IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11ax D4.0 Comment Resolution 9.7.3 | | | | |
| Date: 2019-05-08 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Liwen Chu | Marvell |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

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

* 20131, 20132, 20133, 20134, 20384, 20385, 20414, 20415, 20627, 20765,
* 21032, 21068, 21342, 21610, 20699

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.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | **Resolution** |
| 20131 | 221 | 11 | Why has it switched from "One Ack or BlockAck frame" to "Zero or one Ack or BlockAck frame" in the A-MPDU control response context? If it is because of the sounding sequence please clarify it explicitly | As in comment. | Revised  Discussion: in 11ax D4.0, the feedback of sounding refers to the table. So the table changes to “zero or one”. The resolution of CID 20640 removes such reference. So in this table, we should change it back to one Ack or Block Ack”.  TGax editor to make change in 11-19/0734r3 under CID 20131. |
| 20132 | 222 | 35 | These QoS Null frames can appear at any time in this context. Hence, instead of repeating everytime jas part of the group, ust mention them as a separate row that is not part of the "one of the following" conditions. Please do the same for the subsequent tables as well.  Also add " MU BAR Trigger frame is not present if any QoS Data frames are present" as done in the other tables (e.g., Table 9-532c) in the second column of the Trigger row. | As in comment. | Revised  Discussion: Generally agree with the commenter.  TGax editor: add the following text at the end of the 2nd column of the Trigger row to “MU BAR Trigger frame is not present if any QoS Data frames are present”  TGax editor to make changes in 11-19/0734r3 under 20132 |
| 20133 | 223 | 1 | The title of the table is misleading since the A-MPDU can contain a Management frame that solicits an immediate response as well. Please remove "single TID" from the title | As in comment. | Revised  Discussion: by adding the single TID in the title, this kind of A-MPDU can be explicitly differentiated from ack-enabled multi-TID A-MPDU. A note can be added to clarify that the ack-enabled single-TID A-MPDU includes the case that only one Management frame soliciting acknowledgement and other frames soliciting no acknowledgement are aggregated in the A-MPDU.    TGax editor to make changes in Table 9-527 as shown in 11-19/0437r1 under CID 20133 |
| 20134 | 223 | 31 | Implicit BAR and MU BAR frames seem to have been lost in the table for ack-enabled multi-TID A-MPDU. Please add them with the usual limitations (e.g., number of TIDs, non-presence if QoS Data frames are present etc). Check if anything else is missing from the split of the one table (of D3.0) into 4 separate tables in D4.0. | As in comment. | Rejected  Discussion: P223L31 is about single-TID A-MPDU. In table 9-532c where non-ack-enabled multi-TID A-MPDU is defined, MU-BAR is allowed. For multi-TID ack-enabled A-MPDU, MU-BAR is same as multi-TID non-ack-enabled A-MPDU since the MU-BAR can’t solicit Ack for EoF-MPDU. |
| 20384 | 226 | 41 | In conditions column "Zero or more EOF-MPDUs each of which ...", is it suppose to be "Zero or more non-EOF-MPDUs"? | change to non-EOF-MPDUs | Revised  Discussion: Generally agree with the commenter.  TG ax editor to make changes shown in 11-19/0734r3 under CID 20384 |
| 20385 | 226 | 8 | In condition column bullet 1 with only 1 EOF-MPDU seems to be the same as ack-enabled single TID AMPDU,  Bullet 1 with 2 or more EOF-MPDUs seems to be a subset of bullet 3 | Modify the 1st bullet to cover the case that AMPDU has 1 EOF-MPDU (data or management)+ one or more non-EOF-MPDU (QoS data) | Rejected.  Discussion: Bullet 1 is different from ack-enabled single TID A-MPDU since ack-enabled single-TID A-MPDU only can include one EOF-MPDU. |
