IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | D3.0 Comment Resolution – Part 4 | | | | | | Date: 2018-11-13 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm |  |  | youhank@qti.qualcomm.com | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for the following comments from the letter ballot on P802.11ax D3.0:

15666, 15667, 16002, 15663, 16325, 16323, 16004, 16633, 16376, 16231, 15571, 15574, 15159, 15160, 15580, 16823, 15575, 15576, 16824, 16825, 15597

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version.

# CID 15666

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15666 | 9.4.2.237.5 | 165.51 | "The PPE Thresholds field determines the minimal packet extension value (see 28.3.12 (Packet Extension))...", according to other places of the spec such as 27.12 and 28.3.12, this is not for "minimal packet extention value", but rather the maximum of norminal packet extension duration. | Clarify |

**Proposed Resolution: CID 15666**

**Revised**. PPE Thresholds field indicates the Nominal Packet Padding value, based on which Packet Extension duration is computed. Proposed text update in 18/1850r1 changes “minimal packet extension” to “nominal packet padding”.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15666.

**Proposed Text Updates: CID 15666**

*TGax Editor: Update D3.2 P173L25 as shown below.*

The PPE Thresholds field determines the nominal packet padding value (see 27.12) for an HE PPDU of a particular RU allocation size and NSTS value.

# CID 15667

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15667 | 9.4.2.237.5 | 166.01 | "The NSTS subfield contains an unsigned integer that is the number of NSTS values minus 1 for which PPE threshold values are included in the PPE Thresholds Info subfield."--what if the NSTS subfield here has a value smaller than the maximum NSTS value as indicated by the Rx HE-MCS Map table? Does it mean for those NSTS, PPET8 and PPET16 are all zero? | Clarify |

**Discussion**

27.12 (D3.2 P372) states that nominal packet padding value is 0 when the PPE Threshold field does not contain the corresponding Nsts + RU size combination

D3.2 P372:

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**Proposed Resolution: CID 15667**

**Rejected**.

27.12 (D3.2 P372L47) clearly states that when PPET8 and PPET16 are not present in the PPE Thresholds fields, then the nominal packet padding value is 0.

# CID 16002

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16002 | 9.4.2.237.5 | 166.11 | "6 x (NSTS + 1) bits" -- need to be clear this is the field value rather than the NSTS itself (which is one more than the field value) | After the cited text at the referenced location add ", where NSTS is the value in the NSTS field," |

**Discussion**

Comment is on the size of the PPE Thresholds Info field.

D3.2 P173:

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D3.2 P173:

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Commenter is correct that the “NSTS” is the value of the NSTS field.

Text after accepting the commenter’s proposal would look like the following.

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| The PPE Thresholds Info field contains 6 x (NSTS + 1) bits, where NSTS is the value in the NSTS field, for every bit in the RU Index Bitmask subfield that is nonzero. |

**Proposed Resolution: CID 16002**

**Accepted**.

# CID 15663

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15663 | 9.4.2.237.5 | 167.01 | "Each PPET8 NSTSn RUb and PPET16 NSTSn RUb subfield contains an integer that corresponds to a constellation index value related to the minimal transmission constellation of an HE PPDU as defined in Table 9-262ac (Constellation index)."--the minimal transmission constellation for what? Also what "transmission" mean? SHould this be for reception capability? | Change to: ..minimal reception constellation of an HE PPDU that supports the maximum Nominal Packet Extension duration (TPE) when pre-FEC padding factor equals to 4 being 8 us and 16 us respectively, as defined in... |

**Discussion**

Comment is on the description of Table 9-322d.

D3.2 P174:

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Note that Table 27-12 (D3.2 P373) is the one which makes use of PPET8 and PPET16, and PPET8/PPET16 are not always the ‘minimum constellation’ level for a particular nominal packet padding value. For example, there are cases where PPET8 and PPET16 thresholds are used to indicate a 0 usec nominal packet padding. Hence, it would be better to simply refer the readers to Table 27-12 instead of trying to ‘describe’ the meaning of PPET8 and PPET16.

