IEEE P802.11
Wireless LANs

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| Resoluction on CID495 and Removal of Unnecessary PHY TBDs |
| Date: 2016-11-07 |
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Abstract

This document shows

* Resolution for a comment received from TGax comment collection (TGax Draft D0.1)
* Text change proposal to remove unncessary TBDs and typo correction in the physical layer sections of the TGax draft v0.5.

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** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 495 | 158.45 | PHY MIB is missing. Add content. | as commented. | Revised.I agree in principle. But removing subclause PHY MIB has been approved according to the document 11-16-1374-00-00ax- removal of unnecessary phy tbds. |

There are few TBDs in the draft TGax specification v0.5 that are unncessary.

**Discussion #1:**

It has been TBD left on cylic shift values which are already resolved by resolution of CID#1984 in 11-16/0937r7.

**Proposed Changes #1:**

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**To TGax Editor: P210L41:** *remove unnecessary TBD as the proposed changes below*

where represents the cyclic shift for the transmitter chain with a value given in 26.3.10.2.1 (Cyclic shift for Pre-HE modulated fields);

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**Discussion #2:**

It has been TBD left on the STBC field position for HE-MU which is already decided and present in 26.3.10.7 (HE-SIG-A) in the draft specification v0.5.

**Proposed Changes #2:**

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**To TGax Editor: P271L22:** *remove unnecessary TBD as the proposed changes below*

For an HE PPDU, STBC is allowed only with single spatial stream and two space-time streams, and its application is as indicated by the STBC bit in HE-SIG-A. In an HE MU PPDU, STBC coding is used in all RUs or not used in any of the RUs. If in an RU, DL MU-MIMO is applied, STBC shall not be used in any RU in the HE MU PPDU.

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**Discussion #3:**

It has been TBD left on the pilot value which is already decided and present in Table 26-35 (The 8 pilot values in a 242-tone RU) in the draft specification v0.5.

**Proposed Changes #3:**

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**To TGax Editor: P279L8:** *remove unnecessary TBD as the proposed changes below*

For a noncontiguous 80+80 MHz transmission, each frequency segment shall follow the 80 MHz pilot tone allocation and values defined for 996-tone RU in 80 MHz transmission as specified in Equation (26-110) and pilot values as defined in Table 26-35 (The 8 pilot values in a 242-tone RU) for 996-tone RU in 80 MHz PPDU BW.

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**Discussion #4:**

The physical layer receive procedure section contains unncessary TBD in Figure 26-49 (PHY receive state machine). We propose to remove it because it does not add value to the readers of the 802.11ax specification.

**Proposed Changes #4:**

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***To TGax editor:*** ***P306L7*** *remove unnecessary TBD as the proposed changes below*

NOTE—This state machine does not describe the operation of optional features, such as DCM.

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**Discussion #5:**

NOTE contains “xxx” to show an example of optional feature in 11ax. Since DCM is the optional feature which is not described in Figure 26-40/41/42/43 (PHY transmit procedure), “xxx” needs to be replaced with DCM.

**Proposed Changes #5:**

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**To TGax Editor: P298L49, P299L25, P299L52 and P300L26: “***xxx” needs to be replaced with DCM*

NOTE—This procedure does not describe the operation of optional features, such as DCM.

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There are few typos in the draft TGax specification v0.5.

**Discussion #6:**

Number of bits of GI+LTF Size field is 2 instead of 3.

**Proposed Changes #6:**

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**To TGax Editor: P217L8:** *3 in Number of bits Field indicated by B21-22 in HE-SIG-A1 needs to be replaced with 2 as the proposed changes below*

