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| 11ax D3.0 Comment Resolution 9.7.3 | | | | |
| Date: 2018-11-01 | | | | |
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Abstract

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

* 15162, 15901, 15902, 16118, 16164, 16207, 16208, 16209, 16210, 16212,
* 16228, 16253, 16271, 16290, 16291, 16292, 16648, 16649, 16650, 16651,
* 17037, 17038.

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** |
| ~~15157~~ | ~~195~~ | ~~21~~ | ~~The HT-immediate BlockAck in Table 9-425 calls out a BlockAck for DMG STA. Type of BlockAck is missing.~~ | ~~Change "same BlockAck" to "same BlockAck frame"~~ |  |
| 15162 | 196 | 1 | I am pretty confident that we can simplify these tables. The normative behavior in clause 27 already covers all these combinations so it could be as simple as adding a reference to subclauses in 27 instead of replications. | As in comment. For all these tables. | Revised.  If we go with want commenter is proposed, the contents for HE SU PPDU, DL/UL HE MU PPDU should be separately described in subclause 27 where most them are missing. It is true that Table 9-529 is complicated. To simplify the Table 9-529, several new tables for A-MPDU contents in HE PPDU in the data enabled immediate response context are defined.  TGax editor to make changes in 11-18/1858r6 under CID 15162 |
| 15901 | 197 | 7 | Change "Action" to "Management frame except Action no Ack" | As in the comment | Revised  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 15901. |
| 15902 | 197 | 17 | Add "BQRP" after "or BSRP" | As in the comment | Revised  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 15902. |
| 16118 | 194 | 28 | "The A-MPDU is transmitted by a STA that is neither a TXOP holder nor an RD responder or the A-MPDU is transmitted by an HE AP in response to an HE TB PPDU and the transmitter also needs to transmit one of the following immediate response frames:" has a precedence ambiguity | Add a comma before " and the transmitter" | Revised  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 16118 |
| 16164 | 197 | 54 | Per the resolution of CID 12743, the claim that multiple Trigger frames are beneficial is not clear | At the end of Table 9-426 add a "NOTE---The inclusion of multiple Trigger frames in an A-MPDU can increase robustness." | Revised  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 16164 |
| 16207 |  |  | The A-MPDU context tables, especially Table 9-425, have turned into an incomprehensible mess similar to the multirate rules mess | Restructure the tables so that the per-PHY/per-role (AP/STA) etc. caveats are clearer | Revised.  Table 9-425 is complicated. To simplify the Table 9-425, a new table for A-MPDU contents HE PPDU in the data enabled immediate response context is defined.  TGax editor to make changes in 11-18/1858r6 under CID 16207 |
| 16208 |  |  | The rules for multi-TID A-MPDUs should not both be in 9.7.3 and in Clause 27 | Delete the stuff that is already covered in Clause 27 from 9.7.3 (making sure what's left is not wrong/misleading) | **Revised**  **Generally agree with the commenter.**  TGax editor to make changes in 11-18/1858r6 under CID 16208 |
| 16209 | 197 | 17 | "In an ack-enabled multi-TID A-MPDU context between two HE STAs at most one of the following is present: [...] One or more Trigger frames" -- this needs to be restricted to a transmission from an AP | Restore the "If transmitted by an AP" the resolution for CID 12921 indicated would be kept | **Revised**  **Note 2 in Table 9-aaax make it clear that Trigger frame is wlays in A-MPDU transmitted by AP.**  TGax editor to make changes in 11-18/1858r6 under CID 16209 |
| 16210 | 194 | 4 | There are references to A-MPDU contexts that are not listed in Table 9-424: data enabled A-MPDU context, non-ack-enabled A-MPDU context, multi-TID A-MPDU context, single TID A-MPDU context (3x) | Add a description of these contexts | **Revised**  **Generally agree with the commenter.**  TGax editor to make changes in 11-18/1858r6 under CID 16210 |
| 16212 |  |  | "at most one of the following is present: x, y, z" is not clear. Does it mean that only what is specified in x or y or z can be present, or can e.g. you have stuff in x plus other stuff as long as it is not in y or z? | Add ", and no other frames" before the colon in each case | **Rejected.**  **Discussion: “at most one of the following is present” is used 11 baseline spec.** |
| 16228 |  |  | "Zero of more", but all the items in the A-MPDU context tables are implicitly zero or more unless stated otherwise | Delete the cited text | **Rejected.**  **Discussion: with zero or more description, the A-MPDU content is clear** |
