IEEE P802.11  
Wireless LANs

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| **CIDs: Section 9.3.1.8 & 9.3.1.9.7** |
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| **Author(s):** |

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Abstract

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

3006, 3010, 3112, 3162, 5047, 5058, 5067, 5403, 5926, 6075,

6076, 6184, 6272, 6273, 7044, 7134, 7311, 7312, 7314, 7475,

7733, 7734, 7735, 7736, 7737, 7934, 8113, 8157, 8186, 8187

8474, 8475, 8477, 8478, 9362, 9363, 9364, 9625, 9626, 9642

9814, 9815, 9816, 9817, 9818

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** |
| 3006 | Abhishek Patil | 33.49 | What is the BAR Ack Policy subfield for MU-BAR? | Presentation to be provided which would reflect the requirements in the baseline. | Rejected –  MU BAR's Ack poolicy definition is specificed in 9.3.1.23.3 |
| 3010 | Abhishek Patil | 39.63 | AMSDU fragmentation is allowed. Remove the sentence, "For an A-MSDU, only the first bit of the subbitmap is used, as fragmentation is not allowed in an A-MSDU." | Remove the sentence "For an A-MSDU, only the first bit of the subbitmap is used, as fragmentation is not allowed in an A-MSDU." | Revised –  TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 3112 | Adrian Stephens | 38.04 | "NOTE--When a Multi-STA BlockAck frame is used to acknowledge a management frame, the TID value is set to 15." If not stated elsewhere, this should not be in a NOTE | If not stated elsewhere, remove "NOTE-". | Revised – |
| 3162 | Ahmadreza Hedayat | 38.54 | The content of the third colum of the last row of Table 9-24b seems strange; "N/A" is "Not present". Either set both either to "N/A" or set "Block Ack Bitmap" to "Not prsent". | As in the comment | Revised –  Agree in pirnciple. TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 5047 | Chunyu Hu | 38.35 | There is no explicit language anywhere stating what the allowed responses to single VHT are - I assume, without any explicit language, that both ACK and MBA are allowed | Clarify - even if the comment is correct, at least add a note pointing this out to avoid the possibility that an AP responds with ACK and a non-AP STA refuses it. | Revised –  Duplicate of CID8113. TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 5058 | David Kloper | 38.06 | What is the procedure to identify that all MPDU in an AMPDU were received successfully? An MPDU with a good/bad FCS is easy, but what about delimiters being bad causing an MPDU to be lost. A detailed proceedure is required in order to enable this. | A procedure should be defined that is not error prone. | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 5067 | Dengyu Qiao | 37.64 | Regarding multi-TID A-MPDU, the current M-BA mechanism needs to include multiple Per STA Info subfields to acknowledge to one STA. | Define a mechanism to use only one Per STA Info subfield to acknowledge multi-TID MPDUs transmitted by a same STA | Rejected –  Ability to send multiple TIDs of the same STA is already defined through Multi-TID BA. However, note that adding STA AID info is not adding additional overhead |
| 5403 | Geonjung Ko | 38.06 | According to the subclause 27.10.4 (A-MPDU with multiple TIDs), a multi-TID A-MPDU may contain A-MPDU subframes with the EOF subfield set to 1 and the MPDU Length subfield set to nonzero value. The STA that receives the A-MPDU acknowledges successful receptions of MPDUs in the above mentioned A-MPDU subframes with Per STA Info fields indicating an Ack. The TID value of a frame in an A-MPDU subframe with the EOF subfield set to 1 and the MPDU Length subfield set to nonzero value is unique among TID values of frames in the A-MPDU. Therefore, when every unsuccessful receptions of MPDUs are for a MPDU in an A-MPDU subframe with the EOF subfield set to 1 and the MPDU Length subfield set to nonzero, the Per STA Info field without Block Ack Starting Sequence Control and Block Ack Bitmap can acknowledge the successful reception of all MPDUs of a TID value without the ambiguity. This can reduce the length of the Multi-STA BlockAck frame. With this, the description on the Ack Type subfield should be modified. | If the Ack Type subfield is 1 and the TID value of the Per AID TID Info subfield is less than 8 or equal to 15, then the Block Ack Starting Sequence Control and Block Ack Bitmap subfields are not present and the Per STA Info subfield acknowledges successful reception of a single MPDU "or all the MPDUs" indicated by the TID of the Per AID TID Info subfield. | Rejected –  It is not possible to detect whether all the MPDUs of a particular TID in an AMPDU has been received without error, since MPDUs may not be ordered based on TID |
