IEEE P802.11
Wireless LANs

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| LB187-PR-AMPDU-LENGTH-PAD |
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Abstract

Proposed resolutions to LB187 CIDs 4389, 4392, 4660 and 4524

# Revision notes:

**REV3:**

CID 4660 – modified the way that the proposed text changes account for TXOP sharing

**REV2:**

CID 4392 – modified wording of references to EOF Pad, EOF Padding to be consistent and less ambiguous.

**REV1:**

**REV0:**

**CID 4389:**

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| 4389 | Brian Hart | 104.47 | 9.12.2 | "up to" and including? | Check, and add suggested language if needed. | Reject – Changing the language potentially causes existing devices to become non-compliant. |

**Discussion:**

The baseline has already committed us to this language.

It is unclear if receivers have been implemented to NOT include that last 1 octet or not.

It would be dangerous to change the language now and force a requirement on existing devices.

(Alternatively, the language for VHT could be changed while leaving the HT language unchanged.)

**9.12.2 A-MPDU length limit rules**

Using the Maximum A-MPDU Length fields, the STA establishes at association the maximum

length of an A-MPDU pre-EOF padding that can be sent to it. An HT STA shall be capable of

receiving A-MPDUs of length up to the value indicated by the Maximum A-MPDU Length Exponent

field in its HT Capabilities element. A VHT STA shall be capable of receiving A-MPDUs where the AMPDU

pre-EOF padding length is up to the value indicated by the Maximum A-MPDU Length Exponent

field in its VHT Capabilities element.

A STA shall not transmit an A-MPDU in an HT\_MF or HT\_GF PPDU that

is longer than the value indicated by the Maximum A-MPDU Length Exponent field in the HT Capabilities

element sent by the intended receiver. A STA shall not transmit an A-MPDU in a VHT PPDU

where the A-MPDU pre-EOF padding length is longer than the value indicated by the Maximum A-MPDU

Length Exponent field in the VHT Capabilities element sent by the intended receiver. A DBand STA shall

not transmit an A-MPDU that is longer than the value indicated by the Maximum A-MPDU Length Exponent

field in the DBand Capabilities element.

**CID 4392, 4660:**

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| 4392 | Brian Hart | 106.43 | 9.12.6 | "The procedure in the subclause is applied for each user ..." was never good enough as shown by P106L58 or P106L65 | Delete this sentence and apply an iteration (or "each-ification") over users as required. E.g. P107L15-23: append each para with ", for each user"; and at P106L47: "an A-MPDU ... pad the ampdu" -> "one or more A-MDPUs ... pad each ampdu" | Revise - Tgac editor to make changes shown under the heading CID 4389 within document 11-12-0541r3 which generally agree with the sentiment expressed by the commenter. |
| 4660 | kaiying Lv | 106.52 | 9.12.6 | "The inclusion of secondary AC traffic in an MU PPDU shall not increase the duration of the MU PPDU beyond that required to transport the primary AC traffic. "The value of the PSDU\_LENGTH parameter for user u returned in the PLME-TXTIME.confirm primitive and in the RXVECTOR for an MU PPDU is calculated based on the largest number of data symbols in the data field of multiple users. However PHY cannot guarantee the largest number of data symbols comes from the APEP\_LENGTH of user u of primary AC, but MAC layer should make sure that the largest data symbols come from the A\_MPDU from the primary AC. | Clarify in the section 9.12.6 A-MPDU padding for VHT PPDU that "An A-MPDU pre-EOF padding for MU PPDU shall also follow the rule that the inclusion of secondary AC traffic in an MU PPDU shall not increase the duration of the MU PPDU beyond that required to transport the primary AC traffic (see 9.19.2.2a Sharing an EDCA TXOP constraints. | Revise - Tgac editor to make changes shown under the heading CID 4660 within document 11-12-0541r3 which generally agree with the sentiment expressed by the commenter. |

**Discussion:**

Proposed resolution is revise, with the following proposed draft changes:

***TGac editor, please make changes to subclause “9.12.6 A-MPDU padding for VHT PPDU*” *of 802.11 TGac draft 2.1 as shown:***

* A-MPDU padding for VHT PPDU

A VHT STA that delivers a one or more A-MPDUs to the PHY (using PHY-DATA.request primitives) as one or more PSDUs for a VHT PPDU shall pad the A-MPDU(s) as described in this subclause.

An A-MPDU pre-EOF padding (see 9.12.2 (A-MPDU length limit rules)) is constructed for each user from the MPDUs available for transmission and meeting the A-MPDU content (see 8.6.3 (A-MPDU contents)), length limit (see 8.6.1 (A-MPDU format)) and MPDU start spacing (see 9.12.3 (Minimum MPDU Start Spacing field)) constraints for the intended recipient and that have a TID value that matches the primary AC. The A-MPDU\_Length[n] for user *n* is initialized as the length of the A-MPDU pre-EOF padding.