| 20414 | 224 | 26 | Delete "at most " since one of them must be in the A-MPDU. | As in comment | Accepted |
| 20415 | 226 | 7 | Delete "at most " since one of them must be in the A-MPDU. | As in comment | Accepted |
| 20627 | 222 | 17 | "Multi-TID Block" -- wrong type (everything is Multi-STA in ax) | Change to "Multi-STA Block". Also at 234.29, 237.28, 258.17, | Revised.  Discussion: The commenter is right that in P222 L17, it should be multi-STA Block Ack. However if the frame is related to block ack request frame, e.g. in P234L29, P237L28, P258L17, the multi-TID Block Ack Request is correct name.  TGax editor: make changes as shown in 11-19/734r3 under CID 20627 |
| 20765 |  |  | Re CID 16212: the baseline qualifies all instances with "of these" or similar, so is not ambiguous | Add "of these" or similar qualifier to the "as most one of the following"s in the referenced subclause, as in the baseline | Rejected.  Discussion: the bullets list every allowed frames. So without “of these” is fine. Another observation is that not all bullets have “of these”, e.g. for acknowledge frames. |
| 21032 |  |  | Re CID 16207: the A-MPDU context tables are still 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 | Rejected  Discussion: The comment fails to identify a technical reason. It fails to identify changes in sufficient detail so that the specific wording of the changes can be determined. Please note that the newly added tables follow the structure of the existing tables in the baseline, with the addition of the new combination of frames that are enabled by the 11ax amendment, namely presence of Trigger frames, ack-enabled A-MPDU, non-ack-enabled A-MPDUs and multi TID A-MPDU constructions. |
| 21068 | 225 | 1 | Shouldn't Table 9-532d--A-MPDU contents in the HE ack-enabled multi-TID immediate response context contain an allowance for one SMPDU? Is there a difference for DL vs UL, MU vs SU, triggered vs non? | Fix the table to allow one SMPDU, for example, zero or one SMPDU. | Rejected  Discussion: S-MPDU can’t be in multi-TID A-MPDU. EoF MPDU is the frame that solicits Ack acknowledgement. There is not difference between DL and UL, MU and SU. |
| 21342 | 218 | 42 | These 4 new contexts all have the same definition. | Give each a unique definition | Revised  Discussion: Generally agree with the commenter.  TGax editor to make changes in 11-19/0734r3 under CID 21342 |
| 21610 | 222 | 55 | In Table 9-532a A-MPDU contents in the HE non-ack-enabled single TID immediate response context. It specifies as follows "At most one of the following is present: ... One or more non-EOF-MPDUs each of which is a Basic Trigger, MU-BAR Trigger, BQRP Trigger, or BSRP Trigger frame. The MU-BAR Trigger frame solicits block acknowledgment for one TID.". It basically means MU-BAR can not be aggregated together with QoS data in the DL HE MU PPDU. | Remove the limitation. Enable BAR and MU-BAR to agregate with QoS data in DL HE MU PPDU. | Rejected  Discussion: This topic was discussed several times in 11ax group. The previous agreement is that given that BAR is not allowed in A-PMDU in 802.11 baseline spec, 802.11ax also not allows the frame with BAR information tobe aggregated with A-MPDU with QoS Data frames. Without MU-BAR/BAR in DL MU PPDU, 11ax spec already has the way for the AP to notify the STA whether Ack or Block Ack can be transmitted as the responding frame. Adding another method to do the same thing is not necessary. |
| 20699 | 326 | 56 | "If one or more Trigger frames are aggregated with other frames in an A-MPDU, then the Trigger frames shall be the first MPDUs of the A-MPDU unless the A-MPDU also carries an Ack or BlockAck frame in which case the Trigger frames shall be included immediately after the Ack or BlockAck frame." -- this is format not behaviour | Move to 9.7.3 | Revised  Agree with the commenter to move the subclause to 9.7.3  TGax editor to make changes shown in 11-19/734r3 under CID 20699 |

