IEEE P802.11
Wireless LANs

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| **CIDs: Section 27.4** |
| **Date:** 2017-03-12 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0s with the following CIDs (**65 CIDs**):

3060, 3063, 3064, 3065, , 3201, 3202, 3203

3204, 3205, 3206, 3213, 5174, 5178, 5650, 5651, 5652

5653, 5654, 5655, 5668, 5685, 5803, 5804, 5805, 5806, 6060

6135, 6608, 6611, 6621, 6623, 6637, 6639, 6640, 6641, 7082

7393, 7534, 7653, 7654, 7655, 7656, 7802, 7967, 8122, 8391

8392, 8459, 8490, 8491, 9214, 9286, 9718, 9736, 9737, 9882

10009, 10329, 10330, 10333, 8395

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 3060 | Abhishek Patil | 158.11 | Current sentence is convoluted. Simplify it. | Change sentence to: "If an HE AP does not receive an HE Capabilities element with the Rx Control Frame To MultiBSS set to 1from a STA, then the HE AP shall not send a Multi-STA Block Ack frame to the STA if the frame is destined for STAs associated with more than one AP that are part of the same multiple BSSID set." | Revised - Updated the text.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
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|  |  |  |  |  |  |
| 3063 | Abhishek Patil | 159.16 | Add the condition for TID, when AckType=1 in the following sentence: "If the Ack Type field is 1 then the Per STA Info field indicates either the acknowledgement of a single MPDU identified by the value of the TID." | If the Ack Type field is 1, and if the TID is less than or equal to 7, or is equal to 15, then the Per STA Info field indicates the acknowledgement of a single MPDU identified by the value of the TID | Revised - Added clarificationTGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 3064 | Abhishek Patil | 159.40 | 32-bit BA is used only if '32-bit BA bitmap' is supported per HE capabilities element format | Add the condition as in the comment | Rejected - Text at line 54 clarifies this case already, "A recipient shall not include in a transmitted Multi-STA BlockAck frame a BlockAck Bitmap field of size 32 bits that is intended to a STA that has not declared support of its reception in the HE Capabilities element it transmits" |
| 3065 | Abhishek Patil | 160.30 | Need to add the procedure for the case where SU Multi TID AMPDU soliciting SU PPDU response [for example, whether the response is always using M-BA, and not with Multi-TID BA if it receives a multi-TID frame in legacy PPDU format] | As in the comment | Revised - Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
|  |  |  |  |  |  |
| 3201 | Ahmadreza Hedayat | 157.61 | Include GCR MU-BAR as well: "An HE STA that receives a BlockAckReq frame or a MU-BAR variant Trigger frame that contains a Compressed BlockAckReq variant in the User Info field addressed to the STA shall respond with a BlockAck frame as defined in 10.24.7 (HT-immediate block ack extensions) or a Multi-STA BlockAck frame as defined in 27.4 (Block acknowledgement).". Also similarly in P158L2: "An HE STA that receives a Multi-TID BlockAckReq frame or a MU-BAR variant Trigger frame that contains a Multi-TID BlockAckReq variant in the User Info field addressed to the STA shall respond with a Multi-STA BlockAck frame ..." | "An HE STA that receives a BlockAckReq frame, a MU-BAR variant Trigger frame that contains a Compressed BlockAckReq variant in the User Info field addressed to the STA, or a GCR MU-BAR variant Trigger frame that contains a Compressed BlockAckReq variant in the Common Info field shall respond with a BlockAck frame as defined in 10.24.7 (HT-immediate block ack extensions) or a Multi-STA BlockAck frame as defined in 27.4 (Block acknowledgement)." and for P158L2: "An HE STA that receives a Multi-TID BlockAckReq frame, a MU-BAR variant Trigger frame that contains a Multi-TID BlockAckReq variant in the User Info field addressed to the STA, or a GCR MU-BAR variant Trigger frame that contains a Multi-TID BlockAckReq variant in the Common Info field shall respond with a Multi-STA BlockAck frame ..." | Revised - Modified the text to add GCR MU-BAR condition.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 3202 | Ahmadreza Hedayat | 158.62 | "... contained in the BlockAckReq frame ..." | "... contained in the BlockAckReq, MU-BAR or GCR MU-BAR frame ..." | Revised - Modified the text to add GCR MU-BAR condition.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 3203 | Ahmadreza Hedayat | 158.37 | " ... that MPDUs to indicate the successful reception of that MPDU." | "... that MPDU to indicate the successful reception of that MPDU." | Revised - Modified the text per comment.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 3204 | Ahmadreza Hedayat | 159.62 | "A recipient that is the intended receiver of an (multi-TID) A-MPDU, (multi-TID) BlockAckReq frame or MU-BAR variant Trigger frame that solicits an immediate BlockAck frame response for each TID shall follow the rules ..." | "A recipient that is the intended receiver of an (multi-TID) A-MPDU, (multi-TID) BlockAckReq frame, MU-BAR or BGR MU-BAR variant Trigger frame that solicits an immediate BlockAck frame response for each TID shall follow the rules ..." | Revised - Modified the text to add GCR MU-BAR condition.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 3205 | Ahmadreza Hedayat | 160.37 | "An HE AP may solicit BlockAck frame responses from multiple HE STAs using a MU-BAR variant Trigger frame. If an MU-BAR variant Trigger frame is aggregated in an A-MPDU then no other BlockAckReq frames shall be present in the same A-MPDU... (Multi-TID) BlockAckReq, BlockAckReq, and MU-BAR variant Trigger frames indicate the length of the soliciting block ack responses according to the FN settings defined in 9.3.1.9 (BlockAck frame format)." | "An HE AP may solicit BlockAck frame responses from multiple HE STAs using an MU-BAR variant Trigger frame or a GCR MU-BAR variant Trigger frame. If an MU-BAR variant Trigger frame or a GCR MU-BAR variant Trigger frame is aggregated in an A-MPDU then no other BlockAckReq frames shall be present in the same A-MPDU... (Multi-TID) BlockAckReq, BlockAckReq, MU-BAR variant Trigger and GCR MU-BAR variant Trigger frames indicate the length of the soliciting block ack responses according to the FN settings defined in 9.3.1.9 (BlockAck frame format)." | Revised - Modified the text to add GCR MU-BAR condition.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 3206 | Ahmadreza Hedayat | 160.57 | Does this apply to all AMPDUs or all except the one set to Normal ACK? "The A-MPDUs carried in the soliciting DL MU PPDU shall not contain an Action frame or a MMPDU that solicits a response." | As in the comment | Rejected - Only one MPDUs in the AMPDU is allowed to solicit immediate response. Reason: context is SU PPDU response |
