subclause.TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 11160. |
| 11321 | Alfred Asterjadhi | 249.05 | This note seems out of place. None of the paragraphs preceding it talks about unassociated STAs. Remove it or clarify the relation to the paragraph. | As in comment. | Revised –The page and line of the comment are wrong. Reference should be P251L51 instead of P249L05 (checked with the commenter who happens to be myself). Proposed resolution clarifies this aspect.TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 11321. |
| 11322 | Alfred Asterjadhi | 251.44 | The STA includes at least one CBF and CQI frame in the A-MPDU if the AP actually allocates sufficient resources for the STA to do so. If the AP does not then the STA is not really required to send anythinig in the A-MPDU. Inline with note in P250L20. | Replace "The STA includes at least one Compressed Beamforming And CQI framein the A-MPDU as defined in 27.6 (HE sounding protocol)." with "The STA includes at least one Compressed Beamforming And CQI framein the A-MPDU as defined in 27.6 (HE sounding protocol) if the AP allocates enough resources for the STA to include the frame; otherwise the STA is not required to include the frame." | Revised --Agree with comment. Proposed resolution accounts for the suggested change in a more general perspective as well (STA cannot include an MPDU in the HE TB PPDU if the AP does not allocate resources for it, independently of the Trigger frame). In addition, to keep consistency from a technical perspective proposed resolution also moves the note in P250L20 to under this paragraph. TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 11322. |
| 12144 | kaiying Lv | 251.24 | Please change "9.3.1.23.8 NDP Feedback Report Poll variant" to "9.3.1.23.8 NDP Feedback Report Poll(NFRP) variant". | as comment | Accepted |
| 13283 | Robert Stacey | 252.04 | The reference here to Table 9-429 is inappropriate and unecessary. Table 9-429 describes the "non-A-MPDU" options. The concept of a "non-A-MPDU" in the context of an HE TB PPDU is non-sensical; the non-A-MPDU as developed in 11ac was meant to replicate the Aggregation = 0 behavior in HT PPDU and is unnecessary for an HE TB PPDU. The HE TB PPDU always carries an A-MPDU because we have statements such as the one at P255L41. An A-MPDU that carries one MPDU in an EOF=1 subframe is still an A-MPDU and doesn't need to be called out separately from the other rules for A-MPDU formation. Its just a special case where the user doesn't have any extra QoS Null frames to add. | Remove all references to the context tables in 9.7. Provide explicit rules for the A-MPDU formation. In many cases these already exist and this paragraph duplicates them. | Revised –Agree in principle with the spirit of the comment but not with its details. Table 9-429 is necessary because it is the only table that defined the contents of an A-MPDU for enabling any MPDU to be included in the A-MPDU however with the usual restrictions: only one MPDU, EOF of 1 on the nonzero length MPDU delimiter. This was done to differentiate between an Ack frame response and a BlockAck frame response. Also the preference is to maintain references to the tables since the references to them avoids us to duplicate efforts. Proposed resolution tries to remove as much reduncancy as possible. TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 13283. |
| 13744 | Woojin Ahn | 251.64 | The STA may aggregate QoS data frame as long as the QoS Data frame does not solicit an immediate response (e.g., Ack Policy set to No Ack) | As in comment | Revised –This is not forbidden (i.e., already allowed). Please refer to the table 8-426. However during the discussions during the Ad-hoc meeting the members pointed out that allowing QoS Data (no matter what the Ack policy is) together with the control response when the TID Aggregation limit is 0 complicates the design and does not add any benefit. Proposed resolution was then to forbid this case. TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 13744. |
| 13918 | Yongho Seok | 251.54 | Similar to a NOTE 2 of an previous paragraph, a STA that responds to a DL MU PPDU containing MPDU(s) addressed to it that include a Trigger frame with the CS Required equal to 0 can be an unassociated STA when the MPDUs are contained in an RU identified by STA-ID equal to 2045. | Include that a STA that responds to a DL MU PPDU containing MPDU(s) addressed to it that include Trigger frame can be an unassociated STA. | Revised–This case brings ambiguity. What would be the value of the AID in the Trigger frame in this case? If it is 2045 (for unassociated STAs) it means that all unassociated STAs will attempt to randomly access this resource. But the DL MU PPDU seems to contain MPDUs for one unassociated STA in particular in the suggested operation. This would create ambiguity because it is possible that the other STAs may only decode the Trigger and not the other MPDUs in that unit. This does not happen with the UMRS because there is no AID for random access in that procedure. Proposed resolution is to clarify the case when this is possible, which is with UMRS Control in the Management frame.TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 13918. |
| 13919 | Yongho Seok | 253.27 | "The STA shall include an HE Control field containing the UPH Control field in MPDUs carried in the A-MPDU of the HE TB PPDU except when:"Does the A-MPDU also cover an S-MPDU? Because the S-MPDU is defined as a sub-category of the A-MPDU, I think that it is covered.Otherwise, include the S-MPDU.When the PS-Poll frame (also BlockAckReq frame) is carried in an HE TB PPDU, the UPH Control field can't be contained even though the listed exception conditions are not met.Please allow a QoS Null frame including the UPH Control to be aggregated with the PS-Poll frame (also BlockAckReq frame).Otherwise, include an additional exception case for the PS-Poll frame (also BlockAckReq frame). | As in comment. | Revised—The case of the BAR + QoS Null is already covered as part of the A\_MPDU context (see table 426). If the STA sets the EOF to 1 preceding the BAR then it cannot include the QoS Null since an EOF of 1 indicates the last MPDU of the A-MPDU (i.e., the S-MPDU). We can do the same thing for the PS-Poll as well but the QoS Null frame already performs the functionality of a PS-Poll so it would be redundant.Resolution is to clarify that it can be an S-MPDU as well. TGax editor to make the changes shown in 11-18/0011r2 under all headings that include CID 13919. |