D3.2 P373:

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**Proposed Resolution: CID 15663**

**Revised**.

Table 27-12 (D3.2 P373) in clause 27.12 is the place which makes use of PPET8 and PPET16, and PPET8/PPET16 are not always the ‘minimum’ constellation level (regardless of whether one views it from ‘transmit’ or ‘receive’ point of view.) Proposed text update in 11-18/1850r1 simply refers the readers to Table 27-12 without trying to ‘describe’ the meaning of PPET8/PPET16 erronenously.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15663.

**Proposed Text Updates: CID 15663**

*TGax Editor: Update D3.2 P174L12 as shown below.*

Each PPET8 NSTS*n* RU*b* and PPET16 NSTS*n* RU*b* subfield contains an integer as defined in Table 9-322d (Constellation index), which is used to compute the nominal packet padding value (see 27.12).

# CID 16325

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16325 | 9.4.2.237.5 | 167.33 | "The value of the PPET8 NSTSn RUb subfield is always less than the value of the PPET16 NSTSn RUb subfield, except if the PPET8 subfield is 7." -- there are other constraints | Add the other constraints, e.g. value for NSSi must be no more than for NSSj for given RUm, if i > j |

**Background**

Comment is on the relationship between the PPET8 and PPET16 values.

D3.2 P174:

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Note that Table 27-12 (D3.2 P373) is the one which makes use of PPET8 and PPET16, and all possible combinations of PPET8 and PPET16 values are allowed in Table 27-12.

D3.2 P373:

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**Proposed Resolution: CID 16325**

**Revised**.

Table 27-12 (D3.2 P373) in clause 27.12 is the place which makes use of PPET8 and PPET16, and all possible combinations of of PPET8 and PPET16 values are allowed in Table 27.12. Yes, PPET8 or PPET16 having value 6 is not valid because it is a ‘reserved’ value, but it is well understood in IEEE 802.11 that reserved values should not be used. Hence, there is no need to describe any ‘restrictions’ on the possible values of PPET8/PPET16 in clause 9.4.2.237.5.

Instruction to Editor: Delete the sentence “The value of the PPET8 NSTSn RUb subfield is always less than the value of the PPET16 NSTSn RUb subfield, except if the PPET8 subfield is 7.” from D3.2 P174L33.

**Proposed Text Updates: CID 16325**

*TGax Editor: Update D3.2 P174L12 as shown below.*

Each PPET8 NSTS*n* RU*b* and PPET16 NSTS*n* RU*b* subfield contains an integer as defined in Table 9-322d (Constellation index), which is used to computing the nominal packet padding value (see 27.12).

# CID 16323

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16323 | 27.12 | 358.33 | It is not clear what to do if the PPET8 and PPET16 comparisons in Table 27-12 give different rows | Express as a list: if <list of conditions> then the Nominal Packet Padding value is 16 us, otherwise if <another list of conditions> then 8 us, otherwise 0 us. |

**Background**

Comment is on Table 27-12.

D3.2 P373:

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**Proposed Resolution: CID 16323**

**Rejected**.

There are three rows in Table 27-12, with each row representing combinations of PPET8 and PPET16 values. Note that the last row states “all other combinations”. Hence, if the combination of PPET8 and PPET16 values for a given NSTS and RU size does not match either of the first two rows, then the last row ‘catches’ all these cases.

**Proposed Text Updates: CID 16323**

*TGax Editor: Update D3.2 P174L12 as shown below.*

Each PPET8 NSTS*n* RU*b* and PPET16 NSTS*n* RU*b* subfield contains an integer as defined in Table 9-322d (Constellation index), which is used to computing the nominal packet padding value (see 27.12).

# CID 16004

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16004 | 28.2.2 | 397.32 | "If the PPDU contains at least one MPDU whose RA field is broadcast group address, then the value of NOMINAL\_PACKET\_PADDING is 16 us." -- this should not be buried in the TXVECTOR table | Delete the cited text at the referenced location and insert it at the end of Subclause 28.3.12 |

**Background**

D3.2 P415:

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**Proposed Resolution: CID 16004**

**Revised**.

Agree with the commenter that TXVECTOR table is not the best place for this information. However, subclause 28.3.12 is not appropriate either as PHY does not know the RA of the PPDU. Proposed text update in 11-18/1850r1 moves the requirement to subclause 27.12.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 16004.

