IEEE P802.11
Wireless LANs

|  |
| --- |
| **Ack related CRs on Section 26.4** |
| **Date:** 2019-05-08 |
| **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 **28 CIDs**

20182, 20213, 20219, 20316, 20317, 20318, 20388, 20607, 20608, 20609,

20763, 20789, 20791, 20890, 20932, , 21021, 21065, 21187, 21299,

21307, 21459, 21593, 21029, 21030, , 21451, 21187, 21455, 21175

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** |
| 20182 | Chunyu Hu | 317.64 | W.r.t. this paragraph/condition -- "The A-MPDUs in the HE MU PPDU shall not contain a Management frame that solicits acknowledgment."It's not complete true that the AP cannot include a management as S-MPDU in a HE MU PPDU solicitng ACK from the intended recipient STA. As long as there is only one such management frame as S-MPDU in the HE MU PPDU, the remaining A-MPDUs intended for other STAs can be solicited by BAR following the first ACK (in SU PPDU.) | Suggest to add corresponding description. | Reject - Agree with the commentor in principle that the rules could be relaxed to allow QoS Data frames that don't solicit immediate acknowledgment. HE TB PPDU response to Management frame carried in HE MU PPDU is already possible (see section 26.4.4.4)However, given the stability of draft, and limited applicability of the proposed extension, propose to reject the comment. |
| 20213 | GEORGE CHERIAN | 314.41 | Management frame reference in the following note is irrelavent. Remove it. I am not able to find a CID that caused this change.NOTE--A STA indicates the maximum number of Per AID TID Info fields with the same AID and that do not acknowledgea Management frame that it can include in the Multi-STA BlockAck frame in the Multi-TID Aggregation Rx Supportfield in the HE Capabilities element it transmits | As in the comment. | Revised - Agree in principle. Requested change made in the document.TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 20219 | Huizhao Wang | 314.42 | The Note is incomprehenceable | Please rewrite the following Note in a way that a human can understand:"NOTE--A STA indicates the maximum number of Per AID TID Info fields with the same AID and that do not acknowledgea Management frame that it can include in the Multi-STA BlockAck frame in the Multi-TID Aggregation Rx Supportfield in the HE Capabilities element it transmits." | Revised - Agree in principle. This is addressed with CID20213. Seems like some text wrongly without a corresponding CID.TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 20316 | kaiying Lv | 315.48 | Devide the paragraph to two paragraphs to make it clearer. One pragraph describes the QoS data, another one describes the management and PS-poll. | As in comment. | Reject - The since the procedure is the same, it will be confusing to duplicate the paragraph one for management frame, and the other one for PS-Poll |
| 20317 | kaiying Lv | 317.45 | Change " Normal Ack, or Implicit Block Ack Request," to "Normal Ack or Implicit Block Ack Request". It is the name of the single subfield. | As in comment. | Revised - Updated per comment.  |
| 20318 | kaiying Lv | 319.19 | In this condition, the A-MPDU can not include a Implicit Block Ack Request. Delete ", or Implicit Block Ack Request" | As in comment. | Revised - Updated per comment |
| 20388 | Li-Hsiang Sun | 318.05 | How does a rx STA be certain that the 'A-MPDU carries only one MPDU...', 'A-MPDU includes more than one MPDU...', 'A-MPDU does not include an EOF-MPDU...', 'A-MPDU includes two or more QoS Data frames...' if it has only decoded a subset of MPDUs/delimiters in the AMPDU? | add a note to indicate that 'includes/carries' in 26.4.4 means the decoded content seen by the receiver | Reject - Since the text is written from a recepient standpoint, it is clear that it is the recepient that makes a determination of whether the AMPDU carries only one MPDU or not (by checking if there are any CRC failures) - however they are implementation specific, and no need to standardize it. |