| 16253 | 170 | 3 | "All of the MPDUs within an A-MPDU have the same TA." -- a new requirement cannot be imposed on existing non-HE STAs | Change the cited text to "All of the MPDUs within an A-MPDU transmitted by an HE STA have the same TA. " | **Rejected**  **Discussion: 802.11 baseline requires that a STA associates with a single AP and the A-MPDU is from its associated AP. So the TA in one A-MPDU is same.** |
| 16271 |  |  | Only ack policy No Ack is allowed for QoS Nulls in the A-MPDU case, except for S-MPDU. It would be desirable for a STA to be able to know the peer has received whatever it's trying to signal in the QoS Null (here the QoS Null would have EOF=1 and Ack Policy=Normal/Implicit, and would be the only frame with that TID) | Allow ack policy Normal Ack for QoS Null frames sent in A-MPDUs between HE STAs | Rejected.  Discussion: the group agreed that it is not necessary to allow acknowledging QoS Null in A-MPDU. Another observation is that if the transmitter wants the Ack of QoS Null, a S-MPDU can be used. |
| 16290 | 196 | 41 | Frames can only have a single TID at most | In T9-425 change "One frame with a single TID value" to "One QoS Data frame" | **Revised**  **Table 9-425 is resumed to the baseline content. No further change is needed.** |
| 16291 | 196 | 21 | "single TID non-ack-enabled A-MPDU" is not a defined term | Delete "single TID" at the referenced location, and at line 38 change "In a single TID A-MPDU context" to "In an A-MPDU that is not a multi-TID A-MPDU" | **Revised**  **Generally agree with the commenter**  TGax editor to make changes in 11-18/1858r6 under CID 16291 |
| 16292 | 196 |  | The contexts are defined in a table; other things are not contexts | Delete "context" at lines 22, 50, 38, 45 on page 196 and at 197.6 | **Revised**  **Generally agree with the commenter**  TGax editor to make changes in 11-18/1858r6 under CID 16292 |
| 16648 | 195 | 23 | A Multi-STA BlockAck frame is a variant of a BlockAck frame. Either the "HT immediate BlockAck" (which is not defined) needs to become "Compressed BlockAck" or the two rows need to be combined as a more general "BlockAck frame" | Either combine this row and the previous row as "BlockAck" or change "HT-immediate BlockAck" to "Compressed BlockAck" | **Revised**  **Generally agree with the commenter**  TGax editor to make changes in 11-18/1858r6 under CID 16648 |
| 16649 | 196 | 41 | "One frame with a single TID" -- what does that mean? A BlockAck frame has a single TID. Some management frames (ADDBA for example) carry TIDs. Was the intention here to include both QoS Data and QoS Null frames? Clarify. | Explicitly state the frame types. | **Revised**  **Generally agree with the commenter**  TGax editor to make changes in 11-18/1858r6 under CID 16649 |
| 16650 | 196 |  | Not only QoS Data frames can be sent with ACK Policy="Normal ACK", "HTP ACK","Block ACK" but also QoS Null frames as well. From the current spec, it implies that QoS Null frames are sent only with ACK Polcy= No ACK. | In a single TID non-ack-enabled A-MPDU context between two HE STAs at most one of the following is present: -- One or more QoS Data frames or QoS Null frames with a single TID value with the Ack Policy field equal to Implicit Block Ack Request or HTP Ack or Block Ack, zero or more QoS Null frames with Ack Policy set to No Ack, and zero or more Trigger frames. The Trigger frame is one of Basic Trigger, BQRP Trigger or BSRP Trigger, where the content of all Trigger frames in the A-MPDU is the same | Rejected.  Discussion: the group agreed that it is not necessary to allow acknowledging QoS Null in A-MPDU. Another observation is that in a single non-ack-enabled A-MPDU context, a frame is not allowed to solicit Ack. |
| 16651 | 197 | 7 | The 3rd column refers to "Management frame that solicits an Ack frame" but the 1st column only lists "Action frame" | Change "Action" in first column to "Management frame that solicits acknowledgment" | Revised  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 16651 |
| 17037 | 196 | 42 | "...equal to Normal Ack or HTP Ack, or one Management frame that solicits an Ack frame..." Are you sure that any management frame can be aggregated in an ack-enabled A-MPDU? If it is yes, add a new row for a management frame to MPDU Description column of Table 9-425 (A-MPDU contents in the data enabled immediate response context). | As in comment. | **Revised**  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 17037 |
| 17038 | 197 | 12 | "...Policy set to No Ack, up to one Action frame, and zero or more..." Up to one Action frame is right? Or, up to one management frame that solicits an Ack frame is right? Based on 27.10.4.3 (Ack-enabled multi-TID A-MPDU operation), up to one management frame is right. | As in comment. | **Revised**  Generally agree with the commenter.  TGax editor to make changes in 11-18/1858r6 under CID 17038 |

