IEEE P802.11
Wireless LANs

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| **Resolutions to LB230 comments submitted to** **subclauses 9.3.1.9.3 and 9.3.1.9.7** |
| **Date:** 2018-05-07 |

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Abstract

This submission proposes resolutions for the following CIDs to subclauses 9.3.1.9.3 (**2 CIDs**) and 9.3.1.9.7 (**40 CIDs**):

* 11114, 12362
* 13234,
* 11746, 12363,
* 11510, 13525, 14340,
* 11178, 11747, 11748, 11912,
* 11115, 13526,
* 11749, 12006, 12365, 12370, 12596, 11461,
* 12005,
* 11165, 12077,
* 12371,
* 12696,
* 11750,
* 11913,
* 12366, 12583, 12901,
* 11856, 12004, 12082, 12083, 12577, 12744, 12991,
* 12598,
* 12367, 12694,
* 12372,
* 12369

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.***

# 9.3.1.9.3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 11114 | Adrian Stephens | 78.25 | The Fragment Number subfield clearly doesn't hold a fragment number. It holds a fragmentation level and a length indication. Naming should follow purpose | Rename the field in the generic description to something that encompasses this new function.Consider defining new named subfields of this renamed field rather than refering to "B0 of the Fragment Number subfield". | Rejected. The Fragment Number subfield of a BlockAck frame is the same with that of a BlockAckReq frame. By changing the name here in BlockAck frame, it will give great impact to the BlockAckReq frame format and to the remaining text. As it is clear enough how to use this subfield by Tables 9-24a and 9-24c, it is decided to be unchanged.  |
| 12362 | Liwen Chu | 79.07 | it should be "MSDUs and/or AMSDUs". In whole subclause make similar changes. | As in comment | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
|  |  |  |  |  |  |

