IEEE P802.11
Wireless LANs

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| LB225 11ax D1.0 Comment Resolution HE PHY Capabilities, PPE |
| Date: 2017-08-23 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs :

* ~~7376,~~ 3388, 3497, 3828, 3916, 4383, 4453, 5538, 5540, 5541, 5543, 5544, 5545, 5546, 5547, 5549, 5550, 7994, 8106, 8107, 8681, 8688.

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~~** | **~~PP~~** | **~~LL~~** | **~~Comment~~** | **~~Proposed Change~~** | **~~Resolution~~** |
| ~~7376~~ | ~~81~~ | ~~35~~ | ~~There are 3 bits, B37, B38 and B39 for the NSTS Total For \leq 80 MHz subfeld, but it shows in the figure that there are only 2 bits.~~ | ~~Replace "2" with "3".~~ |  ~~Revised~~~~D1.4 already replaces “2” with “3”~~ |

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| **CID** | **PP** | **LL** | **Comment** | **Proposed Change** | **Resolution** |
| 3388 | 89 | 36 | PPET, PPET8 and PPET16 acronym not defined | Add definitions for PPET, PPET8 and PPET16 in clause 3.4 Definitions, acronyms, and abbreviations |  RevisedTGax editor adds the following abbreviation in subclause 3.4 after PPE: “PPET PPE Threshold” |
| 3497 | 89 | 36 | PPET, PPET8 and PPET16 acronym not defined | Add definitions for PPET, PPET8 and PPET16 in clause 3.4 Definitions, acronyms, and abbreviations | Revised See CID 3388 |
| 3828 | 89 | 36 | PPET, PPET8 and PPET16 acronym not defined | Add definitions for PPET, PPET8 and PPET16 in clause 3.4 Definitions, acronyms, and abbreviations | Revised See CID 3388 |
| 3916 | 89 | 36 | PPET, PPET8 and PPET16 acronym not defined | Add definitions for PPET, PPET8 and PPET16 in clause 3.4 Definitions, acronyms, and abbreviations | Revised See CID 3388 |
| 4383 | 89 | 36 | PPET, PPET8 and PPET16 acronym not defined | Add definitions for PPET, PPET8 and PPET16 in clause 3.4 Definitions, acronyms, and abbreviations | Revised See CID 3388 |
| 4453 | 89 | 36 | PPET, PPET8 and PPET16 acronym not defined | Add definitions for PPET, PPET8 and PPET16 in clause 3.4 Definitions, acronyms, and abbreviations | Revised See CID 3388 |
| 5538 | 21 | 89 | "PPE threshold values appear in increasing NSS value and increasing RU index value order, where lower numbered PPE Thresholds Info field bits contain PPE threshold values corresponding to lower numbered NSS values and within a set of PPE Threshold subfields corresponding to a single value of NSS, lower numbered PPE Thresholds Info field bits contain PPE threshold values corresponding to lower numbered RU index values" Starts off pretty clear but then proceeds to confuse. Dont think the rest is actually making ot any clearer, suggest it is kept simple. End sentence at the first comma and delete from there. | At the first comma end sentence and delete from there. "PPE threshold values appear in increasing NSS value and increasing RU index value order." | Revised.See 6434. |
| 5540 | 60 | 88 | "are included in the PPE Thresholds Info field." Should be "subfield" | Change 'field' to 'subfield' | Accepted. |
| 5541 | 59 | 88 | "The NSS M1 subfield contains an unsigned integer that is equal to the number of NSS values minus one for which PPE threshold values are included in the PPE Thresholds Info field". All well and good but we have no idea what NSSs are actually referred to. If we simply have, say 4 NSSs how do I know if the NSS is 1-4, or 3-7? I don't get it, can you please clarify this as I can't see this working. | Clarify as per comment. Can't propopse a solution as I can't tell how this is supposed to work. Is it supposed to be the number starting at MCS0, for example? | RejectedDiscussion: the following paragraph clarifies it. |
| 5543 | 21 | 89 | "PPE threshold values appear in increasing NSS value and increasing RU index value order". Why are these called PPE Threshold values when they are Constellation indexes? I can't see the connection. The PPE Threshold, I think, is 8 or 16us, but that is not what appears in this field. I think its OK to call it the PPE Threshold Info field, but the info, although used to get the PPE Threshold, is not the actual value. I think maybe use "PPET16 and PPET8 subfields"? | Replace cited text with "The PPEt16 and PPET8 Constellation indexes appear in increasing NSS value and increasing RU index value order." | RevisedTGax editor to make changes in 11-17/1290r2 under CID 5543 |
| 5544 | 1 | 90 | "The PPET8 for NSSn for RUb subfield and PPET16 for NSSn for RUb subfield values are combined to determine the Maximum PE value for HE PPDUs that are transmitted to the STA sending this field and using NSS = n and an RU allocation corresponding to RU Allocation Index b, for each value of NSS and RU specified by the field." This is describing what a STA does with the Constellation indexes not anything to do with describing the contents of the field. This behavior belongs elsewhere, presumeablky in 28.3.13? HAving said that, the sentence itself has problems: how does one combine two constellation indexes?, and how does the second half of the sentence present any further information than the first half (it seems to repeat the same but differently in an attempt to confuse the reader)? | Replace cited text with "The PPET8 for NSSn for RUb subfield and PPET16 for NSSn for RUb subfield values are examined to determine the Maximum PE value for HE PPDUs that are transmitted to the STA sending this field (see XXX)" Then the rest of this description should be moved to another section maybe 28.3.13. | RevisedTGax editor to make changes in 11-17/1290r2 under CID 5544 |
