

Discussions on Signaling for UL HE MU PPDU

Date: 2017-01-16

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UL HE MU PPDU

Table 9-262aa—Subfields of the HE PHY Capabilities Information field

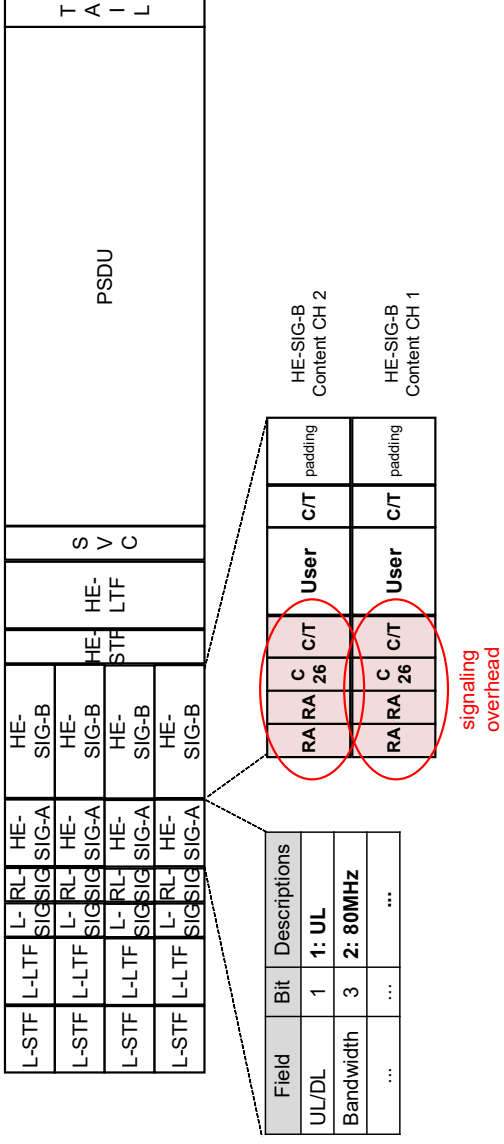
UL HE MU PPDU Payload Support	Indicates that the STA supports the reception of an HE MU PPDU payload over full bandwidth and partial bandwidth (106-tone RU within 20 MHz).	Set to 0 if not supported. Set to 1 if supported. This field is reserved for a non-AP STA.
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- **In 11ax Draft 1.0, UL HE MU PPDU is defined**
 - An HE non-AP STA may transmit UL HE MU PPDU to an HE AP
 - If the HE AP sent an HE Capabilities element with the UL HE MU PPDU Payload Support field equal to 1
 - UL HE MU PPDU can be transmitted in full bandwidth or partial bandwidth (106-tone RU within 20MHz)
 - HE-SIG-B’s STAID in user field indicates the transmitting non-AP STA
- **UL HE MU PPDU is beneficial in that the transmitter can reveal its STAID in preamble part, and that it can utilize the 106-tone RU.**
- **However, since the HE-SIG-B field is designed for DL MU communication, it may incur unnecessary overhead when used for UL HE MU PPDU**

LB225 CIDs on Signaling for UL HE MU PPDU

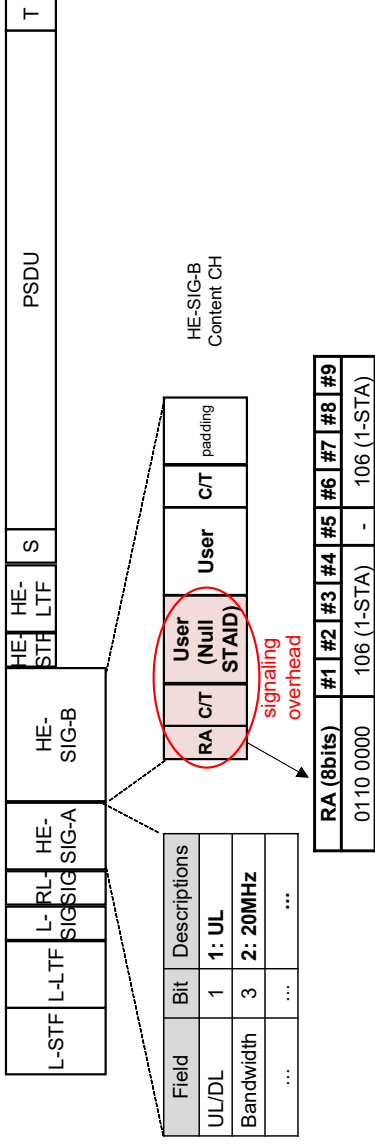
CID	Page.line	Comment	Proposed Change
5412	285.55	An HE MU PPDU with the UL/DL field set to 1 is intended to one STA and the HE-SIG-B design is not efficient.	Please refine the HE-SIG-B design for the UL case to reduce the length of the HE-SIG-B field.
6194	84.26	For UL HE MU PPDU transmission from an STA to an AP, the current SIG-A/B design incurs overhead because the current format is designed for DL MU signaling. SIG-B's RU allocation and User specific fields can be redundant overheads for UL HE MU PPDU.	Please specify UL HE MU PPDU's SIG-A/B signaling detail.
7032	84.28	For the current HE-SIG-B design which is designed for DL MU signalling, it is inefficient to signal full-BW UL HE MU PPDU transmission. RU allocation field is not required in full-BW UL HE MU PPDU, since SIG-A's BW subfield signals the PPDU BW and the signaling of RU allocation is not needed.	Please clarify SIG-A/B signalling method for full bandwidth (20/40/80/160(80+80) MHz) UL HE MU PPDU transmission with the minimal overhead.
7033	84.28	For the current HE-SIG-B design which is designed for DL MU signalling, it is inefficient to signal partial bandwidth transmission (left or right 106tone/20MHz) of UL HE MU PPDU transmission. For example, it requires signalling of RU allocation (106, -, 106) and two User specific information fields where one user information field would be useless.	Please clarify SIG-A/B method for partial bandwidth (left/right 106-tone RU within 20MHz) UL HE MU PPDU transmission with the minimal overhead.