# 9.3.1.9.7

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 13234 | Robert Stacey | 79.35 | We have an MU-BAR and MU-RTS but we have a Multi-STA BlockAck. Let's be consistent: is it multi-user or multi-STA? | Change the name of the Multi-STA BlockAck frame to MU BlockAck frame. | Rejected. It is a BlockAck frame capable of acknowledging multiple STAs. By changing the name to MU BlockAck frame, it will be misled as though the frame is sent in HE MU PPDU, which is not always the case.  |
|  |  |  |  |  |  |
| 11746 | GEORGE CHERIAN | 79.39 | Need to cover the case for MPDUs sent in HE TB PPDU in the following sentence: "The Multi-STA BlockAck frame is supported if either UL MU or multi-TID A-MPDU operation is supportedand is used to acknowledge multi-STA multi-TID, multi-STA single TID, or single-STA multi-TID | As in the comment | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
| 12363 | Liwen Chu | 79.40 | single STA, single TID in HE TB PPDU is missing. | Add it. | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
|  |  |  |  |  |  |
| 11510 | Chunyu Hu | 79.43 | In "An HE AP that transmits a Multi-STA BlockAck frame with different values of the AID11 subfield in Per AID TID Info subfields sets the RA field to the broadcast address.", change "sets the RA" to "should set RA". | as in the comment | Rejected. As normative requirements are not allowed in clause 9, “shall” cannot be used here.  |
| 13525 | Stephen McCann | 79.43 | In the cited sentence "AID11" is not defined. | Either define "AID11" in the definitions clause or insert a forward reference to Figure 9-38d where it is defined. | Rejected. It is said in the cited sentence that the AID11 subfield is in the Per AID TID Info subfield and it is clear that the Per AID TID info subfield carries the AID TID Info subfield and the AID TID Info subfield carries the AID11 subfield, if read patiently.  |
| 14340 | Zhou Lan | 79.43 | "An HE AP that transmits a Multi-STA BlockAck frame with different values of the AID11 subfield in Per AID TID Info subfields sets the RA field to the broadcast address. An HE AP that transmits a Multi-STA BlockAck frame with a single Per AID TID Info subfield or with the same values of the AID11 subfield in Per AID TID Info subfields sets the RA field to the address of the recipient STA that solicited the BlockAck frame." what does it mean by saying "different values of the AID11 subfield"? If it is mean to be multiple AID11 subfield then please state in that way. Also change "sets the RA" to "Shall set". | as in the comment | Rejected. Please see NOTE 1 after the 8th paragraph in this subclause. Different values of the AID11 subfield means not just multiple AID11 subfields. There can be a case when the AID TID Info subfield is repeated multiple times with the AID11 subfields all the same but the TID subfields being different. In such case, the RA will be an unicast address. Also, “shall” cannot be used here as normative requirements are not allowed in clause 9.  |
|  |  |  |  |  |  |
| 11178 | Albert Petrick | 79.64 | The same Per AID TID info subfield for unique identifier 2045 is use for the same Figure 9-38b. | Change Figure 9-38b to 9-38c and change... is not 2045... to ...is 2045. Remove...not | Accepted. It is already resolved by CIDs 12679 and 11060.  |
| 11747 | GEORGE CHERIAN | 79.64 | Wrong reference. Change to Figure 9-38c (from Figure 9-38b) | As in the comment | Accepted. It is already resolved by CIDs 12679 and 11060. |
| 11748 | GEORGE CHERIAN | 79.64 | This paragraph refers to the case when AID is 2045. Remove "not" from the sentence: "Per AID TID Info subfield format when the AID11 subfield is not 2045)." | As in the comment | Accepted. It is already resolved by CIDs 12679 and 11060. |
| 11912 | Huizhao Wang | 79.65 | Wrong Figure 9-38b is indicated for the Per AID TID Info subfield when AID11 is 2045 | Change the "Figure 9-38b (Per AID TID Info subfield format when AID11 subfield is not 2045)", to "Figure 9-38c (Per AID TID Info subfield format when the AID11 subfield is 2045)" | Accepted. It is already resolved by CIDs 12679 and 11060. |
|  |  |  |  |  |  |
| 11115 | Adrian Stephens | 80.19 | "when the AID11 subfield is not 2045" -- UGH. This is repeated over and over again. It is defining a new mode or structure without naming it. | Define a named mode or structure equivalent to "when the AID11 subfield is not 2045" and use that name consistently throughout. | Rejected. There are only 4 occurrences.  |
| 13526 | Stephen McCann | 80.19 | The title of Figure 9-38b refers to "when the AID11 subfield is not 2045". It's not clear where the AID11 subfield is. | Either define "AID11" in the definitions clause or re-arrange clause 9.3.1.9.7, so that the definition of AID11 appears in the clause before Figure 9-3b. | Rejected. It is clear from the sentence where it refers Figure 9-38b that the AID11 subfield is in the AID TID Info subfield.  |
|  |  |  |  |  |  |
| 11749 | GEORGE CHERIAN | 80.34 | Incomplete sentence. Move it to the previous paragraph. "Where Block Ack Starting Sequence Control subfield is set to 0 and RA subfield indicates the MAC addressof an unassociated STA for which the Per STA Info subfield is intended" | As in the comment | Revised. The part pointed out is resolved by CID 12595. |
| 12006 | James Yee | 80.34 | This paragraph is supposed to describe the subfield meanings when the AID11 subfield is 2045, but there is no text which specifies that. | Add some text or relocate the paragraph | Revised. The part pointed out is resolved by CID 12595. |
| 12365 | Liwen Chu | 80.34 | This is not a complete sentence. | Change it to a complete sentence. | Revised. The part pointed out is resolved by CID 12595. |
| 12370 | Liwen Chu | 80.35 | Change "Per STA Info" to "Per AID TID Info" | As in comment | Accepted.  |
