IEEE P802.11  
Wireless LANs

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| Comment Resolutions on Clause 28.1.1 (HE PHY Introduction)  Part 2 | | | | |
| Date: 2017-02-09 | | | | |
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Abstract

This submission proposes resolutions for the following 22 comments on Clause 28.1.1 of TGax D1.0:

4903, 4934, 4935, 4936, 4937,

5233, 5235, 5236, 5237, 5238,

5239, 5240, 5241, 5745, 6110,

6818, 6819, 7218, 8331, 8332,

8357, 8361

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** |
| 4903 | 28.1.1 | 209.44 | The channel puncturing transmisison brief is confusing. Especially, the "zero out" operation is not clear. | Change to "For channel widths greater than or equal to 80 MHz, the HE PHY supports channel puncturing transmissions where one or more of the non-primary 20 MHz channels in an HE MU PPDU with more than one RU is zeroed outare punctured. | Reject—  ‘Zeroed out’ refers to no signal being present, i.e., holes in a transmission.  The current description is appropriate. |
| 4934 | 28.1.1 | 210.49 | "applicable" in "all RU sizes and locations applicable to the 20 MHz channel width" is vague | Provide a rigorous definition: e.g. via a cross reference to a table. | Reject—  The section 28.1.1 is an introduction to the HE PHY functions and avoids providing references to location of different functions in the spec.  With this is mind, the current description is appropriate. |
| 4935 | 28.1.1 | 211.07 | If 11n taught us anything, long range modes should be mandatory or deleted from the draft. The status quo involves too many MAC work-arounds and/or little likelihood of adoption | Make this mandaotry or remove this mode | Reject—  Single spatial stream HE-MCSs0-2 in primary 20 MHz channel for HE\_EXT\_SU PPDUs is mandatory.  Additional mode of single spatial stream HE-MCS0 in right 106-tone RU of the primary 20 MHz channel for an HE EXT\_SU PPDU is optional. |
| 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—  Agree with the general direction provided in the comment. However, to support different variations of 11ax devices without burdening implementations, mandating Max Nss per user at 4 is reasonable. At the same time, support of Max Nss > 4 and up to 8 is optional. |
| 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—  Agree with the general direction provided in the comment. However, to support different variations of 11ax devices without burdening implementations, sounding with a total number of spatial stream of at least 4 is mandated while sounding with Nsts\_total > 4 and up to 8 is optional. |
| 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—  Agree with the general direction provided in the comment. However, to support different variations of 11ax devices without burdening implementations, mandating Max Nss per user at 4 is reasonable. At the same time, support of Max Nss > 4 and up to 8 is optional. |
| 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—  Agree with the general direction provided in the comment. However, to support different variations of 11ax devices without burdening implementations, sounding with a total number of spatial stream of at least 4 is mandated while sounding with Nsts\_total > 4 and up to 8 is optional. |
| 5236 | 28.1.1 | 212.04 | Why not support RU size of 242? | add 242 to the requirement for non-AP STA | Reject—  All RU242s in HE40/80 MHz OFDMA transmission have data modulated on the DC tone location of 20 MHz operating STA. This may cause RX DC (DL OFDMA) or TX LO leakage (UL OFDMA) to interfere with the data tone, further degrading performance.  Please see 802.11-16/0906r0 for details. |
| 5237 | 28.1.1 | 212.15 | Why is it only optional for a 20 MHz-only STA to support RU sizes of 242 or less in a 40 MHz channel width? It shouldn't be an issue for such a device to at least support these RU sizes in the primary 20MHz subchannel. With this requirement we might not be able to include any 20 MHz-only STAs in an OFDMA transmission in a 40 MHz BSS | make this mandatory | Reject—  All RU242s in HE40/80 MHz OFDMA transmission have data modulated on the DC tone location of 20 MHz operating STA. This may cause RX DC (DL OFDMA) or TX LO leakage (UL OFDMA) to interfere with the data tone, further degrading performance.  Please see 802.11-16/0906r0 for details. |
| 5238 | 28.1.1 | 212.18 | Make it mandatory to support 242 | make this mandatory | Reject—  All RU242s in HE40/80 MHz OFDMA transmission have data modulated on the DC tone location of 20 MHz operating STA. This may cause RX DC (DL OFDMA) or TX LO leakage (UL OFDMA) to interfere with the data tone, further degrading performance.  Please see 802.11-16/0906r0 for details. |
| 5239 | 28.1.1 | 212.21 | Make it mandatory to support 242 | make this mandatory | Reject—  242 tone RU in 40 and 80 MHz channel width is optional. Hence 160/80+80 is optional as well. |
| 5240 | 28.1.1 | 212.25 | Regrding, "If the non-AP STA is 20 MHz-only capable then 160 MHz and 80+80 MHz channel width, 2+∙996-, 996- and 484-tone RU sizes in 5 GHz band are not applicable" is incorrect. A 20 MHz-only STA shall be able to receive a 20 MHz PPDU in a 160/80+80 MHz BSS. | fix this statement | Reject—  The statement is correct since it refers to RU sizes > 242 tones in 160 and 80+80 MHz channel width. |