| 5545 | 1 | 90 | Table 9-262ad is a mess. What do the rows mean, do both columns need to be satisfied or either? I assume both. What is the "result of a comparison of index x" mean? I have no idea what the rule is. It looks as though we are comparing the constellation index of a PPDU to the PPET8 and PPET16 constellation indexes but there has been no indication of how the indexes are chosen. To be honest there has to be a better way of doing this. This entire section needs re-writing and possibly re-thinking. | Rewrite L1 - 35 and clarify what it is trying to convey. Also this text should not be here. This section should be simply the description of the field. | RevisedTGax editor to make changes in 11-17/1290r2 under CID 5545 |
| 5546 | 42 | 88 | PPE Thresholds field. This has proved a struggle to understand and to try to see why it seems to be so convoluted. One suggestion that may help might be to add a sentence at the begininning that explained the use of this field. | Add at beginning such as "The PPE Thresholds field is used to determine the maximum packet extension value (see 28.3.12) for an HE PPDU of a particular RU allocation size and NSS value." | Accepted |
| 5547 | 21 | 89 | "Each PPET8 for NSSn for RUb subfield and PPET16 for NSSn for RUb subfield contains an integer that corresponds to a constellation index value related to the transmission constellation of an HE PPDU as defined in Table 9-262ac (Constellation index).." There is no indication of what is the criteria for entering the constellation index. Is the minimum constellation for 8 or 16us? it is the maximum? Should the 16 be higher or equal to the 8? What is it? Need to add some words so that it is clear as to how the index corresponds to the 8 or 16 us threshold. | Add some words so that it is clear as to how the index corresponds to the 8 or 16 us threshold. | RevisedTGax editor to make changes in 11-17/1290r2 under CID 5547 |
| 5549 | 14 | 90 | Table 9-262ad. Can't help but feel this would be better replaced by pseudo code or simple equations. | Replace Table with something along the lines of: "For NSSn and RUb, and Constellation index of HE PPDU, xIF AND (x >= PPET8, OR(x< PPET16, PPET16 = 0))THEN Maximum PE value = 8 usIF AND (OR( x >= PPET8, PPET8 = 0),x>= PPET16))THEN Maximum PE value = 16 usELSE Maximum PE value = 0 us" | RevisedTGax editor to make changes in 11-17/1290r2 under CID 5549 |
| 5550 | 42 | 88 | I have made a lot of comments on this section and this is my final one. Can it be explained why we need this when we have a simple Default PE Duration field in the HE Operation Parameters field? Has it been shown that specifying a PE threshold is needed and then effectively setting a PE for every NSS and RU and BW actually is better or more efficient that this default setting? Could a simple, expanded Default PE duration have been much simpler? | Consider if a set of default values could have achieved this. What is the overriding factor for this NSS, BW or RU? I don't know enough about the need for the PE, but is there no way simple 'max' combinations of these 3 could be used for 0, 4, 8, 12 and 16us, similar to the "Basic HE-MCS and NSS Set field format, for example? | RejectedDiscussion: With default value, the medium time may be wasted. |
| 7994 | 88 | 64 | What does "RU allocation index 0" means? Please give a definition of "RU allocation index". | As in comment. | RevisedDiscussion: generally agree with the commnenter. RU allocation index 0 means RU Allocation Index equal 0.TGax editor to make changes in 11-17/1290r2 under CID 7994 |
| 8106 | 90 | 25 | A minor error in the rules written in the table for PPET8 and PPET16 | In table 9-262ad - PPET8 and PPET16 encoding, change "x greater than equal to PPET16" to "x greater than or equal to PPET16" | RevisedTGax editor to make changes in 11-17/1290r2 under CID 8106 |
| 8107 | 90 | 7 | The text describing a relationship between PPET8 and PPET16 is not quite correct. | Change "The value for each PPET8 for NSSn for RUm is always less than the value of PPET16 for NSSn for RUm." to "The value for each PPET8 for NSSn for RUm is always less than the value of PPET16 for NSSn for Rum, except when PPET8 = 7." | Acceptd. |
| 8681 | 88 | 59 | Change name of "NSS M1" to "NSS" and make it clear that they content of the field is number of streams - 1 | See comment | RejectedDiscussiongenerally agree with the commneter.TGax editor to make changes in 11-17/1290r2 under CID 8681 |
| 8688 | 98 | 5 | Clarify sentence. Change "The PPE Thresholds Info field is (NSS M1 + 1) x Number of bits set to 1 in the RU Index Bitmask subfieldx 6 bits in length." to "The PPE Thresholds Info field contains 6 x (NSS M1 + 1) bits for every bit in the RU Index Bitmask subfield that is different from zero." | See comment | RevisedTGax editor to make changes in 11-17/1290r2 under CID 8688 |

