IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | D3.0 Comment Resolution – Part 1 | | | | | | Date: 2018-09-09 | | | | | | 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:

17085, 16455, 17092, 16815, 17093, 17094, 16976, 17096, 16816, 16031, 16978, 17099, 16818, 16819

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

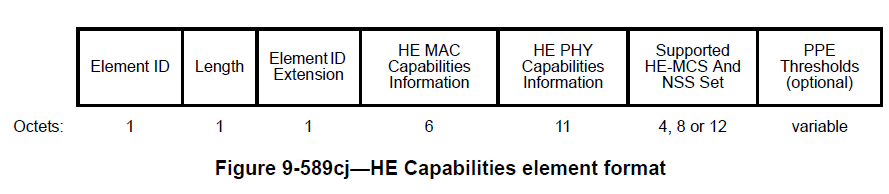
**Revision History:**

R0: Initial version.

# CID 17085

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 17085 | 9.4.2.237.3 | 156.06 | HE Capabilities element is too long. For example, VHT Capabilities element is 14 bytes long. However, the HE Capabilities element can be as long as 60 bytes. Part of the reason for the long duration is the PPE Thresholds field, which could be as long as 24 bytes. HE Capabilities already has a bit "PPE Threshold Present" which allows devices which does not require any packet extension in all cases to not include the PPE Thresholds field. However, it is likely that many devices would require some amount of packet extension. Hence, we should add additional cases to use a single bit to signal the PPE Thresholds and skip the PPE Thresholds field | In figure 9-589cl (P156L6), change B78 from Reserved to "PPE Threshold Not Present Reason". Also add a row to Table 9-262aa with Subfield = PPE Threshold Not Present Reason, Definition = Indicates the reason for the PPE Threshold field not being present in the HE PHY Capabilities Information field, Encoding = If PPE Threshold Present field is 1: Set to 0 if the required Nominal Packet Padding value is 0 for all cases. Set to 1 if the required Nominal Packet Padding value is 1 for all cases. If PPE Threshold Present fiels is 0: Reserved and set to 0. At P358L11, change "A STA that sets the PPE Thresholds Present subfield in HE Capabilities elements that it transmits to 0 has zero packet extension duration value for all constellations, NSS and RU allocations it supports." to "A STA that sets the PPE Thresholds Present subfield to 0 and the PPE Threshold Not Present Reason field set to 0 in the HE Capabilities elements has Nominal Packet Padding value of 0 for all constellations, NSS and RU allocations it supports. A STA that sets the PPE Thresholds Present subfield to 0 and the PPE Threshold Not Present Reason field set to 1 in the HE Capabilities elements has Nominal Packet Padding value of 16 for all constellations, NSS and RU allocations it supports." |

**Discussion**



HE Capabilities element has variable length, and can be as long as 56 bytes. Of these 56 bytes, 24 bytes are due to the PPE Thresholds field which is optionally present. Currently, the 11ax draft allows not sending the PPE Thresholds field only if the STA supports 0 usec Nominal Packet Padding for all constellations, NSS and RU allocations the STA supports. However, significant portion of practical implementations are expected to require non-zero Nominal Packet Padding. Hence, HE BSSs would benefit by introducing more cases in which the PPE Thresholds field does not need to be transmitted, reducing overhead of various management frames such as Beacon, Probe Response, Association Request, Association Response, Re-associattion Request and Re-association Response frames.

**Proposed Resolution: CID 17085**

**Revised**. Proposed text update introduces additional modes for which the PPE Thresholds fields does not need to be transmitted, reducing the overhead of various management frames.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 17085.

**Proposed Text Updates: CID 17085**

* HE PHY Capabilities Information field

*TGax Editor: Update Figure 9-589cl on D3.1 P159-160 as shown below.*

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|  | B51 | | B52 | | B53 | | B54 | | B55 | | B56 | | B57 | | B58 | |
|  | Triggered MU Beamforming Partial BW Feedback | | Triggered CQI Feedback | | Partial Bandwidth Extended Range | | Partial Bandwidth DL  MU-MIMO | | Reserved | | SRP-based SR Support | | Power Boost Factor Support | | HE SU PPDU And HE MU PPDU With 4x HE-LTF And 0.8 s GI | |
| Bits: | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
|  | B69 | B70   B71 | | B72 | | B73 | | B74 | | B75 | | B76 | | B77 | |  | |
|  | Midamble Tx/Rx 2x And 1x HE-LTF | DCM Max BW | | Longer Than 16 HE SIG-B OFDM Symbols Support | | Non-Triggered CQI Feedback | | Tx 1024-QAM < 242-tone RU Support | | Rx 1024-QAM < 242-tone RU Support | | Rx Full BW SU Using HE MU PPDU With Compressed SIGB | | Rx Full BW SU Using HE MU PPDU With Non-Compressed SIGB | |  | |
| Bits: | 1 | 2 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |  | |