| 5926 | James Yee | 38.12 | The meaning of "all the MPDUs carried in the eliciting A-MPDU" is not clear. Does it include all MPDUs of any TIDs in the eliciting A-MPDU? | Please clarify. | Revised –  Agree that the text was not clear. Made clarifications on how to detect if all MPDUs are received successfully. Reword. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 6075 | Jian Yu | 37.51 | It is better to use AID11 instead of AID | AID11 instead of AID | Accept –  TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 6076 | Jian Yu | 38.04 | The NOTE should be incorprated into Table 9-24b or inline instead of a NOTE. | As in comment | Revised –  Agree to include the text in the main body. TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 6184 | Jin-Sam Kwak | 38.06 | As discussed till now, the shorter Multi-STA BlockAck frame is desirable. When a STA receives all of nonzero length MPDUs with the corresponding EOF subfield set to 0 in a multi-TID A-MPDU, the STA can acknowledge the reception for the MPDUs using a Multi-STA BlockAck frame without the bitmap for the MPDUs indicating each TID. | Please extend the case of a Per STA Info subfield without the Block Ack Starting Sequence Control field and the Block Ack Bitmap field. | Rejected –  All-Ack (Acktype = 1, with TID=14) is used when all MPDUs (across all TIDs) are received without error. Short-acking on a per-TID basis is complex, since the ordering of MPDUs may not be based on TID, and hence it is complex to determine if all MPDUs of a particular TID is received correctly. |
| 6272 | John Coffey | 33.45 | Inconsistent usage: here we have "The TA field value is". In many (most?) other places in the draft we have "The TA field is". What distinction is intended between these two forms? If no distinction is intended, the same form should be used. | Delete "value". | Rejected –  This is part of baseline text. |
| 6273 | John Coffey | 33.49 | Inconsistent usage: here we have "The TA field value is". In many (most?) other places in the draft we have "The TA field is". What distinction is intended between these two forms? If no distinction is intended, the same form should be used. | Delete "value". | Rejected –  This is part of baseline text. |
| 7044 | Ju-Hyung Son | 38.06 | An HE STA can construct a multi-TID A-MPDU containing multiple nonzero length MPDUs with the EOF subfield set to 1 or multiple nonzero length MPDUs with the EOF subfield set to 0. Utilizing the EOF field, a multi-STA BlockAck frame can be more efficient. | As per comment | Rejected –  All-Ack (Acktype = 1, with TID=14) is used when all MPDUs (across all TIDs) are received without error. |
| 7134 | kaiying Lv | 39.51 | Change "and" to "or" | As in comment | Rejected –  BA can indicate only one BA length at any time. |
| 7311 | Kwok Shum Au | 38.33 | The description is about MU-BAR frame rather than BAR frame. | Replace "BAR frame" with "MU-BAR frame". | Revised –  It could be BAR (in the case of a Multi-TID AMPDU SU) or MU-BAR (in the case of MU). TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 7312 | Kwok Shum Au | 38.54 | The description here is about Block Ack Bitmap rather than N/A. | Replace "N/A" with "Block Ack Bitmap". | Revised –  TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7314 | Kwok Shum Au | 39.36 | For the paragraph in lines 36-46, there is no description that the Block Ack Bitmap subfield is used to indicate the receive status of up to 64, 128, 256, and 32 MSDUs and A-MSDUs. | Add description that the Block Ack Bitmap subfield is used to indicate the receive status of up to 64, 128, 256, and 32 MSDUs and A-MSDUs. | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7475 | Lei Huang | 38.54 | The second row under the column "Presence of optional subfields in the Per STA Info field" corresponding to Ack Type = 1 and TID = 15 should be changed from "N/A" to "Block Ack Bitmap" | As per comment | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7733 | Mark Hamilton | 37.23 | There appears to be no such terms as "multi-STA multi-TID" or "multi-STA single TID" | Delete "multi-TID, and multi-STA single TID" | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7734 | Mark Hamilton | 37.46 | Per STA Info is a poor choice of name, since this subfield can be repeated more than once for a given STA. | Change 'Per STA Info' subfield name to 'Per AID TID Info' subfield. Change the first subfield within this subfield from 'Per AID TID Info' to 'AID TID Info', since there is only one of these per 'Per AID TID Info', and it provides the AID and TID information for that 'Per AID TID' pair. | Revised –  TGax editor to apply the changes suggested by the commenter throughout the draft:  Change 'Per STA Info' subfield name to 'Per AID TID Info' subfield.  Change the first subfield within this subfield from 'Per AID TID Info' to 'AID TID Info' |