**9.4.2.218.5 PPE Thresholds field**

***TGax editor: Change 9.4.2.218.5 as follows:***

The format of the PPE Thresholds field is defined in Figure 9-589co (PPE Thresholds field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B2 | B3 B6 |  |  |
|  | NSS (#8681) | RU Index Bitmask | PPE Thresholds Info | PPE Pad |
| Bits: | 3 | 4 | variable | variable |

**Figure 9-589co—PPE Thresholds field format**

The NSS (#8681) subfield contains an unsigned integer that is equal to the number of NSS values minus one for which PPE threshold values are included in the PPE Thresholds Info subfield(#5540).

The RU Index Bitmask subfield contains a bitmask that indicates whether PPE threshold values are present for each of four RU allocation sizes according to their RU Allocation Index values (see Table 9-262ae (RU Allocation Index encoding))(#5542). For example, when B3 is set to 1, PPE threshold values are present for the RU allocation corresponding to RU Allocation Index being 0 and when B3 is set to 0, PPE threshold values are not present for the RU allocation corresponding to RU Allocation Index being 0 (#7994).

The PPE Thresholds Info field contains 6 x (NSS  + 1)  bits for every bit in the RU Index Bitmask subfield that is different from zero. The format of the PPE Thresholds Info field is defined in Figure 9-589cp (PPE Thresholds Info field format) (#8681, 8688).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0      B2 | B3      B5(#3330) |  |  |  |  |  |  |
|  | PPET16 NSS1 RU*x(#Ed)* | PPET8 NSS1 RU*x* | ... | PPET16 NSS1 RU*m* | PPET8 NSS1 RU*m* | ... | PPET16 NSS*n* RU*m* | PPET8 NSS*n* RU*m* |
| Bits: | 3 | 3 |  | 3 | 3 |  | 3 | 3 |
| * PPE Thresholds Info field format
 |