**9.7.3 A-MPDU contents**

***TGax editor: Change Table 9-527 (A-MPDU Contexts) as follows:***

|  |  |  |
| --- | --- | --- |
| * A-MPDU Contexts | | |
| Name of Context | Definition of Context | Table defining  permitted contents |
| Non-HE Data Enabled Immediate Response | The A-MPDU is transmitted outside a PSMP sequence by a TXOP holder or an RD responder including potential immediate responses. | Table 9-528 (A-MPDU contents in the non-HE data enabled immediate response context) |
| 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 9-529 (A-MPDU contents in the data enabled no immediate response context) |
| PSMP | The A-MPDU is transmitted within a PSMP sequence. | Table 9-530 (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 9-531 (A-MPDU contents MPDUs 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 9-532 (A-MPDU contents in the S-MPDU context) |
| HE Non-Ack-Enabled Single- TID Immediate Response | The A-MPDU is transmitted by a TXOP holder or TXOP responder in an HE PPDU and solicits block acknowledgement for single TID. (#21342) | Table 9-532a (A-MPDU contents in the HE non-ack-enabled single TID immediate response context) |
| HE Ack-Enabled Single -TID Immediate Response | The A-MPDU is transmitted by a TXOP holder or TXOP responder in an HE PPDU and solicits single acknowledgement. (#21342) | Table 9-532b (A-MPDU contents in the HE ack-enabled single TID immediate response context) |
| HE Non-Ack Enabled Multi-TID Immediate Response | The A-MPDU is transmitted by a TXOP holder or TXOP responder in an HE PPDU, and solicits block acknowledgments for multiple TIDs. (#21342) | Table 9-532c (A-MPDU contents in the HE non-ack-enabled multi-TID immediate response context) |
| HE Ack-Enabled Multi-TID Immediate Response | The A-MPDU is transmitted by a TXOP holder or TXOP responder in an HE PPDU, and solicits at least one acknowledgment and zero or more block acknowledgments. (#21342) | Table 9-532d (A-MPDU contents in the HE ack-enabled multi-TID immediate response 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: Change Table 9-529 as follows:***

|  |  |
| --- | --- |
| * A-MPDU contents in the data enabled no immediate response context | |
| 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 frame or BSRP Trigger frame.  The Trigger frames are the first MPDUs of the A-MPDU unless the A-MPDU also carries an Ack or BlockAck frame in which case the Trigger frames are included immediately after the Ack or BlockAck frame. (20699) |
| 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. |

***TGax editor: Change Table 9-531 as follows:(#20131)***

|  |  |  |
| --- | --- | --- |
| * A-MPDU contents ~~MPDUs~~ in the control response context | | |
| MPDU | Conditions | |
| Ack | Ack frame transmitted in response to an MPDU that requires an Ack frame. | one of Ack and Compressed BlockAck frame is present at the start of the A-MPDU between two STAs that are not both HE STAs; these are not present  other than at the start of the A-MPDU.  ~~One of these~~ one of Ack, Compressed BlockAck, and Multi-STA BlockAck frame is present at the start of the A-MPDU between two HE STAs; these are not present  other than at the start of the A-MPDU. |
| 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 26.4.4.5 (Responding to an HE TB PPDU with an SU PPDU)) or is an HE PPDU that carries a multi-TID A-MPDU or ack-enabled multi-TID A-MPDU (see 26.6.4 (Multi-TID A-MPDU and ack-enabled A-MPDU)). |
|
| 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.  Flow Control Action No Ack frames carrying a flow suspension frame or a flow  resumption frame.  In an A-MPDU between two HE STAs: Zero or more Action No Ack frames. | |
| QoS Null frame with Ack Policy subfield set to No Ack | For an HE STA: Zero or more QoS Null MPDUs with Ack Policy subfield set to No Ack. | |

