IEEE P802.11
Wireless LANs

|  |
| --- |
| **Ack related CRs on Section 27.4** |
| **Date:** 2018-09-05 |
| **Author(s):** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Affiliation** | **Address** | **Phone** | **Email** |
| George Cherian | Qualcomm | 5775 Morehouse Dr. San Diego, CA, USA |   | gcherian@qti.qualcomm.com |
| Alfred Asterjadhi |  |  |  |  |
| Abhishek Patil |  |  |  |  |
| Raja Banerjea |  |  |  |  |

Abstract

Resolved the following **31 CIDs**

15316, 15678, 15856, 15857, 15858, 16198, 16199, 16200, 16201, 16204

16205, 16270, 16320, 16361, 16370, 16377, 16402, 16496, 16655, 16658

16659, 16661, 16662, 16941, 16942, 16943, 16945, 17039, 17148, 17149

17150

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** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 15316 | Amelia Andersdotter | 274.21 | There are smaller grammar errors. An AP sends (third person singular s), "when" can be replaced by "if", and "would occupy" should be replaced by "occupies". | As in comment. | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 15678 | Huizhao Wang | 273.07 | The rules of selecting ACK, C-BA or M-STA BA are identical in the clauses fro 27.4.4.2 to 27.4.4.6. Instead of repeating these rules, please extract them and put them into a separate clause to be referenced. | as specified in Comment | Rejected - Though most of the context are the same, there are some differences for responding to HE TB PPDU that is captured in the preceeding paragraph. |
| 15856 | Li-Hsiang Sun | 274.47 | It is not clear why 'the A-MPDU includes only one MPDU, and the MPDU is an EOF-MPDU' is not an S-MPDU | replace with S-MPDU | Rejected - EOF (& non-EOF) MPDU is defined to remove the ambiguity of S-MPDU in a multi-TID AMPDU context |
| 15857 | Li-Hsiang Sun | 274.35 | "If a Management frame that solicits acknowledgment is carried in an HE MU PPDU, then the response is carried in an HE TB PPDU." It is not clear the intention of this sentence. In this subcluse, when we talk about management frame, is the management frame must be in a HE MU PPDU? This seems to be in conflict with L43 item 1), 2), | add 'HE SU PPDU, or HE ER SU PPDU' after HE MU PPDU | Rejected - The explicit statement for management frame is added to clarify that maangement frame carried in HE MU PPDU can only be responded with HE TB PPDU (see 27.4.4.3) |
| 15858 | Li-Hsiang Sun | 274.52 | If a management frame is aggredated with a trigger frame, in a HE SU PPDU, but the receiver did not decode the trigger frame, does the receiver follow the prcedure in 27.4.4.2? Is this expected by the AP? | Mandate management frame sent in the context of 27.4.4.4 in a HE (ER) SU PPDU must include TRS control subfield | Rejected - Management frame that is carred in HE(ER) SU PPDU may be responded either with HE TB PPDU or with HE SU PPDU depending on whether TRS control subfield is present or not. |
| 16198 | Mark RISON | 272.64 | The PPDU type is also important. The resolution to CID 12892 states that "Though it is true that that there are some special rules based on PPDU format (like HE TB PPDU), the Ack rules are self-contained within the frame", but as the headings of the subsequent subclauses indicates ("Responding to an HE <format> PPDU") the format is a factor in deciding the form of the acknowledgment | Add "PPDU format" to the list of deciding factors | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16199 | Mark RISON | 273.42 | This subclause is about responding, so rules on what the AP may or may not do are not appropriate. The resolution to CID 12893 claims that "The rules for response is in the first paragraph" but this is not true: the first para is about the rules for the transmitter, and contains no rules for the responder | Move the first para (inc. bullets) to a different subclause | Rejected.As responded earlier, the intention is to capture related rules in a single section, not to lose the context. However, commenter may propose an alternative subclause, which is missing in the comment. |
| 16200 | Mark RISON | 274.31 | This subclause is about responding, so rules on what the AP may or may not do are not appropriate. The resolution to CID 12894 claims that "The rules for response is part of the sentence" but this is not true: the first sentence is about the rules for the transmitter, and contains no rules for the responder | Move the first sentence to a different subclause | Rejected.As responded earlier, the intention is to capture related rules in a single section, not to lose the context. However, commenter may propose an alternative subclause, which is missing in the comment. |
| 16201 | Mark RISON | 275.16 | This subclause is about responding, so rules on what the non-AP STA may or may not do are not appropriate. The resolution to CID 12893 claims that "The rules for response is in the first paragraph" but this is not true: the first para is about the rules for the transmitter, and contains no rules for the responder | Move the first para to a different subclause | Rejected.As responded earlier, the intention is to capture related rules in a single section, not to lose the context. However, commenter may propose an alternative subclause, which is missing in the comment. |
| 16204 | Mark RISON | 275.21 | "If the HE TB PPDU carries MPDUs only from one STA" -- an HE TB PPDU always carries MPDUs only from one STA, per what I think is the understanding that an HE TB PPDU is the waveform generated by a transmitting STA rather than the waveform received by a receiving STA | Change the cited text at the referenced location to "If the AP has received an HE TB PPDU from only one STA" and below change "If the HE TB PPDUs carry MPDUs from more than one STA" to "If the AP has received more than one HE TB PPDU" | Rejected.From the definition of HE TB PPDU, a single HE TB PPDU can carry PSDUs from multiple STAs."high efficiency (HE) trigger-based (TB) physical layer protocol data unit (PPDU): An HE PPDU transmittedwith HE TB PPDU format that is capable of carrying one or more PHY service data units (PSDU) forone or more users." |
| 16205 | Mark RISON | 276.03 | This subclause is about responding, so rules on what the non-AP STA may or may not do are not appropriate. The resolution to CID 12907 claims that "The rules for response is part of the sentence" but this is not true: the first sentence is about the rules for the transmitter, and contains no rules for the responder | Move the first sentence to a different subclause | Rejected.As responded earlier, the intention is to capture related rules in a single section, not to lose the context. However, commenter may propose an alternative subclause, which is missing in the comment. |
| 16270 | Mark RISON | 274.44 | "contains MPDUs that solicits acknowledgment" -- suggests more than one MPDU is required (and bad grammar) | Change to "contains one or more MPDUs that solicit acknowledgment" | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16320 | Mark RISON | 238.22 | "The recipient shall not include in the Buffer Size field of an ADDBA Response frame a value that wouldcause the BlockAck Bitmap length of its block ack responses to exceed the BlockAck Bitmap length that isderived by the Buffer Size field of the ADDBA Request frame sent by the originator. " is not clear (especially the "is derived by the Buffer Size field") | Should at least add a NOTE to say that if the originator wants to use >64 bitmaps it needs to set the Buffer Size in the request to >64 (can't be less, can't be 0) | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16361 | Mark RISON | 268.00 | The rules for acknowledgment should be simplified. Irrespective of PPDU format, role, direction, etc., for a given RU+set of spatial streams:- if there is only one STA and only one MPDU to ack, and it had EOF=1, then send an Ack frame- otherwise, if there is only one STA and only one TID to ack, then send a C-BA- otherwise, send an M-BA | As it says in the comment | Rejected.The proposed simplified rule ignores many aspects: management frame acknowledgment procedure, All-Ack setting, combination of certain Ack-policy setting for certain TIDs and another Ack-policy settings for other TIDs etc. |
| 16370 | Mark RISON | 270.56 | "Pre-association ack context: A recipient receiving a Management frame from the unassociated STA, that requires an acknowledgment, shall set the Ack Type field to 0, AID subfield to 2045, and the TID field to 15 in the Per AID TID Info field, and the RA field of the Per AID TID Info field to the intended recipient's MAC address to indicate the successful reception of that Management frame." And in 27.1 we have "If the Ack Type field is 0, and the AID field is 2045, and the TID field is 15, then Per AID TID Info field indicates the acknowledgement of an EOF-MPDU that is a Management frame soliciting immediate acknowledgment. The RA field in the Per AID TID Info field is the MAC address of an unassociated STA for which the Per AID TID Info subfield is intended." And in 27.4.2 we have "If the Ack Type field is 0 and the TID field is 15, then the Per AID TID Info field indicates the acknowledgment of a single Management frame sent by the unassociated STA as defined by the acknowledgment context." This should not be triplicated | Put the rules on pre-assoc ack context in one place and one place only | Rejected.Different sections are addressing different aspects of the same feature (for example, overview section provides overall description on many aspects out of which one is pre-assoc.  |