| 3213 | Ahmadreza Hedayat | 161.10 | Both S-MPDU and single-MPDU are used in this clause (P162L10, P161L56, etc). Suggest to use S-MPDU throughout this clause. | As in the comment | Revised - Agree in principle. TGax editor to change all occurances of single MPDU to S-MPDU.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5174 | Dorothy Stanley | 157.48 | "An HE STA that supports Multi-STA BlockAck shall examine each received Multi-STA sent by an STA with which it has a BA agreement."A few issues with this sentence: 1) what is meant by "shall examine each received Multi-STA"? Was the intent to examine Per STA Info subfields for each STA identified in the BA? 2) "an STA" should be "a STA" or "an HE STA" | as in comment | Revised - Agree in principle. Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
|  |  |  |  |  |  |
| 5178 | Dorothy Stanley | 160.60 | There is no definition for S-MPDU | provide definition | Rejected -The definition is already present in 11ah |
| 5650 | Guoqing Li | 157.57 | The wording in this paragraph is not accurate.For ACK=1, TID=15, the M-BA is acknoledging a managaeent frame not a data indicated by the TID. | remove "identified by the value of the TID" | Revised - Agree in principle. Added a condition for MPDU that contains Action frame.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5651 | Guoqing Li | 158.37 | "to the TID value of that MPDU" , for acknolwdging action frame, this sentence is not accurate | Clarify | Revised - Agree in principle. Added a condition for MPDU that contains Action frame.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5652 | Guoqing Li | 159.16 | This sentence misses the case of the acknoledgement of the action frame | Clarify | Revised - Agree in principle. Added a condition for MPDU that contains Action frame.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5653 | Guoqing Li | 159.00 | The descripton is confusing. For example, if the buffer size is 31, it meets conditions of both paragraphs where one says the bigmap length shall be 64 and the other says it could be 64 or 256. | Change the second paragraph to "if....is within [65, 256], ... | Rejected - Responder is allowed to decide on the BA length as described in the text. For example, if the negotiated buffer size is 256, then the BA length could be 64, or 256 based on the # of MPDUs in the eliciting A-MPDU size |
| 5654 | Guoqing Li | 159.36 | if buffer size is 128, can the recipient dynamcally changing the bitmap length between 64 and 256? The sentence in this paragraph is not clear on this. | Clarify | Revised - Agree in principle. Negotiated buffer sizes are made disjoint set. .TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5655 | Guoqing Li | 159.00 | The descripton is confusing. For example, if the buffer size is 31, it meets conditions of the hree paragraphs, which one can the STA uses? | change the second paragraph to "if....is within [65,1286], ...", and change third paragraph to "...within [129-256]..." | Revised -Agree in principle. Negotiated buffer sizes are made disjoint set. .TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5668 | Guoqing Li | 160.57 | Why the A-MPDU in this case cannot contain Action frame? What about the case the A-MPDU is VHT single MPDU in A-MPDU? | Remove this constraint | Rejected - In the case of a DL MU PPDU soliciting SU PPDU response, only one of the STAs in the DL MU PPDU can send the response. Action frame does not have a field to indicate the Ack policy. |
| 5685 | Guoqing Li | 160.58 | Why DL MU PPDU soliciting SU resposne cannot contain action frame soliciting a response? | Clarify | Rejected - In the case of a DL MU PPDU soliciting SU PPDU response, only one of the STAs in the DL MU PPDU can send the response. Action frame does not have a field to indicate the Ack policy. |
| 5803 | Huizhao Wang | 158.13 | Rule of not allowed to send Mult-STA Block ACK to STAs with MultiBSS case is not clear. | Replace the text: " to the STA", with the text: " on the HE AP" | Rejected - The intention of the current text is to state that the AP sends MBSS M-BA only to those STAs that indicated the support of MBSS control frame reception |
| 5804 | Huizhao Wang | 160.05 | Starting Sequence number range is wrong. It should be allowed between WinStartR and WinEndR -1 | Remove the text: "The Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield shall be set to any value in the range from (WinEndR ┤╟í BitmapLength + 1) to WinStartR" | Rejected - The comment does not provide adequate reasons on why the range is wrong |
| 5805 | Huizhao Wang | 160.08 | The description of how to choose Block ACK bitmap size if its smallest bitmap size is greater than the WinSizeR is not clear | Replace the text: "The values in the recipient's record of status of MPDUs beginning with the MPDU for which the Sequence Number subfield value is equal to WinStartR and ending with the MPDU for which the Sequence Number subfield value is equal to WinEndR, wherein the length of the BlockAck Bitmap field shall be greater than or equal to the smallest BitmapLength that is greater than WinEndR ┤╟íWinStartR"With following text: "If the smallest BitmapLengh is greater than WinSizeR, then the Bock ACK bitmap field shall be greater than or equal to the smallest BitmapLength" | Revised - Agree with the confusion. Clarified that the 3rd bullet point should actually refer to BlockAckBitmap instead of BitmapLength.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 5806 | Huizhao Wang | 160.17 | Block ACK transmit time should not be bounded by TXOP limitation | Remove the text: "NOTE 2--An HE STA can generate a Block Ack frame with variable length Block Ack Bitmap field in which case the STA ensures that the Block Ack frame response fits within the remaining duration of the TXOP." | Rejected - The comment is inaccurate. The TXOP should include response time. |