**9.7 Aggregate MPDU (A-MPDU)**

**9.7.3 A-MPDU contents**

***TGax editor: change table 9-528 as follows:***

Table 9-528 A-MPDU Contexts

|  |  |  |
| --- | --- | --- |
| Name of Context | Definition of Context | Table defining  permitted contents |
| Data Enabled Immediate Response in non-HE PPDU | The A-MPDU is transmitted outside a PSMP sequence by a TXOP holder, or an RD responder including potential immediate responses. | Table 9-529 (A-MPDU contents in the data enabled immediate response context in non-HE PPDU) |
| Data Enabled No Immediate Response | The A-MPDU is transmitted outside a PSMP sequence by a TXOP holder, TXOP responder when transmitted by an HE STA to another HE STA, and the A-MPDU ~~that~~ does not include or solicit an immediate response.  See NOTE. | Table 9-530 (A-MPDU contents in the data enabled no immediate response context) |
| PSMP | The A-MPDU is transmitted within a PSMP sequence. | Table 9-531 (A-MPDU contents in the PSMP context) |
| Control Response | The A-MPDU is transmitted by a STA that is neither a TXOP holder nor an RD responder or the A-MPDU is transmitted by an HE AP in response to an HE TB PPDU and the transmitter ~~that~~ also needs to transmit one of the following immediate response frames:   * Ack * BlockAck frame with a TID for which an HT-immediate block ack agreement exists * Multi-STA BlockAck frame for acknowledging multi-TID A-MPDU | Table 9-532 (A-MPDU contents in the control response context) |
| S-MPDU context | The A-MPDU is transmitted within a VHT PPDU or an HE PPDU and contains an S-MPDU. | Table 9-533 (A-MPDU contents in the S-MPDU context) |
| Data Enabled Immediate Response in non-ack-enabled single TID A-MPDU in HE PPDU (#15162, 16207, 16291, 16292) | The A-MPDU is transmitted by a TXOP holder, or TXOP responder in HE PPDU. (#16118) | Table 9-aaa1 (A-MPDU contents in the non-ack-enabled single TID A-MPDU (data enabled immediate response) context in HE PPDU) |
| Data Enabled Immediate Response in ack-enabled A-MPDU in HE PPDU (#15162, 16207, 16291, 16292) | The A-MPDU is transmitted by a TXOP holder, or TXOP responder in HE PPDU. (#16118) | Table 9-aaa2 (A-MPDU contents in the ack-enabled A-MPDU (data enabled immediate response) in HE PPDU context) |
| Data Enabled Immediate Response in non-ack-enabled multi-TID A-MPDU in HE PPDU (#15162, 16207, 16291, 16292) | The A-MPDU is transmitted by a TXOP holder, or TXOP responder in HE PPDU. (#16118) | Table 9-aaa3 (A-MPDU contents in the non-ack-enabled multi-TID A-MPDU (data enabled immediate response) in HE PPDU context) |
| Data Enabled Immediate Response in ack-enabled multi-TID A-MPDU in HE PPDU (#15162, 16207, 16291, 16292) | The A-MPDU is transmitted by a TXOP holder, or TXOP responder in HE PPDU. (#16118) | Table 9-aaa4 (A-MPDU contents in the ack-enabled multi-TID A-MPDU (data enabled immediate response) in HE PPDU context) |
| NOTE—This context includes cases when no response is generated or when a response is generated later by the operation of the delayed block ack rules. | | |

TGax editor: make changes of Table 9-425 as follows:

Table 9-529 A-MPDU contents in non-HE PPDU in the data enabled immediate response context