| 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—  Agree with the general direction provided in the comment. However, to support different variations of 11ax devices without burdening implementations, mandating Max Nss per user at 4 is reasonable. At the same time, support of Max Nss > 4 and up to 8 is optional. |
| 5745 | 28.1.1 | 210.34 | Shoudn't extended range SU PPDU also be included in MCS0-7 list according to IEEE doc#1159r2 | If it's missing in the list then add this into the list | Reject—  Please refer to row 8 in excel sheet provided by 1159r2. |
| 6110 | 28.1.1 | 211.13 | DL OFDMA in the bracket doesn't truly reflect the previous sentence. It should be DL OFDMA without MU MIMO. DL MU MIMMO should be DL MU MIMO without OFDMA. It is better to have somewhere to define what is DL/UL OFDMA, DL/UL MU-MIMO, DL/UL MU MIMO with OFDMA. | As in comment | Reject—  The statement on 211.13 is correct.  Furthermore, MU transmissions are defined in 28.3.2. |
| 6818 | 28.1.4 | 213.51 | 11ax suffers from a severe case of mode bloat. The amendment would be greatly improved by eliminating the great number of modes that have limited application and are of secondary importance to the main modes and project objectives. A goal of extended range appears absolutely nowhere in the PAR or CSD, yet it clutters up the amendment in many places. The HE\_EXT\_SU mode defined here has the feel of a slapdash add-on. Extending range in many ways works counter to the main goals of the 11ax amendment, since long-range (low-rate) modes will displace high-rate uses of the medium. If extended range is nevertheless deemed an important goal, let's do it properly by defining a new project that will consider all aspects of the problem, including the aspect of future extensibility. Shoehorning a minor mode into the 11ax amendment is the wrong way to go. | Eliminate the HE\_EXT\_SU mode and all references to it in the draft. | Reject—  Extended range mode is agreed in SFD. Commentor is welcome to bring contribution. |
| 6819 | 28.1.4 | 213.53 | "Support for the HE extended range PPDU format is mandatory". When this topic was discussed and voted on, there were many questions on whether there was sufficient justification to make the mode mandatory. The questions were never answered satisfactorily, and as far as I recall no real attempt was made to provide justification. It seems the mode is designated mandatory because the proposers wished it so, and for no other substantive reason. This is a very unsatisfactory way of developing a standard. The mode seems of limited importance, and its stated benefits are entirely orthogonal to the stated goals of the project. If it is to remain in the draft at all, it should be optional only. | Change "mandatory" to "optional". | Reject—  Extended range mode is agreed in SFD. Commentor is welcome to bring contribution. |
| 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 uses HE trigger-based PPDU while the ln 9 on pg 212 is talking about use of HE MU PPDU for UL transmission. |
| 8331 | 28.1.3 | 212.61 | Regulatory requirements text (e.g.,17.3.8.3) should be added in HE PHY functions. | Repeat 17.3.8.3 text here and modify as necessary. | Reject—  11ax follows description template of 11ac, which has very similar text and no mention of regulatory requirements in this subsection. |
| 8332 | 28.1.1 | 209.10 | Somewhere it should be mentioned that adaptivity at other than these specified CCA thresholds might be required by regulation, and that adaptivity is not specified here. Sharing the 5 GHz band in Europe under EN 301 893 is an example. The 2.4 is getting new rules too. | Insert "Regulatory requirements that do not affect interoperability are not addressed in this standard. Implementers are referred to the regulatory sources in Annex D for further information. Operation in countries within defined regulatory domains may be subject to additional or alternative national regulations." | Reject—  11ax follows description template of 11ac, which has very similar text and no mention of regulatory requirements in this subsection |
| 8357 | 28.1.1 | 209.51 | HE PHY does not support only data field OFDM symbol of 12.8 us. It also supports data symbol of 4 us. | Change "The HE PHY supports a single Data field OFDM symbol duration of 12.8 ++s (excluding guard interval)." to "In addition to supporting the legacy OFDM data symbols of 3.2 us, HE-PHY also supports OFDM data symbol of 12.8 us (excluding guard interval). | Reject—  HE PHY is 4x OFDM symbol duration of 11ac. |
| 8361 | 28.1.1 | 211.59 | "Maximum" and "at least" are contradictory. | Same paragraph but the word maximum is removed. (Responding with the requested beamforming feedback in an HE sounding procedure with the number of space-time streams in the HE NDP that the non-AP STA can respond to being at least 4 ) | Reject—  Maximum value of “A” is at least “x”, i.e., A >= x.  The statement is correct grammatically. |