IEEE P802.11
Wireless LANs

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| CRs for the HE Trigger-based NDP feedback |
| Date: 2017-06-22 |
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Abstract

This submission proposes resolutions for comments of TGax Draft 1.0 with the following CIDs: CID 4863, 4963, 4964, 5040, 7503, 7850, 8597, 8784, 8785, 8786, 8787, 8788, 8789, 8790, 8791, 8792, 8793, 8794, 8795, 8796, 8797, 9781, 9782, 9783, 9784, 10370, 10371, 10372.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: updated resolutions
* Rev 2: updated CID 5040

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** | **Commenter** | **Clause** | **P.L.** | **Comment** | **Proposed Change** | **Resolution** |
| 4863 | Allert Van Zelst | 28.3.3.1 | 228.16 | Wrong reference in "The difference between OFDM and OFDMA is illustrated in Table 28-15 (CH\_BANDWIDTH and for pre-HE modulated fields)." | Refer to Figure 28-1 instead | Revised-As proposed changeTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 4863. |
| 4963 | Brian Hart | 28.3.3.1 | 228.17 | Not clear what is in and out of scope of std | Insert "The allocation of users to subchannels and powers to users is out of scope of this standard" | Rejected-Cannot find any clue on the P.L. |
| 4964 | Brian Hart | 28.3.3.1 | 228.59 | AFAIK, always more than 1 DC subcarrier | DC subcarrier => DC subcarriers | Revised-As proposed changeTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 4964. |
| 5040 | Christopher Hansen | 28.3.2.1 | 227.53 | The text "The DL MU transmission allows an AP to simultaneously transmit frames to more than one non-AP STAs." restricts transmission from one AP to another. This is un-necessary. | Remove "non-AP" | Rejected-AP could behave as non-AP in DL MU transmission |
| 7503 | Lei Huang | 28.3.3.1 | 228.17 | The reference is incorrect. The difference between OFDM and OFMA is illustrated in Figure 28-1, not Table 28-15. | Please fix it. | Revised-Resolved in CID 4863 |
| 7850 | Mark RISON | 28.3.3.1 | 228.52 | Allocating different transmit powers to different subchannels may violate transmit spectrum flatness requirement | Add a NOTE to that effect | Reject-Resource unit power boosting and beamformingshould not be used when measuring spectral flatness. |
| 8597 | Sigurd Schelstraete | 28.3.3.1 | 228.60 | Replace "not used for data/pilot transmission" with " not used for either data or pilot transmission" | See comment | Revised-As proposed changeTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8597. |
| 8784 | Sigurd Schelstraete | 28.3.2.1 | 227.48 | "The MU transmissions include DL MU transmissions and UL MU transmissions." What do we call an HE MU transmitted by an non-AP STA? This is an allowed option (see page 212, line 9), but it appears to be neither UL or DL MU. | Clarify | Rejected-It should be UL MU transmission. |
| 8785 | Sigurd Schelstraete | 28.3.2.1 | 227.50 | "simultaneously transmit frames". There is only one frame. Use term PSDU instead of frame. | See comment | Revised-Agreed and made several modifications.TGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8785. |
| 8786 | Sigurd Schelstraete | 28.3.2.1 | 227.54 | "simultaneous frames from more than one non-AP STAs.". It is allowed to trigger a sinlge STA, so it would be more correct to say "one or more non-AP STAs" | See comment | Rejected-Agreed but current description is enough for the introduction, especially it says “allowed” |
| 8787 | Sigurd Schelstraete | 28.3.2.1 | 227.55 | "Non-AP STAs transmit their frames using HE trigger-based PPDUformat and employ either UL OFDMA, UL MU-MIMO, or a mixture of both." The STAs don't employ OFDMA or MU-MIMO. They simply transmit in their given RU with the requested number of HE-LTFs and are pretty much ignorant to whether MU-MIMO is applied or not. | Delete "and employ either UL OFDMA, UL MU-MIMO, or a mixture of both." | Rejected-The original description is better for introduction. |
| 8788 | Sigurd Schelstraete | 28.3.2.1 | 227.59 | Replace "On an RU" with "within an RU" | See comment | Revised-As proposedTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8788. |
| 8789 | Sigurd Schelstraete | 28.3.2.1 | 227.64 | Who is "they"? | Improve wording | Revised-As proposedTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8789. |
