IEEE P802.11
Wireless LANs

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| 11ax D2.0 Comment Resolution 27.10.4.1 |
| Date: 2018-04-18 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D2.0 with the following CIDs:

* 11279, 12926, 12932, 11280, 11281, 13728, 12927, 12928, 13295, 13729,
* 11284, 11285, 13727, 11287, 11288, 11289, 13680, 11290, 11291, 11292,
* 11294

Revisions:

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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** | **PP** | **LL** | **Comment** | **Proposed Change** | **Resolution** |
| 11279 | 300 | 34 | This is not an If statement, so the otherwise does not belong here. Use the same wording as the previous paragraph. Also please remove redundancy of calling out HE MAC Capabilities Information field. | As in comment. | **Revised****Generally agree with the commenter.****TGax editor ot make changes in 11-18/0797r1 under CID 11279** |
| 12926 | 300 | 43 | "An ack-enabled A-MPDU is an A-MPDU that follows the rules in 9.7 (Aggregate MPDU (A-MPDU)) and10.13 (A-MPDU operation) except that it shall contain:" -- it is not clear what the "except" means here. It might mean that it restricts the A-MPDUs to a particular subset of what 9.7/10.13 allow, or it might mean that it contradicts some of the rules in 9.7/10.13 | Change "except that it shall contain" to "and that contains both of the following" | **Revised** **Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r1 under CID 12926** |
| 12932 | 300 | 43 | We have a definition of ack-enabled multi-TID A-MPDU in 27.10.4.1 and another in 27.10.4.3 | Delete the definition in 27.10.4.1 | **Rejected****Ack-enabled A-MPDU is different from ack-enabled multi-TID A-MPDU. Ack-enabled A-MPDU can’t aggregate more than of the following frames: QoS Data frames, Management frames except Action no Ack frames. Ack-enalbed Multi-TID A-MPDU allows the aggregation of more than of the following frames: QoS Data frames, Management frames except Action no Ack frames.** |
| 11280 | 300 | 44 | Suggest rewriting the paragraph: "An ack-enabled A-MPDU is an A-MPDU that follows the rules in 9.7 (Aggregate MPDU (A-MPDU)) and10.13 (A-MPDU operation) except that it shall contain:" Also the first bullet should be Either, or, but not both. | Rewrite as:"An ack-enabled A-MPDU is an A-MPDU that is constructed as defined in 9.7 (Aggregate MPDU (A-MPDU)) and 10.13 (A-MPDU operation) except that it shall contain:- One MPDU that is either a QoS Data frame with Ack Policy field set to Normal Ack or HTP Ack or an Action frame and is carried in an A-MPDU subframe with the EOF field set to 1-- One or more MPDUs that are not sent under block ack agreements and are carried in A-MPDU subframes with the EOF field set to 0". | **Revised** **Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r0 under CID 11280** |
| 11281 | 300 | 44 | The multi-TID A-MPDU is not even defined yet and it is already been forbidden. Please define first and then forbid it. Also what about Ack-enabled A-MPDU? | Move this sentence after definining multi-TID A-MPDU. And determine the fate of Ack-enabled A-MPDUs as well. | **Revised** **Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r2 under CID 11281** |
| 13728 | 300 | 45 | It is ambiguos whether an ack-enable A-MPDU shall contain both or either one of:-- One QoS Data frame with the Ack Policy field set to Normal Ack or HTP Ack each carried in an AMPDU subframe with the EOF field set to 1, or one Action frame carried in an A-MPDU subframe with the EOF field set to 1-- One or more frames in A-MPDU subframes with the EOF field set to 0 that are not under the block ack agreements | Need to clarify | **Revised** **Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r1 under CID 13728** |