***TGax editor: Change Table 9-532a as follows:***

|  |  |  |
| --- | --- | --- |
| * A-MPDU contents in the HE non-ack-enabled single TID immediate response context | | |
| MPDU | 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 non-EOF-MPDU that is Ack, Compressed BlockAck, or Multi-STA BlockAck frame is present (#20627) |
| 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 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 BlockAck frame at the start of the A-MPDU. |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | |
| QoS Null frame with Ack Policy subfield set to No Ack | Zero or more non-EOF-MPDUs that are QoS Null frames with Ack Policy subfield set to No Ack.(#20132) | |
| 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. | one of the following is present:   * one or more non-EOF-MPDUs each of which is a QoS Data frame with Ack Policy subfield set to Implicit Block Ack Request, HTP Ack, or Block Ack and belonging to a block ack agreement,(#20132) zero or more non-EOF-MPDUs each of which is a Basic Trigger, BSRP Trigger, or BQRP Trigger frame * One non-EOF-MPDU that is BlockAckReq frame, zero or more non-EOF-MPDUs each of which is a QoS Null frame with Ack Policy subfield set to No Ack. * One or more non-EOF-MPDUs each of which is a Basic Trigger, MU-BAR Trigger, BQRP Trigger, or BSRP Trigger frame. The MU-BAR Trigger frame solicits block acknowledgment for one TID. |
|  | (#20132) |
| 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.  The Trigger frames are the first MPDUs of the A-MPDU unless the A-MPDU also carries an Ack or BlockAck frame in which case the Trigger frames are included immediately after the Ack or BlockAck frame. (20699)  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 or Block Ack.  NOTE 2—Only an HE AP is allowed to include a Trigger frame in the A-MPDU. 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.  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 9-532b as follows:***

|  |  |  |
| --- | --- | --- |
| * A-MPDU contents in the HE ack-enabled single-TID immediate response context | | |
| MPDU | 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 non-EOF-MPDU that is Ack, Compressed BlockAck, or Multi-STA Block Ack frame 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 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 BlockAck frame at the start of the A-MPDU. |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | |
| Data frames not sent under an HT-immediate block ack agreement | At most one Data frame with a TID that does not correspond to an HT-immediate block ack agreement | One EOF-MPDU that is either a QoS Data frame with Ack Policy field set to Normal Ack 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 subfield set to No Ack, or a Trigger frame. The Trigger frame is a Basic Trigger, BSRP Trigger or BQRP Trigger frame. |
| Data frames sent under an HT-immediate block ack agreement | At most one QoS Data frame with a TID that corresponds to an HT-immediate block ack agreement |
| QoS Null frame with Ack Policy subfield set to No Ack | QoS Null frames with Ack Policy subfield set to No Ack. |
| Management frame | At most one Management frame that is not Action No Ack |
| Trigger | Basic Trigger, BQRP Trigger or BSRP Trigger frames.  The Trigger frames are the first MPDUs of the A-MPDU unless the A-MPDU also carries an Ack or BlockAck frame in which case the Trigger frames are included immediately after the Ack or BlockAck frame. (20699)  See NOTE 2. |
| NOTE 1—Only an AP is allowed to include a Trigger frame in the A-MPDU. Multiple Trigger frames in one A-MPDU increases robustness. The content of all Trigger frames in the A-MPDU is the same.  NOTE 2—The BSRP Trigger 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 frame types in the BSRP BQRP A-MPDU Aggregation field of the HE Capabilities element.  NOTE 3— The single Management frame that solicits the acknowledgement in ack-enabled single-TID A-MPDU is treated as single-TID frame, e.g. soliciting Ack of TID 15 in multi-STA BlockAck frame. **(#20133)** | | |