| 16377 | Mark RISON | 270.04 | A Multi-TID BlockAck should be used in response to a multi-TID A-MPDU rather than a Multi-STA BlockAck, if there is only one STA to respond to (e.g. when the transmitter of the A-MPDU is an AP) | Change "If all MPDUs in the A-MPDU are received successfully, then the recipient may follow the procedure described in the All Ack context. Otherwise, the recipient may follow the procedure described in the BlockAck context." to "If all MPDUs in the A-MPDU are received successfully, then the recipient may follow the procedure described in the All Ack context. Otherwise, the recipient shall generate a Multi-TID BlockAck frame." | Rejected.11ax has made a decision early on to use Multi-STA Block-Ack for both Multi-TID acking as well we multi-STA acking. |
| 16402 | Massinissa Lalam | 275.14 | "DL SU PPDU" is not defined. In subclause 27.4.4.3, when responding to an HE MU PPDU, we did not precise UL SU PPDU, but just SU PPDU. I do think that the same should be used in this subclause | Replace "DL SU PPDU" with "SU PPDU" in this subclause. | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16496 | Naveen Kakani | 271.00 | An un-associated STA is allowed to send a Management Frame, if the A-MPDU received has more than one EoF-MPDU then it cannot be from an un-associated STA.Clairfy the text "or 15 (for indicating acknowledgment of an Action frame or a Management frame sent by the unassociated HE STA, e.g., Association Request)." | delete "or a Managementframe sent by the unassociated HE STA, e.g., Association Request" | Revised - Agree in principle. Removed 'unassociated', since the management frames can be sent by associated STAs under this contextTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16655 | Robert Stacey | 271.08 | Why are these "allowed values"? Specify the constraints on the value that can be used. Also, the requirements for TID=15 are not comprehensive -- PS Poll is not present. | Change to read "The TID field is set to the TID of the QoS Data or QoS Null frame that is being acknowledged and set to 15 for a Management frame soliciting acknowledgement or PS Poll frame." | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16658 | Robert Stacey | 272.40 | The reason for this statement is not clear. Why explicitly call out the requirement to follow the rules in 10.24.7 for the BlockAckReq frame, MU-BAR Trigger frame, etc, but not for QoS Data frames? The reason for the extra statement "with the restirction that the Block Ack Bitmap field shall be greater than or equal to WinEndR-WinSTartR is not clear. The section already has this restriction (statement at P228L51). Anyway, it is not clear again why this resriction is specific to BlockAckReq frame, etc and not QoS Data frames that solicit BA. | Remove statement. There is already a statement in 27.4.1 that the HE acknowledgement procedure builds on the procedure in 10.24.7 -- see P268L6 | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16659 | Robert Stacey | 272.51 | The subject of the requirement is not clear. The STA that sets the HE Fragment Support subfield is not the STA that does the Fragment Number subfield setting. Also, while "may" permits behavior it does prevent behavior and there is behavior here that needs to be prevented. | Change to: "A recipient shall not transmit to an originator a BlockAck frame where the LSB of the Fragment Number subfield is 1 unless the recipient has received from the originator an HE Capabiltiies element where the HE Fragmentation Support subfield is 3." | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16661 | Robert Stacey | 274.56 | If this is an HE TB PPDU response, then the correct ack policy is HTP Ack not Normal Ack | Change "Normal Ack" to "HTP Ack" | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16662 | Robert Stacey | 275.05 | If this is an HE TB PPDU response, then the correct ack policy is HTP Ack not Normal Ack | Change "Normal Ack, or Implicit Block Ack Request" to "HTP Ack" | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16941 | Xiaofei Wang | 269.48 | The sentence "An HE STA that transmits a BlockAckReq frame carried in an HE TB PPDU contains the TID Values of the Per TID Info subfields of the BAR Information field of the BlockAckReq frame for the MPDUs of whichTIDs correspond to any AC." is not unclear and confusing and needs to be revised. | Please clarify and reformulate the sentence. | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16942 | Xiaofei Wang | 269.39 | The sentences "An HE STA that transmits a Multi-TID BlockAckReq frame shall contain the TID Values of the Per TIDInfo subfields of the BAR Information field of the Multi-TID BlockAckReq frame for the MPDUs of whichTIDs correspond to AC that has the same or higher priority with respect to the primary AC, except when theMulti-TID BlockAckReq frame is carried in an HE TB PPDU in which case the HE STA contains the TIDValues of the Per TID Info subfields of the BAR Information field of the Multi-TID BlockAckReq frame forthe MPDUs of which TIDs correspond to any AC." are unclear and confusing. Please clarify and rewrite what these sentences meant. | please clarify and reformulate | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16943 | Xiaofei Wang | 273.03 | The phrase "receives an HE SU PPDU or HE ER SU PPDU with an A-MPDU" is unclear and confusing. Please clarify | please clarify the meaning of the phrase | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 16945 | Xiaofei Wang | 272.57 | The different acknowledgement schemes seem to be very complicated, since a STA needs to chose different options, such as ACK, multi-STA BA, carried in SU PPDU, or HE TB PPDU, and the receiving STA may not know the format that it should use until it has decoded the last MPDU in a frame, which may be trigger frame or including TRS Control subfield. It would be much easier, and more straightforward to have at least an option to have the transmitter of a packet to indicate the acknowledgement it expects, such as SU, HE TB, ACK, Mutli-STA ACK, etc., which the transmitter often knows anyway, due to the contents of its transmitted PPDU. This approach would be inline with the previous approach of ACK policy indication. | Simply the current HE acknowledgement procedure or at least add an option in which the transmitter of a packet indicates the acknowledgement it expects, such as SU, HE TB, ACK, Mutli-STA ACK, etc., which the transmitter often knows anyway, due to the contents of its transmitted PPDU. | Rejected. Rules are enumerated to explcitly set the rules for acking using HE SU PPDU, HE TB PPDU, and also based on eliciting PPDU type. Commentor is welcomg to bring a simplified rules that can be discussed.  |
| 17039 | Yongho Seok | 271.09 | "The allowed values for the TID field in this context are 0 to 7 (for indicating acknowledgment of QoS Data or QoS Null frames) or 15 (for indicating acknowledgment of an Action frame or a Management frame sent by the unassociated HE STA, e.g., Association Request)."Value 15 can be used for a Management frame sent by the associated HE STA.Remove "sent by the unassociated STA, e.g., Association Request)" | As in comment. | Revised - Agree in principleTGax editor shall incorporate changes in 11-18-1501-01-00ax |
| 17148 | Zhou Lan | 268.00 | "Acknowledging QoS Data frames with two or more TIDs using a Multi-STA BlockAck frame", can MTID Block Ack be used in this case? Please clarify. | as in the comment | Rejected.Multi-TID Block Ack cannot be used. This was disussed in the early times of 11ax, and the group decided to use Multi-STA BA even when there is only one AID |
| 17149 | Zhou Lan | 268.00 | "Pre-Association acknowledgment, which acknowledges pre-association Management frames formultiple STAs using a single Multi-STA BlockAck frame" can we use two MSTA BlockACK in one AMPDU in this case? Please clarify. | as in the comment | Rejected.Rules in D3.0 are clear that one MBA acks more than one STAs. Having multiple MBAs in an AMPDU was discussed during early times of 11ax development, and group decided against it. |
| 17150 | Zhou Lan | 268.00 | "An HE AP that sends a Multi-STABlockAck frame where the Per AID TID Info fields are all addressed to a single recipient STA and that issent in response to an HE TB PPDU may set the RA field of the Multi-STA BlockAck frame to either theaddress of the recipient STA or to the broadcast address. An HE AP that sends a Multi-STA BlockAckframe where the Per AID TID Info fields are all addressed to a single recipient STA and that is sent inresponse to an HE SU PPDU, HE ER SU PPDU or HE MU PPDU shall set the RA field to the address of therecipient STA." Please clarify why the RA setting rule is different of HE TB PPDU from other type of PPDU. MSTA BA is a MAC frame and the setting of the field of a MAC frame should be PHY agnostic. | as in the comment | Rejected. When the AP responds to an HE TB PPDU, the context could be that multiple STAs have responded to the Trigger frame - but AP received the HE TB PPDU from only one STA - in this case, other STAs need to know that MBA didn't carry the Ack for its PPDU so that STA can know that the issue was on the UL side. If the MBA itself was missed, then the issue could either UL or DL. |