| 12596 | Mark RISON | 80.34 | "Where Block Ack Starting Sequence Control subfield is set to 0 and RA subfield indicates the MAC address of an unassociated STA for which the Per STA Info subfield is intended." -- the BASSC subfield is therefore useless, as are the two reserved octets after it | Delete "Block Ack Starting Sequence Control subfield is set to 0 and" in the cited text, and delete the "Block Ack Starting Sequence Control (0)" and "Reserved" fields in Figure 9-38c | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that the intention is to keep the basic length of the Per AID TID Info subfield the same with the unit length of the BA Information field of the Multi-TID BlockAck, i.e., 12 octets.  |
| 11461 | Carol Ansley | 80.34 | sentence fragment | lines 34 and 35 are a sentence fragment. Not sure what was meant there. Complete sentence or delete. | Revised. The part pointed out is resolved by CID 12595.  |
|  |  |  |  |  |  |
| 12005 | James Yee | 80.38 | It is not clear or not described in text what the Ack Type in the AID TID Info subfield means. Is it just randomly selected in Table 9-24b to fit specific context? If not, please add some text to specify the physical meaning of the Ack Type subfield. | As in the comment. | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Please see the description after Table 9-24b. Note that, although the concept of the subfield is to show whether the acknowledgement is given without Block Ack Bitmap subfield, there are 3 cases when it can be set to 1, i.e., (i) to acknowledge a single QoS Data frame that solicits an Ack frame, (ii) to acknowledge a management frame, and (iii) to acknowledge whole MPDUs within an A-MPDU when they are all received successfully. To avoid misinterpretation of the subfield, it is described in this way.  |
|  |  |  |  |  |  |
| 11165 | Albert Petrick | 80.53 | Clarify unique identifier 2045 in AID 11 | Change A value 2045 to A value equal to 2045 | Accepted.  |
| 12077 | Jinjing Jiang | 80.54 | If the AID 2045 is used for unassociated STA, what is the reason we need to set ACK type B11 and TID field to the fixed value? It seems redundant | Delete "The Ack Type subfield and TID subfield are set to 0 and 15, respectively" | Rejected. They are set to 0 and 15, respectively, in the course of nature. In other words, the Ack Type subfield is set as a default value, 0, and the TID subfield is set to 15 because only management frames can be sent from an unassociated STA. And also by limiting the values to such, future extention can be made.  |
|  |  |  |  |  |  |
| 12371 | Liwen Chu | 81.18 | Change "MPDUs" to "QoS frames" | As in comment | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
|  |  |  |  |  |  |
| 12696 | Mark RISON | 81.22 | "Sent as a response to an MPDU or S-MPDU that solicits animmediate acknowledgment." is imprecise | Change the cited text to "Sent as a response to a QoS Data MPDU that solicits an immediate non-block acknowledgment." | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890.Note that there is no definition of “non-block acknowledgement.”  |
|  |  |  |  |  |  |
| 11750 | GEORGE CHERIAN | 81.29 | Table 9-24b. All-ack context:Current text doesn't cover the Multi-TID case. It is not clear if A-MPDU covers Multi-TID A-MPDU also. | As in the comment | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
|  |  |  |  |  |  |
| 11913 | Huizhao Wang | 81.34 | Ack Type = 0, TID = 15 in Per AID TID Info is no longer as reserved. This combination is defined as acknowldge a management frame sent by unassociated STA | Remove "Reserved", and add the text to describe that this combination is for acknowldge a management frame sent by an unassociated STA | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that Table 9-24b is for the case when AID11 subfield is not 2045, i.e., for associated STAs.  |
|  |  |  |  |  |  |
| 12366 | Liwen Chu | 81.37 | Action can also be in S-MPDU | Change per the comment | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
| 12583 | Mark RISON | 81.37 | "an Action frame carried in an A-MPDU, or PS-Poll frame in an S-MPDU that solicits animmediate acknowledgment" -- Action and PS-Poll frames always solicit an immediate acknowledgement | Delete "that solicits an immediate acknowledgment" in the cited text | Accepted.  |
| 12901 | Mark RISON | 81.37 | "an Action frame carried in an A-MPDU" -- also other MMPDUs, except Action No Ack | Change the cited text to "a Management frame other than an Action No Ack frame, carried in an A-MPDU" | Rejected. An Action frame and an Action No Ack frame are clearly differentiated in subclause 9.3.3. It was also agreed that only Action frame can be carried in an A-MPDU.  |
|  |  |  |  |  |  |
| 11856 | Guoqing Li | 81.46 | The table above says that ACK type =0 and TID=15 is reserved, but the text in this paragraph says that this combination is for unassociated STAs. Please correct. | Clarify | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that Table 9-24b is for the case when AID11 subfield is not 2045, i.e., for associated STAs. |
| 12004 | James Yee | 81.46 | The paragraph is not clear if the associated AID11 is 2045 or not. | Please clarity. | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that Table 9-24b is for the case when AID11 subfield is not 2045, i.e., for associated STAs, and the case for unassociated STAs are already covered by the last sentence in the paragraph just before NOTE 1. |
| 12082 | Jinsoo Ahn | 81.46 | The 'Per AID TID Info' should be changed to 'AID TID Info' | As in the comment | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that Table 9-24b is for the case when AID11 subfield is not 2045, i.e., for associated STAs, and the case for unassociated STAs are already covered by the last sentence in the paragraph just before NOTE 1. |