| 20607 | Mark RISON | 316.26 | "The recipient may respond with a Block Ack Bitmap subfield in the BA Information field that is less thanthe maximum allowed Block Ack Bitmap for the negotiated buffer size. The length of the Block Ack Bitmapsubfield in a Compressed BlockAck frame or a Multi-STA BlockAck frame may be less than the negotiatedbuffer size" -- duplication | Delete the first cited sentence at the referenced location | Revised - The proposed deletion is actually a useful sentence to provide the context for the following sentence. Agree with commentor about duplicity of some aspects. So, I made the first sentence informative.TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 20608 | Mark RISON | 315.65 | "The allowed Block Ack Bitmap lengths for each of the negotiated buffer sizes are defined in Table 26-1 (Negoti-ated buffer size and Block Ack Bitmap subfield length)." -- no, 32 is not allowed if the peer has not indicated support | Add a table "NOTE---32 is not allowed unless the originator has set the 32-bit BA Bitmap Support field in the HE MAC Capabil-ities Information field in the HE Capabilities element to 1." | Revised - Agree in principle. Added the note.TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 20609 | Mark RISON | 316.45 | Because "A Multi-STA BlockAck frame might include Per AID TID Info fields with a 32-bit BlockAck Bitmap fieldaddressed to other originators and the nonsupporting originator needs to able to parse these fields to locate a possible PerAID TID Info field addressed to it.", the 32-bit BA Bitmap Support field is essentially useless | Make B21 in Figure 9-772b "Reserved". Delete the "32-bit BA Bitmap Support" row from Table 9-321a. Delete the para starting "A recipient shall not include in a Multi-STA BlockAck frame a Per AID TID Info field with a 32-bit Block-Ack Bitmap field" and the NOTE following it from 26.4.3 | Reject - The capability bit is needed to indicate if it is able to receive a 32-bit BA |
| 20763 | Mark RISON |  | Re CID 16204: the definition cited in the resolution was obviously wrong and it no longer appears in D4.0. I think there is consensus that an HE TB PPDU is the thing sent by any given STA, not the superposition of the things sent by all the STAs that respond to a triggering PPDU | Make the changes indicated in CID 16204 | Revised - Agree in principle. TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 20789 | Mark RISON | 313.53 | Re CID 16370: it's not clear if spread all around the place | If not put the rules on pre-assoc ack context in one place and one place only, then at least put a single place with xrefs to the other places (see CID 16370 for places) | Reject- This is a CID that was rejected by the group during D3.0. Commentor is not providing any new reasons to reconsider the CID |
| 20791 | Mark RISON |  | Re CID 16377: the decision needs to be justified, as the outcome is prima facie inefficient | As it says in CID 16377, use Multi-TID BlockAck frames when only one STA is involved | Reject- This is a CID that was rejected by the group during D3.0. During the introduction of MBA for single STA acknowledgment, the use of Multi-TID Block Ack was discussed extensively, and the group decided to use MBA. |
| 20890 | Mark RISON | 316.55 | "QoS Data frames or Management frame that solicits an immediate BlockAck frameresponse" -- a Management frame does not solicit a BlockAck frame response (at best it solicitys a Multi-STA BlockAck frame). And HT-delayed is deprecated/obsolete/not supported | Change the cited text at the referenced location to "QoS Data frames that solicit a BlockAck frame response" | Revised - Agree in principle. Made the requested change.TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 20932 | Mark RISON | 321.00 | "The Ack Type field and AID11 field of the Multi-STA BlockAckframe are set as described in 9.3.1.8.7 (Multi-STA BlockAck variant)." -- there is typically more than one of each | Delete the cited text at the referenced location (2x) | Reject - The cited text is not repeated. Not sure if the commentor is referring to another section/paragraph than what is listed here |