**Discussion: *None.***

**27.5.3.3 STA behavior for UL MU operation**

**TGax Editor: *Delete the note below of this subclause as follows (#CID 11322):***

 *(#11322)*

* A-MPDU contents in an HE TB PPDU(17/1087r2)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 13317, 11159, 11322):***

A STA that receivesa Trigger frame or an MPDU that includes an UMRS Control field and generates an HE TB PPDU in 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 that the AP allocates sufficient resources for the STA to include MPDUs in the A-MPDU; otherwise the STA is not required to include MPDUs in the A-MPDU.*(#11159, 11322)*

NOTE—The MU-RTS*(#13317)* Trigger frame and the NFRP Trigger frame are exempt from these construction rules since the MU-RTS*(#13317)* 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 STA transmitting an HE TB PPDU follows the rules in 27.10.3 (A-MPDU padding for an HE TB PPDU)(#7649) for constructing the PSDU carried in the HE TB PPDU(#9640).

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 13283, 11321):***

A(#6684) STA that responds to a DL MU PPDU containing MPDU(s) addressed to it that include UMRS Control field(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 block acknowledgement 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(#6685) shall be as defined in:

* Table 9-428 (A-MPDU contents MPDUs in the control response context) when at least one of the received MPDUs solicits an immediate acknowledgement..
* Table 9-426 (A-MPDU contents in the data enabled no immediate response context) when none of the received MPDUs solicit an immediate acknowledgement except thatthe STA shall not aggregate any QoS Data frames. *(#13283)*

NOTE 1—The STA additionally follows the rules defined in 27.3.2 (Dynamic fragmentation) when fragments are present in the soliciting (A-)MPDU(s).