Full-BW UL HE MU PPDU example



- For example, if a non-AP STA transmits 80MHz UL HE MU PPDU to an AP
 - HE-SIG-A's BW field indicates 80MHz
 - HE-SIG-B's common block field in each content channel indicates redundantly
 - Two 8-bit RU Allocation fields indicating "996(1-STA)"
 - One 1-bit Center 26-tone RU field indicating "0"
 - 10-bit CRC/Tail
- In each HE-SIG-B content channel, 18/18/27/43 bits of overhead respectively for 20/40/80/160(80+80)MHz UL HE MU PPDU
- Therefore, it is not required to transmit the Common Block field in HE-SIG-B for the full-BW UL HE MU PPDU case

Partial-BW UL HE MU PPDU example



- For example, if a non-AP STA transmits right 106-tone RU in Primary 20MHz to an AP using UL HE MU PPDU
 - HE-SIG-A's BW field indicates 20MHz
 - HE-SIG-B indicates
 - One 8-bit RU Allocation field indicating "106(1-STA), -, 106(1-STA)"
 - 10-bit CRC/Tail
 - Two User specific info fields while the first includes STAID 2046 indicating RU carries no data
- In HE-SIG-B, 39 bits of overhead for 106-tone/20MHz UL HE MU PPDU
- Therefore, more efficient signaling is needed for the partial-BW UL HE MU PPDU

Proposed signaling for UL HE MU PPDU

- **HE-SIG-B's Common Block field is redundant for UL HE MU PPDU**
 - For the full-BW UL HE MU PPDU
 - PPDU's bandwidth is signaled in SIG-A's BW field
 - Then RU Allocation field is not needed
 - For the partial-BW UL HE MU PPDU
 - Simple indication of left/right 106-tone RU in primary 20MHz can be signaled in HE-SIG-A's BW field (similar to the 106-tone signaling in HE ER SU PPDU)
- **Proposal**
 - For UL HE MU PPDU, the Common Block field of HE-SIG-B is not present
 - For the partial-BW UL HE MU PPDU, the left/right 106-tone RU within the primary 20MHz is signalled in HE-SIG-A's BW field (reusing the preamble puncturing bit ranges in DL)

Summary

- **A non-AP HE STA may transmit UL HE MU PPDU to an HE AP if it is allowed**
- **However, the current SIG-B design incurs signaling redundancy**
 - 18~43 bits of SIG-B overhead in full-BW PPDU
 - 39 bits of SIG-B overhead in partial-BW PPDU
- **For UL HE MU PPDU, we propose that Common Block field of HE-SIG-B is not present and bandwidth options are signaled in SIG-A**

Strawpoll #1

- **Do you agree with the following?**
- When the UL/DL field in the HE-SIG-A field of an HE MU PPDU is set to 1 (indicating UL HE MU PPDU), the Common Block field is not present and the content channel consists of only the User Specific field.
- Y/N/A

Strawpoll #2

- **Do you agree with the following?**
- When the UL/DL field in the HE-SIG-A field of an HE MU PPDU is set to 1 (indicating UL HE MU PPDU), the Bandwidth field in the HE-SIG-A field of an HE MU PPDU is defined as follows:
 - Set to 0 for full 20 MHz
 - Set to 1 for full 40 MHz
 - Set to 2 for full 80 MHz
 - Set to 3 for full 160 MHz and 80+80 MHz
 - Set to 4 for lower 106-tone RU within the primary 20MHz
 - Set to 5 for higher 106-tone RU within the primary 20MHz
 - Values 6-7 are reserved

- Y/N/A