IEEE P802.11
Wireless LANs

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| Comment Resolutions on Clause 28 (HE PHY) Part 1 |
| Date: 2017-07-09 |
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Abstract

This submission proposes resolutions for the following 11 comments on Clause 28.1.1 of TGax D1.0:

7045, 7217, 7218, 4936, 4937, 5233, 5235, 5241, 7832, 8636, 8731

Revisions:

* Rev 0: Initial version of the document.

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** | **Clause Number** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 7045 | 28.1.1 | 209.48 | We need a general statement in the introduction of 11ax PHY that we have a frame with a mixed symbol length in the preamble portion and in the data portion. This is a key feature of 11ax different from the Legacy. | "Insert the following statement in Line 48.The HE PHY supports the mixed OFDM symbol length in a frame where the OFDM symbol length of 3.2 usec in the preamble field portion and the symbol length of 12.8 usec excluding the Guard Interval in the data field portion are mixed. | Revised—In principle, the direction provided by the commenter is correct. The proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-17/0902r0 under all headings that include CID 7045. |
| 7217 | 28.1.1 | 211.49 | UL-OFDMA is described as a mandatory feature for an HE non-AP STA here. But line 9 in page 212 seems to describe transmission of an HE MU PPDU over partial PPDU bandwidth as an option. Aren't they conflicted? | Mandatory/option of UL-OFDMA should be confirmed for an HE non-AP STA. | Reject—UL-OFDMA is made possible by HE TB PPDU that is transmitted by the non-AP STA. UL-OFDMA support is mandatory.Support of transmission of HE MU PPDU by a non-AP STA is optional. Typically, HE MU PPDU is used by the AP in the DL to perform DL-OFDMA. However, in some cases a non-AP STA may use HE MU PPDU to do an SU transmission to the AP. Such a method allows, the non-AP STA to embed its STA ID in the preamble of the UL transmission.  |
| 7218 | 28.1.1 | 212.09 | Transmission of an HE MU PPDU over partial PPDU bandwidth is described as an option for an HE non-AP STA. But line 49 in page 211 seems to describe as a mandatory feature. Aren't they conflicted? | Mandatory/option of UL-OFDMA should be confirmed for an HE non-AP STA. | Reject—UL-OFDMA is made possible by HE TB PPDU that is transmitted by the non-AP STA. UL-OFDMA support is mandatory.Support of transmission of HE MU PPDU by a non-AP STA is optional. Typically, HE MU PPDU is used by the AP in the DL to perform DL-OFDMA. However, in some cases a non-AP STA may use HE MU PPDU to do an SU transmission to the AP. Such a method allows, the non-AP STA to embed its STA ID in the preamble of the UL transmission. |
| 4936 | 28.1.1 | 211.54 | Maximum number of SSs per user, at 4, is too low | AP antenna counts will only increase: min value should be 8 for practically important client antenna counts. See also P212L32 | Reject—MU-MIMO beauty is that multiple STAs are assigned multiple spatial streams out of the total spatial streams allowed for simultaneous transmission. If one of the STAs is allocated majority of the spatial streams out of the total spatial streams allowed, then isn’t it better to do an SU-MIMO transmission to the STA that is assigned majority of the spatial streams? Note, 802.11ax allows transmission of up to 8 spatial streams to a single user using SU transmission.  |
| 4937 | 28.1.1 | 211.62 | Maximum number of SSs for explicit feedback, at 4, is too low | AP antenna counts will only increase: min value should be 8 for practically important client antenna counts. See als P12L35 | Reject—The maximum number of space-time streams for explicit feedback that are mandatory in 11ax is 4. It is optional for a STA to support more than 4 and up to 8 maximum number of space-time streams for explicit feedback. |
| 5233 | 28.1.1 | 211.57 | If we are going to substantially improve efficiency over 11ac, we need HE non-AP STAs to support DL MU-MIMO PPDUs with a total number of spatial streams equal to 8. | change total number of spatial streams requirement to 8 | Reject—The non-AP STA shall be able to receive its intended spatial streams in a DL MU-MIMO transmission with at least 4 total number of spatial streams. The support of greater than 4 and up to 8 Nsts\_Total is optional for a non-AP STA.  |
| 5235 | 28.1.1 | 211.61 | If we are going to substantially improve efficiency over 11ac, we need HE non-AP STAs to support sounding with a total number of spatial streams equal to 8. | change sounding requirement to 8 | Reject—The maximum number of space-time streams for explicit feedback that are mandatory in 11ax is 4. It is optional for a STA to support more than 4 and up to 8 maximum number of space-time streams for explicit feedback. |
| 5241 | 28.1.1 | 212.35 | If we are going to substantially improve efficiency over 11ac, we need HE non-AP STAs to support DL MU-MIMO PPDUs with a total number of spatial streams equal to 8. | change total number of spatial streams requirement to 8 | Reject—The non-AP STA shall be able to receive its intended spatial streams in a DL MU-MIMO transmission with at least 4 total number of spatial streams The support of greater than 4 and up to 8 Nsts\_Total is optional for a non-AP STA. |
| 7832 | 28.1.1 | 342.59 | Confusing sentence. Doesn't seem necessary. | Delete the sentence "This requirement does not include round trip delay." | Revised—To improve the clarity of the text, propose the editing of the original text.TGax Editor to make the changes shown in IEEE 802.11-17/0902r1 under all headings that include CID 7832. |
| 8636 | 28.1.1 | 210.25 | If a STA is 20 MHz-only and were to use more than four streams, then:- BCC is not allowed (per line 16)- LDPC is not mandatory (per lines 23 and 27 ). | How to resolve this?- 20 MHz-only can not send more than 4 streams (or declare capability to do so)?- remove "except when the STA is an20 MHz only non-AP STA" on lines 25 and 28? | Revised—If a STA is 20 MHz only and were to use more than 4 streams, then LDPC is mandatory.Proposed resolution accounts for the suggested change. TGax Editor to make the changes shown in IEEE 802.11-17/0243r0 under all headings that include CID 4930. |
| 8731 | 28.1.1 | 210.60 | Support for LDPC coding does not cover the case of 20 MHz-only STA with capability to send more than four streams. Note that for this case, LDPC is neither mandatory or optional. | Clarify requirement | Revised—If a STA is 20 MHz only and were to use more than 4 streams, then LDPC is mandatory.Proposed resolution accounts for the suggested change. TGax Editor to make the changes shown in IEEE 802.11-17/0243r0 under all headings that include CID 5754. |