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| * HE-SIG-A field of an HE SU PPDU and HE extended range SU PPDU(#Ed)
 |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
| HE-SIG-A1 | B0 | Format | 1 | Differentiate an HE SU PPDU from an HE trigger-based PPDU:(#1685)Set to 0 for HE trigger-based PPDUSet to 1 for HE SU PPDUThis field is reserved and set to 1 for an HE extended range SU PPDU.(#1196) |
|  | B1 | Beam Change | 1 | Set to 1 indicates that the pre-HE-STF portion of the PPDU(#481) is spatially mapped differently from HE-LTF1.Set to 0 indicates that the pre-HE-STF portion of the PPDU(#481) is spatially mapped the same way as HE-LTF1 on each tone. |
|  | B2 | UL/DL | 1 | Indicates whether the PPDU is sent UL or DL:Set to 0 for DLSet to 1 for UL(#2002)This field indicates DL for TDLS, mesh and IBSS(#2864).NOTE—The TDLS peer can identify the TDLS frame by To DS and From DS fields in the MAC header of the MPDU. |
|  | B3-B6 | MCS | 4 | For an HE SU PPDU:Set to *n* for MCS*n*, where *n* = 0, 1, 2, …., 11Values 12-15 are reserved For HE extended range SU PPDU with Bandwidth field set to 0 (242-tone RU):Set to *n* for MCS*n*, where *n* = 0, 1, 2Values 3-15 are reservedFor HE extended range SU PPDU with Bandwidth field set to 1 (right 106-tone RU in P20):Set to 0 for MCS 0Values 1-15 are reserved |
|  | B7 | DCM | 1 | Indicates whether or not DCM is applied to the Data field for the MCS indicated.Set to 1 to indicate that DCM is applied to the Data fieldSet to 0 to indicate that DCM is not applied to the Data field.DCM is only applied for MCS0, MCS1, MCS3 and MCS4.DCM is only applied for 1 and 2 spatial streams. DCM is not applied when STBC is used.(#2007) |
|  | B8-B13 | BSS Color | 6 | The BSS Color field is an identifier of the BSS |
|  | B14 | Reserved | 1 | Reserved and set to 1(PHY Motion #162) |
|  | B15-B18 | Spatial Reuse | 4 | Set to SR Disallowed to disallow SRP-based spatial reuse (see 25.9 (Spatial reuse operation) and 25.11a (TXVECTOR parameters SPATIAL\_REUSE for an HE PPDU)).(#226)NOTE—This part needs further development.(#2169) |
|  | B19-B20 | Bandwidth | 2 | For an HE SU PPDU:Set to 0 for 20 MHzSet to 1 for 40 MHzSet to 2 for 80 MHzSet to 3 for 160 MHz and 80+80 MHz(#Ed)For an HE extended range SU PPDU:Set to 0 for 242-tone RUSet to 1 for right 106-tone RU within the primary 20 MHz |
|  | B21-B22 | GI+LTF Size(#1420) | 2 | Indicates the GI duration(#1420) and HE-LTF size.Set to 0 to indicate a 1x HE-LTF and 0.8 µs GISet to 1 to indicate a 2x HE-LTF and 0.8 µs GISet to 2 to indicate a 2x HE-LTF and 1.6 µs GISet to 3 to indicate a 4x HE-LTF and 3.2 µs GI(#2005) |
|  | B23-B25 | Nsts | 3 | Indicates the number of space time streams.(#1457)For an HE SU PPDU:Set to the number of space time streams minus 1For an HE extended range SU PPDU:Set to 0 for one space time stream when STBC field is set to 0Set to 1 for two space time streams when STBC field is set to 1(#2001)Values 2-7 are reserved |
| HE-SIG-A2 | B0-B6 | TXOP Duration | 7 | Set to 127 to indicate no duration information. Set to value other than 127 to indicate duration information for NAV setting and protection of the TXOP.NOTE—The encoding of TXOP Duration field is the same as the TXOP\_DURATION parameter(#Ed) in **Error! Reference source not found.**.(#783) |
|  | B7 | Coding | 1 | Indicates whether BCC or LDPC is used:Set to 0 to indicate BCCSet to 1 to indicate LDPC(#1197) |
|  | B8 | LDPC Extra Symbol | 1 | Indicates the presence of the extra OFDM symbol for LDPC.(#1197)Set to 1 if an extra OFDM symbol for LDPC is presentSet to 0 if an extra OFDM symbol for LDPC is presentReserved and set to 1 when the Coding field is 0. |
|  | B9 | STBC | 1 | Set to 1 if space time block coding is usedSet to 0 otherwise |
|  | B10 | TxBF | 1 | Set to 1 if a Beamforming steering matrix is applied to the waveform in an SU transmissionSet to 0 otherwise |
|  | B11-B12 | Pre-FEC Padding Factor(#2564) | 2 | Indicates the pre-FEC padding factor(#1626)(#2564) value as defined in **Error! Reference source not found.**.(#2534) |
|  | B13 | PE Disambiguity | 1 | Indicate PE Disambiguity as defined in **Error! Reference source not found.**.(#2534) |
|  | B14 | Reserved | 1 | Reserved and set to 1 |
|  | B15 | Doppler | 1 | Set to 0 if Doppler mode is not usedSet to 1 if Doppler mode is used(#2167) |
|  | B16-B19 | CRC | 4 | CRC for bits 0-41 of the HE-SIG-A field (see **Error! Reference source not found.**). The first bit to be transmitted is bit *c7* as explained in **Error! Reference source not found.**).(#2535) |
|  | B20-B25 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.Set to 0. |
| NOTE—Integer fields are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position. |

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**Discussion #7:**

Number of bits of GI+LTF Size field is 2 instead of 3.