| 7735 | Mark Hamilton | 37.59 | AIDs are 14 bits. The AID subfield here is a truncated AID. | Change "the AID" to "the 11 least significant bits of the AID" | Revised –  Agree in principle. Changed AID to AID11. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7736 | Mark Hamilton | 38.04 | This is a normative statement, and shouldn't be a NOTE. | Change text to normal (normative) text instead of a NOTE. | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7737 | Mark Hamilton | 38.15 | Circular definition of BASSC subfield format. The sentence says, "When B0 of the Fragment Number subfield of the Block Ack Starting Sequence Control subfield is 0, the Block Ack Starting Sequence Control subfield is as defined in Figure 9-28." But, without knowing the format of hte BASSC subfield (if it is defined per Figure 9-28 or not), the receiver can't find B0 of the Fragment Number subfield. | Add a paragraph, before the sentence at P39L1: "The Block Ack Starting Sequence Control subfield format, if present, is as defined in Figure 9-28. " Change the start of the paragraph at P38L36, to: "When B0 of the Fragment Number subfield of the Block Ack Starting Sequence Control subfield is 0, the Block Ack Bitmap subfield of the BA Information field conatins an 8-octet, 16-octet, 32-octet or 4-octet bitmap subfield depending on B2-B1 of the Fragment Number subfield ..." | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 7934 | Mark RISON | 38.04 | "NOTE---When a Multi-STA BlockAck frame is used to acknowledge a management frame, the TID value is set to 15." -- according to e.g. Table 9-24b this is only the case for Action frames | Delete this NOTE | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8113 | Matthew Fischer | 38.35 | There is no explicit language anywhere stating what the allowed responses to UL OFDMA VHT Single are - I assume, without any explicit language, that both ACK and MBA are allowed | Clarify - even if the comment is correct, at least add a note pointing this out to avoid the possibility that an AP responds with ACK and a non-AP STA refuses it. | Revised –  Clarified that Ack Context (MBA with Acktype=1 & TID 0-7) is sent only in DL in response to an HE TB PPDU. Responding with Ack is legacy behavior, and is captured in 27.4 for HE cases. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8157 | Ming Gan | 38.04 | Now Multi-STA BlockAck can not be used to acknowledge the association request frame because of unassociated STA is not assigned an AID | define a common special AID for all the unassociated STAs such that they can parse the M-BA frame correctly | Rejected –  Un-associated STAs can have a single AID. No need to have individually unique AID. |
| 8186 | Osama Aboulmagd | 37.23 | The language, "multi-STA multi-TID and multi-STA single TID" is very awakward. Additionally there is no BA variant having this name. | I suggest using something like, "Multi-STA BA varaint for single or multiple TID". I am sure the Editor will come up with better wording :-) | Revised –  TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8187 | Osama Aboulmagd | 38.35 | I am wondering what is the value of using multi-STA BA variant to aknowledge a single MPDU or VHT Single MPDU. Is there any gain compared to using the normal ACK frame? | Clarify | Revised –  Clarified that Ack Context (MBA with Acktype=1 & TID 0-7) is sent only in DL in response to an HE TB PPDU (which is used in combination with other Acks). Responding with Ack is legacy behavior, and is captured in 27.4 for HE cases. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8474 | Robert Stacey | 38.13 | "The Ack Type field is not set to 1 when responding to a BlockAckReq frame..." responding to a BlockAckReq frame with a Multi-STA BlockAck frame is not possible. | Change to read: "The Ack Type field is not set to 1 when responding to an MU-BAR frame." | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8475 | Robert Stacey | 38.04 | The TID value for a management frame acknowledgement is descriptive and shouldn't be a NOTE. | Change from a NOTE to a statement that reads: " | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8477 | Robert Stacey | 38.31 | "context" column: A-MPDUs don't solicit anything; the MPDUs in the A-MPDU do the soliciting. Also, there is no way for a BlockAckReq frame to solicit a Multi-STA response so this statement should be deleted. | Change to read: Sent in response to an A-MPDU that carries a QoS Null frame or one or more QoS Data frames of the same TID where the Ack Policy subfield is MU Ack." | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 8478 | Robert Stacey | 33.61 | Meaning needs to be assigned to the nonzero values of the Fragment Number subfield or the strikeout removed | Remove the strikeout | Revised –  BAR can be used to solicit different BA length response based on the FragNumber subfield of BAR. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9362 | Weimin Xing | 39.62 | Fragmentation is allowed in an A-MSDU when dot11AMSDUFragmentationOptionImplemented is true. Delete the sentence "For an A-MSDU, only the first bit of the subbitmap is used, as fragmentation is not allowed in an A-MSDU " | As in comment | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9363 | Weimin Xing | 37.23 | The Multi-STA Block variant can also used for single-STA multi-TID and single-STA single-TID BlockAck variant. | Please add the cases for single-STA multi-TID and single-STA single-TID BlockAck variant. | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9364 | Weimin Xing | 38.54 | Change "N/A" to "Block Ack Bitmap" | As in comment | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9625 | Yongho Seok | 37.23 | "The format defined below is used for multi-STA multi-TID, and multi-STA single TID BlockAck variant." It is conflicted with the following Note. "NOTE--One or more Per STA Info subfields with same value of the AID subfield and different values of the TID subfields can be present in the Multi-STA BlockAck frame." The Multi-STA BlockAck format can be used for single STA multi-TID as well. | Change it as the following: "The format defined below is used for single STA multi-TID, multi-STA multi-TID, and multi-STA single TID BlockAck variant." | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9626 | Yongho Seok | 37.59 | "When Multi-STA BlockAck variant is intended for a non-AP STA,..." The case when Multi-STA BlockAck variant is intended for multiple non-AP STAs is missing. | Change it as the following: "When Multi-STA BlockAck variant is intended for one or more non-AP STA(s),..." | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9642 | Yongho Seok | 33.54 | The 802.11-2016 spec is clearly stating that the Fragment Number subfield is set to 0. Changing Figure 9-28 without revising this sentence is meaningless. | Remove the changes on Figure 9-28 or clarify how to set the Fragment Number if it can be set to a non-zero value. | Revised –  Will add text to state why Fragment Number subfield could take different values based on BA length. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9814 | Young Hoon Kwon | 37.23 | Not clear what "the format defined below" means here. It's better to have figure that describes the format for Multi-STA BlockAck, instead. Or, it can also refer to Figure 9-32. | Per comment. | Revised –  Will point to figure 9-38a. TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 9815 | Young Hoon Kwon | 37.24 | Normative descript is not appropriate in clause 9. | Delete the sentence "Multi-STA BlockAck frames shall be supported if either UL MU or multi-TID A-MPDU operation is supported.", and describe the normative behavior in Clause 10 or Clause 27. | Revised –  Will convert to informative text. TGax editor shall incorporate changes in 11-17-0306-00-00ax. |
| 9816 | Young Hoon Kwon | 38.01 | First, the first sentence should start with a "NOTE". And, the sentence is somewhat misleading as there's no acknowledgement contained in the Per AID TID Info subfield. | Modify the first sentence to "NOTE -- The TID subfield contains the TID for which the acknowledgment or block acknowledgment contained in the Per STA Info subfield applies.". | Revised –  Revised to make the text under NOTE in the main body text. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9817 | Young Hoon Kwon | 38.04 | Does the TID value set to 15 imply a management frame or an action frame? In this note, it is said to be a management frame, but in Table 9-24b and in sub-clause 27.4, it is said to be an action frame. Clarification is needed. | As in the comment. | Revised –  Will clarify that it is a management frame. TGax editor shall incorporate changes in 11-17-0306-00-00ax |
| 9818 | Young Hoon Kwon | 39.62 | In subclause 10.12, it says "An A-MSDU may be fragmented and each fragment transmitted within a single QoS Data frame, when the recipient has indicated support for reception of fragmented A-MSDUs.", which implies that A-MSDU can be fragmented. Therefore, text in 10.12 and text in line 62 contradict each other. Need clarification. | As in the comment. | Revised –  Agree in principle. TGax editor shall incorporate changes in 11-17-0306-00-00ax |