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| --- | --- | --- |
|  | B78 B79 | B80 B87 |
|  | PPE Thresholds Present and Nominal Packet Padding | Reserved |
| Bits: | 1 | 2 |

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| * HE PHY Capabilities Information field format |

*TGax Editor: Update Table -9262aa on D3.1 P165 and 168 as shown below.*

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| * Subfields of the HE PHY Capabilities Information field | | |
| Subfield | Definition | Encoding |
| **…** | | |
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| **…** | | |
| Rx Full BW SU Using HE MU PPDU With Non-Compressed SIGB | Indicates support for reception of an HE MU PPDU with a bandwidth less than or equal to 80 MHz, an RU spanning the entire PPDU bandwidth and a non-compressed HE-SIG-B format. | Set to 0 if not supported.  Set to 1 if supported. |
| PPE Thresholds Present and Nominal Packet Padding | Indicates whether the PPE Thresholds field is present, and if not present, also indicates the Nominal Packet Padding value to be used for all constellations, NSS and RU allocations the STA supports. | Set to 0 if PPE Thresholds field is not present, and Nominal Packet Padding value is 0 µs for all constellations, NSS and RU allocations the STA supports.  Set to 1 if PPE Thresholds field is not present, and Nominal Packet Padding value is 8 µs for all constellations, NSS and RU allocations the STA supports.  Set to 2 if PPE Thresholds field is not present, and Nominal Packet Padding value is 16 µs for all constellations, NSS and RU allocations the STA supports.  Set to 3 if PPE Thresholds field is present. |

*TGax Editor: Update D3.1 P360L15 as shown below.*

* HE PPDU post FEC padding and packet extension

An HE STA with dot11PPEThresholdsRequired set to false may set the PPE Thresholds Present subfield in HE Capabilities elements that it transmits to 0.

An HE STA with dot11PPEThresholdsRequired set to true shall set the PPE Thresholds Present subfield in HE Capabilities elements that it transmits to 3.

A STA that sets the PPE Thresholds Present and Nominal Packet Padding subfield in HE Capabilities elements that it transmits to 0 has Nominal Packet Padding value of 0 µs for all constellations, NSS and RU allocations it supports.

A STA that sets the PPE Thresholds Present and Nominal Packet Padding subfield in HE Capabilities elements that it transmits to 1 has Nominal Packet Padding value of 8 µs for all constellations, NSS and RU allocations it supports.

A STA that sets the PPE Thresholds Present and Nominal Packet Padding subfield in HE Capabilities elements that it transmits to 2 has Nominal Packet Padding value of 16 µs for all constellations, NSS and RU allocations it supports.

A STA that sets the PPE Thresholds Present subfield in HE Capabilities elements that it transmits to 3 shall indicate its Nominal Packet Padding value per constellation, NSS and RU allocation by setting the subfields of the PPE Thresholds field according to 9.4.2.237 (HE Capabilities element) and using the corresponding values from dot11PPEThresholdsMappingTable.

# CID 16455

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16455 | 28.3.11.4 | 156.06 | Given that 802.11az is based on IEEE 802.11aq, and 802.11aq has added a client privacy feature, 802.11ax needs to describe consistent scrambler behaviour. | Insert the following paragraph at the cited location "If dot11MACPrivacyActivated is true, the initial state of the scrambler shall be reset when the STA's MAC address is changed." |

**Proposed Resolution: CID 16455**

**Rejected**. The paragraph suggested by the commenter is already present in the IEEE Std 802.11aq-2018 amendment. As 11aq is a part of the baseline for the 11ax amendment (see P1L8 of the 11ax D3.1), there is no need to duplicate the paragragh in 11ax.

# CID 17092

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 17092 | 28.3.11.5 | 156.06 | HE TB PPDU is missing | Change "User Info field in a Trigger frame, as defined in" to "User Info field in the corresponding Trigger frame in case of HE TB PPDU, as defined in". |

**Proposed Resolution: CID 17092**

**Revised**. Agree with the commenter. Proposed text update implements the change suggested by the commenter on top of D3.1.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 17092.

**Proposed Text Updates: CID 17092**

*TGax Editor: Update D3.1 P520L41 as shown below.*

* + - 1. Coding

The Data field shall be encoded using either the binary convolutional code (BCC) defined in 28.3.11.5.1 or the low density parity check (LDPC) code defined in 28.3.11.5.2. The coding type is selected by the Coding field in HE-SIG-A in an HE SU PPDU or an HE ER SU PPDU, or the Coding field in HE-SIG-B per user sub-field(s) in an HE MU PPDU, or the UL FEC Coding Type subfield in User Info field in the corresponding Trigger frame in case of HE TB PPDU, as defined in 28.3.10.7, 28.3.10.8 and 9.3.1.23, respectively.