**Proposed Changes #7:**

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**To TGax Editor: P220L6:** *3 in Number of bits Field indicated by B23-24 in HE-SIG-A1 needs to be replaced with 2 as the proposed changes below*

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| * HE-SIG-A field of an HE MU PPDU(#Ed)
 |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
| HE-SIG-A1 | B0 | UL/DL | 1 | Indicates whether the PPDU is sent UL or DL:Set to 0 for DLSet to 1 for UL(#2002)This field indicates DL for TDLS, mesh and IBSS(#2864).NOTE—The TDLS peer can identify the TDLS frame by To DS and From DS fields in the MAC header of the MPDU. |
|  | B1-B3 | SIGB MCS | 3 | Indicates the MCS of the HE-SIG-B field:Set to 0 for MCS 0Set to 1 for MCS 1Set to 2 for MCS 2Set to 3 for MCS 3Set to 4 for MCS 4Set to 5 for MCS 5(#1616)The values 6 and 7 are reserved(#847) |
|  | B4 | SIGB DCM | 1 | Set to 1 indicates that the HE-SIG-B is modulated with dual sub-carrier modulation for the MCS. Set to 0 indicates that the HE-SIB-B is not modulated with dual sub-carrier modulation for the MCS.DCM is only applicable to MCS0, MCS1, MCS3, and MCS4. |
|  | B5-B10 | BSS Color | 6 | The BSS Color field is an identifier of the BSS |
|  | B11-B14 | Spatial Reuse | 4 | Set to SR Disallowed to disallow SRP-based spatial reuse (see 25.9 (Spatial reuse operation) and 25.11a (TXVECTOR parameters SPATIAL\_REUSE for an HE PPDU)).(#226)NOTE—This part needs further development.(#2169) |
|  | B15-B17 | Bandwidth | 3(#846) | Set to 0 for full 20 MHzSet to 1 for full 40 MHzSet to 2 for full 80 MHzSet to 3 for full 160 MHz and 80+80 MHz(#Ed)Set to 4 for preamble puncturing in 80 MHz, where in the preamble only the secondary 20 MHz is puncturedSet to 5 for preamble puncturing in 80 MHz, where in the preamble only one of the two 20 MHz sub-channels in secondary 40 MHz is puncturedSet to 6 for preamble puncturing in 160 MHz or 80+80 MHz, where in the primary 80 MHz of the preamble only the secondary 20 MHz is puncturedSet to 7 for preamble puncturing in 160 MHz or 80+80 MHz, where in the primary 80 MHz of the preamble the primary 40 MHz is present.(PHY Motion #161) |
|  | B18-B21 | Number Of HE-SIG-B Symbols Or MU-MIMO Users | 4 | If the SIGB Compression field is 0, indicates the number of OFDM symbols in the HE-SIG-B field minus 1.(#821)If the SIGB Compression field is 1, indicates the number of MU-MIMO users minus 1.(#296) |
|  | B22 | SIGB Compression | 1 | Set to 1 for full BW MU-MIMO.Set to 0 otherwise. |
|  | B23-B24 | GI+LTF Size(#1420) | 2 | Indicates the GI duration(#1420) and HE-LTF size.Set to 1 to indicate a 2x HE-LTF and 0.8 µs GISet to 2 to indicate a 2x HE-LTF and 1.6 µs GISet to 3 to indicate a 4x HE-LTF and 3.2 µs GI(#2005)The value 0 is reserved(#Ed) |
|  | B25 | Doppler | 1 | Set to 0 if Doppler mode is not usedSet to 1 if Doppler mode is used(#2167) |
| HE-SIG-A2 | B0-B6 | TXOP Duration | 7 | Set to 127 to indicate no duration information. Set to value other than 127 to indicate duration information for NAV setting and protection of the TXOP.NOTE—The encoding of TXOP Duration field is the same as the TXOP\_DURATION parameter(#Ed) in **Error! Reference source not found.**.(#783) |
|  | B7 | Reserved | 1 | Reserved and set to 1 |
|  | B8-B10 | Number of HE-LTF Symbols | 3 | Indicates the number of HE-LTF symbols:Set to 0 for 1 HE-LTF symbolSet to 1 for 2 HE-LTF symbolsSet to 2 for 4 HE-LTF symbolsSet to 3 for 6 HE-LTF symbolsSet to 4 for 8 HE-LTF symbolsOther values are reserved.(#2127) |
|  | B11 | LPDC Extra Symbol | 1 | Indication of the presence of the extra OFDM symbol for LDPC. |
|  | B12 | STBC | 1 | In an HE MU PPDU where each RU includes no more than 1 user, set to 1 to indicate all RUs are STBC encoded in the payload, set to 0 to indicate all RUs are not STBC encoded in the payload.STBC is not applied in MU-MIMO RUs.STBC doesn't apply to HE-SIG-B.(#540) |
|  | B13-B14 | Pre-FEC Padding Factor(#2564) | 2 | Indicates the pre-FEC padding factor(#1626)(#2564) value as defined in **Error! Reference source not found.**.(#2534) |
|  | B15 | PE Disambiguity | 1 | Indicate PE Disambiguity as defined in **Error! Reference source not found.**.(#2534) |
|  | B16-B19 | CRC | 4 | CRC for bits 0-41 of the HE-SIG-A field (see **Error! Reference source not found.**). The first bit to be transmitted is bit *c7* as explained in **Error! Reference source not found.**).(#2535) |
|  | B20-B25 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.Set to 0. |
| NOTE—Integer fields are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position. |

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