NOTE 2—An AP might include a Management frame that solicits an acknowledgment that contains an UMRS Control field addressed to an unassociated STA in an RU identified by STA-ID equal to 2045. The UMRS Control field allocates the resources for the unassociated STA to include the acknowledgment in the HE TB PPDU sent in response to the DL MU PPDU *(#11321, 13918)*.(#4800)

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11160, 13283, 13744):***

(17/1087r2)A STA 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 9-428 (A-MPDU contents MPDUs in the control response context) when the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame*(#11160)* is 0, the Trigger frame is contained in an A-MPDU, and the STA receives at least another MPDU that solicits an immediate acknowledgment, except that the STA shall not aggregate any QoS Data frames..*(#13283, 13744)*
* Table 9-426 (A-MPDU contents in the data enabled no immediate response context) when the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame*(#11160)* is 0 and the Trigger frame is either not contained in an A-MPDU or is contained in an A-MPDU but the STA receives no other MPDUs that solicit an immediate acknowledgment.
* Table 9-429 (A-MPDU contents in the S-MPDU context) when the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame*(#11160)* is greater than 0 and the STA 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 shall be subject to the following restrictions: *(#13283)*
* It shall be a control response frame if the STA received at least another MPDU that solicits an immediate acknowledgment. *(#13283)*
* If the MPDU is a Multi-TID BlockAckReq*(#12860)* frame then the number of TIDs present in the Multi-TID BlockAckReq frame shall not exceed the TID aggregation limit that is obtained from the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame. *(#11160, 13283)*
* Table 9-425 (A-MPDU contents in the data enabled immediate response context) when the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame*(#11160)* is greater than 0 and the STA 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 shall be subject to the following restrictions: *(#13283)*
* It shall contain a control response frame if the STA received at least another MPDU that solicits an immediate acknowledgment. *(#13283)*
* The number of TIDs present in the A-MPDU 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 STA in the Trigger frame*(#11160)*.
* Table 9-425 (A-MPDU contents in the data enabled immediate response context) when the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame*(#11160)* is greater than 0 and the STA 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 shall be subject to the following restrictions: *(#13283)*
* It shall contain a control response frame if the STA receives at least another MPDU that solicits an immediate acknowledgment. *(#13283)*
* 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 STA in the Trigger frame*(#11160)*.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 11322):***

A STA that responds to a BRP Trigger frame addressed to it shall construct the A-MPDU carried in the HE TB PPDU as defined in Table 9-428 (A-MPDU contents MPDUs in the control response context), except that only Compressed Beamforming And CQI frames shall be allowed in the A-MPDU; other frames shall not be allowed in the A-MPDU. The STA includes at least one Compressed Beamforming And CQI frame in the A-MPDU as defined in 27.6 (HE sounding protocol) if the AP allocates sufficient resources for the STA to include the frame in the A-MPDU; otherwise the STA is not required to include the frame*(#11322)*.

*(#11322)*

A STA 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 9-428 (A-MPDU contents MPDUs in the control response context). The STA includes either a BlockAck frame or a Multi-STA BlockAck frame in the A-MPDU as defined in 27.4 (HE block acknowledgement procedure).

A STA 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 9-428 (A-MPDU contents MPDUs in the control response context). The STA includes a GCR BlockAck frame in the A-MPDU as defined in 10.24.10 (GCR and GLK-GCR block ack).

A STA 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 9-426 (A-MPDU contents in the data enabled no immediate response context). The STA shall include in the A-MPDU at least one QoS Null frame.

NOTE 1—An AP can include other MPDUs in a soliciting DL MU PPDU that contains Trigger frames as specified in 9.7.3 (A-MPDU contents).

NOTE 2—The frame type of MPDUs may be different across A-MPDUs within the(#6688) same HE TB PPDU.(#4828)

NOTE 3—A STA 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.(17/249r2)

A STA that is scheduled in a Trigger frame or is the intended receiver of an UMRS Control field transmits the dB value of its UL power headroom, *HRSTA*, 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).