# CID 16815, 17093

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16815 | 28.3.11.5 | 516.49 | "LDPC is the only FEC coding scheme in the HE PPDU Data field for HE-MCSs 10 and 11 in a 242- 484-, 996- and 2x996-tone RU." Now that MCS 10 and 11 are also allowed on smaller RU sizes, isn't it mandatory there too? | Clarify requirements fro 26, 52 and 106-tone RUs |
| 17093 | 28.3.11.5 | 516.49 | MCS10 and 11 are allowed in all RU sizes in D3.0 | At P516L49, delete "in a 242- 484-, 996- and 2x996-tone RU" |

**Proposed Resolution: CID 16815**

**Revised**. Proposed text update clarifies that LDPC is the only coding scheme for MCSs 10 and 11 for all RU sizes.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 16815 and 17093.

**Proposed Resolution: CID 17093**

**Revised**. Agree with the commenter. Proposed text update implements the change suggested by the commenter on top of D3.1.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 16815 and 17093.

**Proposed Text Updates: CID 16815, 17093**

*TGax Editor: Update D3.1 P520L49 as shown below.*

LDPC is the only FEC coding scheme in the HE PPDU Data field for a 484-, 996-, and 2996-tone RU. LDPC is the only FEC coding scheme in the HE PPDU Data field for HE-MCSs 10 and 11.

# CID 17094

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 17094 | 28.3.11.5 | 517.39 | Npld is defined twice (once at P517L39 and once in Equation (28-69)), with two different definitions. Yes, the two definitions in fact end up with the same number, but still seems confusing. | At P517L39, delete ", i.e., Npld = Nservice + 8 x APEP\_LENGTH + NPAD,Pre-FEC." |

**Background**

D3.1 P521:

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**Proposed Resolution: CID 17094**

**Revised**. Agree with the commenter. Proposed text update implements the change suggested by the commenter on top of D3.1.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 17094.

**Proposed Text Updates: CID 17094**

*TGax Editor: Update D3.1 P521L38 as shown below.*

For an HE SU PPDU or HE ER SU PPDU using LDPC coding to encode the Data field, the LDPC code and encoding process described in 19.3.11.7 (LDPC codes) shall be used with the following modifications. First, all bits in the Data field including the scrambled SERVICE, PSDU, and pre-FEC pad bits are encoded. Thus, *Npld* for HE PPDUs shall be computed using Equation (28-69) instead of Equation (19-35).

# CID 16976, 17096

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16976 | 28.3.11.5.4 | 518.57 | for each user u using Equation (28-64) if user u is BCC encoded, or Equation (28-64) if user u is LDPC encoded.  The same equation is used for both BCC and LDPC. so no need to mention twice | remove "if user u is BCC encoded, or Equation (28-64) if user u is LDPC encoded" |
| 17096 | 28.3.11.5.4 | 518.57 | Both BCC and LDPC cases use Equation (28-64). | At P518L57, delete "if user u is BCC encoded, or Equation (28-64) if user u is LDPC encoded" |

**Background**

D3.1 P522:

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**Proposed Resolution: CID 16976, 17096**

**Revised**. Agree with the commenter. Proposed text update implements the change suggested by the commenter on top of D3.1.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 16976 and 17096.

**Proposed Text Updates: CID 16976 and 17096**

*TGax Editor: Update D3.1 P522L57 as shown below.*

First compute initial pre-FEC padding factor value (*ainit,u*) for each user *u* using Equation (28-61), and the initial number of OFDM symbols (*NSYM,init,u*) for each user *u* using Equation (28-64). Among all the users, derive the user index with the longest encoded packet duration, as in Equation (28-76).

# CID 16816

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16816 | 28.3.11.5.4 | 519.13 | Change "Update" to "Calculate". There is nothing to update since this is the first time these values are determined. | See comment |

**Background**

D3.1 P523:

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**Proposed Resolution: CID 16816**

**Revised**. Agree with the commenter. Proposed text update implements the change suggested by the commenter on top of D3.1.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 16816.