**Proposed Text Updates: CID 16004**

*TGax Editor: Add the following sentence at D3.2 P373L46 as shown below.*

* 1. HE PPDU post FEC padding and packet extension

…

An HE STA transmitting an HE PPDU provides the nominal packet padding in the TXVECTOR parameter NOMINAL\_PACKET\_PADDING for the minimal PE calculation (see 28.3.12 (Packet extension)).

An HE STA transmitting an HE PPDU which contains at least one MPDU whose RA field is broadcast group address shall set the value of the TXVECTOR parameter NOMINAL\_PACKET\_PADDING to 16 µs.

*TGax Editor: Delete the following sentence at D3.2 P415L56 as shown below.*

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| NOMINAL\_PACKET\_PADDING | FORMAT is HE\_SU, HE\_MU or HE\_ER\_SU | The nominal packet padding(#16006) as defined in 9.4.2.241.5 (PPE Thresholds field).  Possible values are 0 µs, 8 µs and 16 µs. | MU | N |
| Otherwise | Not present | N | N |

# CID 16633

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16633 | 28.3.11.2 | 514.51 | Pre-FEC padding factor in Trigger frame (Table 9-25g) maps to two terms in PHY. At P514L51, PFPF is a\_init ("pre-FEC padding factor value or a init") but at P518L23, it is a ("With the final pre-FEC padding factor value a") | Clarify which pre-FEC padding factor is meant in Table 9-25g (e.g .refer to a PHY eqn) but also use sensible naming in the PHY - e.g. call "a\_init" as Initial PFPF and call "a" as just "PFPF" (without a modifier) |

**Discussion**

D3.2 P533:

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Confusion is arising from the fact that both “a” and “a\_init” are being referred to as “pre-FEC padding factor” in some places. Note that in several other cases, “a\_init” is being correctly referred to as “initial pre-FEC padding factor”. This should be done consistently throughout the draft.

Also note that the draft clearly states that the Pre-FEC padding factor subfield in the Trigger frame is “a” at D3.2 P540L21:

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**Proposed Resolution: CID 16633**

**Revised**.

D3.2 P540L21 states that the Pre-FEC padding factor subfield in the Trigger frame is the “a”, not “a\_init”. Nevertheless, proposed text update in 11-18/1850r1 clarifies that a\_init is the “initial” pre-FEC padding factor to avoid any additional confusion. As for the variable name “a”, having a long name also makes equations longer and harder to read (e.g. is “PFPF” one variable, or “P \* F \* P \* F”?). Using “a” (with italics) within equations seems clear enough.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 16633.

**Proposed Text Updates: CID 16633**

*TGax Editor: Update D3.2 P533L50 as shown below.*

Based on *NExcess*, compute the initial number of symbol segments in the last OFDM symbol(s), initial pre-FEC padding factor value or *ainit*, as shown in Equation (28-61).

*TGax Editor: Update D3.2 P534L61 as shown below.*

Among the pre-FEC padding bits, the MAC delivers a PSDU that fills the available octets in the Data field of the HE PPDU (see A-MPDU padding for HE PPDUs in 27.10.2 and 27.10.3), toward the desired initial pre-FEC padding boundary, represented by *ainit* value, in the last OFDM symbol(s).

*TGax Editor: Update D3.2 P536L22 as shown below.*

For an HE SU PPDU with BCC encoding,

*NSYM* = *NSYM,init* (28-66)

and

*a* = *ainit* (28-67)

where *NSYM,init* is defined in **Error! Reference source not found.**, *ainit* is defined in **Error! Reference source not found.** and *a* is the pre-FEC padding factor.

*TGax Editor: Update D3.2 P537L14 as shown below.*

 (28-71)

and then compute the pre-FEC padding factor *a* and *NSYM* values by the following **Error! Reference source not found.**:

 (28-72)

If in step d) of LDPC encoding process as described in 19.3.11.7.5 (LDPC PPDU encoding process), the above mentioned condition is not met, then the LDPC Extra Symbol Segment field in HE-SIG-A shall be set to 0, and

 (28-73)

Using the pre-FEC padding factor value *a*, compute the *NCBPS* of the last symbol as:

 (28-74)

The number of data bits of the last symbol is calculated as *NDBPS,last* = *NDBPS,last,init*.