| 12927 | 300 | 46 | "---One QoS Data frame with the Ack Policy field set to Normal Ack or HTP Ack each carried in an A-MPDU subframe with the EOF field set to 1, or one Action frame carried in an A-MPDU subframewith the EOF field set to 1--- One or more frames in A-MPDU subframes with the EOF field set to 0 that are not under the blockack agreements" is confusing, e.g. "each" and incomplete, e.g. can be multiple EOF=1 QoS Datas | Change the cited text to "--- One or more QoS Data frames with the Ack Policy field set to Normal Ack or HTP Ack and/or one Action frame, where each frame is carried in an A-MPDU subframe with the EOF field set to 1--- One or more frames carried in A-MPDU subframes with the EOF field set to 0 and that are not sent under block ack agreements" | **Rejected****Discussion: Ack-enabled A-MPDU is different from ack-enabled multi-TID A-MPDU. Ack-enabled A-MPDU can’t aggregate more than of the following frames: QoS Data frames, Management frames except Action no Ack frames. Ack-enalbed Multi-TID A-MPDU allows the aggregation of more than of the following frames: QoS Data frames, Management frames except Action no Ack frames.** |
| 12928 | 300 | 46 | An A-MPDU with two EOF=1 MPDUs is also an ack-enabled multi-TID A-MPDU, even if there are no EOF=0 MPDUs | As it says in the comment | **Rejected****Discussion: Ack-enabled A-MPDU is different from ack-enabled multi-TID A-MPDU. Ack-enabled A-MPDU can’t aggregate more than of the following frames: QoS Data frames, Management frames except Action no Ack frames. Ack-enalbed Multi-TID A-MPDU allows the aggregation of more than of the following frames: QoS Data frames, Management frames except Action no Ack frames.** |
| 13295 | 300 | 50 | "One or more frames in A-MPDU subframes with the EOF field set to 0 that are not under the block ack agreement"QoS Data frames that are not part of a block ack agreement MUST be sent in EOF = 1 subframes. | Remove the statement. (QoS Data frames in EOF = 1 subframes already covered by rpevious bullet) | **Revised****Discussion: the cited bullet is about the MPDU that are neither QoS Data frames nor Management frames.** **TGax editor to make changes in 11-18/0797r1 under CID 13295** |
| 13729 | 300 | 50 | If a QoS Data frame not under the BA agreement is contained in an ack-enabled A-MPDU, the EOF field must be set to 0? If so, what is the expected Acknowledgement context in M-BA, Ack context or BlockAck context? | Need to clarify | **Revised****Discussion: the cited bullet is about the MPDU that are neither QoS Data frames nor Management frames.** **TGax editor to make changes in 11-18/0797r1 under CID 13729** |
| 11284 | 301 | 10 | This rule is superceded by the rules in the last paragraph of P300. As such it is not needed. | As in comment. | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r1 under CID 11284** |
| 11285 | 301 | 17 | Table 9-426 (Data enabled no immediate response context) is not related to the multi-TID context. Please remove this reference as it is wrong. | As in comment. | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r1 under CID 11285** |
| 13727 | 301 | 30 | The TID Aggregation Limit has been proposed to save the reordering buffer of an HE recipient with partial state operation and to reduce the length of M-BA. As QoS Data with Ack Policy set to No Ack affects neither the reordering buffer of the recipient nor the length of M-BA, it must be excluded from the TID Aggregation Limit counting | Change to "Any number of QoS Data frame and QoS Null frame with any TID with which the Ack Policy field is set to No Ack may be aggregated in an A-MPDU carried in the HE TB PPDU regardless of the value of the TID Aggregation Limit subfield and the value of the Preferred AC subfield in the Basic Trigger frame." | **Rejected.****Discussion: the QoS Data frame with No Ack in Ack Policy field is not allowed in multi-TID A-MPDU.** |
| 11287 | 301 | 42 | Primary AC is defined in 10.22.2.8. Add a reference to it. | Replace "This AC is defined as the primary AC." with " The AC used to gain access to the medium is defined as the primary AC (see 10.2.2.28)." | **Revised****TGax editor to make changes in 11-18/0797r1 under CID 11287.** |