| 12083 | Jinsoo Ahn | 81.46 | It says 'If the ACK Type subfield is 0 and the TID value of the Per AID TID Info subfield is 15, then the Block AckStarting Sequence Control, 2 octets reserved and RA fields are present and the Per AID TID Info fieldacknowledges a Management frame sent by an unassociated non-AP STA.' This case occurs when AID is 2045 | Move the sentence to P80L55 | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that Table 9-24b is for the case when AID11 subfield is not 2045, i.e., for associated STAs, and the case for unassociated STAs are already covered by the last sentence in the paragraph just before NOTE 1. |
| 12577 | Mark RISON | 81.46 | If the ACK Type subfield is 0 and the TID value of the Per AID TID Info subfield is 15, then the Block Ack Starting Sequence Control, 2 octets reserved and RA fields are present and the Per AID TID Info field acknowledges a Management frame sent by an unassociated non-AP STA." -- this contradicts Table 9-24b | At 81.46 change "If" to "If the AID11 subfield is 2045,". At 81.50 add a para "The remainder of this subclause only applies to the case where the AID11 subfield is not 2045" | Revised. See the instructions to the TGax editor in doc. 11-18/0890.By deleting the cited paragraph, it is now clear that the 3 paragraphs starting after NOTE 1 are descriptions related to Table 9-24b, the case when the AID11 subfeild is not 2045.  |
| 12744 | Mark RISON | 81.46 | "Pre-association ack context: A recipient receiving a single MMPDU from the unassociated STA, that requires an acknowledgment, shall set the Ack Type field to 0, AID subfield to 2045, and the TID field to 15 in the Per AID TID Info field, and the BA information set to the intended recipient's MAC address to indicate the successful reception of that MMPDU." That combination is reserved. Ack Type should be 1. Or maybe it's Table 9-24b that's wrong? "If the ACK Type subfield is 0 and the TID value of the Per AID TID Info subfield is 15, then the Block Ack Starting Sequence Control, 2 octets reserved and RA fields are present and the Per AID TID Info field acknowledges a Management frame sent by an unassociated non-AP STA.". Why not align all of these so that it's always Ack Type 1 and TID 15 to ack an MMPDU? Or at least the second quoted para needs to be explicitly restricted to AID11==2045 | See comment | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Note that Table 9-24b is for the case when AID11 subfield is not 2045, i.e., for associated STAs. |
| 12991 | Massinissa Lalam | 81.46 | A table similar to Table 9-24b should be produced when the AID subfield is 2045 to clarify the behavior and available combination. Otherwise, the line 46 seems a bit out of place (for AID subfield not equal to 2045, the combination described by this line (AckType=1 and TID=15) is N/A. | Create a table equivalent to Table 9-24b but adressing the case when AID is 2045 | Revised. See the instructions to the TGax editor in doc. 11-18/0890.Deleted the cited paragraph, as it is already covered by the last sentence in the paragraph just before NOTE 1. |
|  |  |  |  |  |  |
| 12598 | Mark RISON | 81.51 | This para and the next one seem to duplicate Table 9-24b | Delete the paras in question. Move behavioural information (e.g. "acknowledges successful reception of a single MPDU indicated by the TID of the AID TID Info subfield") to Clause 27 | Rejected. The 2 paragraphs are there to help the interpretation of Table 9-24b. They are explaining the frame format setting and should be here in subclause 9.3.1.9.7.  |
|  |  |  |  |  |  |
| 12367 | Liwen Chu | 81.59 | "The responding STA determines that all the MPDUs carried in the eliciting A-MPDU are successfullyreceived if the all the MPDUs that precede the first MPDU delimiter with EOF equal to 1 and MPDU Lengthfield equal to 0 are received successfully."The sentence is not true. If some MPDUs in the eliciting A-MPDU is wrong, definitely the eliciting A-MPDU is not receievd correctly. | Change the text per the comment. | Rejected. The cited sentence explains how to determine that all the MPDUs carried in the eliciting A-MPDU are successfully received. It is clearly saying that it is when all the MPDUs before the EOF Padding field are received successfully.  |
| 12694 | Mark RISON | 81.59 | "The responding STA determines that all the MPDUs carried in the eliciting A-MPDU are successfullyreceived if the all the MPDUs that precede the first MPDU delimiter with EOF equal to 1 and MPDU Lengthfield equal to 0 are received successfully." -- since the EOF=1 frames can be anywhere in a multi-TID A-MPDU this is not strict enough. Also "received successfully" is not clear enough | Change the cited text to "The responding STA determines that all the MPDUs carried in the eliciting A-MPDU are successfullyreceived if there were no delimiter CRC errors and there were no MPDU FCS errors in that A-MPDU." and move to 27.4.2.a) | Rejected. When EOF is equal to 1 and the MPDU Length field is equal to 0, the remainder will be EOF Padding field. And “received successfully” is used in other places in the baseline, so it is understood to be clear enough.  |
|  |  |  |  |  |  |
| 12372 | Liwen Chu | 82.06 | Change to "If Ack Type subfield is 0 and TID subfield is less than 8," | As in comment | Revised. Agree in principal with the comment. See the instructions to the TGax editor in doc. 11-18/0890. |
|  |  |  |  |  |  |
| 12369 | Liwen Chu | 82.42 | Level 2 fragment is missing from the paragraph. | Add the missed case. | Rejected. The paragraph describes Table 9-24c which is related to level 3 fragmentation and as all the other levels are lower than level 3, it is clear that they will be categorized into level 3 “OFF” case.  |
|  |  |  |  |  |  |