* HE acknowledgment procedure
* Overview

The HE acknowledgment procedure builds on the features defined for HT-immediate block ack (see 10.24.7 (HT-immediate block ack extensions)), with the following extensions:

* Support for a Multi-STA BlockAck frame
* Support for a MU-BAR Trigger frame
* Support for a Multi-TID BlockAckReq frame
* Support for BlockAck Bitmap field lengths of 32, 64, 128 and 256
* Acknowledging MPDUs from multiple STAs using a single Multi-STA BlockAck frame
* Acknowledging QoS Data frames with two or more TIDs using a Multi-STA BlockAck frame
* Acknowledging QoS Data frames with one or more TIDs, and a Management frame using a Multi-STA BlockAck frame
* Acknowledging all MPDUs in a PPDU using a variant of the Multi-STA BlockAck frame
* Pre-Association acknowledgment, which acknowledges pre-association Management frames for multiple STAs using a single Multi-STA BlockAck frame

An HE STA shall be able to respond with Compressed BlockAck frames if HT-immediate block ack is supported in the role of recipient (see 10.24.7.1 (Introduction)). An HE STA shall be able to respond with a Multi-STA BlockAck frame if multi-TID A-MPDU operation (27.10.4 (Multi-TID A-MPDU and ack-enabled A-MPDU)) is supported in the role of recipient.

A non-AP HE STA that is associated with an AP and that sends a Multi-STA BlockAck frame shall set the AID11 subfield in the Per AID TID Info field of the Multi-STA BlockAck frame to 0 and the RA field to the MAC address of the intended recipient. A non-AP HE STA that is not associated with an AP shall not send a Multi-STA BlockAck frame.