| 8790 | Sigurd Schelstraete | 28.3.2.1 | 228.01 | "SU transmission" in a given RU can only be done using HE MU format. The use of the term SU in this case is confusing. We need a better term to distinguish RUs with one user vs. RUs shared by multiple users. | See comment | Rejected-SU transmission doesn’t mean SU PPDU format.The original is clear:“The combination of SU transmissions and MU-MIMOtransmissions on different RUs in one PPDU is also supported.” |
| 8791 | Sigurd Schelstraete | 28.3.3.1 | 228.12 | Replace "several" with "one or more". MU format can be used for one user. | See Comment. Also updated\ decription. | Revised-As proposedTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8791. |
| 8792 | Sigurd Schelstraete | 28.3.3.1 | 228.12 | Remove "in general" | See comment | Revised-As proposedTGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8792. |
| 8793 | Sigurd Schelstraete | 28.3.3.1 | 228.13 | "In HE, the time region covers the entire data portion of an HE PPDU". No mention has been made of "time regions" so far. The need for this is not clear. | Replace "In HE, the time region covers the entire data portion of an HE PPDU, and the frequency region includes a number of contiguous subcarriers with the exception of the RUs which straddle DC where nulls are placed in the middle of the band." with "In HE, subsets consists of contiguous subcarriers called resource units (RU) with the exception of the RUs which straddle DC where nulls are placed in the middle of the band." | Revised-Remove the sentence.TGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8793. |
| 8794 | Sigurd Schelstraete | 28.3.3.1 | 228.17 | Reference to Table 28-15 should probably be Figure 28-1 | Correct reference | Revised-Resolved in CID 4863 |
| 8795 | Sigurd Schelstraete | 28.3.3.1 | 228.18 | Sentence starting at "Similar to OFDM, ..." is essentially repetition. | Remove sentence | Rejected-Don’t see repetition |
| 8796 | Sigurd Schelstraete | 28.3.3.1 | 228.20 | The term "subchannelization" is only used twice on this page and nowhere else in the document. | Delete this sentence and the use of "subchannelization" | Revised-Remove the sentence and related description for subchannelization.TGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 8796. |
| 8797 | Sigurd Schelstraete | 28.3.3.1 | 228.50 | Sentence starting at "Subchannelization defines subchannels, ..." is essentially repetition. | Remove sentence | Revised-Resolved in CID 8796 |
| 9781 | Youhan Kim | 28.3.2.1 | 227.60 | An RU with a single HE-SIG-B user field ("SU" RU) may be destined to multiple 'users' when the RU is used for broadcast/multicast purposes. Hence, 'transmissions to one user' may be misleading. | Use a more appropriate terminology than 'one user' in "single stream transmissions to one user os spatial multiplexing to one user". | Revised-As proposed.TGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 9781. |
| 9782 | Youhan Kim | 28.3.2.1 | 227.61 | What is a "full bandwidth" DL MU-MIMO? | Define the phrase "full bandwdith" MU-MIMO | Rejected-It should be clear enough… |
| 9783 | Youhan Kim | 28.3.3.1 | 228.16 | Table 28-15 does not illustrate the difference between OFDM and OFDMA. | Fix the sentence "The differencebetween OFDM and OFDMA is illustrated in Table 28-15 (CH\_BANDWIDTH and for pre-HE modulatedfields)." | Revised-Resolved in CID 4863 |
| 9784 | Youhan Kim | 28.3.3.1 | 228.20 | The term "subchannel" seems a bit confusing. In 802.11-2016, subchannel is used to describe 20 MHz or 80 MHz portions of the PPDU. In 11ax D1.0, subchannel is used to describe both 20 MHz subchannels as well as RUs. | Consider using a different term than "subchannelization" and "subchannel" when referring to RUs. | Revised-Resolved in CID 8796 |
| 10370 | Oghenekome Oteri |  | 228.43 | Fig 28-1 | separate OFDMA and OFDM figures totally. Separate freq/time lines drawn | Revised-As proposed.TGax editor to make the changes shown in 11-17/0986r2 under all headings that include CID 10370. |
| 10371 | Oghenekome Oteri |  | 228.52 | An OFDMA system may allocate different transmit powers to differentsubchannels | add statement "in both downlink and uplink" to clarify allowance for RU based power control in both directions | Revised-Resolved in CID 8796 |
| 10372 | Oghenekome Oteri |  | 228.55 | "In OFDMA, an OFDM symbol is constructed of subcarriers, the number of which is a function of the PPDUbandwidth." It is also a function of the data size" | In OFDMA, an OFDM symbol is constructed of subcarriers, the number of which is a function of the PPDUbandwidth and data size. | Rejected-Number of subcarriers is independent of data size. |