* BlockAckReq frame format
* Overview

Change the 4th paragraph as follows:

The TA field value is the address of the STA transmitting the BlockAckReq frame or a bandwidth signaling TA. In a BlockAckReq frame transmitted by a VHT STA or an HE STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field value is a bandwidth signaling TA.

* Basic BlockAckReq variant

***Change the 3rd paragraph of this subclause as follows:***

The BAR Information field of the Basic BlockAckReq frame contains the Block Ack Starting Sequence Control subfield, as shown in Figure 9-28. The Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield contains the sequence number of the first MSDU for which this Basic BlockAckReq frame is sent. The Fragment Number subfield is set to 0 when sent to a non-HE STA and is set as defined in [CID8478, CID9642] in Table 9-24c when sent to an HE STA.

***Change Figure 9-28 as follows:***

|  |  |  |
| --- | --- | --- |
|  | B0 B3 | B4 B15 |
|  | Fragment Number  ~~(0)~~ | Starting Sequence Number |
| Bits: | 4 | 12 |
| * Block Ack Starting Sequence Control subfield | | |

* Multi-STA BlockAck variant

The BlockAck variant format is defined below as shown in Figure 9-38a [CID9814]. Multi-STA BlockAck frames [CID9815] are supported if either UL MU or multi-TID A-MPDU operation is supported. The Multi-STA BlockAck variant is used to acknowledge multi-STA multi-TID, multi-STA single TID, single-STA Multi-TID or single-STA single-TID A-MPDUs[CID7733, CID9363, CID9625]

The TID\_INFO subfield of the BA Control field of the Multi-STA BlockAck frame is reserved.

The BA Information field of the Multi-STA BlockAck frame comprises one or more Per STA Info subfields. The Per STA Info subfield is shown in Figure 9-38a (Per STA Info subfield format).

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | Per AID TID Info | Block Ack Starting Sequence Control | Block Ack Bitmap |
| Octets: | 2 | 0 or 2 | 0, 4, 8, 16 or 32 |
| * Per STA Info subfield format | | | |

The Per AID TID Info subfield is shown in Figure 9-38b (Per AID TID Info subfield format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B10 | B11 | B12 B15 |
|  | AID11 [CID6075] | Ack Type | TID |
| Bits: | 11 | 1 | 4 |
| * Per AID TID Info subfield format | | | |

When Multi-STA BlockAck variant is intended for [CID9626] one or more non-AP STA(s), the AID11 subfield carries the 11 LSBs of the AID[CID7735] of the non-AP STA for which the Per STA Info subfield is intended. When the Multi-STA BlockAck variant is intended for an AP, the AID11 subfield is set to 0.

NOTE—One or more Per STA Info subfields with same value of the AID11 subfield and different values of the TID subfields can be present in the Multi-STA BlockAck frame.

The TID subfield contains the TID for which the acknowledgment or block acknowledgment contained in the Per AID TID Info subfield applies and is set as defined in Table 9-24b. [CID6076, CID7736, CID7934, CID3112, CID8475, CID9816, CID9817]

If the Ack Type subfield is 1 and the TID value of the Per AID TID Info subfield is less than 8 or equal to 15, then the Block Ack Starting Sequence Control and Block Ack Bitmap subfields are not present and the Per STA Info subfield acknowledges successful reception of a single MPDU indicated by the TID of the Per AID TID Info subfield. If the Ack Type subfield is 1 and the TID subfield of the Per AID TID Info field is 14, then the Block Ack Starting Sequence Control and Block Ack Bitmap are not present and the Per STA Info field acknowledges successful reception of all the MPDUs carried in the eliciting A-MPDU. The responding STA determines that all the MPDUs carried in the eliciting A-MPDU are successfully received if all the MPDUs that is preceeding the first MPDU delimiter with EOF equal to 1 and MPDU Length field equal to 0 are received successfully [CID5058, CID5926]. The Ack Type field is not set to 1 when responding to [CID8474] an MU-BAR frame. If the Ack Type subfield is 0, then the Block Ack Starting Sequence Control and Block Ack Bitmap subfields are present.

