IEEE P802.11  
Wireless LANs

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Abstract

This submission proposes resolutions of comments received from TGax LB225.

(The proposed change is based on TGax Draft 1.4.)

* CIDs: 9389 (1 CID)

NOTE: Revision 1 includes a clarification text that the A-MPDU is an ack-enabled A-MPDU.

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** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 9389 | 111.03 | 9.7.3 | In data enabled no immediate response context, Data frames without block ack agreement from multiple different TIDs can be aggregated. | Change to: QoS Data frames with multiple TIDs that does not correspond to a block ack agreement. These have the Ack Policy field equal to No Ack and the A-MSDU Present subfield equal to 0. | Revised-  Basically, the proposed change is same as the original text.  Meanwhile, for A-MSDU support of QoS Data frames without a block ack agreement, additional discussion and text change are necessary. Please see the discussion part in 11-17/1271r1.  TGax editor makes changes as shown in the as specified in 11-17/1271r1. |

**Discussion:**

In IEEE 802.11n and 802.11ac, a support of an A-MSDU in A-MPDU is as the following:

In the data enabled immediate response context, an A-MSDU in A-MPDU is an optional support.

* An A-MSDU can be carried in a QoS data frame if the recipient indicates the support of an A-MSDU.
  + The A-MSDU Supported subfield of the Block Ack Parameter Set field is set to 1 by a STA to indicate that it supports an A-MSDU carried in a QoS Data frame sent under this block ack agreement. It is set to 0 otherwise. (from IEEE 802.11-2016 spec)

In the data enabled no immediate response context, an A-MSDU in A-MPDU is not supported.

* An A-MSDU can’t be carried in a QoS data frame because the A-MSDU Present subfield of a QoS data frames without a block ack agreement is constrained to 0 in the baseline spec.

In the S-MPDU context, an A-MSDU in A-MPDU is a mandatory support when a QoS data frame does not have a block ack agreement and it is an optional support when a QoS data frame has a block ack agreement.

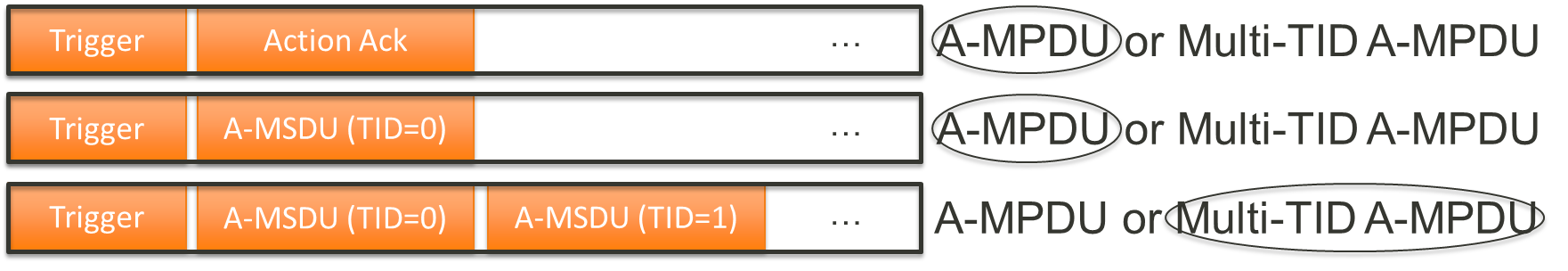
* A STA shall support the reception of an A-MSDU, where the A-MSDU is carried in a QoS Data frame with Ack Policy equal to Normal Ack in the following cases:
  + By an HT STA when the A-MSDU is not aggregated within an A-MPDU.
  + By a VHT STA when the A-MSDU is sent as an S-MPDU.
* But, a QoS Data frame with Ack Policy equal to Implicit Block Ack Request is still optionally supported if the recipient indicates the support of an A-MSDU.

For 802.11n/ac, the following table summarizes when the A-MSDU in A-MPDU is supported.

|  |  |  |
| --- | --- | --- |
| A-MPDU context | A-MSDU in QoS data frame with HT-immediate block ack agreement | A-MSDU in QoS data frame without HT-immediate block ack agreement |
| Data enabled immediate response context | 11n/ac: Optional | 11n/ac: N/A |
| Data enabled no immediate response context | 11n/ac: N/A | 11n/ac: N/A |
| S-MPDU context | 11n/ac: Optional | 11n/ac: Mandatory |

In 802.11ax, a support of an A-MSDU in A-MPDU has the following issue.