An HE AP that sends a Multi-STA BlockAck frame where the Per AID TID Info fields are addressed to more than one STA shall set the RA field to the broadcast address. An HE AP that sends a Multi-STA BlockAck frame where the Per AID TID Info fields are all addressed to a single recipient STA and that is sent in response to an HE TB PPDU may set the RA field of the Multi-STA BlockAck frame to either the address of the recipient STA or to the broadcast address. An HE AP that sends a Multi-STA BlockAck frame where the Per AID TID Info fields are all addressed to a single recipient STA and that is sent in response to an HE SU PPDU, HE ER SU PPDU or HE MU PPDU shall set the RA field to the address of the recipient STA.

An HE AP that sends a Multi-STA BlockAck frame to an associated STA shall set the AID11 subfield in the Per AID TID Info field of the Multi-STA BlockAck frame to the 11 LSBs of the AID of the intended STA. An HE AP that sends a Multi-STA BlockAck frame to an unassociated STA shall set the AID11 subfield in the Per AID TID Info field of the Multi-STA BlockAck frame to 2045.

An HE STA that transmits a Multi-STA BlockAck frame shall use a rate, HT MCS, <VHT-MCS, NSS> tuple or <HE-MCS, NSS> tuple that is supported by all recipient STAs.

An HE STA that receives a Multi-STA BlockAck frame that is a response to frames requiring acknowledgment(#17029), shall examine Per AID TID Info field received in the Multi-STA BlockAck frame, and shall process each Per AID TID Info field using the procedure defined in 27.4.2 (Acknowledgement context in a Multi-STA BlockAck frame).

A non-AP HE STA that receives a Multi-STA BlockAck frame that is a response to frames requiring acknowledgment(#17029) but that do not belong to an established a block ack agreement shall examine each Per AID TID Info field received in the Multi-STA BlockAck frame as follows:

* If the Ack Type field is 1 and the TID field is less than 8, then the Per AID TID Info field indicates the acknowledgment of an EOF-MPDU that is a QoS Data frame with the indicated TID. The BA Information field is addressed to(#16334) the STA if the AID of the BA Information field contains the STA's AID, and is processed according to the procedure defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* If the Ack Type field is 1 and the TID field is 15, then the Per AID TID Info field indicates the acknowledgment of an EOF-MPDU that is a Management frame that solicits acknowledgment or a PS-Poll frame. The BA Information field is addressed to(#16334) the STA if the AID of the BA Information field contains the STA's AID, and is processed according to the procedure defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* If the Ack Type field is 0, and the AID field is 2045, and the TID field is 15, then Per AID TID Info field indicates the acknowledgment(#17029) of an EOF-MPDU that is a Management frame soliciting immediate acknowledgment. The RA field in the Per AID TID Info field is the MAC address of an unassociated STA for which the Per AID TID Info subfield is intended. The BA Information field is addressed to(#16334) the STA if the RA field of the BA Information field contains the STA's MAC address, and is processed according to the procedure defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).

An HE AP shall not send to the STA a Multi-STA BlockAck frame that has Per AID TID Info fields for STAs associated with more than one BSS in a multiple BSSID set unless the HE AP has received from the STA an HE Capabilities element with the Rx Control Frame To MultiBSS subfield in HE MAC Capabilities Information field set to 1.

An AP that transmits a Multi-STA BlockAck frame addressed to HE STAs shall set the TA field of the frame to the MAC address of the AP, except when dot11MultiBSSIDActivated is true and the Multi-STA BlockAck frame is directed to STAs from at least two different BSSs of the multiple BSSID set, in which case, the AP shall set the TA field of the frame to the transmitted BSSID.

(#16942)When an HE STA transmits a Multi-TID BlockAckReq using a PPDU format other than HE TB PPDU, then the HE STA shall set the TID values of the Per TID Info subfields of the BAR Information field of the Multi-TID BlockAckReq frame, to the TIDs correspond to AC that has the same or higher priority than the primary AC. When an HE STA transmits a Multi-TID BlockAckReq using a PPDU format using HE TB PPDU, then the HE STA may set the TID values of the Per TID Info subfields of the BAR Information field of the Multi-TID BlockAckReq frame to a TID that corresponds to any AC.

(#16941) When an HE STA transmits a BlockAckReq frame using an HE TB PPDU, the STA may set the TID value of the Per TID Info subfields of the BAR Information field of the BlockAckReq frame to a TID that corresponds to any AC.

* Acknowledgment context in a Multi-STA BlockAck frame

A recipient of an A-MPDU shall set the Ack Type subfield and TID subfield in the Per AID TID Info field of the Multi-STA BlockAck frame sent as a response depending on the acknowledgment context as follows:

* An HE AP that receives an A-MPDU that includes one MPDU, and the MPDU is an EOF-MPDU that is a Management frame that solicits an acknowledgment prior to association may generate a Multi-STA BlockAck frame using the procedure described in the pre-association ack context defined below.
* An HE STA that receives an A-MPDU that does not include an EOF-MPDU but does include one or more non-EOF-MPDUs that are QoS Data frames with Ack Policy field equal to Normal Ack or Implicit Block Ack Request belonging to the same block ack agreement may generate a Multi-STA BlockAck frame as follows:
* If all MPDUs in the A-MPDU are received successfully, then the recipient may follow the procedure described in the all ack context(#16049) as defined below.
* Otherwise, the recipient shall follow the procedure described in the BlockAck context defined below.
* An HE STA that supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes an EOF-MPDU that is a Management frame that solicits acknowledgment, and one or more MPDUs (either EOF-MPDUs or non-EOF-MPDUs) that are QoS Data frames with the Ack Policy field equal to Normal Ack, or Implicit Block Ack Request, then the recipient shall generate Multi-STA BlockAck frame as follows:
* If all the MPDUs in the A-MPDU are received successfully, then the recipient may follow the procedure described in the all ack context(#16049).
* Otherwise:
* For the MPDU that is a Management frame, the recipient shall create a Per AID TID info field using the procedure described below in Ack context with the TID value set to 15.
* For the EOF-MPDUs that are QoS Data frames(#16236), the recipient shall create a Per AID TID info field using the procedure described below in Ack context with the TID set to the TID of the QoS Data frame
* For the non-EOF-MPDUs that are QoS Data frames(#16236), the recipient shall create a Per AID TID info field using the procedure described below in BlockAck context with the TID set to the TID of the QoS Data frame
* An HE STA that supports multi-TID aggregation and if the A-MPDU does not include an EOF MPDU but does include non-EOF-MPDUs that are QoS Data frames with Ack Policy field equal Implicit Block Ack Request and are belonging to more than one block ack agreement, then the recipient shall generate a Multi-STA BlockAck frame as follows:
* If all MPDUs in the A-MPDU are received successfully, then the recipient may follow the procedure described in the all ack context(#16049)
* Otherwise, for each TID included the received A-MPDU, the recipient shall create a per AID TID info field using the procedure described in BlockAck context with the TID set to the TID of the QoS Data frame

NOTE—The maximum number of Per AID TID Info fields that the STA is capable of including in the Multi-STA BlockAck frame for the same value of the AID field is indicated in the Multi-TID Aggregation Rx Support field of HE Capabilities element it transmits.