The context and the presence of each optional subfields in a Per STA Info subfield in a Multi-STA BlockAck frame is as defined in Table 9-24b (Context of the Per STA Info subfield and presence of optional subfields).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * Context of the Per STA Info subfield and presence of optional subfields | | | | |
| Ack Type subfield value | TID subfield values | Presence of optional subfields  in the Per STA Info field | | Context of a Per STA Info field in a Multi-STA BlockAck frame |
| 0 | 0-7 | Block Ack Starting Sequence Control | Present | Block acknowledgment context:  See Note in the last row of this table  Sent as a response to an A-MPDU that solicits an immediate block acknowledgement or to a BAR frame |
| Block Ack Bitmap | Present |
| 1 | 0-7 | Block Ack Starting Sequence Control | Not present | Acknowledgment context.  See Note in the last row of this table  :  Sent as a response to an MPDU or VHT Single MPDU that solicits an immediate acknowledgment |
| Block Ack Bitmap | Not present |
| 0 or 1 | 8 to 13 | N/A | N/A | Reserved |
| 0 | 14 | N/A | N/A | Reserved |
| 1 | 14 | Block Ack Starting Sequence Control | Not present | All-Ackcontext.  See Note in the last row of this table  :  Sent as a response to an A-MPDU that solicits an immediate response and all MPDUs contained in the A-MPDU are received successfully |
| Block Ack Bitmap | Not present |
| 0 | 15 | N/A | N/A | Reserved |
| 1 | 15 | Block Ack Starting Sequence Control | Not present | Action frame acknowledgment context.  See Note in the last row of this table  :  Sent as a response to an Action Ack frame carried in an A-MPDU that solicits an immediate acknowledgment |
| Block Ack Bitmap [CID 3162, 7312, 7475, 9364] | Not present |
| NOTE-= Additional rules for acknowledgement, block acknowledgment, all-ack, are defined in 27.4.2 for when the A-MPDU is a multi-TID A-MPDU. [CID8477, CID7311, CID8113, CID818 ] | | | | |

If the Ack Type field is 0, the Fragment Number subfield indicates the length of the BlockAck bitmap subfield as defined in Table 9-24c (Fragment Number subfield encoding for the Multi-STA BlockAck variant).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| * Fragment Number subfield encoding for the Multi-STA BlockAck variant | | | | | |
| Fragment Number subfield | | | Fragmentation Level 3 (ON/OFF) | Block Ack Bitmap subfield length (octets) | Maximum number of MSDUs/A-MSDUs that can be acknowledged |
| B3 | B2-B1 | B0 |
| 0 | 0 | 0 | OFF | 8 octets | 64 |
| 0 | 1 | 0 | 16 octets | 128 |
| 0 | 2 | 0 | 32 octets | 256 |
| 0 | 3 | 0 | 4 octets | 32 |
| 0 | 0 | 1 | ON | 8 octets | 16 |
| 0 | 1 | 1 | 16 octets | 32 |
| 0 | 2 | 1 | 32 octets | 64 |
| 0 | 3 | 1 | 4 octets | 8 |
| 1 | Any | Any |  | Reserved | Reserved |
| NOTE—A Multi-STA BlockAck frame with B0 of the Fragment Number subfield set to 1 can only be sent to an HE STA whose HE Fragmentation Support subfield in the HE Capabilities element it transmits is 3 (see 27.3 (Fragmentation)). | | | | | |

When B0 of the Fragment Number subfield of the Block Ack Starting Sequence Control subfield is 0, the [CID7737] BA Information field of the Multi-STA BlockAck frame contains an 8-octet, 16-octet, 32-octet or 4-octet Block Ack Bitmap subfield depending on B2-B1 of the Fragment Number subfield as defined in the Table 9-24c (Fragment Number subfield encoding for the Multi-STA BlockAck variant). [CID7314] indicating the receive status of up to 64, 128, 256 and 32 (A-)MSDUs respectively. Each bit that is equal to 1 in the Block Ack Bitmap subfield acknowledges the successful reception of a single MSDU or A-MSDU in the order of sequence number with the first bit of the Block Ack Bitmap subfield corresponding to the MSDU or A-MSDU with the sequence number that matches the value of the Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield.

When B0 of the Fragment Number subfield of the Block Ack Starting Sequence Control subfield is 1, the Block Ack Bitmap subfield of the BA Information field of the Multi-STA Block Ack frame is used to indicate the receive status of up to 16, 32, 64 or 8 MSDUs or [CID7134] A-MSDUs depending on B2-B1 of the Fragment Number subfield as shown in the Table 9-24c (Fragment Number subfield encoding for the Multi-STA BlockAck variant). If bit position *n* of the Block Ack Bitmap subfield is 1, it acknowledges receipt of an MPDU with sequence number value *SN* and fragment number value *FN* with *n* = 4 × (*SN* – *SSN*) + *FN*, where *SSN* is the value of the Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield and the operations on the sequence numbers are performed modulo 4096. If bit position *n* of the Block Ack Bitmap subfield is 0, it indicates that the MPDU has not been received.

NOTE—When B0 of the Fragment Number subfield is 1 then the Block Ack Bitmap field is split into Block Ack Bitmap field length/4 subbitmaps, each of which indicates receive status for 4 fragments of each of the MSDUs as indicated in Table 9-24c (Fragment Number subfield encoding for the Multi-STA BlockAck variant). [CID9362, CID3010, CID9818]