*TGax Editor: Update D3.2 P539L61 as shown below.*

Among the pre-FEC padding bits, the MAC delivers a PSDU that fills the available octets in the Data field of the HE PPDU, toward the desired initial pre-FEC padding boundary represented by *ainit* for users encoded by LDPC and the pre-FEC padding boundary represented by *a* for users encoded by BCC, in the last OFDM symbol(s).

# CID 16376

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16376 | 28.3.11.5.5 | 521.02 | It is not clear how what the AP indicates maps to what the non-AP STA uses in HE TB | See proposed changes for CID 12652 |

**Discussion**

CID 12652 is a comment which was submitted for D2.0, not D3.0. Since there were text updates made from D2.0 to D3.0, it is not trivial to understand how the proposed changes the commenter had proposed for CID 12652 maps to CID 16376.

CID 16376 is on D3.2 P540:

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Note that the Trigger frame has subfields named “Pre-FEC Padding factor” and “LDPC Extra Symbol Segment”. As for “common length” and “STBC”, the Trigger frame has “UL Length” and “UL STBC” subfields. Suggestion is to update the terminology in 28.3.11.5.5 to match that of the Trigger frame subfields for additional clarity.

**Proposed Resolution: CID 16376**

**Revised**.

Proposed text update in 11-18/1850r1 updates the terminology to match that used in the Trigger frame format to provide additional clarity.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 16376.

**Proposed Text Updates: CID 16376**

*TGax Editor: Update D3.2 P540L10 as shown below.*

The AP indicates the UL Length, Pre-FEC Padding Factor, UL STBC and LDPC Extra Symbol Segment fields in the Trigger frame

# CID 16231

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16231 | 28.3.11.10 | 526.59 | The fact that STBC is not to be used with >1SS or DCM is still repeated half a million times (T28-1 under STBC and under DCM, 28.3.5 twice, T28-18 under DCM and under GI+LTF Size and under STBC, 28.3.11.9, 28.3.11.10) | Say it in 28.3.11.10 and nowhere else |

**Discussion**

This reviewer has searched for all instances of “STBC” in D3.2, and fortunately found only four places stating that STBC is not used with >1SS or DCM. Of the four places, two are within the “Transmitter block diagram” subclause. Removing the information that STBC is not used with >1SS or DCM from “Transmitter block diagram” should not impact the accuracy of the draft.

D3.2 P405L24:

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D3.2 P449L33:

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D3.2 P450L35:

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D3.2 P545L64:

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**Proposed Resolution: CID 16231**

**Revised**.

Proposed text update in 11-18/1850r1 removes language on STBC not being used with >1SS or DCM from the Transmitter block diagram subclause.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 16231.

**Proposed Text Updates: CID 16231**

*TGax Editor: Delete the following sentence from D3.2 P449L33.*

*TGax Editor: Delete the following sentence from D3.2 P450L35.*

# CID 15571

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15571 | 28.3.11.6 | 536.59 | Need to clarify that doppler field can only be set to 1 for MU PPDU when all the recipients's Doppler Rx capability subfiled is equal to 1. | as in comment |

**Discussion**

This has been addressed in proposed resolution for CID 17100 (11-18/1848r1).

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| An HE STA shall not set the TXVECTOR parameter DOPPLER to 1 when transmitting an HE SU, HE ER SU or HE MU PPDU unless the HE STA has received an HE Capabilities element with the Doppler Rx subfield equal to 1 in the HE PHY Capabilities Information field from each of the intended receipient STAs. |

**Proposed Resolution: CID 15571**

**Rejected**.

Agree with the commenter, but the issue has been resolved as part of CID17100 in 11-18/1848r1.

# CID 15574, 15159

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15574 | 28.3.18.4.3 | 555.52 | "For 1024-QAM, the relative constellation error shall be equal to or less than -35 dB when amplitude drift compensation in the test equipment is on and shall be equal to or less than -32 dB when amplitude drift compensation is off in the test equipment." This sentence implies both requirements have to be satisfied. Chane the "AND" to "OR". | as in comment |
| 15159 | 28.3.18.4.3 | 555.58 | The Note in this section is not necessary. If EVM is <35dB with amplitude compensation off (as per the note), then by definition we already meet the <-32dB specification in Table 28-46. There is no need for the note. | Remove Note as commented. |

**Background**

D3.2 P572L62:

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**Proposed Resolution: CID 15574**

**Revised**.

Proposed text update in 11-18/1850r1 clarifies the requirements as suggested by the commenter.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15574 and 15159.