The procedure for different acknowledgment contexts for generating Multi-STA BlockAck frame is defined below:

* All ack context(#16049): if the originator had set the All Ack Support subfield in the HE Capabilities element to 1, then the recipient may set the Ack Type field to 1 and the TID subfield to 14 to indicate the successful reception of all the MPDUs carried in the eliciting A-MPDU or multi-TID A-MPDU. Otherwise the recipient shall not set the Ack Type field to 1 and the TID subfield to 14. The Multi-STA BlockAck frame shall contain only one Per AID TID Info field addressed to an originator in the Multi-STA BlockAck frame.
* Pre-association ack context: A recipient receiving a Management frame from an(#16256) unassociated STA, that requires an acknowledgment, shall set the Ack Type field to 0, AID subfield to 2045, and the TID field to 15 in the Per AID TID Info field, and the RA field of the Per AID TID Info field to the intended recipient's MAC address to indicate the successful reception of that Management frame.
* Ack context: A recipient that sets the Ack-Enabled Aggregation Support subfield in the HE Capabilities element to 1 and that receives an EOF-MPDU soliciting acknowledgment shall set the Ack Type field to 1 and, if the EOF-MPDU is a QoS Data frame, set the TID field to the TID of the QoS Data frame, or, if the EOF-MPDU is a Management frame or PS-Poll frame, set the TID field to 15.(#16400)

If a received A-MPDU contains more than one EOF-MPDU that solicits an immediate acknowledgment, then the Multi-STA BlockAck frame shall contain multiple Per AID TID Info fields, with Ack Type field equal to 1, one for each such successfully received EOF-MPDU requesting an acknowledgment.

(#16497, #16655, #17039) The TID field is set to the TID of the QoS Data or QoS Null frame that is being acknowledged and set to 15 for a PS Poll frame or Management frame soliciting acknowledgement..
* BlockAck context: The recipient shall set the Ack Type field to 0 and the TID field of a Per AID TID Info field to the TID value of MPDUs requesting block acknowledgment that are carried in the eliciting A-MPDU or multi-TID A-MPDU.

The Multi-STA BlockAck frame may contain multiple occurrences of these Per AID TID Info fields addressed to an originator, one for each MPDU that is requesting block acknowledgment, in which case the Block Ack Starting Sequence Control and Block Ack Bitmap fields shall be set according to 10.24.7 (HT-immediate block ack extensions) for each block ack session, and according to 27.3 (Fragmentation and defragmentation) for each block ack session with dynamic fragmentation.

The allowed values for the TID field in this context are 0 to 7 (for indicating block acknowledgment of QoS Data frames).

Variable bitmap lengths may be included in the Per AID TID Info field when the originator and recipient negotiate their use as defined in 27.4.3 (Negotiation of block ack bitmap lengths).

Upon reception of the Multi-STA BlockAck frame the originator shall examine each Per AID TID Info field and shall perform the following operations for each Per AID TID Info field that has an AID field addressed to the originator (i.e., the AID subfield is an AID if the originator is a non-AP STA, is 0 if(#15315) the originator is an AP, and is 2045 if(#15315) the originator is an unassociated HE STA):

* If the Ack Type field is 0 and the TID field is less than 8 then the BlockAck Starting Sequence Control, TID and BA Bitmap fields of the Per AID TID Info field are processed according to 10.24.7 (HT-immediate block ack mechanism), 27.3 (Fragmentation and defragmentation), and as defined below.
* If the Ack Type field is 0 and the TID field is 15, then the Per AID TID Info field indicates the acknowledgment of a single Management frame sent by the unassociated STA as defined by the acknowledgment context.
* If the Ack Type field is 1 and the TID is less than or equal to 7 or is equal to 15, then the Per AID TID Info field indicates the acknowledgment of an EOF-MPDU that is a QoS Data frame identified by the value of the TID, a Management frame or a PS-Poll frame.
* If the Ack Type field is 1 and the TID subfield of AID TID Info field is 14, then the Per AID TID Info field indicates the acknowledgment of all MPDUs carried in the eliciting PPDU as defined by the acknowledgment context.
* Negotiation of block ack bitmap lengths

Both the Compressed BlockAck frame and Multi-STA BlockAck frame allow different Block Ack Bitmap subfield lengths. The length of the Block Ack Bitmap subfield is indicated in the Fragment Number subfield of the Block Ack Starting Sequence Control field as defined in 9.3.1.9 (BlockAck frame format). An HE STA that transmits a Compressed BlockAck frame or a Multi-STA BlockAck frame shall use a Block Ack Bitmap subfield length identified in Table 27-1 (Negotiated buffer size and Block Ack Bitmap subfield length) for the negotiated buffer size of the block ack agreement to which the BA Information field corresponds. The recipient may respond with a Block Ack Bitmap subfield in the BA Information field that is less than the maximum allowed Block Ack Bitmap for the negotiated buffer size, as long as it can indicate the receive status of at least the successfully received MPDUs in the A-MPDU.

|  |
| --- |
| * Negotiated buffer size and Block Ack Bitmap subfield length
 |
| Negotiated buffer size | Block Ack Bitmap subfield length (bits) in a Compressed BlockAck frame | Block Ack Bitmap subfield length (bits) in a Multi-STA BlockAck frame |
| 1–64 | 64 | 32 or 64 |
| 65–128 | 64 or 256 | 32, 64 or 128 |
| 129–256 | 64 or 256 | 32, 64, 128 or 256 |

The recipient shall not include in the Buffer Size field of an ADDBA Response frame a value that would cause the BlockAck Bitmap length of its block ack responses to exceed the BlockAck Bitmap length that is derived by the Buffer Size field of the ADDBA Request frame sent by the originator. When the Buffer Size field in the ADDBA Request frame is set to 0, the Buffer Size field of an ADDBA Response frame is in the range 1 to 64. (#16320) NOTE: Refer to Block Ack Bitmap subfield length identified in Table 27-1 (Negotiated buffer size and Block Ack Bitmap subfield length) for the negotiated buffer size of the block ack agreement.

