IEEE P802.11  
Wireless LANs

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| Comment Resolutions on Clause 28.3.3 (OFDMA and SU Tone Allocation) | | | | |
| Date: 2017-05-05 | | | | |
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Abstract

This submission proposes resolutions for the following 10 comments on Clause 28.3.3 of TGax D1.0:

4971, 4972, 7046, 7852, 7853, 8611, 8612, 8613, 10088, 9794

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Additional Comment Resolution, 9794
* Rev 2: Redundant word, “field” was removed

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** |
| 4971 | 28.3.3.4 | 236.34 | "If pilot subcarriers are present in the HE-LTF field" is vague | Specify which formats this applies to and provide a cross-ref | Revised—  Proposed resolution accounts for the suggested change.  TGax Editor to make the changes shown in IEEE 802.11-17/0614r0 under the tag with CID 4971. |
| 4972 | 28.3.3.4 | 236.34 | Table 28-7 is misleading / confusing for PPDUs with different RU widths. E.g., as written, a 20 MHz PPDU can only be a mix of 26 or 52 RUs, or a mix of 106/242 Rus. But what about PPDUs that is a mix of 26, 52 and 106 RUs? | Need an extra level of indirection: e.g. if an RU is a 26 or 52 tone RU with a range of subcarreirs defined in table xxx, and a tone number listed in the RHS column falls within that range, then that RHS tone number is a pilot tone. Add clarifying language | Rejected—  Whichever RU or mixed RUs might be scheduled, the pilot location follows the corresponding RU in the Table. E.g.) if 52 tone and 106 tone RU are scheduled, then the pilot location for 52 RU follows the 52 RU pilot locations in the table, and the pilot location for 106 RU follows the 106 RU pilot locations in the table. |
| 7046 | 28.3.3.3 | 236.3 | Explanation on why the null subcarriers are located in each band as in the Table 28-6. | Add the following explanation in Line 3.  Those null subcarriers on the edge of the band may provide the protection of the RU adjacent to the edge tones from being distorted. The extra null subcarriers located between the edge tones and the RU adjacent to the edge tones provide the protection of the RU from the edge tone distortion. | Revised—  Proposed resolution accounts for the suggested change.  TGax Editor to make the changes shown in IEEE 802.11-17/0614r0 under the tag with CID 7046. |
| 7852 | 28.3.3.4 | 236.34 | What about 2x HE-LTF case, is it always present? | Clarify | Revised—  Proposed resolution accounts for the suggested change.  TGax Editor to make the changes shown in IEEE 802.11-17/0614r0 under the tag with CID 7852. |
| 7853 | 28.3.3.4 | 236.34 | It is desirable to always transmit pilot subcarrier even if the RU the pilot subcarriers belonging to is not allocated. | Add "Pilot subcarriers shall be transmitted even if the RU a pilot subcarrier belongs to is not allocated" | Rejected—  The pilots in each RU are good enough to compensate the residual phase offset of each RU. As for the DL HE MU-PPDU, all the scheduled RUs as well as the RU allocated to the corresponding STA are transmitted anyway. In case of UL OFDMA using the HE trigger based PPDU, only the scheduled RUs allocated to the correposponding STA are transmitted. |
| 8611 | 28.3.3.3 | 236.16 | Table 28-6, for 40 MHz RU sizes 26, 52 and 106 defines tones +/-3 as null subcarriers, while +2:2 are defined as DC subcarriers. What's wrong with defining -3:+3 as DC subcarriers? | Define -3:+3 as DC subcarriers | Rejected—  It is virtually the same effect whether we set +/- 3 tones to DC or Null subcarriers. Since there are 5 DC set for the 242 tone RUs case, it is better to keep the current tone plan as it is for a consistency purpose among all the RU cases for 40 MHz. |
| 8612 | 28.3.3.4 | 236.35 | Unclear sentence "In the 1x HE-LTF, the pilot locations are the pilot subcarrier indices that are multiples of 4 of the pilot subcarriers for data field." | Change to "In the 1x HE-LTF, the pilot locations in HE-LTF only consists of the pilot subcarriers for data field that are multiples of four." | Revised—  Proposed resolution accounts for the suggested change.  TGax Editor to make the changes shown in IEEE 802.11-17/0614r0 under the tag with CID 8612. |
| 8613 | 28.3.3.4 | 236.42 | The pilot tones are specific to RU's. Table 28-7 should use a format similar to e.g. Table 28-3 to Table 28-5, showing the pilot tones belonging to each RU | Show the pilot tones specific to each RU | Rejected—  This table is clear enough to indicate the pilot indices for the subcarrier indices in Table 28-3 to 28-5.  There is no confusion. It is redundant to create another table like 28-3 to 28-5 just for the pilot indices. |
| 10088 | 28.3.3.4 | 237.6 | Through the spec, "lower/upper" 80MHz is used generally rather than "first/second" 80MHz. The "first/second" 80MHz needs to be replaced with "lower" 80MHz and "upper" 80MHz to be consistent in the spec. | As in the comment. | Revised—  Proposed resolution accounts for the suggested change.  TGax Editor to make the changes shown in IEEE 802.11-17/0614r0 under the tag with CID 10088. |
| 9794 | 28.3.3.3 | 236.6 | Do we need to list out the null subcarrier indices as shown in Table 28-6? In other words, how does one interprete/use Table 28-6? If one transmits any RU26 in a 20 MHz HE PPDU, then it shall not modulate tones +-69, +-122? But what if right side of 20 MHz HE PPDU is using RU106? Isn't it sufficient to specify which tones are modulated (as in Table 28-3~5), and state that all other tones are not modulated? | Consider removing Table 28-6. | Rejected—  We need an entire band scheduling for HE-LTF regardless of the scheduled RU. We had better keep the Table here. |