| 6060 | Jeongki Kim | 157.49 | The text need to be cleaned up or clarified. Change to: Multi-STA BlockAck frame | Changed to the following text:An HE STA that supports Multi-STA BlockAck frame shall examine each received Multi-STA BlockAck frame sent by an STAwith which it has a BA agreement. | Revised - Agree in principle. Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 6135 | Jing Ma | 157.49 | A BA agreement supported Multi-STA BlockAck operation should be specified, because in baseline, the Block Ack session is established between a originator and a recipient by exchanging ADDBA Request frame, ADDBA Response, ADDBA DEL frame. A BA agreement session established among a originator and multiple recipients should be specified. | as the comment | Rejected - There is no special BA agreement for MBA |
| 6608 | John Coffey | 157.21 | Descriptive language used where it seems normative language must have been intended: "An HE STA can use". The ability of a device to do so should not be in question; what is apparently intended is that an HE STA is permitted to do so. If so, it would be better to say so. | Change "can" to "may". | Revised - Removed the sentence. Also see CID8459.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 6611 | John Coffey | 157.49 | Use of undefined term / garbled text: "each received Multi-STA sent". | Change to "each Multi-STA BlockAck frame sent". | Revised - Agree in principle. Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 6621 | John Coffey | 159.16 | Missing condition: "either" followed by only one condition. Presumably there should be additional text: "or [other condition]". | Add appropriate condition. | Revised - Agree in principle. Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 6623 | John Coffey | 160.08 | Missing condition / garbled text: the third item doesn't parse correctly. In the first two bullet items we had a clear action ("is set"; "shall'), but there is no applicable one in the third bullet item. (the one "shall" ties back only to the "wherein'). | Clarify. | Revised - Agree in principle. Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 6637 | John Coffey | 161.30 | Inconsistent terminology: here we have "a Trigger-based PPDU", whereas almost everywhere else in the draft we have "an HE trigger-based PPDU". If the same thing is intended, the same term should be used. | Change "a Trigger-based PPDU" to "an HE trigger-based PPDU". | Revised - Agree in principle. Added clarification.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 6639 | John Coffey | 161.42 | Use of undefined term: "Single MPDU". From the capitalization, it must be inferred that this is a defined term, but where is the definition? The draft also uses "single MPDU", and for good measure both "VHT Single MPDU" and "VHT single MPDU". The baseline | Clarify. | Rejected -The definition is already present in 11ah |
| 6640 | John Coffey | 161.56 | Use of undefined term: "Single MPDU". From the capitalization, it must be inferred that this is a defined term, but where is the definition? The draft also uses "single MPDU", and for good measure both "VHT Single MPDU" and "VHT single MPDU". The baseline | Clarify. | Rejected -The definition is already present in 11ah  |
| 6641 | John Coffey | 161.57 | Use of undefined term: "Single MPDU". From the capitalization, it must be inferred that this is a defined term, but where is the definition? The draft also uses "single MPDU", and for good measure both "VHT Single MPDU" and "VHT single MPDU". The baseline | Clarify. | Rejected -The definition is already present in 11ah |
| 7082 | Junichi Iwatani | 161.56 | "If the HE trigger-based PPDU carries Single MPDUs, A-MPDUs, or multi-TID A-MPDUs from more than one STA, "It seems unnatural that an HE trigger-based PPDU is from more than one STA. (Also, not "STAs"). If necessary, "HE trigger-based PPDU" should be defined for a receiver clearly.(Also for Page 162, Line 10) | Clarify or modify | Rejected - HE TB PPDU can carry A-MPDUs from multiple STAs. |
| 7393 | Laurent Cariou | 157.21 | A STA sending any BA should be able to set the more data bit to 1 to indicate to the originator that it has buffered traffic and would like to access the medium to transmit it (ressource request) | Modify the procedure so that any STA sending a BA to set the more data bit to 1 to indicate an UL resource request | Rejected - See resolution to CID9618 |
| 7534 | Li-Hsiang Sun | 159.34 | If the negotiated buffer size is within [1, 64], not only it satisfies the 1st bullet, it also satisfies all following bullets, so it can use a length 256 bitmap | Change in p159.36 [1, 256] to [65, 256]Change in p159.43 [1,128] to [65, 128]Change in p159.45 [1.256] to [129,256] | Revised - Agree in principle. Negotiated buffer sizes are made disjoint set. .TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 7653 | Liwen Chu | 157.28 | This is also applicable to IBSS and MBSS case. | As in comment | Revised - Agree in principle. Modified the RA setting to include a non-AP by making it more general .TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 7654 | Liwen Chu | 157.36 | Change to "An HE AP may send a Multi-STA BlockAck frame in response to an HE trigger-based PPDU" | As in comment | Revised - Agree in principle. Modified the text as in the comment.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 7655 | Liwen Chu | 158.53 | Change supporting 32 bit capability field to supporting bitmap optimization capability. If a STA does not announce supporting bitmap optimization capability, another STA can't send bitmap 32 to it, bitmap 32/64 to it when 128 bitmap is negotiated, bitmap 32/64/128 to it when 256 bitmap is negotiated. | As in comment | Rejected - Benefit of 32bit BA is scenario dependent. Since it requires additional processing that some vendors may not support this option. Hence a bit is added in capability.On the topic of dynamic length determination: Since the response is taking place in SIFS time, the responder (especially AP that responds to multiple STAs) won't have enough time to check the negotiated value for each of the STA. So, the group decision was to make the the BA length based on the # of MPDUs in eliciting A-MPDU is based on simplicity reasons |