**Proposed Text Updates: CID 16816**

*TGax Editor: Update D3.1 P523L13 as shown below.*

Calculate each user’s initial number of coded bits in its last symbol as below:

# CID 16031

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16031 | 28.3.11.9 | 526.08 | " In an HE MU PPDU or HE TB PPDU, DCM can be applied only to RUs containing data for 1 user" is not clear -- it can be applied only to those RUs, but can it also be applied to other RUs? | To the cited text append " and cannot be applied to RUs containing data for more than one user"; also change "1" to "one" in the cited text |

**Background**

D3.1 P530:

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**Proposed Resolution: CID 16031**

**Rejected**. Draft is clear that DCM can be applied “only” to RUs containing data for 1 user. Hence, the change proposed by the commenter is redundant.

# CID 16978

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16978 | 28.3.11.9 | 526.09 | "DCM is not applied with MU-MIMO", and in the paragraph after the spec say "DCM can be applied only to RUs containing data for 1 user". these are talk about the same rule. only need one or the other. | remove "In an HE MU PPDU or HE TB PPDU, DCM can be applied only to RUs containing data for 1 user." |

**Background**

D3.1 P530:

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**Proposed Resolution: CID 16978**

**Rejected**. The first phrase (“DCM can be applied only to RUs containing data for 1 user”) does indicate that DCM cannot be used together with MU-MIMO. However, the first phrase also clarifies that the if an HE MU or HE TB PPDU has multiple RUs, where some RUs have 1 user while other RUs have multiple users, then the RUs with 1 user can still use DCM. Hence, it is recommended to keep both phrases.

# CID 17099

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 17099 | 28.3.11.10 | 526.64 | Better wording needed. This is really an editorial comment, but marking it as technical so that people can review. | At P526L64, change "If in an RU, DL MU-MIMO is applied, STBC shall not be used in any RU in the HE MU PPDU." to "If any RU in an HE MU PPDU uses DL MU-MIMO, then STBC shall not be used in any RU in the HE MU PPDU." |

**Background**

D3.1 P530-531:

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**Proposed Resolution: CID 17099**

**Revised**. Agree with the commenter. Proposed text update implements the change suggested by the commenter on top of D3.1.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 17099.

**Proposed Text Updates: CID 17099**

*TGax Editor: Update D3.1 P531L1 as shown below.*

**28.3.11.10 Space-time block coding**

For an HE PPDU, STBC is applied only with 1 spatial stream and only if DCM is not applied. Its application is indicated by the STBC field 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 any RU in an HE MU PPDU uses DL MU-MIMO, STBC shall not be used in any RU in the HE MU PPDU.

# CID 16818

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16818 | 28.3.11.13 | 533.15 | "For a 484-tone RU transmission, the pilot mapping for 8 pilots in 242-tone RU is replicated in the two 242-RUs of the 484-tone RU transmission.". This is redundant information. The pilot tones are given in Table 28-41. No need to get into how these tones were selected. | Delete "For a 484-tone RU transmission, the pilot mapping for 8 pilots in 242-tone RU is replicated in the two 242- RUs of the 484-tone RU transmission." |

**Discussion**

D3.1 P537:

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The first sentence is explaining why the pilot values (ψ*m*) is re-using the table for the 242-tone RU, instead of having a dedicated table for 484-tone RU. However, Equation (28-106) is clear on its own and does not require additional clarification. Furthermore, the first sentence (the sentence under question) is poorly written – what does “two 242-RUs of the 484-tone RU transmission” mean? Hence, it would be better to remove the sentence under question to avoid any confusion.

**Proposed Resolution: CID 16818**

**Revised**. Proposed text update removes the sentence under question.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 16818.

**Proposed Text Updates: CID 16818**

*TGax Editor: Update D3.1 P537L15 as shown below.*

For a user transmitting on the *i*-th 484-tone RU in a given PPDU BW, 16 pilot subcarriers shall be inserted in subcarriers , where  is given by the *i*-th pilot index set in the row of given PPDU BW of Table 28-41.

# CID 16819

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16819 | 28.3.11.13 | 533.54 | "For a 996-tone RU transmission, the same mapping method is applied to its 16 pilots as for a 484-tone RU transmission." This is redundant and unclear. The pilot tones are given in Table 28-42. No need to get into how these tones were selected. | Delete "For a 996-tone RU transmission, the same mapping method is applied to its 16 pilots as for a 484-tone RU transmission." |

**Discussion**

This is similar comment as in 16818.

**Proposed Resolution: CID 16819**

**Revised**. Proposed text update removes the sentence under question.

Instruction to Editor: Implement the proposed text changes in 11-18/abcdr0 for CID 16819.

**Proposed Text Updates: CID 16819**

*TGax Editor: Update D3.1 P537L54 as shown below.*

For a user transmitting on the *i*-th 996-tone RU in a given PPDU BW, 16 pilot subcarriers shall be inserted in subcarriers , where  is given by the *i*-th pilot index set in the row of given PPDU BW of Table 28-42.

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