| 11288 | 301 | 42 | It may be obvious but better to clarify that this primary AC access rule is applicable for both non-ack enabled and for ack-enabled Multi-TID A-MPDU transmissions. The reason that it seems to not cover the Ack-enabled portion is because the Action frame presence is not listed in the items. | As in comment. | **Rejected.****Discussion: The text of primary AC rules in P301L42 already mentioned MPDUs from signle TID and multiple ITDs.** |
| 11289 | 301 | 42 | I think the normative behavior specifying that the Multi-STA BlockAck shall be used to acknowledge MT A-MPDU is already covered in 27.4. So this statement may be redundant here. Please remove normative behavior redundancy. This should be placed (if not already there) in clasue 27.4 that governs M-BA generation. | As in comment. | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r1 under CID 11289** |
| 13680 | 301 | 42 | "When TXOP limit is not zero then the STA may aggregate QoS Data frames from one or more TIDs in the A-MPDU under the following conditions:" How about an Action frame? | Allow aggregation of an Action frame. | **Rejected****Discusion: Action frame is not under the restriction of primary AC rules.**  |
| 11290 | 301 | 62 | There is some duplication between this paragraph and the one in P301L22. Please remove one and add the missing portion in the one of P301L22. The portion that is missing is to cover the case of A-MPDU and actually also the case of S-MPDU. But actuallly they should already be listed in 27.5.3.4. So it would be good to remove any normatvie behavior redundancy if possible. | As in comment. | **Revised.****Discussion: the paragraph is covered by the following sentence in 27.5.3.4:** The number of TIDs present in the A-MPDU, in either QoS Data or BlockAckReq frames, shall count towards reaching the TID aggregation limit that is obtained from the TID Aggregation Limit field of the User Info field addressed to the STA in the Trigger frame**However the paragraph in P301 L22 is about the aggragation rules of QoS Null frames. Propose to remove this paragraph and keep the paragraph in P301 L22.****TGax editor to make changes in 11-18/0797r2 under CID 11290** |
| 11291 | 302 | 11 | ...of the Trigger Dependent User Info field " that is addressed to the STA". And not MPDUs in general but "QoS Data". Please add these clarifications. This observation is actually valid for multiple occurrences of MPDUs in this subclause. | As in comment. | **Revised****Generally agree with the commenter.****TGax editor to make changes in 11-18/0797r1 under CID 11291** |
| 11292 | 302 | 23 | I think this paragraph is saying the same thing that the previous paragraphs are saying. Refer to the paragraphs preceding it. Iff we want to keep this I would suggest to have it as a note. | As in comment. | **Revised****Discussion: The previous paragraph is about A-MPDU solicited by Basic Trigger with AC except AC BK in Prefered AC field. The paragraph in L23 can only be applied to A-MPDU solicited by Basic Trigger with AC BK in Prefered AC field. However changing the paragraph in L23 seems ok since paragraphs in L5 and L16 cover this paragraph.****TGax editor to make changes in 11-18/0797r1 under CID 11292** |
| ~~11293~~ | ~~302~~ | ~~23~~ | ~~Perhaps it is good to have one paragraph that covers as itemized list: Single TID case (this paragraph) and Multi-TID case (paragraph in P302L6-11).~~ | ~~Check if we can save some printer toner by merging the two paragraphs while preserving the technical content.~~ |  |
| 11294 | 302 | 39 | This sentence is isolated and kind of out of concext at the end of this subclause. Suggest to have this sentence in the same paragraph (or adjacent) with those related to the transmission of the multi-TID -MPDU transmission in other HE PPDU types. | As in comment. | **Rejected****Discussion: The paragraphes before this one are about A-MPDU aggregation in HE SU, HE TB PPDU. This paragraph is about the A-MPDU aggregation rules in HE MU PPDU.** |