The PPET16 and PPET8 subfields for various NSS and RU values appear in increasing NSS value and increasing RU index value order. Lower numbered PPE Thresholds Info field bits contain PPET16 and PPET8 subfields corresponding to lower numbered NSS values. Within a set of PPET16 and PPET8 subfields corresponding to a single value of NSS, lower numbered PPE Thresholds Info field bits contain PPET16 and PPET8 subfields corresponding to lower numbered RU index values.(#5543) The PPET16 NSS*n* RU*b*(#Ed) and PPET8 NSS*n* RU*b*(#Ed) subfields are present for all values of *n* and *b* where 1  *n*  (NSS + 1) and where *b* = [*x*, …, *m*] is the set of integers equal to the ordered list of bit positions of all bits that are set to 1 in the RU Index Bitmask subfield, with *x* being the lowest value.(#8681)(#6434)

Each PPET8 NSS*n* RU*b*(#Ed) and PPET16 NSS*n* RU*b*(#Ed) 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).(#5547)

|  |
| --- |
| * Constellation index
 |
| Constellation Index | Corresponding Transmission Constellation |
| 0 | BPSK |
| 1 | QPSK |
| 2 | 16-QAM |
| 3 | 64-QAM |
| 4 | 256-QAM |
| 5 | 1024-QAM |
| 6 | Reserved |
| 7 | None |

The value of the PPET8 NSS*n* RU*m*(#Ed) subfield is always less than the value of the PPET16 NSS*n* RU*m*(#Ed)subfield, except when PPET8 = 7(#8107).

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The RU Allocation Index encoding is indicated in Table 9-262ae (RU Allocation Index encoding).

|  |
| --- |
| * RU Allocation Index encoding
 |
| RU Allocation Index value | RU allocation size |
| 0 | 242 |
| 1 | 484 |
| 2 | 996 |
| 3 | 2996 |

The PPE Pad field contains all zeros. The number of bits in the PPE Pad field is the number of bits required to round the length of the PPE Thresholds Info field up to the next integer number of octets.

**27.12 HE PPDU post FEC padding and packet extension**

***TGax editor: Add the following paragraph after the 3rd paragraph in 27.12 (#5544, 5545, 5549, 8106):***

After receiving the PPE Thresholds field from a second STA, the first STA uses the combination of the PPET8 NSS*n* RU*b*(#Ed) subfield and PPET16 NSS*n* RU*b*(#Ed) subfield values to determine the Nominal Packet Padding (consisting of both post-FEC padding and packet extension)(#9490) value for HE PPDUs that are transmitted to the second STA using NSS = *n* and an RU allocation corresponding to RU Allocation Index *b*, for each value of NSS and RU specified by the field. For all values of *n* and *b* for which PPET8 and PPET16 are not present, the Nominal Packet Padding(#9490) value is 0 for HE PPDUs that are transmitted to the STA using NSS = *n* and an RU allocation corresponding to RU Allocation Index *b*. The decision of PPE threshold is described in Table 27-xxx (PPE Thresholds per PPET8 and PPET16).

|  |
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| Table 27-xxx----PPE Thresholds per PPET8 and PPET16   |
| Result of comparison of the constellation index *x* of an HE PPDU with NSS value *n* and RU value Allocation size that corresponds to the RU Allocation index = (*b* + DCM) to the value in the PPET8 NSS*n* RU*m* subfield(#Ed) | Result of comparison of the constellation index of an HE PPDU with NSS value *n* and RU value Allocation size that corresponds to the RU Allocation index = value (*b* + DCM) to the value in the PPET16 NSS*n* RU*m* subfield(#Ed) | Nominal Packet Padding(#9490) value for an HE PPDU transmitted to this STA using the constellation index = *x*, NSS = *n* and RU Allocation size that corresponds to the RU Allocation index = (*b* + DCM) |
| *x* greater than or equal to PPET8 | *x* less than PPET16 or PPET16 equal to None | 8 µs |
| *x* greater than PPET8 or PPET8 equal to None | *x* greater than or equal to PPET16 | 16 µs |
| All other combinations not otherwise listed in this table | 0 |
| NOTE—DCM = 1 when the HE PPDU uses DCM; DCM = 0 otherwise. |