#### 9.3.1.9 BlockAck frame format

TGax Editor: Change texts under 9.3.1.9.3 in P802.11ax D2.3 as follows:

##### 9.3.1.9.3 Compressed BlockAck variant

Change subclause 9.3.1.9.3 (including Figure 9-34) as follows:

The TID\_INFO subfield of the BA Control field of the Compressed BlockAck frame contains the TID for which this BlockAck frame is sent.

The BA Information field of the Compressed BlockAck frame comprises the Block Ack Starting Sequence Control subfield and the Block Ack Bitmap subfield, as shown in Figure 9-35 (BA Information field (Compressed BlockAck)). The Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield contains the sequence number of the first MSDU or A-MSDU for which this BlockAck frame is sent. The value of this subfield is defined in 10.24.7.5 (Generation and transmission of BlockAck frames by an HT STA or DMG STA). ~~The Fragment Number subfield of the Block Ack Starting Sequence Control subfield is set to 0.~~

|  |  |  |
| --- | --- | --- |
|  | Block Ack Starting Sequence Control | Block Ack Bitmap |
| Octets: | 2 | 8 or 32 |

**Figure 9-35—BA Information field (Compressed BlockAck)**

The Fragment Number subfield of the Block Ack Starting Sequence Control field is set as defined in Table 9-24a (Fragment Number subfield encoding for the Compressed BlockAck variant).

Insert the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **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 | 64 |
| 0 | 1 | 0 | Reserved | Reserved |
| 0 | 2 | 0 | 32 | 256 |
| 0 | 3 | 0 | Reserved | Reserved |
| 0 | 0 | 1 | ON | 8 | 16 |
| 0 | 1 | 1 | Reserved | Reserved |
| 0 | 2 | 1 | 32 | 64 |
| 0 | 3 | 1 | Reserved | Reserved |
| 1 | Any | Any |  | Reserved | Reserved |
| NOTE—A Compressed BlockAck frame with B0 of the Fragment Number subfield set to 1 is not sent to an HE STA whose HE Fragmentation Support subfield in the HE Capabilities ele-ment it transmits is not set to 3 (see 27.3 (Fragmentation and defragmentation)). |

**Table 9-24a—Fragment Number subfield encoding for the Compressed BlockAck variant**

Change the remainder of 9.3.1.9.3 as follows:

If(#11060) B0 of the Fragment Number subfield is 0, the Block Ack Bitmap subfield of the BA Information field of the Compressed BlockAck frame indicates(#11062) the receive status of up to 64 or 256 MSDUs and/or(#12362) A-MSDUs depending upon the value of B2-B1 in the Fragment Number subfield as shown in Table 9-24a (Fragment Number subfield encoding for the Compressed BlockAck variant),~~The Block Ack Bitmap sub-field of the BA Information field of the Compressed BlockAck frame is 8 octets in length and is used to indi-cate the received status of up to 64 MSDUs and A-MSDUs.~~ Each bit that is equal to 1 in the compressed 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, A-MSDU,(#12362) or fragment thereof with the sequence number that matches the value of the Starting Sequence Number subfield of the Block Ack Starting Sequence Control subfield.