| 7656 | Liwen Chu | 160.39 | MU-BAR Trigger is not allowed to be aggregated in A-MPDU. This is like BAR is not allowed to be aggregated in A-MPDU | As in comment | Revised - Agree in principle. Removed the sentenceTGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 7802 | Mark Hamilton | 159.53 | Why is there a special case for support of a 32-bit BlockAck Bitmap in a Multi-STA BlockAck? | Delete this paragraph. Also delete this item from the HE Capabilities element in subclause 9.4.218.2. | Rejected - Benefit of 32bit BA is scenario dependent. Since it requires additional processing that some vendors may not support this option |
| 7967 | Mark RISON | 160.17 | The length is also limited by this UL RU duration | Add this and any other limitations | Rejected - It could be sent on either direction. TXOP is sufficient enough |
| 8122 | Matthew Fischer | 159.45 | Size of the MBA response bitmap can be chosen by the MBA transmitter without constraint, so the STA that elicits the MBA cannot predict the duration of MBA - this is probably only a problem for SU PPDU eliciting frame because the MU PPDU includes a trigger for response which includes a duration value - maybe also for MU eliciting frame if for example, the MU PPDU has only one response required - e.g. the MU PPDU is to two STA and one STA has noACK MPDUs. | Need to define a way to constrain the MBA response (e.g. the bitmap length in particular) so that DUR times are predictable. Maybe simply include a restriction that the resopnse shall not exceed the DUR field value of the eliciting PPDU. See also 27.4.4.2 DL MU PPDU soliciting an SU PPDU response which probably needs some new language. | Revised - Agree in principle. Add clarification on TXOP setting by the Originator.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 8391 | Po-Kai Huang | 161.08 | In 27.4.4.3 DL MU PPDU soliciting an HE trigger-based PPDU response, it is not clear if the DL MU PPDU includes VHT MU PPDU. | Two suggested options to resolve the comment: If the answer is no, change the title to "HE DL MU PPDU soliciting an HE trigger-based PPDU response". Specify that trigger frame or UL MU response scheduling is not allowed in VHT MU PPDU. If the answer is yes, a sentence in the paragraph describes that "An Action frame in the DL MU PPDU is always responded with an HE trigger-based PPDU." This behavior contradicts with the description in Table 9-9--Ack Policy subfield in QoS Control field of QoS Data frames, where the content only allows DL HE MU PPDU to set MU Ack Policy. Change the following sentence "For a frame that is carried in a DL HE MU PPDU" in table 9-9 to "For a frame that is carried in a DL MU PPDU." Specify that trigger frame or UL MU response scheduling is allowed in VHT MU PPDU. | Revised - Agree in principle with the ambiguity. Changing all occurances of DL MU PPDU to HE MU PPDU.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 8392 | Po-Kai Huang | 160.52 | It will be worthwhile to clarify the definition of DL MU PPDU in this section. Specifically, does DL MU PPDU include VHT MU PPDU? It will also be worthwhile to clarify the definition of DL SU PPDU. Does DL SU PPDU mean any PPDU format from AP to one destination? Similarly it will be worthwhile to clarify the definition of SU PPDU. Is it PPDU with any format to a singl user? | Add the definition of DL MU PPDU, DL SU PPDU, and SU PPDU in Section 3. | Revised - Agree in principle with the ambiguity. Changing all occurances of DL MU PPDU to HE MU PPDU.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 8459 | Robert Stacey | 157.21 | "An HE STA can use ...": the conditions for Compressed BlockAck frame and Multi-STA BlockAck frame use are more elaborate than this. The statement carries no value. | Delete sentence. | Revised - Removed the sentence.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 8490 | Robert Stacey | 160.52 | DL MU PPDU is not defined. It could be HE MU PPDU or VHT PPDU with Group ID between 1 and 62 or both. | Change all occurances of DL MU PPDU to HE MU PPDU. | Revised - Agree in principle with the ambiguity. Changing all occurances of DL MU PPDU to HE MU PPDU.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 8491 | Robert Stacey | 160.57 | If DL MU PPDU includes VHT PPDU then we break backward compatibility with this requirement ("... shall not include an Action frame..."). | Change all occurances of DL MU PPDU to HE MU PPDU. | Revised - Agree in principle with the ambiguity. Changing all occurances of DL MU PPDU to HE MU PPDU.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 9214 | Tomoko Adachi | 157.16 | Even if the STA receives only a Trigger frame and an Action Ack frame, it should respond with a Multi-STA BlockAck as there might be data frames aggregated. The response behavior will be simple if whenever an Action Ack frame is received with a Trigger frame, the STA has to respond with a Multi-STA BlockAck. | Specify that whenever an Action Ack frame is aggregated with a Trigger frame, the STA shall respond with a Multi-STA BlockAck. | Rejected - Ack is more efficient than sending M-BA in the suggested scenario. Since Ack is a legacy frame, there is not additional complexity in sending Ack, when M-BA is not needed. |