*

where

 represents the maximum UL transmit power of an(#6874) HE TB PPDU with the assigned MCS

 represents the current UL transmit power of the HE TB PPDU for the assigned MCS

*HRSTA* is the UL headroom, in dB,(#6876) of the(#6877) HE TB PPDU, the encoding of which is specified in 9.2.4.6.4.6 (UPH Control).(#8577)

NOTE—If the Minimum Transmit Power Flag subfield(17/1088r0) in the UPH Control field(#Ed) is 1, then the STA is transmitting the HE TB PPDU at its minimum  for the assigned MCS.(#7678)

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 13919):***

The STA shall include an HE Control field containing the UPH Control field in MPDUs carried in the S-MPDU or A-MPDU of the HE TB PPDU except when:

* The remaining space in the A-MPDU, after inclusion of solicited MPDUs that cannot contain an HE Control field, is not sufficient to contain MPDU(s) that contain an HE Control field
* The STA includes other Control fields in the HE Control field and the available space in the HE Control field is not sufficient to contain an additional UPH Control field
* The MPDU is a Control frame.(#7887, #5013, #5014)*(#13919)*
* A-MPDU contents

**TGax Editor: *Change the tables below of this subclause as follows (#CID 13283):***

***Change Table 9-426 (A-MPDU contents in the data enabled no immediate response context) as follows:***

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| * A-MPDU contents in the data enabled no immediate response context
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| MPDU Description | Conditions |
| Delayed BlockAcks | For a non-HE STA: BlockAck frames for a TID for which an HT-delayed block ack agreement exists with the BA Ack Policy subfield equal to No Acknowledgment. |
| Delayed Block Ack data | For a non-HE STA: QoS Data frames with a TID that corresponds to a Delayed or HT-delayed block ack agreement.These have the Ack Policy field equal to Block Ack. |
| Data without a block ack agreement | QoS Data frames with a TID that does not correspond to a block ack agreement.These have the Ack Policy field equal to No Ack and the A‑MSDU Present subfield equal to 0. |
| Action No Ack | Action No Ack frames. |
| Delayed BlockAckReqs | For a non-HE STA: BlockAckReq frames with the BA Ack Policy subfield equal to No Acknowledgment and with a TID that corresponds to an HT-delayed block ack agreement. |
| Trigger | For an HE AP: Zero or more Trigger frames where the Trigger Type field is Basic Trigger or BSRP Trigger.See NOTE 1. |
| QoS Null frame with Ack Policy field set to No Acknowledgment | For an HE STA: Zero or more QoS Null MPDUs with Ack Policy field set to No Acknowledgment. |
|  *(#13283)*. |

***Change Table 9-428 (A-MPDU contents MPDUs in the control response context) as follows:***

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| * A-MPDU contents MPDUs in the control response context
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| MPDU | Conditions |
| Ack | Ack frame transmitted in response to an MPDU that requires an Ack frame. | One Ack and BlockAck frame is present at the start of the A-MPDU between two STAs that are not both HE STAs.(#8409)One of these is present at the start of the A-MPDU between two HE STAs. |
| BlockAck | BlockAck frame with a TID that corresponds to an HT-immediate block ack agreement. |
| Multi-STA BlockAck | At most one Multi-STA BlockAck frame if the preceding PPDU is either an HE TB PPDU that solicits an immediate response (27.4.4.5 (Responding to an HE TB PPDU with a DL SU PPDU)) or is an HE PPDU that carries a multi-TID A-MPDU or an ack-enabled A-MPDU (see 27.10.4 (multi-TID A-MPDU and ack-enabled A-MPDU)). (#4760) |
| Action No Ack | +HTC Action No Ack frames carrying a Management Action Body containing an explicit feedback response or BRP frame.For an HE STA: Zero or more Action No Ack frames. |
| QoS Null frame with Ack Policy field set to No Ack | For an HE STA: Zero or more QoS Null MPDUs with Ack Policy field set to No Ack. *(#13283)* |