***TGax editor: Change Table 9-532c (A-MPDU Contexts) as follows:***

|  |  |  |
| --- | --- | --- |
| * A-MPDU contents in the HE non-ack-enabled multi-TID immediate response context | | |
| MPDU | 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 non-EOF-MPDU that is an Ack, Compressed BlockAck, or Multi-STA Block Ack frame 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 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 BlockAck frame at the start of the A-MPDU. |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | |
| QoS Null frame with Ack Policy subfield set to No Ack | Zero or more non-EOF-MPDUs that are QoS Null frames with Ack Policy subfield set to No Ack.(#20132) | |
| Data frames sent under an HT-immediate block ack agreement | QoS Data frames with different TIDs each of which corresponds to an HT-immediate block ack agreement.  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 with Ack Policy subfield set to Implicit Block Ack Request, HTP Ack, or Block Ack, zero or more non-EOF-MPDUs each of which is a Trigger frame. The Trigger frame is a Basic Trigger, BSRP Trigger, or BQRP Trigger frame(#20132) * One non-EOF MPDU that is a Multi-TID BlockAckReq frame. (#20132) * One or more non-EOF-MPDUs each of which is an MU-BAR Trigger frame that solicits block acknowledgment for more than one TID. |
|  | (#20132) |
| 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 | Basic Trigger, MU-BAR Trigger, BQRP Trigger or BSRP Trigger frames.  MU-BAR Trigger frame is not present if any QoS Data frames are present.  The Trigger frames are the first MPDUs of the A-MPDU unless the A-MPDU also carries an Ack or BlockAck frame in which case the Trigger frames are included immediately after the Ack or BlockAck frame. (20699)  See NOTE 2 and NOTE 3. |
| NOTE 1—The MPDUs from the same TID all have the Ack Policy subfield set to the same value, which is either Implicit Block Ack Request, HTP Ack or Block Ack.  NOTE 2—Only an HE AP is allowed to include a Trigger frame in the A-MPDU. Multiple Trigger frames in one A-MPDU increases the robustness. The content of all Trigger frames in the A-MPDU is the same.  NOTE 3—The BSRP Trigger 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 9-532d as follows:***

|  |  |  |
| --- | --- | --- |
| * A-MPDU contents in the HE ack-enabled multi-TID immediate response context | | |
| MPDU | 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 non-EOF-MPDU that is an Ack, Compressed BlockAck, or Multi-STA Block Ack frame 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 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 BlockAck frame at the start of the A-MPDU. |
| Action No Ack | Non-EOF-MPDUs that are Action No Ack frames. | |
| QoS Null frame with Ack Policy subfield set to No Ack | Zero or more non-EOF-MPDUs that are QoS Null frames with Ack Policy subfield set to No Ack.(#20132) | |
| Data frames without an 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 Ack Policy subfield set to Normal Ack or HTP Ack and where the TIDs of the QoS Data frames differ if there is more than one, zero or more non-EOF-MPDUs each of which is a Basic Trigger, BSRP Trigger, or BQRP Trigger frame (#20132) * Zero or more non-EOF-MPDUs each of which is a QoS Data frame with Ack Policy subfield 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 subfield set to Normal Ack or HTP Ack and where the TIDs of the QoS Data frames 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 Basic Trigger, BSRP Trigger, or BQRP Trigger frame (#20132) * Zero or more non-EOF-MPDUs each of which is a QoS Data frame with Ack Policy subfield 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 Ack Policy subfield set to Normal Ack or HTP Ack and where the TIDs of the QoS Data frames differ if there is more than one, zero or more non-EOF-MPDUs each of which is a Basic Trigger, BSRP Trigger, or BQRP Trigger frame (#20384)(#20132) |
| Data frames sent under an HT-immediate block ack agreement | One of the following:   * One or more QoS Data frames with a TID that corresponding to an HT-immediate block ack agreement * QoS Data frames with TIDs that correspond to two or more HT-immediate block ack agreements   See NOTE 1. |
|  | (#20132) |
| Management | At most one Management frame that is not an Action No Ack frame |
| Trigger | One or more Basic Trigger, BQRP Trigger or BSRP Trigger frames.  The Trigger frames are the first MPDUs of the A-MPDU unless the A-MPDU also carries an Ack or BlockAck frame in which case the Trigger frames are included immediately after the Ack or BlockAck frame. (20699)  See NOTE 2 and NOTE 3. |
| NOTE 1—MPDUs with the same TID all have the Ack Policy subfield set to the same value, which is either Implicit Block Ack Request, HTP Ack or Block Ack.  NOTE 2—Only an HE AP is allowed to include a Trigger frame in the A-MPDU. Multiple Trigger frames in one A-MPDU increases the robustness. The content of all Trigger frames in the A-MPDU is the same.  NOTE 3—The BSRP Trigger 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. | | |

**26.5.3.2 Rules for soliciting UL MU frames**

**26.5.3.2.1 General**

***TGax editor: delete the following paragraph from 26.5.3.2.1:***

……

(#20699)……