| 9286 | Tomoko Adachi | 157.22 | UL OFDMA is mandatory at HE STAs. Therefore the support of Multi-STA BlockAck frame is mandatory at HE STAs. And the generation of Multi-STA BlockAck frames is under the operation of HT-immediate BA. | Change the sentences "An HE STA shall support generation of Compressed BlockAck frames if HT-immediate BA is supported in the role of recipient (see 10.24.7.1 (Introduction). An HE STA shall support generation of Multi-STA BlockAck frame if either UL MU operation (see 27.5.2 (UL MU operation)) or multi-TID A-MPDU operation (27.10.4 (A-MPDU with multiple TIDs)) is supported in the role of recipient." to "An HE STA shall support generation of Compressed BlockAck frames and Multi-STA BlockAck frames if HT-immediate BA is supported in the role of recipient (see 10.24.7.1 (Introduction)." | Revised - Agree in principle. Add clarification on the generation of M-BA as conditional, and reception of M-BA as mandatory from STA's standpoint.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 9718 | Yongho Seok | 159.54 | "A recipient shall not include in a transmitted Multi-STA BlockAck frame a BlockAck Bitmap field of size 32 bits that is intended to a STA that has not declared support of its reception in the HE Capabilities element it transmits."For using the BlockAck Bitmap length of 128 or 256 bits, a STA needs to check the declared HE Capabilities element of its peer STA.Insert the missing constraint for the BlockAck Bitmap length of 128 or 256 bits. | As per comment. | Rejected - 256BA support is negotiated during BA session setup through 'buffer size'. 32BA is added as a capability, since a responder is allowed to pick a BA length lower than the negotiated buffer size, but since some STAs may not support 32BA, there should be an explicit indication.  |
| 9736 | Yongho Seok | 158.06 | "...the length of each Block Ack Bitmap subfields shall be equal to the solicited Bitmap length (i.e., FN subfields in solicited Block Ack Request Starting Sequence Control and responding Block Ack Starting Sequence Control for the same TIDare equal)."Why does the block ack originator decide the Block Ack Bitmap length?In a case of an implicit Block Ack Request, the block ack recipient decides the Block Ack Bitmap length.Please remove the corresponding sentences for the consistent protocol design. | As per comment. | Rejected - The receipient decides the BA bit map length due to the complexity of checking the negotiated buffer size within a SIFS duration |
| 9737 | Yongho Seok | 160.45 | "(Multi-TID) BlockAckReq, BlockAckReq, and MU-BAR variant Trigger frames indicate the length of the soliciting block ack responses according to the FN settings defined in 9.3.1.9(BlockAck frame format)."Why does the block ack originator decide the Block Ack Bitmap length?In a case of an implicit Block Ack Request, the block ack recipient decides the Block Ack Bitmap length.Please remove the corresponding sentences for the consistent protocol design. | As per comment. | Revised - Agree in principle. Updated the text to make the BA length decision made by the responder.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 9882 | Young Hoon Kwon | 159.34 | The first two sub bullets are confusing. In case the negotiated buffer size is within [1, 64] which is also within [1, 256], the first sub bullet says it shall use bitmap size of 64, but the second sub bullet sais to use either 64 or 256. Clarification is needed. The same thing applies to the Multi-STA BlockAck frame case. Clarification is needed. | As in the comment. | Revised - Agree in principle. Negotiated buffer sizes are made disjoint set.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 10009 | Yuichi Morioka | 160.61 | Any response frame (such as ACK/BA/CTS) sent by associated AP in legacy PPDU doesn't meet this condition, therefore third party STAs which can't receive the UL PPDU frame will not be able to update the intra NAV. | Modify the condition in L1P150 as follows.- The frame is identified as inter-BSS or cannot be identified as intra-BSS or inter-BSS with the condition that received power is less than OBSS-PD according to the rule described in 27.2.1 (Intra-BSS and inter-BSS frame detection)Modify the condition in L53P149 as follows.- The frame is identified as intra-BSS or cannot be identified as intra-BSS or inter-BSS with the condition that received power is higher than OBSS-PD according to the rule described in 27.2.1 (Intra-BSS and inter-BSS frame detection) | Rejected - AP can send MU RTS/CTS to set the NAV.  |
| 10329 | Zhou Lan | 157.24 | "Multi-STA BlockAck frame if either UL MU operation (see 27.5.2 (UL MU operation)) or multi-TID AMPDUoperation (27.10.4 (A-MPDU with multiple TIDs)) is supported in the role of recipient.", UL OFDMA (one of the UL MU operation) is mandatory. So M-BA is mandatory. This setence can be deleted. | per comment | Revised - Agree in principle. Add clarification on the generation of M-BA as conditional, and reception of M-BA as mandatory from STA's standpoint.TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 10330 | Zhou Lan | 157.33 | Shall define a mandated response rule mechanism to simplify the response MCS selection implementation | per comment | Rejected - Mandating to a single MCS is too limiting |
| 10333 | Zhou Lan | 157.48 | "An HE STA that supports Multi-STA BlockAck shall examine each received Multi-STA sent by an STAwith which it has a BA agreement." A HE STA shall support receiption of a M-BA. So delete "that supports Multi-STA BlockAck" | per comment | Revised - Agree in principle. Removed the text "that supports Multi-STA BlockAck".TGax editor shall incorporate changes in 11-17-0319-01-00ax |
| 8395 | Po-Kai Huang | 51.40 | GCR MU-BAR has variable length for Trigger dependent common info field due to variable length of BAR information field. As a result, in the future if additional BAR variant is added, a STA that supports GCR MU-BAR may not be able to decode User Info field. Ideally, a STA that does not support the new BAR vairant will not be included in the User Info field. However, this introduces additional checking logic except User Info field to check if a STA is solicited by different variant of Trigger frame. | Suggest to add a length field in Trigger dependent Common Info field of MU-BAR to indicate the length of BAR control and BAR Info | Revised. See resolution for CID4852 in 11-17-0306-02-00ax |