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| --- | --- | --- | --- |
| MPDU Description | Conditions | | |
| Ack | If the preceding PPDU contains an MPDU that requires an Ack frame response, a single Ack frame at the start of the A‑MPDU. | | In a non-DMG STA: at most one of these MPDUs is present.  In a DMG STA: at most one Ack frame is present, and zero or more HT-immediate BlockAck frames are present. |
| HT-immediate BlockAck | In a non-DMG STA: if the preceding PPDU contains an implicit or explicit block ack request for a TID for which an HT-immediate block ack agreement exists, at most one BlockAck frame for this TID, in which case it occurs at the start of the A-MPDU.  In a DMG STA: if the preceding PPDU contains an implicit or explicit block ack request for a TID for which an HT-immediate block ack agreement exists, one or more copies of the same BlockAck for this TID. | |
| Delayed BlockAcks | BlockAck frames with the BA Ack Policy subfield equal to No Acknowledgment with a TID for which an HT-delayed block ack agreement exists. | | |
| Delayed block ack data | QoS Data frames with a TID that corresponds to (#57)an HT-delayed block ack agreement.  These have the Ack Policy field equal to Block Ack. | | |
| Action No Ack | Action No Ack frames. | | |
| Delayed BlockAckReqs | BlockAckReq frames with a TID that corresponds to an HT-delayed block ack agreement, and in which the BAR(#1490) Ack Policy subfield is equal to No Acknowledgment.(#1392) | | |
| Data frames sent under an HT-immediate block ack agreement | QoS Data frames with the same TID, which corresponds to an HT-immediate block ack agreement.  See NOTE. | Of these, at most one of the following is present in a non-DMG BSS:   * One or more QoS Data frames with the Ack Policy field equal to Implicit Block Ack Request * A BlockAckReq frame   Of these, at most one of the following is present in a DMG BSS:   * One or more QoS Data frames with the Ack Policy field equal to Implicit Block Ack Request * QoS Null MPDU with the Ack Policy subfield(#1489) set to No Ack * A BlockAckReq frame with an optional QoS Null MPDU the Ack Policy subfield(#1489) set to No Ack | |
| QoS Null MPDUs with the Ack Policy subfield(#1489) set to No Ack | In a DMG BSS, QoS Null MPDUs with the Ack Policy subfield(#1489) set to No Ack. |
| Immediate BlockAckReq | At most one BlockAckReq frame with a TID that corresponds to an HT-immediate block ack agreement.  This is the last MPDU in the A-MPDU.  It is not present if any QoS Data frames for that TID are present. |
| NOTE—These MPDUs all have the Ack Policy field equal to the same value, which is either Implicit Block Ack Request or Block Ack. | | | |

TGax editor: make changes of Table 9-xxxa1 to 9-xxa4 as follows:

Table 9-aaa1 A-MPDU contents in the non-ack-enabled single TID A-MPDU (data enabled immediate response) in HE PPDU context (#15162, 16207, 16208)