If(#11060) B0 of the Fragment Number subfield is 1, the Block Ack Bitmap subfield of the BA Information field of the Compressed BlockAck frame indicates(#11062) the receive status of up to 16 or 64 MSDUs and/or(#12362) A-MSDUs depending upon the value B2-B1 in the Fragment Number subfield as shown in Table 9-24a (Fragment Number subfield encoding for the Compressed 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—If(#11060) the B0 of the Fragment Number subfield is equal to 1 then the Block Ack Bitmap subfield is split into (Block Ack Bitmap subfield length)/4 subbitmaps, each of which indicates receive status for 4 fragments of each of the MSDUs or A-MSDUs(#12362) as indicated in Table 9-24a (Fragment Number subfield encoding for the Compressed BlockAck variant).

TGax Editor: Change texts under 9.3.1.9.7 in P802.11ax D2.3 as follows:

##### 9.3.1.9.7 Multi-STA BlockAck variant

The Multi-STA BlockAck frame is supported if either UL MU or multi-TID A-MPDU operation is supported and acknowledges(#11062) MPDUs carried in an HE TB PPDU or(#11746, #12363) multi-STA multi-TID, multi-STA single TID, or single-STA multi-TID A-MPDUs.

An HE AP that transmits a Multi-STA BlockAck frame with different values of the AID11 subfield in Per AID TID Info subfields sets the RA field to the broadcast address. An HE AP that transmits a Multi-STA BlockAck frame with a single Per AID TID Info subfield or with the same values of the AID11 subfield in Per AID TID Info subfields sets the RA field to the address of the recipient STA that solicited the BlockAck frame. A non-AP HE STA that transmits a Multi-STA BlockAck frame with a single Per AID TID Info field or with multiple Per AID TID Info subfields each carrying the same AID value, sets the RA field to the TA field of the soliciting frame or to the address of the recipient STA whose Data or Management frames(#12596) are acknowledged.(#13644)

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 AID TID Info subfields as defined in Figure 9-38a (BA Information field format (Multi-STA BlockAck)).

|  |  |
| --- | --- |
|  | Repeated for each <AID, TID> tuple |
|  | Per AID TID Info |
| Octets: | variable |

**Figure 9-38a—BA Information field format (Multi-STA BlockAck)**

If the AID11 subfield of the AID TID Info subfield is not 2045, then the Per AID TID Info subfield has the format shown in Figure 9-38b (Per AID TID Info subfield format if(#11060) the AID11 subfield is not 2045).(#11060)

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

**Figure 9-38b—Per AID TID Info subfield format if(#11060) the AID11 subfield is not 2045**

If the AID11 subfield of the AID TID Info subfield is 2045, then the Per AID TID Info subfield has the format shown in Figure 9-38c (Per AID TID Info subfield format if the AID11 subfield is 2045)(#12679, #11060), where (#12596) the RA subfield indicates the MAC address of an unassociated STA for which the Per AID TID(#12370) Info subfield(#13747) is intended.(#12595)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | AID TID Info |  | Reserved | RA |
| Octets: | 2 |  | 4 | 6 |

**Figure 9-38c—Per AID TID Info subfield format if the AID11 subfield is 2045(#12596)**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 | B10 | B11 | B12 | B15 |
|  | AID11 | Ack Type | TID |
| Bits: | 11 | 1 | 4 |

**Figure 9-38d—AID TID Info subfield format**

The AID11 subfield carries the 11 LSBs of the AID of the non-AP STA for which the Per AID TID Info subfield is intended. If the Multi-STA BlockAck frame is intended for an AP, the AID11 subfield is set to 0. A value equal to(#11165) 2045 in the AID11 subfield is used as a unique identifier for any unassociated STA. If the AID11 subfield is set to 2045, then the Ack Type subfield and TID subfield are set to 0 and 15, respectively.(# 11060)

NOTE 1—More than one Per AID TID Info subfield with the same value in the AID11 subfield but different values in the TID subfield can be present in the Multi-STA BlockAck frame.