* Block acknowledgement
* Overview

[CID6608, CID8459]An HE STA shall support generation of Compressed BlockAck frames if HT-immediate BA is supported in the role of recipient (see 10.24.7.1 (Introduction). An HE STA shall support generation of Multi-STA BlockAck frame if either multi-TID A-MPDU operation (27.10.4 (A-MPDU with multiple TIDs)) is supported in the role of recipient. An HE non-AP STA shall support reception of Multi-STA BlockAck frame [CID9286, CID10329].

An HE non-AP STA that sends a Multi-STA BlockAck frame shall set the AID subfield in the Per STA Info field of the Multi-STA BlockAck frame to 0 and the RA field to the MAC address of the intended receiver. [CID7653]

When sending Multi-STA BlockAck frame, the HE STA shall transmit the Multi-STA BlockAck using one of rate, MCS, NSS that all of the acknowledgement receivers support.

An HE AP[CID7654] may send a Multi-STA BlockAck frame in response to an HE trigger-based PPDU. A Multi-STA BlockAck frame contains one or more BA Information fields with one or more AIDs and one or more different TIDs. An HE AP that transmits a Multi-STA BlockAck frame with different AID subfield values shall set the RA field to the broadcast address. An HE AP that transmits a Multi-STA BlockAck frame with a single AID subfield or with the same values of the AID subfield in Per STA Info subfields shall set the RA field to the address of the recipient STA that requested the Block Ack or to the broadcast address. An HE non-AP STA shall transmit a Multi-STA BlockAck frame with a single AID subfield or with the same values of the AID subfield in Per STA Info subfields and shall set the RA field to the address of the recipient STA that requested the Block Ack frame.

An HE non-AP STA [CID10333] shall examine each received Multi-STA BlockAck frame [CID5174, CID6060, CID6611] sent by an HE STA with which it has a BA agreement. On receiving such a Multi-STA BlockAck frame a STA performs the following for each BA Information field with its AID:

* If the Ack Type field is 0 then the Block Ack Starting Sequence Control, TID and Block Ack Bitmap fields of the STA Info field are processed according to 10.24.7 (HT-immediate block ack extensions) and 27.3 (Fragmentation).
* If the Ack Type field is 1, then the STA Info field indicates either the acknowledgement of a single MPDU identified by the value of the TID [CID5650] or a single MPDU that is an Action frame or a PS Poll frame [CID5065] when the TID field is set to 15, or of all MPDUs carried in the eliciting PPDU, when the TID field is set to 14.

An HE STA that receives a BlockAckReq frame or a MU-BAR variant Trigger frame that contains a Compressed BlockAckReq variant in the User Info field addressed to the STA, [CID3201] or a GCR MU-BAR Trigger frame that contains a Compressed BlockAckReq variant in the Common Info field shall respond with a BlockAck frame as defined in 10.24.7 (HT-immediate block ack extensions) or a Multi-STA BlockAck frame as defined in 27.4 (Block acknowledgement), 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[CID9737].

An HE STA that receives a Multi-TID BlockAckReq frame or a MU-BAR variant Trigger frame that contains a Multi-TID BlockAckReq variant in the User Info field addressed to the STA, [CID3201]or a GCR MU-BAR variant 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 STA Info subfield 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[CID9737]..

If an HE AP does not receive an HE Capabilities element with the Rx Control Frame To MultiBSS set to 1 from a STA, then the HE AP shall not send a Multi-STA Block Ack frame to the STA if the frame is destined for STAs associated with more than one AP that are part of the same multiple BSSID set [CID3060].

An HE non-AP STA that is associated with a nontransmitted BSSID and has indicated support for receiving Control frames with TA set to the Transmitted BSSID (Rx Control Frame To MultiBSS set to 1 in HE Capabilities element), shall respond to an MU BAR frame with RA set either to the (nontransmitted) BSSID it is associated with or the transmitted BSSID (i.e., the TA of the soliciting MU BAR frame).

* Acknowledgement, block acknowledgment or all acknowledgement selection in a Multi-STA BlockAck frame

A recipient sets the Ack Type and TID subfields in a Per AID TID Info field of the Multi-STA BlockAck frame sent as a response depending on the acknowledgement context.

* All Ack context: if the originator had set the All Ack Supported subfield to 1 in the HE Capabilities element, 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 intended to it carried in the eliciting A-MPDU or multi-TID A-MPDU only. 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 STA Info field addressed to an originator in the Multi-STA BlockAck frame.
1. Ack context: A recipient receiving a single MPDU, that requires an acknowledgment, shall set the Ack Type field to 1 and the TID field to the TID value of that [CID3203] MPDU to indicate the successful reception of that MPDU, [CID5652, CID5651] or to the TID value of 15 to indicate the successful reception of the MPDU that is an Action frame, or a PS Poll control frame [CID5065]

If multiple single MPDUs in a Multi-TID A-MPDUs are received by a recipient that supports its reception, the Multi-STA BlockAck frame may contain multiple occurrences of these Per STA Info fields that are intended to an originator, one for each successfully received single MPDU requesting an acknowledgment.

The allowed values for the TID field in this context are 0 to 7 (for indicating acknowledgement of QoS Data or QoS Null frames) or 15 (for indicating acknowledgement of an Action frame).
* BlockAck context: The recipient shall set the Ack Type field to 0 and the TID field of a Per STA Info field to the TID value of MPDUs requesting block acknowledgement 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 STA Info fields addressed to an originator, one for each MPDU that is requesting block acknowledgement, 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) 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 acknowledgement of QoS Data frames).

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

An originator shall examine each received Multi-STA BlockAck frame sent by an STA as a response to a soliciting PPDU.