***TGax Editor: Please edit D1.3, Pg 283, ln 52 in section 28.1.1 as follows (CID 7045):***

~~The HE PHY supports a single Data field OFDM symbol duration of 12.8 us.~~ The HE PHY supports a DFT period of 3.2 us and 12.8 us for the pre-HE modulated fields and the HE modulated fields in an HE PPDU, respectively. (#7045)

***TGax Editor: Please edit D1.3, Pg 430, ln 5 in section 28.3.14.3 as follows (CID 7832):***

~~A STA that transmits an HE TB PPDU shall have timing accuracy of +/-0.4 us relative to the actual ending time of the PPDU carrying the Trigger frame. This requirement does not include round trip delay.~~

A STA that transmits an HE TB PPDU in response to a triggering PPDU (PPDU containing a Trigger frame or a frame containing a UMRS Control field) from an AP shall ensure that the arrival time of the HE TB PPDU at the AP is within +/- 0.4 us of TXTIME + aSIFSTime + RTD from the transmission start time of the triggering PPDU, where TXTIME is that of the triggering PPDU and RTD is the round-trip delay between the AP and the STA.

NOTE – TXTIME contains the *SignalExtension*, thus TXTIME + aSIFSTime is equivalent to 16 usec after the end of transmission of the triggering PPDU at the AP.  The STA is not expected to measure or compensate for the RTD when transmitting the HE TB PPDU.

**References:**

1. **IEEE P802.11axTM/D1.3, June 2017.**