A recipient shall not include in a Multi-STA BlockAck frame a Per AID TID Info field with a 32-bit BlockAck Bitmap field addressed to an originator if the 32-bit BA Bitmap Support field in the HE MAC Capabilities Information field in the HE Capabilities element received from that originator is 0.

NOTE—A Multi-STA BlockAck frame might include Per AID TID Info fields with a 32-bit BlockAck Bitmap field addressed to other originators and the nonsupporting originator needs to able to parse these fields to locate a possible Per AID TID Info field addressed to it.

(#16658)

The originator of a BlockAckReq frame, MU-BAR Trigger frame, GCR MU-BAR Trigger frame or a A-MPDU that includes QoS Data frames or Management frame that solicits an immediate BlockAck frame response shall set the Duration field value accounting for the largest BlockAck Bitmap length based on negotiated buffer size.

(#16659) A recipient shall not transmit to an originator of a BlockAckReq frame, a BlockAck frame where the LSB of the Fragment Number subfield is 1 unless the recipient has received from the originator an HE Capabiltiies element where the HE Fragmentation Support subfield is 3. If the LSB of the Fragment Number subfield of the BlockAck frame is set to 1, then the BA Bitmap fields are re-mapped as defined in 27.3 (Fragmentation and defragmentation).

* Per-PPDU acknowledgment selection rules
* General

A STA that transmits a PPDU can solicit different immediate responses for frames contained in the PPDU by using the Ack Policy field of QoS Data or QoS Null frames, the type of the frame, (#16198)PPDU format, number of TIDs in the A-MPDU and the EOF field setting of the A-MPDU delimiter.

* Responding to an HE SU PPDU or HE ER SU PPDU with an SU PPDU

An HE STA that receives an HE SU PPDU or HE ER SU PPDU (#16943)carrying an A-MPDU that includes MPDUs that solicits acknowledgment and that does not include a Trigger frame or a frame with TRS Control subfield, shall respond using an SU PPDU as follows:

* If the A-MPDU includes only one MPDU and the MPDU is an EOF-MPDU that is either a QoS Data frame or QoS Null frame with the Ack Policy field equal to Normal Ack, or an Management frame that solicits acknowledgment, then the STA shall respond with an Ack frame.
* If the HE STA supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes more than one MPDU, only one of which solicits acknowledgment(#17029) and the MPDU that solicits acknowledgment(#17029) is an EOF MPDU that is a QoS Data frame or a QoS Null frame with Ack Policy subfield equal to Normal Ack, or a Management frame that solicits acknowledgment(#17029), then the HE STA shall respond with an Ack frame.
* If the A-MPDU does not include an EOF MPDU but does include one or more non-EOF-MPDUs that are QoS Data frames belonging to the same block ack agreement and with the Ack Policy field equal to Implicit Block Ack Request for at least one MPDU, then the STA shall either respond with a Compressed BlockAck frame as defined in 10.24.7.5 (Generation and transmission of BlockAck frames by an HT STA or DMG STA) or a Multi-STA BlockAck frame with Ack Type field set to 1 and the TID field set to 14 as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame) if the recipient has indicated the all ack support by setting the All Ack Support subfield in the HE MAC Capabilities Information field to 1.
* If the HE STA supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes a Management frame that solicits an acknowledgment(#17029), and one or more QoS Data frames with the Ack Policy field equal to Normal Ack, or Implicit Block Ack Request, then the STA shall respond with a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* If the HE STA supports multi-TID aggregation and if the A-MPDU includes two or more QoS Data frames with the Ack Policy field equal to Implicit Block Ack Request and belonging to more than one block ack agreement, then the STA shall respond with a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* Responding to an HE MU PPDU with an SU PPDU

If an AP intends to solicit an immediate response in an SU PPDU the following apply:

* An AP shall set the Ack Policy field of the QoS Data and QoS Null frames to Normal Ack or Implicit Block Ack Request in at most one A-MPDU in the HE MU PPDU (see 10.3.2.10.1 (Acknowledgment procedure for DL MU PPDU in SU format) for an example of this sequence).
* The A-MPDUs in the HE MU PPDU shall not contain a Management frame that solicits acknowledgment.

A non-AP HE STA that receives an HE MU PPDU with an A-MPDU that contains MPDUs that solicit acknowledgment and that does not include a Trigger frame or a frame with a TRS Control subfield shall respond using an SU PPDU as follows:

* If the A-MPDU carries only one MPDU and the MPDU is an EOF-MPDU that is either a QoS Data frame or QoS Null frame with the Ack Policy field equal to Normal Ack, then the STA shall respond with an Ack frame.
* If the HE STA supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes more than one MPDU, only one of which solicits acknowledgment(#17029) and the MPDU that solicits acknowledgment(#17029) is an EOF-MPDU that is a QoS Data frame or a QoS Null frame with Ack Policy subfield equal to Normal Ack, then the HE STA shall respond with an Ack frame.
* If the A-MPDU does not include an EOF-MPDU but does include one or more non-EOF-MPDUs that are QoS Data frame belonging to the same block ack agreement and with the Ack Policy field equal to Implicit Block Ack Request for at least one MPDU, then the STA shall either respond with a Compressed BlockAck frame as defined in 10.24.7.5 or a Multi-STA BlockAck frame with the Ack Type set to 1 and the TID field set to 14 as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame) if the recipient has indicated the all ack support by setting the All Ack Support subfield in the HE MAC Capabilities Information field to 1.
* If the HE STA supports multi-TID aggregation and if the A-MPDU includes two or more QoS Data frames addressed to it with the Ack Policy field equal to Implicit Block Ack Request and belonging to more than one(#15674) block ack agreement, then the STA shall respond with a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).

