IEEE P802.11  
Wireless LANs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CR on LTF/GI for HE ER SU PPDU | | | | | | Date: 2017-05-10 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm |  |  | youhank@qca.qualcomm.com | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for the following comments from the letter ballot on P802.11ax D1.0:

9765

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version

R1: Added rule that 4xLTF+0.8us GI must be supported for HE SU/MU PPDU if supported for HE ER SU PPDU.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 9769 | Youhan Kim | 274.33 | 28.3.10.7.2 | 4xLTF+0.8 for HE\_EXT\_SU as well?  THe capability bit is for HE\_SU only, not for HE\_MU or HE\_EXT\_SU  But HE\_SIG\_A change is for HE\_EXT\_SU as well (also for HE\_MU)  The HE PHY Capabilities Information field (P86L24) defines 4x HE-LTF and 0.8 usec GI only for HE SU PPDUs, not HE extended range SU. | Change at P274L33 "a 4x HE-LTF and 0.8 us GI" to "if HE extended SU PPDU format, a 4x HE-LTF and 0.8 us GI" |

**Discussion**

According to the HE Capabilities, 4x HE-LTF + 0.8 usec GI is an optional mode for HE SU and HE MU PPDUs (D1.2 P89L6 – Table 9-262aa).

|  |  |  |
| --- | --- | --- |
| 4x HE-LTF And 0.8 s GI | Indicates support for the reception of an HE SU PPDU and HE MU PPDU with 4x LTF and 0.8 s guard interval duration.(#Ed, #9136) | Set to 0 if not supported.  Set to 1 if supported. |

However, the HE-SIG-A field for HE SU and HE ER SU PPDU does not dintinguish between HE SU and HE ER SU PPDUs for 4x HE-LTF + 0.8 usec GI (D1.2 P302L48 – Table 28-15).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B21-B22 | GI+LTF Size | 2 | Indicates the GI duration and HE-LTF size.  Set to 0 to indicate a 1x HE-LTF and 0.8 µs GI  Set to 1 to indicate a 2x HE-LTF and 0.8 µs GI  Set to 2 to indicate a 2x HE-LTF and 1.6 µs GI  Set to 3 to indicate   * a 4x HE-LTF and 0.8 µs GI when both the DCM and STBC fields are 1. Neither DCM nor STBC shall be applied when both the DCM and STBC are set to 1. * a 4x HE-LTF and 3.2 µs GI otherwise |

Hence, there is discrepancy between the capabilities for the optional feature and the HE-SIG-A signalling.

Note that the benefit of the 4x HE-LTF + 0.8 usec GI is different between HE SU and HE ER SU PPDU. This is because the 4x HE-LTF + 0.8 usec GI helps to reduce GI overhead while eliminating channel estimation interpolation loss incurred in 1x and 2x HE-LTF modes. However, HE ER SU PPDU does not support 16-QAM and higher order modulations, thus the impact of channel estimation interpolation loss is less than for HE SU PPDU. Furthermore, HE ER SU PPDU is more focused on packet robustness than data rate increase. If channel estimation interpolation loss reduction is desired, we already have the 4x HE-LTF + 3.2 usec GI mode for HE ER SU PPDU – and it is even a mandatory mode.

Hence, to bridge the gap between the HE Capabilities and the signalling in HE-SIG-A, and to allow implementations to choose tradeoff between the benefit of 4x HE-LTF + 0.8 usec GI mode for HE ER SU PPDU, the proposed resolution adds a capability bit indicating the support of the mode for HE ER SU PPDU.

**Proposed Resolution: CID 9769**

**Revised**. Commenter correctly points out the discrepancy between the HE Capabilities and the HE-SIG-A signalling. Proposed resolution is to add a capability bit for the support of 4x HE-LTF + 0.8 usec GI mode for HE ER SU PPDU.

TGax editor: Implement the text changes under the “Proposed Text Updates: CID 9769” section in 11-17/0813r1.

**Proposed Text Updates: CID 9769**

9.4.2.218.3 HE PHY Capabilities Information field

*TGax Editor: Update Figure 9-589cl as shown below at D1.2 P84L22.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B58 | | B59   B61 | B62 | B63 | B64 | B65   B71 |
|  | 4x HE-LTF And 0.8 s GI for HE SU and HE MU PPDU | | Max Nc(#8676) | STBC Tx  80 MHz(#8381) | STBC Rx  80 MHz(#8381) | 4x HE-LTF And 0.8 s GI for HE ER SU PPDU | Reserved |
| Bits: | 1 | | 3 | 1 | 1 | 1 | 7 |
|  | | Figure 9-589cl – HE PHY Capabilities Information field format | | | | | |

*TGax Editor: Add the following row to Table 9-262aa at D1.2 P89L9.*

|  |  |  |
| --- | --- | --- |
| 4x HE-LTF And 0.8 s GI for HE SU and HE MU PPDU | Indicates support for the reception of an HE SU PPDU and HE MU PPDU with 4x LTF and 0.8 s guard interval duration. | Set to 0 if not supported.  Set to 1 if supported.  If a STA indicates support for the 4x HE-LTF And 0.8 us GI for HE ER SU PPDU, then the STA shall also support the 4x HE-LTF And 0.8 us GI for HE SU PPDU and HE MU PPDU. |
| 4x HE-LTF And 0.8 s GI for HE ER SU PPDU | Indicates support for the reception of an HE ER SU PPDU with 4x LTF and 0.8 s guard interval duration. | Set to 0 if not supported.  Set to 1 if supported. |

*TGax Editor: Note that 11-17/720r1 is adding the following line to D1.2 P330L65 (CIDs 4892, 6119, 9489, 8976). Add “HE ER SU PPDU” to that line as well.*

— 4x HE-LTF, TGI1,Data in an HE SU PPDU, HE ER SU PPDU, or HE MU PPDU

[End of File]