Upon reception of the Multi-STA BlockAck frame the originator performs the following operations for each Per STA 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 and is 0 when the originator is an AP):

* If the Ack Type field is 0 then the BlockAck Starting Sequence Control, TID and BA Bitmap fields of the Per STA Info field are processed according to 10.24.7 (HT-immediate block ack mechanism), 27.3 (Fragmentation), and as defined below.
* If the Ack Type field is 1 [CID3063, CID6621] and if the TID is less than or equal to 7, or is equal to 15, then the Per STA Info field indicates the acknowledgement of either a single MPDU identified by the value of the TID, or an Action frame, or a PS Poll frame.
* If the Ack Type field is 1 and the TID subfield of Per AID TID Info field is 14, then the Per STA Info field indicates the acknowledgement of all MPDUs carried in the eliciting PPDU as defined by the acknowledgement 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). The Block Ack Bitmap subfield length of a BlockAck frame used during a BA session depends on the negotiated buffer size between the originator and the recipient as indicated below:

* When a Compressed BlockAck frame is used:
* If the negotiated buffer size is within [1, 64] then a BlockAck Bitmap length of 64 shall be used during the BA session
* If the negotiated buffer size is within [65, 256] [CID5654]then a BlockAck Bitmap length of either 64 or 256 shall be used during the BA session
* When a Multi-STA BlockAck frame is used:
* If the negotiated buffer size is within [1, 64] then a BlockAck Bitmap length of either 32 or 64 shall be used during the BA session [CID5655, CID7534, CID9882]
* If the negotiated buffer size is within [65, 128] then a BlockAck Bitmap length of 32, 64 or 128 shall be used during the BA session [CID5655, CID7534, CID9882]
* If the negotiated buffer size is within [129, 256] then a BlockAck Bitmap length of 32, 64, 128 or 256 shall be used during the BA session [CID5655, CID7534, CID9882]

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. [CID8122] The originator sets the Duration field value accounting for the largest BlockAck Bitmap length based on negotiated buffer size.

A recipient shall not include in a transmitted Multi-STA BlockAck frame a BlockAck Bitmap field of size 32 bits that is intended to a STA that has not declared support of its reception in the HE Capabilities element it transmits.

NOTE—The recipient can include in the Multi-STA BlockAck frame BlockAck Bitmap fields of 32 bits for other intended recipients that declare reception support and the nonsupporting recipient needs to parse these fields to be able to locate the block ack information that is intended to it.

A recipient that is the intended receiver of an (multi-TID) A-MPDU, (multi-TID) BlockAckReq frame or MU-BAR variant Trigger frame [CID3202] or GCR MU-BAR variant Trigger frame that solicits an immediate BlockAck frame response for each TID shall follow the rules defined in 10.24.7 (HT-immediate block ack extensions) except that:

* *WinSizeR* is set to the smaller of *BitmapLength* and the value of the Buffer Size field of the associated ADDBA Response frame that established the block ack agreement, where the *BitmapLength* is the largest value for the BlockAckBitmap that can be used by the recipient
* The Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield shall be set to any value in the range from (*WinEndR*  *BitmapLength* + 1) to *WinStartR*
* The values in the recipient's record of status of MPDUs beginning with the MPDU for which the Sequence Number subfield value is equal to *WinStartR* and ending with the MPDU for which the Sequence Number subfield value is equal to *WinEndR* shall be included in the BlockAck Bitmap, wherein the length of the BlockAck Bitmap field shall be greater than or equal [CID5805, CID6623] to *WinEndR*  *WinStartR*

NOTE 1—An HE STA follows the rules in 10.24.7 (HT-immediate block ack extensions) where the value 64 is replaced with *BitmapLength*, and the value 63 is replaced with *BitmapLength* minus 1.

NOTE 2—An HE STA can generate a Block Ack frame with variable length Block Ack Bitmap field in which case the STA ensures that the Block Ack frame response fits within the remaining duration of the TXOP.

If the HE Fragmentation Support subfield in the HE Capabilities element it transmits is 3, then the LSB of the Fragment Number subfield of the BA frame may be set to 1. If the LSB of the Fragment Number subfield of the BA frame is set to 1, then the BA Bitmap fields are re-mapped as defined in 27.3 (Fragmentation).

* Per-PPDU acknowledgment selection rules
* General

A STA that sends a PPDU to an intended recipient can solicit different immediate responses by using the Ack Policy field of QoS Data or QoS Null frames, the type of the frame (e.g., Action, (multi-TID) BAR, MU-BAR variant Trigger frame, or a GCR MU-BAR Trigger frame [CID3204], etc.) and the EOF field setting when these frames are carried in an A-MPDU or multi-TID A-MPDU.

An HE AP may solicit BlockAck frame responses from multiple HE STAs using a MU-BAR variant Trigger frame [CID3205] or a GCR MU-BAR Trigger frame. [CID7656] The MU-BAR variant Trigger frame or a GCR 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 intended to the STA in an MU-BAR variant Trigger frame nor as a BAR frame) to a STA that has not indicated support for multi-TID A-MPDU. (Multi-TID) BlockAckReq, BlockAckReq, GCR MU-BAR Trigger frame and MU-BAR variant Trigger frames indicate the length of the soliciting block ack responses according to the FN settings defined in 9.3.1.9 (BlockAck frame format). An HE STA that receives a Multi-TID AMPDU that solicits an immediate response shall send the acknowledgement using Multi-STA BlockAck frame [CID3065]. An HE STA that receives a Single-TID A-MPDU in an HE SU PPDU that solicits an immediate response shall send the acknowledgement using Compressed BlockAck frame.