NOTE—A control response frame carried in an SU PPDU that is an immediate response to an HE MU PPDU follows the rules defined in 10.7.6.5 (Rate selection for control response frames).

An AP that sends (#15316) an HE MU PPDU shall not set the Ack Policy to Normal Ack or Implicit Block Ack Request for any (#15316) of the MPDUs carried in the HE MU PPDU if (#15316) the solicited PPDU containing a control response would occupy one or more 20 MHz channels where pre-HE modulated fields of the soliciting PPDU are not located.

* Responding to an HE MU PPDU, HE SU PPDU or HE ER SU PPDU with an HE TB PPDU

An AP that sends an HE MU PPDU, HE SU PPDU or HE ER SU PPDU that solicits an immediate response carried in an HE TB PPDU shall set the Ack Policy to HTP Ack for each of the QoS Data frames for which it intends to solicit an immediate response (see 10.3.2.10.2 (Acknowledgment procedure for DL MU PPDU in MU format)). If a Management frame that solicits acknowledgment is carried in an HE MU PPDU, then the response is carried in an HE TB PPDU. A non-AP STA that receives an HE MU PPDU, HE SU PPDU or HE ER SU PPDU with an A-MPDU that contains QoS Data addressed to it with Ack Policy field equal to HTP Ack, or a Management frame that solicits an immediate acknowledgment(#17029) shall not respond if it has not received the UL resource allocation information either through TRS Control subfield or a Trigger frame in the soliciting PPDU.

A non-AP STA that receives an HE MU PPDU, HE SU PPDU or HE ER SU PPDU with an A-MPDU that contains (#16270) one or more MPDUs that solicits acknowledgment and includes a Trigger frame or a frame with TRS Control subfield shall respond with an HE TB PPDU as follows:

* If the A-MPDU includes only one MPDU, and the MPDU is an EOF-MPDU that is either a QoS Data frame or QoS Null frame with the Ack Policy field equal to HTP Ack or a Management frame solicits acknowledgment, then the STA shall respond with an Ack frame.
1. If the HE STA supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes more than one MPDU, only one of which solicits acknowledgment(#17029) and the MPDU that solicits acknowledgment(#17029) is an EOF MPDU that is a QoS Data frame or a QoS Null frame with Ack Policy subfield equal to (#16661)HTP Ack, or a Management frame that solicits acknowledgment(#17029), then the HE STA shall respond with an Ack frame.
2. If the A-MPDU does not include an EOF-MPDU but does include one or more non-EOF-MPDUs that are QoS Data frames belonging to the same block ack agreement and with the Ack Policy field equal to HTP Ack for at least one MPDU, then the STA shall either respond with a Compressed BlockAck frame as defined in 10.24.7.5 or a Multi-STA BlockAck frame with the Ack Type set to 1 and the TID field set to 14 (#EDITORIAL MISTAKE DURING D3.0 – see 18/27r4) as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame) if the recipient has indicated the all ack support by setting the All Ack Support subfield in the HE MAC Capabilities Information field to 1.
3. If the HE STA supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes a Management frame that solicits an acknowledgment(#17029), and one or more QoS Data frames with the Ack Policy field equal to (#16662)HTP Ack, or Implicit Block Ack Request, then the STA shall respond with a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* If the HE STA supports multi-TID aggregation and if the A-MPDU includes two or more QoS Data frames belonging to more than one block ack agreement and with the Ack Policy field equal to HTP Ack, then the STA shall respond with a Multi-STA BlockAck frame.
* Responding to an HE TB PPDU with a (#16402)SU PPDU

A non-AP STA that sends an HE TB PPDU as a response to a Basic Trigger frame shall set the Ack Policy field of the QoS Data frames or QoS Null frames to Normal Ack/Implicit Block Ack Request (see 10.3.2.10.3 (Acknowledgment procedure for an UL MU transmission) for an example of this sequence).

If the HE TB PPDU carries MPDUs only from one STA and if the HE AP intends to send the response in a (#16402)SU PPDU format, then the HE AP shall respond using a (#16402)SU PPDU as follows:

* If the A-MPDU includes only one MPDU, and the MPDU is an EOF-MPDU that is either a QoS Data frame or QoS Null frame with the Ack Policy field equal to Normal Ack, or a Management frame that solicits acknowledgment then the HE AP shall respond with either an Ack frame or a Multi-STA BlockAck frame with the Ack Type field set to 1.
* If the HE AP supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes more than one MPDU, only one of which solicits acknowledgment(#17029) and the MPDU that solicits acknowledgment(#17029) is an EOF MPDU that is a QoS Data frame or a QoS Null frame with Ack Policy subfield equal to Normal Ack, or a Management frame(#16751) that solicits acknowledgment(#17029), then the HE AP shall respond with an Ack frame or a Multi-STA BlockAck frame with the Ack Type field set to 1.
* If the A-MPDU does not include an EOF MPDU but does include one or more non-EOF-MPDUs that are QoS Data frames belonging to the same block ack agreement and with Ack Policy field equal to Implicit Block Ack Request for at least one MPDU, then the HE AP shall respond with a Compressed BlockAck frame as defined in 10.24.7.5, a Multi-STA BlockAck with the Ack Type field set to 1 and the TID field set to 14 if the recipient has indicated the all ack support by setting the All Ack Support subfield in the HE MAC Capabilities Information field to 1 or a Multi-STA BlockAck frame with the Ack Type field set to 0 as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* If the HE AP supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU carries a Management frame that solicits acknowledgment(#17029), and one or more QoS Data frames with the Ack Policy field equal to Implicit Block Ack Request, then the HE AP shall respond with a Multi-STA BlockAck frame as defined in Acknowledgement context in a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).
* If the HE AP supports multi-TID aggregation and if the A-MPDU includes two or more QoS Data frames with Ack Policy field equal to Normal Ack or Implicit Block Ack Request and belonging to more than one block ack agreement, then the HE AP shall respond with a Multi-STA BlockAck frame as defined in Acknowledgement context in a Multi-STA BlockAck frame.

If the HE TB PPDUs carry MPDUs from more than one STA, and if the AP intends to send(#16203) the response in a (#16402)SU PPDU, then the AP shall respond with a Multi-STA BlockAck frame carried in a (#16402)SU PPDU format that contains the appropriate settings in each Per AID TID Info field addressed to(#16334) each STA as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame).