The length of the longest resulting A-MPDU pre-EOF padding is used as the APEP\_LENGTH parameter value for the PLME-TXTIME.request (see 6.5.7 (PLME-TXTIME.request)) primitive which is invoked once per PPDU (not once per user) and in the MAC padding procedure described in this subclause. The PLME-TXTIME.confirm (see 6.5.8 (PLME-TXTIME.confirm)) primitive provides the TXTIME parameter and PSDU\_LENGTH[] parameters for each user for the transmission.

While A-MPDU\_Length[n] <= PSDU\_LENGTH[n], for each user *n,* as per the rules for EDCA TXOP Sharing (see 9.19.2.2a Sharing an EDCA TXOP), a VHT STA may:

* add to the A-MPDU for that user, A-MPDU subframes that have a TID that matches the secondary AC and that meet the A-MPDU content (see 8.6.3 (A-MPDU contents)), length limit (see 8.6.1 (A-MPDU format)) and MPDU start spacing (see 9.12.3 (Minimum MPDU Start Spacing field)) constraints for the intended recipient, incrementing the A-MPDU\_Length[n] with the length of each such added A-MPDU subframe
* add to the A-MPDU for that user, a A-MPDU subframes with 0 in the MPDU Length field and 0 in the EOF field and incrementing the A-MPDU\_Length[n] with the length of each such added A-MPDU subframe

Padding is then added to the A-MPDU for each user such *n*, that the resulting A-MPDU for that user contains exactly PSDU\_LENGTH[n] octets, as follows:

* First, while A-MPDU\_Length[n] < PSDU\_LENGTH[n] and A-MPDU\_Length[n] mod 4 != 0, add a subframe padding octet and increment A-MPDU\_Length[n] by 1
* Then, while A-MPDU\_Length[n] + 4 <= PSDU\_LENGTH[n], add an A-MPDU[n] subframe with 0 in the MPDU Length field and 1 in the EOF field and increment A-MPDU\_Length[n] by 4
* Finally, while A-MPDU\_Length[n] < PSDU\_LENGTH[n], add an EOF pad octet and increment A-MPDU\_Length[n] by 1

An A-MPDU subframe with EOF set to 1 and with MPDU Length field set to 0 shall not be added before any A-MPDU subframe with EOF set to 0.

An A-MPDU subframe with EOF set to 1 and with MPDU Length field set to 0 shall not be added before an A-MPDU subframe that contains a VHT single MPDU (see 9.12.7 (Setting the EOF field of the MPDU delimiter(#4969))).

An EOF pad octet shall not be added before any A-MPDU subframe.

**CID 4524:**

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| 4524 | David Hunter | 28.33 | 8.2.4.5.4 | Since a VHT single MPDU is by definition inside an A-MPDU frame, the 11mb version of this text already covers the VHT single MPDU case. | Remove this change to the 11mb text. | Revise – While a VHT single MPDU is an A-MPDU in construct, it does differe in behavior with respect to the ACK policy bits and therefore must be separately identified. The language of draft 2.0 is confusing and needs to be clarified. See changes effected for CID 4817 in draft 2.1. |

**Discussion:**

Note that the commenter suggests that the 11mb language already covers the VHT single case, but it is hard to tell. I.e. the VHT single MPDU is in some sense, NOT an A-MPDU because at least for the purpose of acknowledgement, it is treated differently than an A-MPDU. Based on this behaviour, the commenter would argue that the existing language already correctly identifies the VHT single MPDU case.

The 11mb language was:

*In a frame that is a non-A-MPDU frame*

However, even though for some purposes, the VHT single MPDU is NOT the same as an A-MPDU, it is quite easy to argue successfully that a VHT single MPDU is in fact, an A-MPDU because by definition, any VHT format frame is an A-MPDU and the VHT single MPDU is built using the A-MPDU format - it contains at least one MPDU delimiter, which is only found within the format of an A-MPDU. So, because a VHT single MPDU might be considered by some well-educated, sophisticated, congenial people to be an A-MPDU and by other similarly well-educated, sophisticated, congenial people to NOT be an A-MPDU, it is not really clear whether the 11mb language does or does not include the VHT single MPDU, hence the desire on the part of the TGac for a modification to the 11mb baseline text.

However, the draft 2.0 language was admittedly confusing in its wording because it cannot be definitively established whether the modifier “not” applies to only the phrase preceding the conjunction “or”, or to the pair of conjoined phrases. CID 4817 suggested a change to clarify exactly this point, and this change, which has been effected in draft 2.1 should also satisfy CID 4524.

Draft 2.0 language:

*~~In a frame that is a non-A-MPDU frame~~When not carried in an A-MPDU*

*subframe or carried in a VHT single MPDU:*

Draft 2.1 language:

*In a frame that is either a VHT single MPDU or not carried in an A-MPDU~~a~~*

*~~non-A-MPDU frame~~(#4817):*

**References:**