|  |  |  |  |  |  |
| 21021 | Mark RISON | 320.09 | Re CID 16187: if we agree that "An HE TB PPDU is the response of a given STA no [sic] the union of the transmissions. A PPDU is the transmission from a STA to one or more other STAs." then "If the HE TB PPDUs carry MPDUs from more than one STA" is at best misleading and at worst wrong | At the referenced location change "If the HE TB PPDUs carry MPDUs from more than one STA" to "If the AP receives more than one HE TB PPDU". At 104.42 change "the solic-ited HE TB PPDU" to "of the solic-ited HE TB PPDU(s)". In Table 27-2 change "expected HE TB PPDU" to "expected HE TB PPDU(s)" throughout. Change "thesolicited HE TB PPDU" to "thesolicited HE TB PPDU(s)" at 88.13/15/22/35/36. At 89.11 change "a solicited HE TBPPDU" to "(a) solicited HE TBPPDU(s)". At 106.55 change "status of STBC encoding the solicited HE TBPPDUs" to "status of STBC encoding in the solicited HE TBPPDU(s)". At 104.42 change "L-SIG LENGTH field the solicited HE TB PPDU" to "L-SIG LENGTH field in the solicited HE TB PPDU(s)". At 106.60, 107.26/48 change "in the solicited HE TB PPDUs" to "in the solicited HE TB PPDU(s)". At 110.16/24/25/33 change "the solicited HE TBPPDU" to "the solicited HE TBPPDU(s)". At 110.20 change "the solicited HE TB PPDUe" (sic) to "the solicited HE TB PPDU(s)" | Revised - Agree in principle. TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 21065 | Matthew Fischer | 320.37 | The tables in 9.7.3 do not seem to allow any case of a QOS NULL in an AMPDU with ACK policy set to anything that does not look like no ack. But in 26.4.4.6 Responding to an HE TB PPDU with an HE MU PPDU, there is a statement that says that an AP can send an AMPDU with a QOS NULL Frame with ack policy set to normal ack. | Resolve the contradiction. Also see the note at P362L19 | Revised - Agree in principle. TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 21187 | Pooya Monajemi | 318.50 | A Management frame sent in an HE SU or HE ER PPDU does not require a Trigger to respond. | Modify as follows "Management frame in an HE MU PPDU that solicits an immediate acknowledgment" | Reject - This is a case where the response is sent in the HE TB PPDU. In this case, Trigger frame/TRS field is needed |
| 21299 | Robert Stacey | 312.24 | "pre-association" is not used in the baseline and not defined in 11ax. | Change to "Acknowledging MPDUs from multiple unassocaited STAs with a single Multi-STA BlockAck frame." Change the statement at 312.16 to "Acknowledging MPDUs from multiple associated STAs using a single Multi-STA BlockAck frame." | Revised - Agree in principle. TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 21307 | Robert Stacey | 316.65 | The only description in 26.3 for block ack bitmap setting has to do with level 3 fragmentation. Reference level 3 fragmention. | Change reference to 26.3.2.4 | Revised - Agree in principle. TGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 21459 | Vincent Knowles IV Jones | 320.00 | Using an ACK mechanism in a non-legacy PHY format will cause EIFS and in general, loss of slotting. The D3.0 resolution agreed with the comment, but rejected it based on utility in 6GHz. In that case, restrict it to 6GHz. | Eliminate this way of ACKing a TB PPDU and save the industry a big headache or restrict it to 6GHz. | Reject - Agree with the commentor on the reasoning for 2.4/5GHz. However, depricating this ack format can cause instability in the spec. |