|  |  |  |  |
| --- | --- | --- | --- |
| MPDU Description | Conditions | | |
| Ack | If the preceding PPDU contains an MPDU that requires an Ack frame response, a single Ack frame at the start of the A‑MPDU. | | At most one of non-EOF-MPDU that is Ack , Compressed BlockAck, or multi-TID Block Ack is present |
| HT-immediate BlockAck | If the preceding PPDU contains an implicit or explicit block ack request for a TID for which an HT-immediate block ack agreement exists, at most one Compressed BlockAck frame for this TID, in which case it occurs at the start of the A-MPDU.  If the preceding PPDU contains explicit block ack requests for multiple TIDs or a multi-TID A-MPDU, at most one Multi-STA BA frame, in which case it occurs at the start of the A-MPDU. (16648) | |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | | |
| Data frames sent under an HT-immediate block ack agreement | One or more QoS Data frames with the same TID, which corresponds to an HT-immediate block ack agreement  See NOTE 1. | (#4763)At most one of the following is present:   * non-EOF-MPDUs each of which is a QoS Data frame with the Ack Policy field set to Implicit Block Ack Request, HTP Ack, or Block Ack and belonging to a block ack agreement, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy set to No Ack, zero or more non-EOF-MPDUs each of which is a Basic Trigger frame, BSRP, or BQRP * One non-EOF-MPDU that is BlockAckReq, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy set to No Ack. * One or more non-EOF-MPDUs each of which is Trigger frame. The Trigger frame is one of Basic Trigger, MU-BAR Trigger, BQRP Trigger, or BSRP Trigger frame. The MU BAR Trigger frame solicits blockacknowledgment from one TID. | |
| QoS Null MPDUs with Ack Policy set to No Ack | QoS Null MPDUs with Ack Policy set to No Ack. |
| Compressed BlockAckReq | At most one BlockAckReq frame with a TID that corresponds to an HT-immediate block ack agreement.  This frame is the last MPDU in the A-MPDU.  BlockAckReq is not present if any QoS Data frames are present. |
| Trigger | Trigger frames where the Trigger Type field is Basic Trigger, MU-BAR, BQRP or BSRP. (#15902)  See NOTE 2 and NOTE 3. |
| NOTE 1—The MPDUs from the same TID all have the Ack Policy field equal to the same value, which is either Implicit Block Ack Request, HTP Ack(#4723) or Block Ack.  NOTE 2—Only an HE AP is allowed to include a Trigger frame in the A-MPDU(#16209). The presence of more than one copy of a Trigger frame in an A-MPDU might increase the probability of the successful reception of the Trigger frame. The content of all Trigger frames in the A-MPDU is the same. (#16164)  NOTE 3—The BSRP and BQRP Trigger frames can be aggregated with other MPDUs in the A-MPDU if the receiver has indicated the support of receiving these trigger types in the BSRP BQRP A-MPDU Aggregation field of the HE Capabilities element. | | | |

Table 9-aaa2 A-MPDU contents in the ack-enabled A-MPDU (data enabled immediate response) in HE PPDU context (#15162, 16207, 16208)

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| --- | --- | --- | --- |
| MPDU Description | Conditions | | |
| Ack | If the preceding PPDU contains an MPDU that requires an Ack frame response, a single Ack frame at the start of the A‑MPDU. | | At most one of non-EOF-MPDU that is Ack , Compressed Block Ack or multi-STA BA is present |
| HT-immediate BlockAck | If the preceding PPDU contains an implicit or explicit block ack request for a TID for which an HT-immediate block ack agreement exists, at most one Compressed BlockAck frame for this TID, in which case it occurs at the start of the A-MPDU.  If the preceding PPDU contains explicit block ack requests for multiple TIDs or a multi-TID A-MPDU, at most one Multi-STA BA frame, in which case it occurs at the start of the A-MPDU. (16648) | |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | | |
| Data frames without HT-immediate block ack agreement | At most one Data frame with a TID without HT-immediate block ack agreement | The following is present:   * One EOF-MPDU that is either a QoS Data frame with Ack Policy field equal to Normal Ack(, (#8408, #9678)or HTP Ack), or a Management frame that solicits an immediate response, one or more non-EOF-MPDUs, each of which is a QoS Null frame with Ack Policy set to No Ack, or a Trigger frame. The Trigger frame is one of Basic Trigger frame, BSRP Trigger frame, or BQRP Trigger frame (#16290, 16649) | |
| Data frames sent under an HT-immediate block ack agreement | At most one QoS Data frame with a TID with an HT-immediate block ack agreement |
| QoS Null MPDUs with Ack Policy set to No Ack | QoS Null MPDUs with Ack Policy set to No Ack. |
| Management frame (#15901, 16651, 17037) | At most one Management frame that is not Action No Ack |
| Trigger | Trigger frames where the Trigger Type field is Basic Trigger, BQRP or BSRP. (#15902)  See NOTE 2 and NOTE 3. |
| NOTE 1—Only an AP is allowed to include a Trigger frame in the A-MPDU(#16209). Multiple Trigger frames in one A-MPDU is for increasing the robustness. The content of all Trigger frames in the A-MPDU is the same. (#16164)  NOTE 2—The BSRP and BQRP Trigger frames can be aggregated with other MPDUs in the A-MPDU if the receiver has indicated the support of receiving these trigger types in the BSRP BQRP A-MPDU Aggregation field of the HE Capabilities element. | | | |

