IEEE P802.11
Wireless LANs

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| CID 6049 S1G A-MPDU |
| Date: 2024-01-09 |
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Abstract

This document contains proposed text changes to address IEEE P802.11-REVme SB1 CID 6049.

Revision History:

R0: Initial version.

# CID 6049

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| CID | Clause | Comment | Proposed Change |
| 6049 | 10.25 | A-MPDU design for S1G has significant flaws as described in: https://mentor.ieee.org/802.11/dcn/21/11-21-0766-01-000m-a-mpdu-issue-for-802-11ah.pptx To avoid these problems industry has implemented A-MPDUs in the same way as 802.11ac. | Remove the S1G version of A-MPDUs. |

## Background

Changes to A-MPDU originator processing were introduced in 802.11ah-2016 which are specific to S1G STAs. For example, in 802.11me d4.1 Section 10.25.6.7 Originator’s behavior:

“During an accepted HT-immediate block ack agreement, the S1G originator of an A-MPDU that is not an SMPDU eliciting an NDP BlockAck frame shall set the Fragment Number subfield in the Sequence Control field of each MPDU in the A-MPDU to WinStartO + WinSizeO – 1 – SN, where SN is the value of the Sequence Number subfield in the corresponding MPDU within the A-MPDU.”

There are no instructions to indicate when the originator should modify the Fragment Number subfield which may lead to differing implementations. For example, a literal implementation would change the Fragment Number subfield after encryption and after FCS creation, since in the A-MPDU case aggregation occurs after these steps.

* The Fragment Number subfield is part of the additional authentication data (AAD) so modifying it after encryption will cause decryption to fail unless the recipient masks the subfield out, but there are no instructions for that on the receive side.
* Modifying the Fragment Number subfield after FCS creation means it cannot be verified on receipt.

Initial 802.11ah interoperability testing by industry indicated that there were differing implementations on the transmit side, which led to industry not implementing the modification of the fragment number subfield for S1G MPDUs in an A-MPDU that is not an S-MPDU.

## Proposed Resolution for CID 6049

Modified. Using 802.11me d4.1 as a baseline please request the REVme Editor to apply the changes below which remove the text that instructs an S1G originator to modify the Fragment Number subfield of each MPDU in an A-MPDU that is not an S-MPDU and remove related scoreboard text.

* Scoreboard context control during full-state operation

Change the text as shown:

* For each received Data frame that is (#407)related to a specific full-state operation HT-immediate block ack agreement, the block acknowledgment record for that agreement is modified as follows, where *SN* is the value of the Sequence Number subfield of the received Data frame(#4200):
* If , set to 1 the bit in position *SN* within the bitmap.

* If ,

* Set to 0 the bits corresponding to MPDUs with Sequence Number subfield values from *WinEndR*+1 to *SN* – 1.
* Set *WinStartR* = *SN* – *WinSizeR* + 1.
* Set *WinEndR* = *SN*.
* Set to 1 the bit at position *SN* in the bitmap.
* If , make no changes to the record.

NOTE—A later-arriving Data frame might validly contain a sequence number that is lower than an earlier-arriving one. This might happen because the transmitter may choose to send Data frames in a nonsequential sequence number order or because a previous Data frame transmission with lower sequence number is not successful and is being retransmitted.

* Scoreboard context control during partial-state operation

Change the text as shown:

A STA implementing partial-state operation for an HT-immediate block ack agreement shall maintain the temporary block acknowledgment record for that agreement according to the following rules:

* During partial-state operation(#4200), *WinStartR* is determined by the Sequence Number subfield value of received Data frames and by the Starting Sequence Number subfield value of received BlockAckReq frames as described below.(#4200)
* For each received Data frame that is (#407)related to a specific partial-state operation HT-immediate block ack agreement, when no temporary record for the agreement (#407)related to the received Data frame exists at the time of receipt of the Data frame, a temporary block acknowledgment record is created as follows, where *SN* is the value of the Sequence Number subfield of the received Data frame (11ay)if segmentation and reassembly is not used and is the value of the MPDU Sequence Number subfield of the received Data frame when segmentation and reassembly is used:
* *WinEndR* = *SN.*
* General(11ay)

Remove the 11th paragraph:

**References:**