 **27.10.4 multi-TID A-MPDU and ack-enabled A-MPDU**

**27.10.4.1 General**

An HE STA with dot11AMPDUwithMultipleTIDOptionImplemented(#12147) equal to true shall set the Multi-TID Aggregation Rx Support subfield(#12379) (#11279) in the HE Capabilities element it transmits to a nonzero value. An HE STA with dot11AMPDUwithMultipleTIDOptionImplemented(#12147) equal to false shall set the Multi-TID Aggregation Rx Support subfield(#12379) to 0.(#14303)

An HE STA with dot11AckEnabledAMPDUOptionImplemented equal to true shall set the Ack-Enabled Aggregation Support subfield in the HE Capabilities element it transmits to 1; An HE STA with dot11AckEnabledAMPDUOptionImplemented equal to false shall set the Ack-Enabled Aggregation Support subfield to 0.(#11279)

A first HE STA may transmit an ack-enabled A-MPDU to a second HE STA if the first HE STA has received from the second HE STA an HE Capabilities element where the Ack-Enabled Aggregation Support subfield is 1.

(#12926, 11280, 13728, 13295, 13729)An ack-enabled A-MPDU is an A-MPDU that follows the rules in 9.7 (Aggregate MPDU (A-MPDU)) and 10.13 (A-MPDU operation) and that contains the following:

* One EOF-MPDU that is either QoS Data frame with the Ack Policy field set to Normal Ack or HTP Ack, or one Management frame that solicit immediate response
* One or more non-EOF-MPDUs that are not under the block ack agreements
* 0 or more A-MPDU subframes with Length field set ot 0

Note: An ack-enabled A-MPDU can’t contains more than one of the following frames: QoS Data frames, Management frame that solicits immediate response.

 (#11281)A multi-TID A-MPDU is either a non-ack-enabled multi-TID A-MPDU or an ack-enabled multi-TID A-MPDU. A first HE STA may transmit a non-ack-enabled multi-TID A-MPDU to a second HE STA if the first HE STA has received from the second STA an HE Capabilities element where the Multi-TID Aggregation Rx Support subfield(#12379) is nonzero. A first HE STA may transmit an ack-enabled multi-TID A-MPDU or a non-ack-enabled multi-TID A-MPDU to a second HE STA if the first HE STA has received from the second HE STA an HE Capabilities element where the Multi-TID Aggregation Rx Support subfield(#12379) is nonzero and where the Ack-Enabled Aggregation Support subfield is 1. Otherwise the first HE STA shall not transmit a multi-TID A-MPDU to the second HE STA.

An HE STA shall not transmit a multi-TID A-MPDU or ack-enabled A-MPDU in a VHT PPDU or a HT PPDU. (#11281)

An HE STA shall construct a multi-TID A-MPDU as defined in 9.7 (Aggregate MPDU (A-MPDU)) and 10.13 (A-MPDU operation) and following the rules defined in the subclauses below.

(#11284)A non-AP STA shall not send a multi-TID A-MPDU in an HE TB PPDU unless it is in response to a Basic Trigger frame where the TID Aggregation Limit field of the User Info field addressed to the STA is nonzero.

An HE STA may aggregate QoS Data frames with multiple TIDs in a multi-TID A-MPDU(#13026) as defined in Table 9-425 (A-MPDU contents in the data enabled immediate response context).(#11285)

(#11290)The multi-TID A-MPDU may contain an Action frame if the TID Aggregation Limit is nonzero and the AP supports reception of ack-enabled multi-TID A-MPDUs.

Any number of QoS Null frames with any TID and with Ack Policy field set to No Ack(#13030) may be aggregated in an A-MPDU carried in the HE TB PPDU regardless of the value of the TID Aggregation Limit subfield and the value of the Preferred AC subfield in the Basic Trigger frame.

NOTE—A QoS Null frame with the Ack Policy field set to Normal Ack or Implicit Block Ack Request is not allowed to be sent in an A-MPDU (as defined in Table 9-425 (A-MPDU contents in the data enabled immediate response context), Table 9-426 (A-MPDU contents in the data enabled no immediate response context(#13283)) and Table 9-428 (A-MPDU contents MPDUs in the control response context(#13283))).