* Responding to an HE TB PPDU with an HE MU PPDU

A non-AP STA that sends an HE TB PPDU as a response to a Basic Trigger frame that solicits an immediate response shall set the Ack Policy to Normal Ack/Implicit Block Ack Request for each of the QoS Data frames carried in the A-MPDU (see 10.3.2.10.3 (Acknowledgment procedure for an UL MU transmission) for an example of this sequence).

If an HE AP sends response to an HE TB PPDU that it received using an HE MU PPDU, then the AP shall respond to each A-MPDU that it received using the following procedure:

* If the A-MPDU received from a STA includes only one MPDU, and the MPDU is an EOF-MPDU that is either a QoS Data frame or QoS Null frame with the Ack Policy field equal to Normal Ack, or a Management frame that solicits acknowledgment(#17029), then the STA shall respond with an Ack frame or a Multi-STA BlockAck frame with the Ack Type field set to 1 carried in the HE MU PPDU.
* If the HE AP supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1, and if the A-MPDU includes more than one MPDU, only one of which solicits acknowledgment(#17029) and the MPDU that solicits acknowledgment(#17029) is an EOF MPDU that is a QoS Data frame or a QoS Null frame with Ack Policy subfield equal to Normal Ack, or a Management frame(#15317) that solicits acknowledgment(#17029), then the HE AP shall respond with an Ack frame or a Multi-STA BlockAck frame with the Ack Type field set to 1 carried in the HE MU PPDU.
* If the A-MPDU does not include an EOF MPDU but does include one or more non-EOF-MPDUs that are QoS Data frames belonging to the same block ack agreement and with the Ack Policy field equal to Implicit Block Ack Request for at least one MPDU, then the HE AP shall respond with a Compressed BlockAck frame as defined in 10.24.7.5 (Generation and transmission of BlockAck frames by an HT STA or DMG STA), a Multi-STA BlockAck with the Ack Type field set to 1 and the TID field set to 14 or a Multi-STA BlockAck frame with the Ack Type field set to 0 as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame) carried in the HE MU PPDU.
* If the HE AP supports ack-enabled aggregation by setting the Ack-Enabled Aggregation Support subfield in the HE MAC Capabilities Information field to 1 and(#15320) the A-MPDU carries a Management frame that solicits acknowledgment(#17029) and one or more QoS Data frames with the Ack Policy field equal to Implicit Block Ack Request, then the HE AP shall respond with a Multi-STA BlockAck frame as defined in Acknowledgement context in a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame), carried in the HE MU PPDU.
* If the HE AP supports multi-TID aggregation and if the A-MPDU includes two or more QoS Data frames, with the Ack Policy field equal to Implicit Block Ack Request and are belonging to more than one block ack agreeement, then the HE AP shall respond with a Multi-STA BlockAck frame as defined in 27.4.2 (Acknowledgment context in a Multi-STA BlockAck frame),

For an AP with dot11MultiBSSIDActivated equal to true, the AP may do one of the following:

* For each BSS belonging to the set, an AP responds with a Multi-STA BlockAck frame with RA field set to the broadcast address in a DL HE MU PPDU. The Ack Type field shall be set according to the acknowledgment context. The AP shall set the STA\_ID\_LIST field as defined in 27.11.1 (STA\_ID\_LIST). There shall be no more than one group addressed Multi-STA BlockAck frame carried in a broadcast RU of the DL HE MU PPDU.
* If all the recipient non-AP STAs have indicated support for receiving Control frames addressed to STAs from two or more BSSs of a multiple BSSID set by setting the Rx Control Frame to MultiBSS subfield in the HE Capabilities element to 1, an AP may respond with a Multi-STA BlockAck frame with RA field set to broadcast address and STA\_ID\_LIST field set to 2047. The Ack Type field shall be set according to the acknowledgment(#17029) context. There shall be no more than one group addressed Multi-STA BlockAck frame carried in a broadcast RU of the HE DL MU PPDU.
* HE block acknowledgment request and response rules

An HE AP may solicit BlockAck frame responses from multiple HE STAs using an MU-BAR Trigger frame or GCR MU-BAR Trigger frame. The MU-BAR Trigger frame shall contain either Compressed BlockAckReq variant or Multi-TID BlockAckReq variant in each of the Per User Info fields. An HE AP shall not send a Multi-TID BlockAckReq (neither as part of a Per User Info field addressed to(#16334) the STA in an MU-BAR Trigger frame nor as a BlockAckReq frame) to a STA that has not indicated support for multi-TID A-MPDU. The Block Ack Bitmap length of the block ack sent in response to an eliciting Multi-TID BlockAckReq frame, BlockAckReq frame, GCR MU-BAR Trigger frame, or MU-BAR Trigger frame is determined as defined in 27.4.3 (Negotiation of block ack bitmap lengths).

An HE STA that receives a BlockAckReq frame or an MU-BAR Trigger frame that contains a Compressed BlockAckReq variant in the User Info field addressed to the STA, or a GCR MU-BAR Trigger frame that contains a Compressed BlockAckReq variant in the Common Info field shall respond with a Compressed BlockAck frame as defined in 10.24.7 (HT-immediate block ack extensions) or a Multi-STA BlockAck frame as defined in 27.4 (HE acknowledgment procedure), with Starting Sequence Number subfield set to the Starting Sequence Number subfield of the Block Ack Request Starting Sequence Control subfield and the length of the Block Ack Bitmap subfield calculated as defined in 27.4.3 (Negotiation of block ack bitmap lengths).

An HE STA that receives a Multi-TID BlockAckReq frame or an MU-BAR Trigger frame that contains a Multi-TID BlockAckReq variant in the User Info field addressed to the STA or a GCR MU-BAR Trigger frame that contains a Multi-TID BlockAckReq variant in the Common Info field shall respond with a Multi-STA BlockAck frame that contains a Per AID TID Info field with a Block Ack Bitmap subfield for each of the TIDs (with values less than 8) contained in the BlockAckReq frame, with Starting Sequence Number subfield set to the Starting Sequence Number subfield of the Block Ack Request Starting Sequence Control subfield and the length of the Block Ack Bitmap subfield calculated as defined in 27.4.3 (Negotiation of block ack bitmap lengths).