Table 9-aaa3 A-MPDU contents in the non-ack-enabled multi-TID A-MPDU (data enabled immediate response) in HE PPDU context (#15162, 16207, 16208)

|  |  |  |  |
| --- | --- | --- | --- |
| MPDU Description | Conditions | | |
| Ack | If the preceding PPDU contains an MPDU that requires an Ack frame response, a single Ack frame at the start of the A‑MPDU. | | At most one of non-EOF-MPDU that is Ack ~~or HT-immediate BlockAck,~~ Compressed Block Ack or multi-STA BA is present |
| HT-immediate BlockAck | If the preceding PPDU contains an implicit or explicit block ack request for a TID for which an HT-immediate block ack agreement exists, at most one Compressed BlockAck frame for this TID, in which case it occurs at the start of the A-MPDU.  If the preceding PPDU contains explicit block ack requests for multiple TIDs or a multiple-TID A-MPDU contains implicit block ack requests for which HT-immediate block ack agreement exist, at most one Multi-STA BA frame, in which case it occurs at the start of the A-MPDU. (16648) | |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | | |
| Data frames sent under an HT-immediate block ack agreement | QoS Data frames with different TIDs, which correspond to multiple HT-immediate block ack agreements  See NOTE 1. | At most one of the following is present:   * Two or more non-EOF MPDUs that are QoS Data frames that belong to two or more block ack agreements and that have the Ack Policy field set to Implicit Block Ack Request, HTP Ack, or Block Ack, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy set to No Ack, zero or more non-EOF-MPDUs each of which is a Trigger frame. The Trigger frame is one of Basic Trigger frame, BSRP, or BQRP * One non-EOF MPDU that is Multi-TID BlockAckReq frame, zero or more non-EOF-MPDUs, each of which is a QoS Null frame with Ack Policy set to No Ack. * One or more non-EOF-MPDUs each of which is Trigger frame. The Trigger frame is MU-BAR Trigger that solicits block acknowledgment from more than one TID. | |
| QoS Null MPDUs with Ack Policy set to No Ack | QoS Null MPDUs with Ack Policy set to No Ack. |
| Immediate BlockAckReq | At most one multi-TID BlockAckReq frame with TIDs that correspond to HT-immediate block ack agreements  This frame is the last MPDU in the A-MPDU.  Multi-TID BlockAckReq frame is not present if any QoS Data frames are present. |
| Trigger | Trigger frames where the Trigger Type field is Basic Trigger, MU-BAR, BQRP or BSRP. (#15902)  MU BAR frame is not not present if any QoS Data frames are present  See NOTE 2 and NOTE 3. |
| NOTE 1—The MPDUs from the same TID all have the Ack Policy field equal to the same value, which is either Implicit Block Ack Request, HTP Ack(#4723) or Block Ack.  NOTE 2—Only an HE AP is allowed to include a Trigger frame in the A-MPDU(#16209). Multiple Trigger frames in one A-MPDU is for increasing the robustness. The content of all Trigger frames in the A-MPDU is the same. (#16164)  NOTE 3—The BSRP and BQRP Trigger frames can be aggregated with other MPDUs in the A-MPDU if the receiver has indicated the support of receiving these trigger types in the BSRP BQRP A-MPDU Aggregation field of the HE Capabilities element. | | | |

Table 9-aaa4 A-MPDU contents in the ack-enabled multi-TID A-MPDU (data enabled immediate response) in HE PPDU context (#15162, 16207, 16208)