**Proposed Resolution: CID 15159**

**Revised**.

Proposed text update in 11-18/1850r1 removes the note, and cleans up the language to help readers understand the requirement better.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15574 and 15159.

**Proposed Text Updates: CID 15574, 15159**

*TGax Editor: Update D3.2 P572L62 as shown below.*

For 1024-QAM, relative constellation error shall meet either of the following two requirements:

* The relative constellation error shall be less than or equal to -35 dB with amplitude drift compensation disabled at the test equipment, or
* The relative constellation error shall be less than or equal to -35 dB with amplitude drift compensation enabled at the test equipment, and the relative constellation error shall be less than or equal to -32 dB with amplitude drift compensation disabled at the test equipment

For all other constellations, relative constellation error shall be less than or equal to the values in Table 28-47, regardless of whether amplitude drift compensation is enabled or disabled at the test equipment.

# CID 15160

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15160 | 28.3.18.4.3 | 555.53 | EVM is a measure of the the signal quality of tranmitter required to reliably demodulate signal information at the receiver. 256 QAM requires EVM -32dB with no amplitude tracking as listed in Table 28-46. An EVM of -32dB for 1024 QAM as listed in Table 28-46 is not sufficient to demodulation or maintain the link between the AP and STA. In theory and in modern day radio design, for 1024-QAM, -35dBm EVM specification with no amplitude tracking and -38dB EVM with amplitude tracking turned on is required. This provides the necessary margin between 256QAM and 1024 QAM and to provide a quality EVM transmitted RF signal to demodulated 1024-QAM and maintain link reliabilty between the AP and STA. | Change text tor read:  For 1024-QAM, the relative constellation error shall be equal to or less than -38 dB when amplitude drift compensation in the test equipment is on and shall be equal to or less than -35 dB when amplitude drift compensation is off in the test equipment. |

**Proposed Resolution: CID 15160**

**Rejected**.

It is becoming more common to use transmit beamforming in IEEE 802.11 based WLAN systems. Also, more and more APs are supporting more than 2 transmit antennas. In order to help balance the implementation complexity and performance, MCS11 transmit EVM evaluation was done in 11-16/0044r0 assuming that AP has 4 transmit chains, STA has 2 receive chains, and 2SS is being sent using transmit beamforming. In 11-16/0044r0, TX EVM of -35 dB resulted in less than 1 dB performance (RX sensitivity) loss under ChD compared to no TX impairment (TX EVM = -∞ dB). Furthermore, TX EVM of -35 dB showed only 0.5 dB RX sensitivity loss compared to TX EVM of -38 dB.

# CID 15580

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15580 | 28.3.18.4.4 | 556.35 | In Table 28-46, the EVM for 1024-QAM R5/6 does not look correct as it is identical to the EVM for 1024 QAM R3/4. Given that there is a 2dB difference for 64 QAM and 256 QAM, we should consider changing the -35/-32 dB numbers to -37/-34 dB. | As in comment |

**Proposed Resolution: CID 15580**

**Rejected**.

It is becoming more common to use transmit beamforming in IEEE 802.11 based WLAN systems. Also, more and more APs are supporting more than 2 transmit antennas. In order to help balance the implementation complexity and performance, MCS11 transmit EVM evaluation was done in 11-16/0044r0 assuming that AP has 4 transmit chains, STA has 2 receive chains, and 2SS is being sent using transmit beamforming. In 11-16/0044r0, TX EVM of -35 dB resulted in less than 1 dB performance (RX sensitivity) loss under ChD compared to no TX impairment (TX EVM = -∞ dB). Furthermore, TX EVM of -35 dB showed only 0.5 dB RX sensitivity loss compared to TX EVM of -38 dB.

# CID 16823

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16823 | 28.3.18.4.4 | 556.54 | "+/- 3 tone neighbors" is ambiguous. It could mean {-3, +3} instead of {-3, -2, -1 0, 1, 2, 3} | Improve wording (Repeated several time in this paragraph) |

**Background**

D3.2 P574:

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**Proposed Resolution: CID 16823**

**Revised**.

Proposed text update in 11-18/1850r1 improves the wording.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15597.