* HE MU PPDU soliciting an SU PPDU response [CID8391, CID 8392, CID8490, CID8491]

An AP that sends a HE MU PPDU that intends to solicit an immediate response carried in an SU PPDU shall set the Ack Policy to Normal Ack (or Implicit BAR) for at most one of the (A-)MPDUs contained in the soliciting HE MU PPDU (see 10.3.2.11.2 (MU acknowledgement procedure for DL MU PPDU in SU format) for an example of this sequence). The AP shall not solicit an immediate response for any of the other (A-) MPDUs carried in the HE MU PPDU. The A-MPDUs carried in the soliciting HE MU PPDU shall not contain an Action frame or a MMPDU that solicits a response. A non-AP STA that receives a HE MU PPDU that solicits an immediate response shall follow the following acknowledgment procedure:

* If the HE MU PPDU carries a S-MPDU intended to it with the Ack Policy equal to Normal Ack, then the STA shall respond with an Ack frame carried in an SU PPDU
* If the HE MU PPDU carries an A-MPDU intended to it with the Ack Policy equal to Implicit BAR, then the STA shall respond with an Compressed BlockAck frame carried in an SU PPDU
* If the HE MU PPDU carries a multi-TID A-MPDU intended to it with the Ack Policy equal to Implicit BAR, then the STA shall respond with a Multi-STA BlockAck frame carried in an SU PPDU

NOTE—The control response frame carried in SU PPDU format follows the rules defined in 10.7.6.5 (Rate selection for control response frames).

* HE MU PPDU soliciting an HE trigger-based PPDU response [CID8391, CID 8392, CID8490, CID8491]

An AP that sends a HE MU PPDU that intends to solicit an immediate response carried in an HE trigger-based PPDU shall set the Ack Policy to MU Ack ('01') for each of the (A-)MPDUs for which it intends to solicit an immediate response (see 10.3.2.11.3 (MU acknowledgement procedure for HE MU PPDU in MU format) for an example of this sequence). An Action frame in the HE MU PPDU is always responded with an HE trigger-based PPDU. A non-AP STA that receives a HE MU PPDU that solicits an immediate response shall follow the following acknowledgment procedure:

* If the HE MU PPDU carries a S-MPDU intended to it that solicits an immediate response, and either an UL MU Response Scheduling A-Control field or a Trigger frame is present, then the STA shall respond with an Ack frame carried in the HE trigger-based PPDU sent as a response.
* If the HE MU PPDU carries an A-MPDU intended to it that solicits an immediate response, and either a Trigger frame or UL MU Response Scheduling A-Control field is present, then the STA shall respond with a Compressed BlockAck frame carried in the HE trigger-based PPDU sent as a response.
* If the HE MU PPDU carries a multi-TID A-MPDU intended to it that solicits an immediate response, and either a Trigger frame or an UL MU Response Scheduling A-Control field is present, then the STA shall respond with a Multi-STA BlockAck frame carried in the [CID6637] HE TB PPDU sent as a response.
* HE trigger-based PPDU soliciting a DL SU PPDU response

A non-AP STA that sends an HE trigger-based PPDU as a response to a Basic variant Trigger frame that intends to solicit an immediate response shall set the Ack Policy to Normal Ack/Implicit BAR (see 10.3.2.11.4 (MU acknowledgement procedure for an UL MU transmission) for an example of this sequence). If the HE AP intends to send the response in a DL SU PPDU format, then the HE AP shall follow the following acknowledgment procedure:

* If the HE trigger-based PPDU carries a Single MPDU from a single STA that solicits an immediate response, 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 carried in a DL SU PPDU format.
* If the HE trigger-based PPDU carries an A-MPDU from a single STA that solicits an immediate response, then the HE AP shall respond with a Compressed BlockAck frame, 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 carried in a DL SU PPDU format.
* If the HE trigger-based PPDU carries a Multi-TID A-MPDU that solicits an immediate response from a single STA then the HE AP shall send a Multi-STA BlockAck frame carried in a DL SU PPDU format.

If the HE trigger-based PPDU carries Single MPDUs, A-MPDUs, or multi-TID A-MPDUs from more than one STA, or a combination of Single MPDUs from a subset of STAs, A-MPDUs from another subset of STAs, or multi-TID A-MPDUs from another subset of STAs then the AP shall respond with a Multi-STA BlockAck frame carried in a DL SU PPDU format that contains the appropriate settings in each Per STA Info field intended to each STA as defined in the previous subclauses.

* HE trigger-based PPDU soliciting a HE MU PPDU response [CID8391, CID 8392, CID8490, CID8491]

A non-AP STA that sends an HE trigger-based PPDU as a response to a Basic variant Trigger frame that intends to solicit an immediate response shall set the Ack Policy to Normal Ack/Implicit BAR (see 10.3.2.11.4 (MU acknowledgement procedure for an UL MU transmission) for an example of this sequence). If the HE AP intends to send the response in an HE MU PPDU format, then the HE AP shall follow the following acknowledgment procedure:

* If the HE trigger-based PPDU carries an S-MPDU from more than one STA, or (multi-TID) A-MPDU from more than one STA, or a combination of an S-MPDU from some STAs and (multi-TID) A-MPDU from other STAs, then the HE-AP shall do one of the following:
* The AP shall respond with Ack frame or an individually addressed Multi-STA BlockAck frame to each of the STAs from which a Single MPDU that solicited an immediate response was received, and with a Compressed BlockAck frame or a Multi-STA BlockAck frame to each of the STAs from which an A-MPDU that solicited an immediate response was received, or a Multi-STA BlockAck frame to each of the STA from which a multi-TID A-MPDU that solicited an immediate response was received. The control response frames for each STA shall be sent in the allocated RU that is identified by the AID of each STA.
* The AP may respond with group addressed Multi-STA BlockAck frame(s) in an HE MU PPDU if the receivers of group-addressed Multi-STA BlockAck frame announce the support the reception of MU Multi-STA BlockAck frame. The Ack Type field shall be set according to the acknowledgement context.. A HE AP should only transmit a group addressed Multi-STA BlockAck frame in a HE DL MU PPDU to a non-AP HE STA *n* on the (broadcast RU) RU (26/52/106/242/484/996) that includes the RU used for receiving the immediate preceding HE trigger-based PPDU from STA *n*. There shall be no more than one group addressed Multi-STA BlockAck frame that is addressed to multiple recipients carried in a broadcast RU of the HE MU PPDU.