|  |  |  |  |
| --- | --- | --- | --- |
| MPDU Description | Conditions | | |
| Ack | If the preceding PPDU contains an MPDU that requires an Ack frame response, a single Ack frame at the start of the A‑MPDU. | | At most one of non-EOF-MPDU that is Ack ~~or HT-immediate BlockAck~~, Compressed Block Ack or multi-STA BA is present |
| HT-immediate BlockAck | If the preceding PPDU contains an implicit or explicit block ack request for a TID for which an HT-immediate block ack agreement exists, at most one Compressed BlockAck frame for this TID, in which case it occurs at the start of the A-MPDU.  If the preceding PPDU contains explicit block ack requests for multiple TIDs or a multiple-TID A-MPDU contains implicit block ack requests for which HT-immediate block ack agreement exist, at most one Multi-STA BA frame, in which case it occurs at the start of the A-MPDU. (16648) | |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | | |
| Data frames without HT-immediate block ack agreement | One or more QoS Data frames with each with different TIDs where none of the TID have HT-immediate block ack agreement  See NOTE 1. | At most one of the following is present:   * EOF-MPDUs each of which is a QoS Data frame with the Ack Policy field set to Normal Ack or HTP Ack and where the TIDs of the EOF-MPDUs differ if there is more than one, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy set to No Ack, zero or more non-EOF-MPDUs each of which is a Basic Trigger frame, BSRP, or BQRP * Zero or more non-EOF-MPDUs each of which is a QoS Data frame with the Ack Policy field set to Implicit Block Ack Request, HTP Ack, or Block Ack and belonging to a block ack agreement, one or more EOF-MPDUs each of which is a QoS Data frame with the Ack Policy field set to Normal Ack or HTP Ack and where the TIDs of the EOF-MPDUs differ if there is more than one, an EOF-MPDU that is a Management frame, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy set to No Ack, zero or more non-EOF-MPDUs each of which is a Basic Trigger frame, BSRP, or BQRP * Zero or more EOF-MPDUs each of which is a QoS Data frame with the Ack Policy field set to Implicit Block Ack Request, HTP Ack, or Block Ack and belonging to a block ack agreement, and two or more EOF-MPDUs each of which is a QoS Data frame with the Ack Policy field set to Normal Ack or HTP Ack and where the TIDs of the EOF-MPDUs differ if there is more than one, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy set to No Ack, zero or more non-EOF-MPDUs each of which is a Basic Trigger frame, BSRP, or BQRP | |
| Data frames sent under an HT-immediate block ack agreement | One of the followwing:   * One or more QoS Data frames with the same TID, which corresponds to an HT-immediate block ack agreement * QoS Data frames with different TIDs, which correspond to multiple HT-immediate block ack agreements   See NOTE 1. |
| QoS Null MPDUs with Ack Policy set to No Ack | QoS Null MPDUs with Ack Policy set to No Ack. |
| Management frame(#15901, 16651, 17038) | At most one Management frame that is not Action No Ack |
| Trigger | One or more Trigger frames where the Trigger Type field is Basic Trigger, BQRP or BSRP. (#15902)  See NOTE 2 and NOTE 3. |
| NOTE 1—The MPDUs from the same TID all have the Ack Policy field equal to the same value, which is either Implicit Block Ack Request, HTP Ack(#4723) or Block Ack.  NOTE 2—Only an HE AP is allowed to include a Trigger frame in the A-MPDU(#16209). Multiple Trigger frames in one A-MPDU is for increasing the robustness. The content of all Trigger frames in the A-MPDU is the same. (#16164)  NOTE 3—The BSRP and BQRP Trigger frames can be aggregated with other MPDUs in the A-MPDU if the receiver has indicated the support of receiving these trigger types in the BSRP BQRP A-MPDU Aggregation field of the HE Capabilities element. | | | |

TGax editor: change Table 9-532 as follows:

Table 9-532 A-MPDU contents in the control response context

|  |  |  |
| --- | --- | --- |
| MPDU | Conditions | |
| Ack | Ack frame transmitted in response to an MPDU that requires an Ack frame. | Zero or One Ack or BlockAck frame is present at the start of the A-MPDU between two STAs that are not both HE STAs.  Zero or One ~~of these~~ Ack, compressed BlockAck, or Multi-STA BlockAck frame is present at the start of the A-MPDU between two HE STAs. |
| BlockAck | Compressed BlockAck frame with a TID that corresponds to an HT-immediate block ack agreement.  Multi-STA BlockAck frame if the preceding PPDU is either an HE TB PPDU that solicits an immediate response (see 27.4.4.5 (Responding to an HE TB PPDU with an SU PPDU(#16402))) or is an HE PPDU that carries a multi-TID A-MPDU or ack-enabled A-MPDU (see 27.10.4 (Multi-TID A-MPDU and ack-enabled A-MPDU)). (16648) |
|  |  |
| Trigger | Trigger frames where the Trigger Type field is Basic Trigger, BQRP or BSRP | Zero or more non-EOF-MPDUs each of which is Trigger frame. The Trigger frame is one of Basic Trigger, BQRP Trigger, or BSRP Trigger frame |
| Action No Ack | In an A-MPDU between two STAs that are not both HE STAs: +HTC Action No Ack frames carrying a Management Action Body containing an explicit feedback response or BRP frame.  In an A-MPDU between two HE STAs: 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. | |