A multi-TID A-MPDU shall not be transmitted in an HE SU PPDU, HE ER SU PPDU or HE MU PPDU, except when the TXOP limit is not zero for the AC that is used to gain access to the medium. This AC used to gain access to the medium is defined as the primary AC(see 10.22.2.28).(#11287) When the TXOP limit(#12956) is not zero then the STA may aggregate QoS Data frames from one or more TIDs in the A-MPDU under the following conditions:

* The A-MPDU shall be carried in either an HE SU PPDU or an HE ER SU PPDU transmitted by STA within the obtained TXOP or an HE MU PPDU transmitted by a non-AP STA within the obtained TXOP
* The A-MPDU shall contain one or more MPDUs with any of the TIDs that correspond to the primary AC
* When no more MPDUs can be aggregated in the A-MPDU from any of the TIDs that correspond to the primary AC then the A-MPDU may additionally contain one or more MPDUs with TIDs that do not correspond to the primary AC if the TIDs correspond to any AC that has a higher priority with respect to the primary AC and the addition of these MPDUs does not cause the STA to exceed the current TXOP duration

The Multi-STA BlockAck frame is used to acknowledge the MPDUs in a multi-TID A-MPDU(as defined in subclause 27.4 (HE acknowledgment(#11208) procedure(#13250)). (#11289)

 (#11290)

For an HE STA with dot11AMPDUwithMultipleTIDOptionImplemented set to true and having a single A-MPDU containing MPDUs with different value of TIDs, the MPDUs with the same TID value may be aggregated in non-contiguous A-MPDU subframes.

When the AP specifies a value defined in Table 9-136 (ACI-to-AC encoding)(#Ed) in the Preferred AC subfield in the Trigger Dependent User Info field of a Basic Trigger frame, then an HE STA with dot11AMPDUwithMultipleTIDOptionImplemented set to true should aggregate QoS Data MPDUs from any one of the TIDs from the same AC or higher AC as indicated in the Preferred AC subfield of the Trigger Dependent User Info field that is addressed to the STA in the Trigger frame, up to the limit indicated in the TID Aggregation Limit subfield in Trigger Dependent User Info field of the Trigger frame. (#11291) (#11292)

NOTE—While it is recommended that the STA transmit QoS Data from the AC that is same or higher than the preferred AC, the STA is still permitted to aggregate QoS Data from an AC lower than the preferred AC.

Tthe STA may aggregate MPDUs from TIDs in other ACs within the remaining time to the HE TB PPDU duration value indicated in the UL Length subfield(#11372) in the Common Info field of the received Trigger frame, up to the limit indicated in the TID Aggregation Limit subfield in Trigger Dependent User Info field of the Trigger frame. (#11292)

Note: When the AP indicates AC\_BK in the Preferred AC subfield in the Trigger Dependent User Info field of a Basic Trigger frame, then an HE STA with dot11AMPDUwithMultipleTIDOptionImplemented set to true can aggregate MPDUs from any AC/TID or combination of TIDs, up to the limit indicated in the TID Aggregation Limit subfield in Trigger Dependent User Info field of the Trigger frame. (#11292)

An HE STA that intends to send QoS Data frames from a single TID should select a TID from the same or higher priority AC indicated in the Preferred AC subfield in the Trigger Dependent User Info field of a Basic Trigger frame. If the HE STA has no buffered MPDU for TIDs belonging to the same or higher priority AC indicated in the Preferred AC subfield in the Trigger Dependent User Info field of a Basic Trigger frame, then the HE STA may include MPDUs for a TID belonging to any other AC in that A-MPDU carried in the HE TB PPDU.

NOTE—A multi-TID A-MPDU allows the aggregation of an Action frame regardless of the value indicated in the Multi-TID Aggregation Rx Support subfield(#12379) in the HE MAC Capabilities Information field of the HE Capabilities element as long as the indicated in the value of the TID Aggregation Limit subfield in the Trigger Dependent User Info field of a the Basic Trigger frame is nonzero.

An HE AP may aggregate MPDUs from any TIDs in multi-TID A-MPDU for DL HE MU PPDU transmission and the number of TIDs in multi-TID A-MPDU shall not be more than the Multi-TID Aggregation Rx Support(#12379) announced by the recipient.