IEEE P802.11
Wireless LANs

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| Comment Resolutions on Clause 26.1.1 Part 1 |
| Date: 2016-04-29 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D0.1 as follows:

* 348, 351, 466, 467, 877, 878, 879, 1030, 1185, 1451, 1605, 1606, 1607, 1757, 1922, 2352, 2507, 2511, 2512, 2513, 2514, 2515, 2516, 2828.

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** |
| 348 | 26.1.1 | 69.12 | A HE STA only works on 2.4GHz is not expected to support VHT. | A HE STA should be compliant with mandatory PHY in Clause 20 and Clause 22 when working in 5GHz band and only compliant with mandatory PHY in Clause 20 when working in 2.4GHz band. | Revised: Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 348. |
| 351 | 26.1.1 | 69.47 | There's no mandatory FEC coding for STAs declaring support HE 20MHz PPDU bandwidth | Claim BBC or LDPC as the mandatory coding scheme | Accepted: Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 351. |
| 466 | 26.1.1 | 70.6 | it is stated that LDPC "may" be supported when less than or equal to 4 spatial stream. However, in page 69 line 54, it is stated that LDPC must be supported when larger than or equal to 4 spatial streams. Therefore, it is not clear whether LDPC support is optional when STA supports exactly 4 spatial streams. | clarify whether or not LDPC is optional or mandatory when STA supports 4 spatial streams. | Rejected:LDPC is mandatory when declaring support for more than 4 spatial streams (transmit and receive). Pg. 69 and Ln. 54 does not state “larger than or equal to 4 spatial streams” but mentions “more than 4 spatial streams”. |
| 467 | 26.1.1 | 70.10 | Remove note with TBD. If note is needed change to editor's note. | as commented | Accepted: Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 467. |
| 877 | 26.1.1 | 69.9 | General statement need to be more accurate | orthogonal frequency dicision multiplexing (OFDM) needs to be changed to wireless localarea network (WLAN | Rejected:The statement is accurate since Clause 26 describes the OFDM HE PHY specification. Similar approach is followed in other 802.11 amendments such as 802.11ac/ah. |
| 878 | 26.1.1 | 69.25 | What does "group addressed" mean for the HE SU PPDU? | The group addressed transmission in "An HE SU PPDU includes individually addressed and group addressed transmissions" need to be confirmed for what it means | Rejected:The meaning of the NOTE is that HE SU PPDU can carry unicast and multicast MPDUs.According to 802.11-2012, group addressed when applied to an MPDU, it is an MPDU with a group address in the Address1 field. |
| 879 | 26.1.1 | 69.31 | The statement "The non-contiguous channels within primary or secondary 80 MHz only exists at AP side" is not clear in what it means | Does it mean the non-contiguous channel bonding is only applicable for the DL? | Revised:Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in 614 under all headings that include CID 879. |
| 1030 | 26.1.4 | 71.9 | HE trigger-based PPDU format which is abbreviated as HE\_TRIG seems inpropriate, like the HE trigger frame itself | suggest to change for another one such as HE\_TRIG\_BSD or other type which can be easily differentiate from the HE trigger frame | Rejected:The nomenclature followed for HE SU PPDU, HE MU PPDU, HE\_EXT\_SU, and HE\_TRIG is consistent as defined in 26.1.4.  |
| 1185 | 26.1.1 | 69.19 | OFDMA refers to "orthogonal frequency division multiple access" not "orthogonal frequency | change "orthogonal frequency divisional multiple access" to "orthogonal frequency division multiple access" | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 1185. |
| 1451 | 26.1.1 | 69.51 | LDPC is significantly less power-efficient than BCC | Do not mandate LDPC for >242 tones | Rejected:Please provide contribution to support the comment. |
| 1605 | 26.1.1 | 69.6 | The fact that OFDM subcarriers are 4x closer together should be explicitly listed in the differences w.r.t. HT/VHT | As it says in the comment | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 1605. |
| 1606 | 26.1.1 | 69.30 | "could be nulled" -- what does this mean? | Change to "can be nulled" | Revised: Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 1606. |
| 1607 | 26.1.1 | 69.43 | The slash should be a non-break slash | As it says in the comment | Rejected:The editing of the 0.1 version to include comment resolution should eliminate this issue. |
| 1757 | 26.1.1 | 69.47 | It's not clear yet which functions a HE STA will support as mandatory or optional. However, this paragraph imposes some mandatory implementations on the HE STA that may later contradict with the actual requirement. | Replace line 47 with "If OFDMA is supported, an HE STA shall support the following Clause 26 features:". Also add a similar paragraph for HE STA that supports MU-MIMO. | Revised: Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 1757. |