| 21593 | Zhou Lan | 317.64 | W.r.t. this paragraph/condition -- "The A-MPDUs in the HE MU PPDU shall not contain a Management frame that solicits acknowledgment."It's not complete true that the AP cannot include a management as S-MPDU in a HE MU PPDU solicitng ACK from the intended recipient STA. As long as there is only one such management frame as S-MPDU in the HE MU PPDU, the remaining A-MPDUs intended for other STAs can be solicited by BAR following the first ACK (in SU PPDU.) | Suggest to add corresponding description. | Reject - Agree with the commentor in principle that the rules could be relaxed to allow QoS Data frames that don't solicit immediate acknowledgment.HE TB PPDU response to Management frame carried in HE MU PPDU is already possible (see section 26.4.4.4)  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 21029 | Mark RISON |  | Re CID 16199-16201, 16205: the resolution may or may not be correct as to the intention, but the point made in the comment, namely that rules on what the non-AP STA may or may not do are not appropriate in a subclause about how the AP responds | As it said in CIDs 16199-16201, 16205 | Reject- This is a CID that was rejected by the group during D3.0. Currrent organization of the paragraph is intended to give the full context in each section |
| 21030 | Mark RISON |  | Re CID 16372: it should not depend on the context. It should be a simple rule | Specify that if a STA can, without causing ambiguity, ack using just an Ack frame, it shall do so, otherwise if it can, without causing ambiguity, ack using just a C-BA frame it shall do so, otherwise it uses an M-BA | Reject - The rules for responding with each acknowledgment type is spelled out in 26.4. The group does not see any ambiguity about the format to use. |
|  |  |  |  |  | 11-19-0756-01-00ax |
| 21451 | Tomoko Adachi | 317.30 | Looking at for example 26.4.4.2, there is the following:"3) 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 ... or a Multi-STA BlockAck frame with 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."Similar description can be found in other places, too.This is saying that the only case when an M-BA frame can be sent is when it is for all ack context. The description should be corrected such as to cover the general case where there are errors in some MPDUs, saying that in such case only C-BA is allowed, and adding a condition to the M-BA part that it's only for all ack context. The capability condition is not necessary here, as it is a basic rule and covered elsewhere. | As in comment. | Reject - The text already captures what the commentor asking for. Please see some clarifications that might help:1. This paragraph is for the single TID case with no EOF-MPDU, in which case C-BA is allowed 2. C-BA is allowed for the case where one or more MPDUs could have been received in error as per the curent text3. M-BA is sent only when all MPDUs are received correctly. |
| 21187 | Pooya Monajemi | 318.50 | A Management frame sent in an HE SU or HE ER PPDU does not require a Trigger to respond. | Modify as follows "Management frame in an HE MU PPDU that solicits an immediate acknowledgment" | Reject- There is no reason to prohibit the case of sending Management frame in an HE SU or HE ER PPDU requiring a Trigger to respond. |
| 21455 | Tomoko Adachi | 236.25 | The mismatch between the explanation of the figure and the figure title has not been fixed.In pp.ll 236.1, it says multiple BlockAck frames are sent in DL OFDMA in Figure 10-15b. But the title of Figure 10-15b is saying it's just DL MU transmission. | Change the title of Figure 10-15b to "An example of an UL MU transmission with an immediate DL OFDMA transmission containing individually addressed BlockAck frames acknowledging the frames received from the respective STAs". Add "OFDMA BA" in the figure like in Figure 10-15a. | Revised – Relax the rule for response to allow HE MU in generalTGax editor shall incorporate changes in 11-19-0756-01-00ax |
| 21175 | Pooya Monajemi | 235.42 | There is no reason that the acknowledgment could not be sent with MU-MIMO, especially for a Cascaded frame exchange. | Remove OFDMA restriction from "or OFDMA MU PPDU" | Revised - Agree in principle. TGax editor shall incorporate changes in 11-19-0756-01-00ax |