***TGax Editor: Please edit D1.0, Pg 236, ln 34- 38 in section 28.3.3.4 as follows:***

If pilot subcarriers are present in the HE-LTF field of HE SU PPDU, HE MU PPDU, HE ER SU PPDU, and HE TB PPDU (#4971), the pilot subcarrier locations in the HE-LTF field and Data field shall be the same, except for the 1x HE-LTF and 2x HE-LTF. In the 1x HE-LTF, the pilot locations in HE-LTF only consist of the pilot subcarriers for data field that are multiples of four (#8612). If pilots present in 2x HE-LTF, their tone indices shall be the same as the indices of those pilots in 4x data symbol divided by 2 (#7852). All pilot subcarriers are at the even indices enumerated in Table 28-7 (Pilot subcarrier indices).

***TGax Editor: Please edit D1.0, Pg 236, ln 1 in section 28.3.3.3 as follows:***

There are null subcarriers between the 26-, 52- and 106-tone RU locations as illustrated in Figure 28-2 (RU locations in a 20 MHz HE PPDU), Figure 28-3 (RU locations in a 40 MHz HE PPDU) and Figure 28-4 (RU locations in an 80 MHz HE PPDU). Null Sub-carriers are located near DC or edge tones to protect those tones near DC or edge tones from the interference of neighboring RU (#7046). The null subcarriers have zero energy. The indices of the null subcarrier are enumerated in Table 28-6 (Null subcarrier indices).

***TGax Editor: Please edit D1.0, Pg 237, ln 6 in section 28.3.3.4 as follows:***

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| 160 MHz | 26, 52, 106, 242, 484 | {pilot subcarrier indices in 80 MHz -512, pilot subcarrier indices in 80 MHz +512} |
| 996 | {for the lower (#10088) 80 MHz, pilot subcarrier indices in 80 MHz -512, for the upper (#10088) 80 MHz, pilot subcarrier indices in 80 MHz +512} |

**References:**

1. **IEEE P802.11axTM/D1.0, Nov 2016.**