| 1922 | 26.1.1 | 69.35 | Use microseconds for consistency with symbol durations | Replace "800 ns, 1600 ns, and 3200 ns" with "0.8 us, 1.6 us, and 3.2 us" | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 1922. |
| 2352 | 26.1.1 | 69.31 | It is seemed that "Non-contiguous channels" in this sentence has the different context from the original definition. | Change "non-contiguous channels" to "non-contiguous RUs." | Revised: Agree in principle with the comment. Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2352. |
| 2507 | 26.1.1 | 69.10 | "an HE STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory PHY specifications defined in Clause 20 and Clause 22." Clause 20 is 11ad, and Clause 22 is 11af. Also, 11ac is prohibited from operation in 2.4G, while 11ax supports operation in 2.4G. | Change "defined in Clause 20 and Clause 22" to "defined in Clause 19". | Revised: Agree in principle with the comment. Please provide reference where Clause 20 and Clause 22 correspond to DMG PHY and 11af PHY, respectively. Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2507. |
| 2511 | 26.1.1 | 69.25 | "NOTE" refers to an HE SU PPDU, but HE SU PPDU is yet to be defined/referenced. | Remove the note. | Rejected:HE SU PPDU term already in-use before 26.1.1. Similar note appears in Clause 22 (802.11ac PHY) for VHT SU PPDU. |
| 2512 | 26.1.1 | 69.30 | The terms "non-contiguous channel bonding" and "non-contiguos channel" are confusing. In two sentences before this, the+R2920 draft says "80+80 MHz non-contiguous channel width." Then, here the draft talks about non-contiguous channel (bonding). What is the difference between non-contiguous channel width and non-contiguous channel (bonding)? For example, is 80+80MHz a non-contigous channel (bonding)? It is, and yet the new terminology seems to say otherwise. It is probably best to come up with an alternative name for "non-contiguous channel bonding" to differentiate from 80+80 MHz mode. | Come up with a better names for "non-contiguous channel bonding" and "non-contiguous channel". | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2512. |
| 2513 | 26.1.1 | 69.49 | BCC is not defined for > 4SS. | Change "RU sizes less than or equal to 242 tones" to "allocations with RU sizes less than or equal to 242 tones, and with number of spatial streams less than equal to four." | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2513. |
| 2514 | 26.1.1 | 69.54 | BCC is not defined for HE40 SU PPDU. LDPC is the only allowed coding scheme for HE40 SU PPDU. And yet, support of LDPC is not mandatory when declaring support for HE40 PPDU. | Change "HE 80/160/80+80 SU-PPDU" to "HE 40/80/160/80+80 SU PPDU". | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2514. |
| 2515 | 26.1.1 | 70.3 | LDPC must be supported when a STA declares support for >= HE40 or >= 4SS. | Change "LDPC (transmit and receive) for RU sizes less than or equal to 242 tones" to "LDPC (transmit and receive) for RU sizes less than or equal to 242 tones when the declared capability of the HE STA is less than or equal to four spatial streams and does not include any of HE 40/80/160/80+80 SU PPDU." | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2515. |
| 2516 | 26.1.1 | 70.5 | LDPC must be supported when a STA declares support for >= HE40 or >= 4SS. | Change "LDPC (transmit and receive) when declaring support for less than or equal to 4 sptial streams" to "LDPC (transmit and receive) when the declared capability of the HE STA is less than or equal to four spatial streams and does not include any of HE 40/80/160/80+80 SU PPDU." | Accepted:Proposed resolution accounts for the suggested change.TGax Editor to make the changes shown in IEEE 802.11-16/614r1 under all headings that include CID 2516. |
| 2828 | 26.1.1 | 69.29 | it is not clarify the purpose of nulled the tones of one or more secondary channels. | clearify that it is used when secondary channels are busy, to enhance the system efficiency. | Rejected: The reason of nulling out of non-primary 20 MHz channels is out of scope of the specification. |

*Changes to D0.1 related to CID 348 and CID 2507:*

**26.1.1 Introduction to the HE PHY**

***TGax Editor: Change the paragraph below as follows (#348, #2507):***

Clause 26 specifies the PHY entity for a high efficiency (HE) orthogonal frequency division multiplexing (OFDM) system. In addition to the requirements in Clause 26, an HE STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory PHY specifications defined ~~in Clause 20 and Clause 22.~~ as follows:

* In Clause 20 and Clause 22 when the HE STA is operating in the 5 GHz band
* In Clause 20 when the HE STA is operating in the 2.4 GHz band

*Changes to D0.1 related to CID 351, CID 467, CID 1757, CID 2514, CID 2513, CID 2514, CID 2515, and CID 2516:*

**26.1.1 Introduction to the HE PHY**

***TGax Editor: Change the paragraph below as follows (#351, #467, #1757, #2513, #2514, #2515, #2516):***

An HE STA shall support the following Clause 26 features:

* Binary convolution coding for RU sizes less than or equal to 242 tones (transmit and receive) whenever number of spatial streams is less than or equal to 4
* LDPC as the only coding scheme for RU sizes of 484, 996 and 996\*2 tones (transmit and receive)
* Binary convolution coding for HE 20 MHz SU PPDU (transmit and receive) whenever number of spatial streams is less than or equal to 4
* LDPC when declaring support for at least one of HE 40/80/160/80+80 MHz SU PPDU bandwidths (transmit and receive)~~, or declaring support for more than 4 spatial streams (transmit and receive)~~
* LDPC when declaring support for more than 4 spatial streams
* A combination of 2x LTF with 0.8 μs GI duration on both LTF and data
* A combination of 2x LTF with 1.6 μs GI duration on both LTF and data
* A combination of 4x LTF with 3.2 μs GI duration on both LTF and data

An HE STA may support the following Clause 26 features:

* Other combinations of LTF durations and GI durations
* LDPC ~~(transmit and receive)~~ for RU sizes less than or equal to 242 tones (transmit and receive) whenever number of supported spatial streams is less than or equal to 4
* LDPC ~~(transmit and receive) when declaring support for less than or equal to 4 spatial streams~~ for HE 20 MHz SU PPDU (transmit and receive) whenever number of supported spatial streams is less than or equal to 4
* Dual carrier modulation (transmit and receive)

Editor’s Note ~~NOTE~~—Once mandatory vs optional TBDs are decided, above text will have additions.

*Changes to D0.1 related to CID 1185:*

**26.1.1 Introduction to the HE PHY**

***TGax Editor: Change the lines 16 – 20 on page 69 as follows (#948):***

The HE PHY extends the maximum number of users supported for downlink multi-user (MU-MIMO) transmissions to eight and provides support for downlink and uplink orthogonal frequency ~~divisional~~ division multiple access (OFDMA) as well as for uplink MU-MIMO.

*Changes to D0.1 related to CID 1605:*

**26.1.1 Introduction to the HE PHY**

***TGax Editor: Change the paragraph below as follows (#1605):***

The HE PHY data subcarrier frequency spacing is a quarter of VHT PHY and HT PHY subcarrier frequency spacing defined in Clause 22 and Clause 20, respectively. The HE PHY data subcarriers are modulated using binary phase shift keying (BPSK), 64-QAM, 256-QAM, and 1024-QAM. Forward error correction (FEC) coding (convolution or LDPC coding) is used with coding rates of 1/2, 2/3, 3/4 and 5/6.

*Changes to D0.1 related to CID 1922:*

**26.1.1 Introduction to the HE PHY**

***TGax Editor: Change the line 35 on page 69 as follows (#1922):***

The HE PHY provides support for ~~800 ns, 1600 ns, and 3200 ns~~ 0.8 $μ$s, 1.6 μs and 3.2 μs guard interval durations.

*Changes to D0.1 related to CID 879, CID 1606, CID 2352, and CID 2512:*

**26.1.1 Introduction to the HE PHY**

***TGax Editor: Change the paragraph below as follows (#879, #1606, #2352, #2512):***

The HE PHY provides support for 20 MHz, 40 MHz, 80 MHz and 160 MHz contiguous channel widths and support for 80+80 MHz non-contiguous channel width. For channel widths greater than or equal to 80 MHz, the HE PHY supports channel bonding transmissions where one or more of the non-primary 20 MHz channels in an HE MU PPDU with more than one RU is zeroed out. ~~Tone of one or more secondary channels in 80 MHz and 160 (80+80) MHz could be nulled when using OFDMA PPDU transmission. The modes of non-contigous channel bonding are TBD. The non-contiguous channels within primary or secondary 80 MHz only exists at AP side.~~

**References:**

1. **IEEE P802.11axTM/D0.1, March 2016.**