* Acknowledgment procedure for an UL MU transmission

An AP that receives frames from more than one STA that are part of an UL MU transmission (see 9.42.2) and that require an immediate acknowledgment (i.e., the Ack Policy subfield of the eliciting QoS Data frame is equal to Normal Ack or Implicit Block Ack Request), may send either multiple BlockAck frames (or Ack frames) in an HE MU PPDU, or a Multi-STA BlockAck frame (see 26.4 (HE acknowledgment procedure)). The Multi-STA BlockAck frame may be transmitted in a non-HT PPDU, non-HT duplicate PPDU, HT PPDU, VHT PPDU, HE SU PPDU, HE ER SU PPDU or [21175, 21455] HE MU PPDU. After a successful reception of an UL frame requiring acknowledgment, transmission of the DL acknowledgment shall commence after a SIFS, without regard to the busy/idle state of the medium. When an AP transmits an immediate acknowledgment in an HE MU PPDU in response to an A-MPDU sent in an HE TB PPDU, the AP should send it within the 20 MHz channel(s) where the pre-HE modulated fields of the HE TB PPDU sent by the STA are located. The immediate acknowledgment is an Ack frame, Compressed BlockAck frame or Multi-STA BlockAck frame.

An example of multiple BlockAck frames sent in DL MU is shown in Figure 10-15b (An example of an UL MU transmission with an immediate DL MU transmission containing individually addressed BlockAck frames acknowledging the frames received from the respective STAs).

|  |
| --- |
|  |
| * An example of an UL MU transmission with an immediate DL MU transmission containing individually addressed BlockAck frames acknowledging the frames received from the respective STAs
 |

An example of a Multi-STA BlockAck frame acknowledgment in a non-HT PPDU, HT PPDU, VHT PPDU, HE SU PPDU or HE ER SU PPDU is given in Figure 10-15c (An example of UL MU transmissions with an immediate Multi-STA BlockAck frame acknowledging the MPDUs).

|  |
| --- |
|  |
| * An example of UL MU transmissions with an immediate Multi-STA BlockAck frame acknowledging the MPDUs
 |

An example of a Multi-STA BlockAck frame acknowledgment in a non-HT Duplicate PPDU is given in Figure 10-15d (An example of UL MU transmissions with an immediate DL non-HT duplicate PPDU containing the Multi-STA BlockAck frame).

|  |
| --- |
|  |
| * An example of UL MU transmissions with an immediate DL non-HT duplicate PPDU containing the Multi-STA BlockAck frame
 |

An AP may use an MU-BAR Trigger frame or a GCR MU-BAR Trigger frame to solicit acknowledgment frames from multiple HE STAs to which the AP has sent QoS Data frame(s) with the Ack Policy subfield equal to Block Ack or from which the AP has not received immediate acknowledgment frames after sending QoS Data frame(s) with the Ack Policy subfield equal to HTP Ack in an HE MU PPDU.

A STA may send a BlockAckReq frame or Multi-TID BlockAckReq frame to solicit the acknowledgment frame(s) from an AP.

* 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 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
* Acknowledging MPDUs from multiple associated STAs using a single Multi-STA BlockAck frame [21299]
* Acknowledging MPDUs from multiple unassociated STAs with a single Multi-STA BlockAck frame [21299]

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 (26.6.4 (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 not sent in response to an HE TB PPDU shall set the RA field of the Multi-STA BlockAck frame 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, 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 26.4.2 (Acknowledgment 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 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 the STA if the AID of the BA Information field contains the STA's AID, and is processed according to the procedure defined in 26.4.2 (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 the STA if the AID of the BA Information field contains the STA's AID, and is processed according to the procedure defined in 26.4.2 (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 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 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 26.4.2 (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 unless dot11MultiBSSIDImplemented 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.

An HE STA that transmits a Multi-TID BlockAckReq frame in a PPDU that is not an HE TB PPDU shall set the TID subfields in the AID TID Info fields in the Per TID Info subfields of the BAR Information field of the Multi-TID BlockAckReq frame to TIDs that correspond to ACs that have the same or higher priority as the primary AC. An HE STA that transmits a Multi-TID BlockAckReq frame in an HE TB PPDU may set the TID subfields in the AID TID Info fields in the Per TID Info subfields of the BAR Information field of the Multi-TID BlockAckReq frame to a TID that corresponds to any AC.

An HE STA that transmits a BlockAckReq frame in an HE TB PPDU may set the TID subfield in the AID TID Info field in 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 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.
* 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, 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, 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
* 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—A STA indicates the maximum number of Per AID TID Info fields with the same AID [20213] excluding the one for Management frame that it can include in the Multi-STA BlockAck frame in the Multi-TID Aggregation Rx Support field in the HE Capabilities element it transmits.

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

* All ack context: 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 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. The recipient determines that all the MPDUs carried in the eliciting A-MPDU are received if all the MPDUs that precede the first MPDU delimiter with EOF equal to 1 and MPDU Length field equal to 0 are received.
* Pre-association ack context: A recipient receiving a Management frame from an 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.

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 received(#20724) EOF-MPDU requesting an acknowledgment.

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 that is being acknowledged.
* 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 26.3 (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 26.4.3 (Negotiation of block ack bitmap lengths).