If the AID11 subfield is not 2045, then 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 (Context of the Per AID TID Info subfield and presence of optional subfields if(#11060) the AID11 subfield is not 2045).

**Table 9-24b—Context of the Per AID TID Info subfield and presence of optional subfields if(#11060) the AID11 subfield is not 2045**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ack Type subfield values** | **TID subfield values** | **Presence of Block Ack Starting Sequence Control subfield and Block Ack Bitmap subfields** | **Context of a Per AID TID Info subfield in a Multi-STA BlockAck frame** |
| 0 | 0–7 | Present | Block acknowledgment context:Sent as a response to QoS Data frames(#12371) in an A-MPDU that solicit an immediate block acknowledgment(#11208) or to a BlockAckReq frame. |
| 1 | 0–7 | Not present | Acknowledgment context:Sent as a response to a QoS Data frame that solicits an Ack frame response(#12696). |
| 0 or 1 | 8–13 | N/A | Reserved |
| 0 | 14 | N/A | Reserved |
| 1 | 14 | Not present | All-ack context:Sent as a response to an A-MPDU or Multi-TID A-MPDU(#11750) that solicits an immediate response and all MPDUs contained in the A-MPDU or Multi-TID A-MPDU(#11750) are received successfully. |
| 0 | 15 | N/A | Reserved |
| 1 | 15 | Not present | Action frame/PS-Poll acknowledgment context:Sent as a response to an Action frame carried in an A-MPDU or S-MPDU(#12366), or PS-Poll frame in an S-MPDU(#12583). |
| NOTE—Additional rules for acknowledgment(#11208), block acknowledgment and all-ack are defined in 27.4.2 (Acknowledgment(#11208) context in a Multi-STA BlockAck frame) for a multi-TID A-MPDU. |

(#12596, #12005, #11913, #11856, #12004, #12082, #12083, #12577, #12744, #12991)If the Ack Type subfield is 1 and the TID subfield(#12368) 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 AID TID Info subfield acknowledges successful reception of a single MPDU indicated by the TID of the AID TID Info subfield. If the Ack Type subfield is 1 and the TID subfield of the AID TID Info subfield is 14, then the Block Ack Starting Sequence Control and Block Ack Bitmap are not present and the Per AID TID Info subfield 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 the all the MPDUs that precede the first MPDU delimiter with EOF equal to 1 and MPDU Length field equal to 0 are received successfully. The Ack Type subfield is not set to 1 when responding to an MU-BAR Trigger frame. If the Ack Type subfield is 0 and the TID value of the Per AID TID Info subfield is smaller than 8, then the Block Ack Starting Sequence Control and Block Ack Bitmap subfields are present.

The context and the presence of each optional subfield in a Per AID TID Info subfield in a Multi-STA BlockAck frame is defined in Table 9-24b (Context of the Per AID TID Info subfield and presence of optional subfields if(#11060) the AID11 subfield is not 2045).

If the Ack Type subfield is 0 and the TID subfield is less than 8(#12372), the Fragment Number subfield encoding indicates the length of the BlockAck bitmap subfield as defined in Table 9-24c (Fragment Number subfield encoding for the Multi-STA BlockAck variant).

**Table 9-24c—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 | 64 |
| 0 | 1 | 0 | 16 | 128 |
| 0 | 2 | 0 | 32 | 256 |
| 0 | 3 | 3 | 4 | 32 |
| 0 | 0 | 1 | ON | 8 | 16 |
| 0 | 1 | 1 | 16 | 32 |
| 0 | 2 | 1 | 32 | 64 |
| 0 | 3 | 1 | 4 | 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 and defragmentation)). |

If(#11060) B0 of the Fragment Number subfield of the Block Ack Starting Sequence Control subfield is 0, the 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 Table 9-24c (Fragment Number subfield encoding for the Multi-STA BlockAck variant) indicating the receive status of up to 64, 128, 256 or 32 MSDUs or 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.

If(#11060) 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 BlockAck frame(#12784) indicates(#11062) the receive status of up to 16, 32, 64 or 8 MSDUs or A-MSDUs depending on B2-B1 of the Fragment Number subfield as shown in 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 2—If(#11060) 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). For an A-MSDU, only the first bit of the subbitmap is used, when fragmentation is not allowed in an A-MSDU.