**Proposed Text Updates: CID 16823**

*TGax Editor: Update D3.2 P574L1 as shown below.*

LO leakage that can potentially show up in center frequency of the HE PPDU tone plan and within its ±3 tone neighbors shall be excluded from the computation of the transmitter modulation accuracy test. The potential LO leakage tones for 20 MHz operating devices are the center of primary 20 MHz of the HE PPDU tone plan and within ±3 tones from it. The potential LO leakage tones for 40 MHz operating devices are the center of the primary 40 MHz of the PPDU tone plan and within ±3 tones from it. The potential LO leakage tones for 80 MHz operating devices are the center of the primary 80 MHz of the PPDU tone plan and within ±3 tones it. The potential LO leakage tones for 160 MHz operating devices are the center of the 160 MHz of the PPDU tone plan and within ±3 tones from it. The potential LO leakage tones for 80+80 MHz operating devices exist outside the PPDU bandwidth and should not affect the transmitter modulation accuracy test. For 40 MHz capable devices that transmits 20 MHz, the potential LO leakage tones exist outside the PPDU bandwidth and should not affect the transmitter modulation accuracy test. For 80 MHz capable devices that transmits 20 MHz or 40 MHz PPDU, the potential LO leakage tones exist outside the PPDU bandwidth and should not affect the transmitter modulation accuracy test. For 160 or 80+80 MHz capable devices that transmits 20 MHz or 40 MHz PPDU or 80 MHz PPDU, the potential LO leakage tones exist outside the PPDU bandwidth and should not affect the transmitter modulation accuracy test.

# CID 15575

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15575 | 28.3.18.4.4 | 555.36 | Target RSSI subfield encoding is Table 9-25i instead of 9-25g. Also change "for the same data-carrying subcarriers" to "for the same RU" since the target RSSI is specified for RU instead of datat subcarriers | as in comment |

**Background**

D3.2 P556:

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**Proposed Resolution: CID 15575**

**Revised**.

D3.2 has already fixed the Table reference for the UL Target RSSI subfield encoding. Proposed text update in 11-18/1850r1 clarifies the language “for the same data-carrying subcarriers” as suggested by the commenter.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15575.

**Proposed Text Updates: CID 15575**

*TGax Editor: Update D3.2 P556L36 as shown below.*

NOTE—The maximum power of MCS 7 can be measured by setting the UL Target RSSI subfield as defined in

Table 9-31h (UL Target RSSI subfield encoding) in the Trigger frame to 127 for the RU for which the EVM test is conducted.

# CID 15576

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15576 | 28.3.18.4.4 | 557.29 | Remove "If midambles are present in the Data field of the PPDU, the channel response coefficients shall be based upon the most recently received midamble symbols." in step f) since it is duplicated with step e) | as in comment |

**Background**

D3.2 P574:

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**Proposed Resolution: CID 15576**

**Revised**.

Agree with the commenter that there is duplicate information between steps e) and f). Appropriate place to keep the sentence under question seems to be in f), not e), because f) is the step in which the channel response coefficient is being computed.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15576.

**Proposed Text Updates: CID 15576**

*TGax Editor: Update D3.2 P574L35 as shown below.*

e) For each HE-LTF symbol, transform the symbol into subcarrier received values, estimate the phase from the pilot subcarriers, and derotate the subcarrier values according to the estimated phase.

f) Estimate the complex channel response coefficient for each of the subcarriers and each of the transmit streams. If midambles are present in the Data field of the PPDU, the channel response coefficients shall be based upon the most recently received midamble symbols.

# CID 16824

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16824 | 28.3.18.4.4 | 558.56 | What are the correct arguments of I\_u(i\_f, i\_s, i\_RU)? On page 558.56, it says that the last argument (i\_RU) is the index of an unoccupied RU. In (28-128), the summation over i\_RU is a summation over subcarriers. In (28-129), the last argument of I\_u() is given as i\_SC, indicating that it is a subcarrier index. | Clean up notation. Replace i\_RU in (28-128) with i\_SC. Replace "k" in (28-128) with i\_RU. Correct definition of I\_u and Q\_u on line 55, page 558. |

**Background**

D3.2 P575:

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**Proposed Resolution: CID 16824**

**Revised**.

Agree with the commenter that i\_RU is the index of the tone, not the index of the RU. Proposed text update in 11-18/1850r1 implements the changes suggested by the commenter.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 16824.