Upon receipt of a Multi-STA BlockAck frame the originator shall examine each Per AID TID Info field and shall perform the following operations:

* If the AID subfield is 0 for an AP originator or the non-AP STA's AID for a non-AP STA originator, the Ack Type field is 0 and the TID field is less than 8 then the BlockAck Starting Sequence Control, TID and Block Ack Bitmap fields of the Per AID TID Info field are processed according to 10.24.7 (HT-immediate block ack mechanism), 26.3 (Fragmentation and defragmentation), and as defined below.
* If the AID subfield is 2045, 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 AID subfield is 0 for an AP originator or the non-AP STA's AID for a non-AP STA originator, 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 AID subfield is 0 for an AP originator or the non-AP STA's AID for a non-AP STA originator, 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 A-MPDU 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 9.3.1.8 (BlockAck frame format). The allowed Block Ack Bitmap lengths for each of the negotiated buffer sizes are defined in Table 26-1 (Negotiated buffer size and Block Ack Bitmap subfield length).

|  |
| --- |
| * 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 |
| [20608] NOTE---Length of 32 bits is not allowed unless the originator has set the 32-bit BA Bitmap Support field in the HE MAC Capabilities Information field in the HE Capabilities element to 1 |

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 26-1 (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 [20607] is allowed to 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. The length of the Block Ack Bitmap subfield in a Compressed BlockAck frame or a Multi-STA BlockAck frame may be less than the negotiated buffer size but shall be sufficient to include the recipient's scoreboard state for MPDUs beginning with the MPDU for which the Sequence Number subfield value is *WinStartR* and ending with the MPDU for which the Sequence Number subfield is *WinEndR*.

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.

NOTE—Refer to Block Ack Bitmap subfield length identified in Table 26-1 (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.

The originator of a BlockAckReq frame, MU-BAR Trigger frame, GCR MU-BAR Trigger frame or a A-MPDU that includes QoS Data frames that solicits an immediate BlockAck frame response [20890] or Management frame that solicits acknowledgment shall set the Duration field value accounting for the largest BlockAck Bitmap length based on negotiated buffer size.

A recipient shall not transmit a Compressed BlockAck frame or a Multi-STA BlockAck frame with the LSB of the Fragment Number subfield set to 1 unless the recipient has received from the originator an HE Capabilities element with the Dynamic Fragmentation Support subfield equal to 3. If the LSB of the Fragment Number subfield of the BlockAck frame is set to 1, then the Block Ack Bitmap fields are set as defined in [21307] 26.3.2.4 (Level 3 dynamic fragmentation).

* 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, 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 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 and the MPDU that solicits acknowledgment 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, 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 10.26.6.5 (Generation and transmission of BlockAck frames by an HT STA, DMG STA, or S1G STA) or a Multi-STA BlockAck frame with Ack Type field set to 1 and the TID field set to 14 as defined in 26.4.2 (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, and one or more QoS Data frames with the [#20317] ack policy is equal to Normal Ack, or Implicit BAR, then the STA shall respond with a Multi-STA BlockAck frame as defined in 26.4.2 (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 [#20317] ack policy is Implicit BAR and belonging to more than one block ack agreement, then the STA shall respond with a Multi-STA BlockAck frame as defined in 26.4.2 (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 10.3.2.13.1 (Acknowledgment procedure for DL MU PPDU in SU PPDU) for an example of this sequence).
* The A-MPDUs in the HE MU PPDU shall not contain a Management frame that solicits acknowledgment.