**Propose:** Revised for CID 4863, 4964, 8597, 5040, 8785, 8788, 8789, 8791, 8792, 8793, 8796, 8788, 9781, 10370 per editing instructions in 11-17/0986r2.

*To the TGax Editor: modify P.L. 308.64 as following (CID 4863).*

The difference between OFDM and OFDMA is illustrated in ~~Table 28-16 (CH\_BANDWIDTH and for pre-HE modulated fields)~~ Figure 28-4 (Illustration of OFDM and OFDMA concepts).

*To the TGax Editor: modify P.L. 309.43 as following (CID 4964, 8597).*

…which are not used for ~~data/pilot~~ either data or pilot transmission. The unused subcarriers are the DC subcarriers (defined in 28.3.3.2 (Resource unit, guard and DC subcarriers)),

*To the TGax Editor: modify P.L. 308.31 as following (CID 8785).*

The DL MU transmission allows an AP to simultaneously transmit ~~frames~~ information to more than one non-AP STAs. For the DL MU transmission, the AP uses the HE MU PPDU format, and employs either DL OFDMA, DL MU-MIMO, or a mixture of both. The UL MU transmission allows an AP to simultaneously receive ~~simultaneous~~ ~~frames~~ information from more than one non-AP STAs.

*To the TGax Editor: modify P.L. 308.40 as following (CID 8788).*

~~On~~ Within an RU in a PPDU,

*To the TGax Editor: modify P.L. 308.45 as following (CID 8789).*

The HE PHY defines DL MU-MIMO and UL MU-MIMO, for both the full bandwidth case as well as for the partial bandwidth case where ~~they~~ MU-MIMO are being used on only certain RUs in the PPDU.

*To the TGax Editor: modify P.L. 308.59 as following (CID 8791).*

Orthogonal Frequency Division Multiple Access (OFDMA) is an OFDM-based multiple access scheme where different subsets of subcarriers are allocated to different users, allowing simultaneous data transmission to or from ~~several~~ one or more users.

*To the TGax Editor: modify P.L. 308.59 as following (CID 8792, 8793).*

In OFDMA, ~~in general,~~ users are allocated different subsets of subcarriers which can change from one PPDU to the next. ~~In HE, the time region covers the entire data portion of an HE PPDU, and the frequency region includes a number of contiguous subcarriers with the exception of the RUs which straddle DC where nulls are placed in the middle of the band.~~

*To the TGax Editor: modify P.L. 308.64 and P.L. 309.33 as following (CID 8796).*

Similar to OFDM, OFDMA employs multiple subcarriers, but the subcarriers are divided into several groups of subcarriers where each group is denoted as a resource unit (RU). ~~The grouping of subcarriers into groups of resource units is referred to as subchannelization.~~ An OFDMA system may allocate different transmit powers to different RUs.

~~Subchannelization defines subchannels that can be allocated to stations depending on their channel conditions and service requirements. An OFDMA system may allocate different transmit powers to different subchannels.~~

*To the TGax Editor: modify P.L. 308.41 as following (CID 8788, 9781).*

~~On~~ Within an RU in a PPDU, it is allowed to have single user single stream transmission or single user multi-stream transmission or multi-user multi-stream transition (MU-MIMO). ~~single stream transmissions to one user or spatial multiplexing to one user (SU-MIMO) or spatial multiplexing to multiple users (MU-MIMO).~~

*To the TGax Editor: Replace Figure 28-4 with the following figure (CID 10370).*



**Figure 28-4—Illustration of OFDM and OFDMA concepts**