**Proposed Text Updates: CID 16824**

*TGax Editor: Update D3.2 P575L55 as shown below.*

1. Compute the average unoccupied subcarrier error vector magnitude for each unoccupied 26-tone RU and average across PPDUs of the RMS of all errors per PPDU as given by .

 (28-128)

where

 denotes unequalized observed symbol point in the complex plane in tone *isc* of the unoccupied 26-tone RU and OFDM symbol *is* of frame *if*.

*k* is a set of subcarriers for *k*-th 26-tone RU as defined in **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.**

# CID 16825

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16825 | 28.3.18.4.4 | 559.33 | In (28-128), the argument of UnusedToneError\_RMS is an absolute RU index. In (28-131) it is a gap in units of 26 tones. Which is correct? | Clarify |

**Background**

D3.2 P575:

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| … |

Here, “*k*” is an absolute RU index.

D3.2 P575:

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Here, “*m*” is the gap between RUs.

**Proposed Resolution: CID 16825**

**Revised**.

Agree with the commenter that “m” in Equation (28-131) should be the absolute RU index, not a relative gap.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 16825.

**Proposed Text Updates: CID 16825**

*TGax Editor: Update D3.2 P576L39 as shown below.*

 (28-131)

where

*m* defines the gap in the units of 26-tone RU to the occupied RU from either side and is a positive integer with *m*= 1 being the adjacent 26-tone RU

*iRU* is the index of the occupied RU

*NRU* is defined in Table 28-15

*UsedToneErrorRMS* is the relative constellation error for an HE TB PPDU defined in Table 28-47

# CID 15597

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15597 | 17.3.9.10 | 249.17 | The 350 Hz requirement is only for -60 dBm. Does this mean that for a received power of -59 dBm, we can do much worse? Change the -60 dBm received power to a minimum value. Also change "as the 10% point" to "at the 10% point". | Replace "After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting Trigger frame shall not exceed 350 Hz for data subcarriers when measured at the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN at a received power of -60 dBm in the primary 20 MHz." wih "After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting Trigger frame shall not exceed 350 Hz for data subcarriers when measured at the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN at received powers greater than or equal to -60 dBm in the primary 20 MHz.". |

**Discussion**

D3.2 P259:

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“as the 10% point” has already been fixed to “at the 10% point” in D3.2.

Commenter is correct that performance should not be worse at received power of greater than -60 dBm. However, there needs to be an upper limit to the received power range – otherwise, receiver’s front end would saturate. We should use the receiver maximum input level requirement as specified in 28.3.17.5 (-30 dBm in 5 GHz, and -20 dBm in 2.4 GHz).

Note that 28.3.14 also has similar issues.

D3.2 P564:

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**Proposed Resolution: CID 15597**

**Revised**.

Agree with the commenter that the requirement should not be just at -60 dBm, but also at higher receiver powers as well. However, there needs to be an upper limit as well to avoid receiver saturation. Proposed text update in 11-18/1850r1 clarifies that the requirement is between -60 dBm and the receiver maximum input level. Also, similar issue is fixed in 28.3.14.3.

Instruction to Editor: Implement the proposed text changes in 11-18/1850r1 for CID 15597.

**Proposed Text Updates: CID 15597**

*TGax Editor: Update D3.2 P259L18 as shown below.*

* + - 1. Pre-correction accuracy requirements

…

After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting MU-RTS Trigger frame shall not exceed 2 kHz when measured at the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN when the received power is within the range between 60 dBm and the receiver maximum input level as defined in 28.3.17.5 in the primary 20 MHz.

*TGax Editor: Update D3.2 P564L9 as shown below.*

* + - 1. Pre-correction accuracy requirements

A STA that transmits an HE TB PPDU compensates for carrier frequency offset (CFO) error and symbol clock error. After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting Trigger frame shall not exceed 350 Hz for data subcarriers when measured at the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN when th received power is within the range between 60 dBm and the receiver maximum input level as defined in 28.3.17.5 in the primary 20 MHz.

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