An 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 and the MPDU that solicits acknowledgment 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 26.4.2 (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 block ack agreement, then the STA shall respond with a Multi-STA BlockAck frame as defined in 26.4.2 (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 an HE MU PPDU shall not set the Ack Policy to Normal Ack or Implicit Block Ack Request for any of the MPDUs carried in the HE MU PPDU if 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 contains an MPDU 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 10.3.2.13.2 (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 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 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.
* 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 and the MPDU that solicits acknowledgment is an EOF MPDU that is a QoS Data frame or a QoS Null frame with Ack Policy subfield equal to HTP Ack, or a Management frame that solicits acknowledgment, 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 HTP Ack for at least one MPDU, then the STA shall respond with a Compressed BlockAck frame as defined in 10.26.6.5 (Generation and transmission of BlockAck frames by an HT STA, DMG STA, or S1G STA) or a Multi-STA BlockAck frame with the Ack Type set to 1 and the TID field set to 14 as defined in 26.4.2 (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, and one or more QoS Data frames with the [#20318] ack policy equal to HTP Ack, or Implicit BAR, then the STA shall respond with a Multi-STA BlockAck frame as defined in 26.4.2 (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 an 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 or Implicit Block Ack Request(#20319) (see 10.3.2.13.3 (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 an SU PPDU, then the HE AP 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 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 and the MPDU that solicits acknowledgment 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, 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 26.4.2 (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, 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 26.4.2 (Acknowledgment context in a Multi-STA BlockAck frame)(#20975).
* 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 26.4.2 (Acknowledgment context in a Multi-STA BlockAck frame)(#20975).

If the [21021, 20763] AP receives HE TB PPDUs from more than one STA, and if the AP intends to send the response in an SU PPDU, then the AP shall respond with a Multi-STA BlockAck frame carried in an SU PPDU that contains the appropriate settings in each Per AID TID Info field addressed to each STA as defined in 26.4.2 (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 field to Normal Ack or Implicit Block Ack Request(#20320) for each of the QoS Data frames carried in the A-MPDU (see 10.3.2.13.3 (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, 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 and the MPDU that solicits acknowledgment is an EOF MPDU that is a QoS Data frame [21065] with Ack Policy subfield equal to Normal Ack, or a Management frame that solicits acknowledgment, 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 10.26.6.5 (Generation and transmission of BlockAck frames by an HT STA, DMG STA, or S1G 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 26.4.2 (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 the A-MPDU carries a Management frame that solicits acknowledgment 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 26.4.2 (Acknowledgment context in a Multi-STA BlockAck frame)(#20975), 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 26.4.2 (Acknowledgment context in a Multi-STA BlockAck frame),

An AP with dot11MultiBSSIDImplemented equal to true may do one of the following:

* For each BSS belonging to the multiple BSSID set for which the AP has received an HE TB PPDU, the AP responds with a Multi-STA BlockAck frame with RA field set to the broadcast address and carried in a DL HE MU PPDU. The Ack Type field and AID11 field of the Multi-STA BlockAck frame are set as described in 9.3.1.8.7 (Multi-STA BlockAck variant). The AP shall set the element of the TXVECTOR parameter STA\_ID\_LIST for the RU carrying the Multi-STA BlockAck frame to the value of the BSSID Index field as defined in 26.11.1 (STA\_ID\_LIST). An AP shall not include more than one group addressed Multi-STA BlockAck frame in the A-MPDU carried in a BSS specific broadcast RU of a DL HE MU PPDU.
* If all the recipient non-AP STAs that sent an HE TB PPDU 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, the AP may respond with a Multi-STA BlockAck frame with RA field set to the broadcast address and carried in a DL HE MU PPDU. The Ack Type field and AID11 field of the Multi-STA BlockAck frame are set as described in 9.3.1.8.7 (Multi-STA BlockAck variant). The AP shall set the element of the TXVECTOR parameter STA\_ID\_LIST for the RU carrying the Multi-STA BlockAck frame to 2047. An AP shall not include more than one group addressed Multi-STA BlockAck frame in the A-MPDU carried in a broadcast RU in a DL HE 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 User Info fields(#21541). An HE AP shall not send a Multi-TID BlockAckReq (neither as part of a User Info field(#21541) addressed to 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 26.4.3 (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 26.4 (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 26.4.3 (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 26.4.3 (Negotiation of block ack bitmap lengths).

A non-AP HE STA that responds to a Compressed BlockAckReq frame, Multi-TID BlockAckReq frame, MU-BAR Trigger frame, or GCR MU-BAR Trigger frame with a Multi-STA BlockAck frame shall set the Ack Type subfield of the Multi-STA BlockAck frame to 0.