The following combinations have been newly supported in the data enabled immediate response context from 802.11ax. (In the below figure, TID0 and TID1 have no block ack agreement.)



According to the definition of a multi-TID A-MPDU is that first and second PPDUs are not a multi-TID A-MPDU.

* A multi-TID A-MPDU is an A-MPDU that contains QoS Data frames with two or more different TID values. (from IEEE 802.11ax Draft 1.4)

Current 802.11ax Draft 1.4 is ambiguous whether dot11MPDUAskedforAckInMultiTIDAMPDU shall be set to true for supporting above first and second PPDUs, because first and second PPDUs are not a multi-TID A-MPDU.

* An HE transmitter shall not aggregate MPDU that asks for Ack in a multiple-TID A-MPDU to the HE recipient unless the recipient sets Ack Enabled Multi-TID A-MPDU Support subfield to 1 in its announced HE Capabilities element. (from IEEE 802.11ax Draft 1.4)

BTW, with those interpretation, in the data enabled immediate response context, an A-MSDU in A-MPDU is a conditional mandatory support if an A-MPDU is an ack-enabled A-MPDU when a QoS data frame does not have a block ack agreement.

* A-MSDU can be carried in a QoS data frame without HT-immediate block ack agreement.
  + Because there is no signaling mechanism (e.g., block ack agreement) to indicate whether the STA supports an A-MSDU in A-MPDU or not.

For 802.11ax, the following table summarizes when the A-MSDU in A-MPDU is supported.

|  |  |  |
| --- | --- | --- |
| A-MPDU context | A-MSDU in QoS data frame with HT-immediate block ack agreement | A-MSDU in QoS data frame without HT-immediate block ack agreement |
| Data enabled immediate response context | 11n/ac: Optional  11ax: Optional | 11n/ac: N/A  11ax: Conditional Mandatory  (If an A-MPDU is an ack-enabled A-MPDU.) |
| Data enabled no immediate response context | 11n/ac: N/A  11ax: N/A | 11n/ac: N/A  11ax: N/A |
| S-MPDU context | 11n/ac: Optional  11ax: Optional | 11n/ac: Mandatory  11ax: Mandatory |

When considering an implementation complexity, we prefer to keep an optional support of A-MSDU in A-MPDU.

In that sense, our proposal is to add a new A-MSDU in A-MPDU Support field in the HE MAC Capabilities Information field.

An A-MSDU in A-MPDU Support field is set to 1 for indicating that QoS Data frames without HT-immediate block ack agreement in A-MPDU can carry the A-MSDU. Otherwise it is set to 0.

**9.4.2.237.2 HE MAC Capabilities Information field**

***TGax editor: change Figure 9-589ck and Table 9-262z as the following:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B33 | B34 | B35 | B36 | B37 | B38 | ~~B38~~ B39 |
|  | QTP Support | BQR Support | SR Responder | NDP Feedback Report Support | OPS Support | A-MSDU in  A-MPDU Support | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 9-589ck—HE MAC Capabilities Information field format**

**Table 9-262z—Subfields of the HE MAC Capabilities Information field**

|  |  |  |
| --- | --- | --- |
| A-MSDU in A-MPDU Support | Indicates support by a STA to receive an ack-enabled A-MPDU in which A-MSDU is carried in a QoS Data frame for which no block ack agreement exists. | Set to 1 when the STA supports reception of this A-MSDU in an ack-enabled A-MPDU.  Set to 0 otherwise. |

***TGax editor: change sub-clause 10.12 as the following:***

**10.12 A-MSDU operation**

…

A STA shall support the reception of an A-MSDU, where the A-MSDU is carried in a QoS Data frame with Ack Policy equal to Normal Ack in the following cases:

— By an HT STA when the A-MSDU is not aggregated within an A-MPDU

— By a VHT or HE STA when the A-MSDU is sent as a ~~VHT single~~ S-MPDU

The use of an A-MSDU carried in a QoS Data frame under a block ack agreement is determined for each block ack agreement. A STA shall not transmit an A-MSDU within a QoS Data frame under a block ack agreement unless the recipient indicates support for A-MSDU by setting the A-MSDU Supported field to 1 in its BlockAck Parameter Set field of the ADDBA Response frame.

An HE STA shall not transmit an A-MSDU that is carried in a QoS Data frame for which no block ack agreement exists and that is part of an ack-enabled A-MPDU unless the recipient indicates support for A-MSDU by setting the A-MSDU in A-MPDU Supported field to 1 in its HE MAC Capabilities Information field of the HE Capabilities element.