IEEE P802.11  
Wireless LANs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | D3.0 Comment Resolution – Part 3 | | | | | | Date: 2018-11-09 | | | | | | 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:

17095, 16699, 16025, 15793, 15600, 15601, 16826

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.

R1: Updated during presentation on 11/9/2018

# CID 17095

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 17095 | 28.3.11.5.2 | 518.30 | If an extra OFDM symbol was added due to LDPC extra symbol segment, then the new last OFDM symbol does not have any "data" bits. So, to say that "last symbol is calculated as NDBPS,last = NDBPS,last,init" seems incorrect. | Fix the issue identified in the comment. |

**Discussion**

The comment is on the following sentence.

D3.2 P537:

|  |
| --- |
|  |

Note that N\_DBPS,last is not used elsewhere in the draft. The closest place where it could have been used is in computing the PSDU\_LENGTH in Equaiton (28-136), but we are using N\_DBPS,last,init there.

D3.2 P602:

|  |
| --- |
|  |

**Proposed Resolution: CID 17095**

**Rejected**. The closest place where N\_DBPS,last could have been used in the draft is Equation (28-136) in D3.2 to compute the PSDU\_LENGTH. But since the PSDU\_LENGTH computation uses N\_SYM,init which excludes the extra OFDM symbol which was added by the LDPC extra symbol segment, the equation is still correct. Furthremore, while we could remove the variable N\_DBPS,last from the draft for LDPC transmission, other readers may find it confusing to be not defined for LDPC while it is defined for BCC. While the naming ‘last’ may not be crisp in this case, there is nothing wrong technically, hence it would be better to keep the current draft text as-is.

# CID 16699

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16699 | 28.3.19.6.2 | 552.11 | What is a BQR transmission? | Define BQR transmission |

**Background**

D3.2 P581:

|  |
| --- |
|  |

D3.2 P75:

|  |
| --- |
|  |

**Proposed Resolution: CID 16699**

**Revised**. BQR is Bandwidth query report (see Table 9-22a in D3.2). Proposed text update in 11-18/1849r1 for CID 16699 clarifies the term “BQR transmission.”

**Proposed Text Updates: CID 16699**

* + - * 1. CCA sensitivity for operating classes requiring CCA-ED

*TGax Editor: Update D3.2 P581L15 as shown below.*

For transmissions including an A-Control field with Control ID equal to BQR (see 9.2.4.6a), CCA-ED shall detect a channel busy condition if the received signal strength exceeds the CCA-ED threshold as given by dot11OFDMEDThreshold for primary 20 MHz channel and dot11OFDMEDThreshold for each non-primary 20 MHz channel (if present). The CCA-ED thresholds for the operating classes requiring CCA-ED are subject to the criteria in D.2.5 (CCA-ED threshold).

# CID 16025

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16025 |  |  | "power boost factor" is generally about the <alpha>r thing. However, in a couple of instances it is used for something else. To avoid confusion, those other two instances should be reworded to use a different term. "the received power measured based on the non-HE portion of the HE PPDU preamble and captured in the RXVECTOR parameter RSSI\_LEGACY in the PHY-RXSTART.indication primitive shall be decreased by 3 dB to compensate for the power boost factor when compared to the OBSS PD level." in 27.9.2.2 and "eta\_field,k is the power boost factor of the k-th subcarrier of a given field within an OFDM symbol," in 28.3.9 | Change the term from "power boost factor" to "power difference" in the two pieces of cited text |

**Proposed Resolution: CID 16025**

**Revised**. Agree with the commenter that it would better to use a different terminology than “power boost factor” to avoid confusion. Proposed text update in 11-18/1849r1 for CID 16025 implements the changes suggested by the commenter.

**Proposed Text Updates: CID 16025**

* General operation with non-SRG OBSS PD level

*TGax Editor: Update D3.2 P352L33 as shown below.*

If the inter-BSS frame is carried in an HE ER SU PPDU (where power of the L-STF/L-LTF symbols is boosted 3 dB), the received signal strength, which is measured from the L-STF or L-LTF fields of the PPDU and which is used to determine PHY-CCA.indication, shall be decreased by 3 dB to compensate for the power difference.

* General operation with SRG OBSS PD level

*TGax Editor: Update D3.2 P353L15 as shown below.*

If the inter-BSS frame is carried in an HE ER SU PPDU (where power of the L-STF/L-LTF symbols is boosted 3 dB), the received signal strength, which is measured from the L-STF or L-LTF fields of the PPDU and which is used to determine PHY-CCA.indication, shall be decreased by 3 dB to compensate for the power difference when compared to the OBSS PD level.

* Mathematical description of signals

*TGax Editor: Update D3.2 P470L20 as shown below.*





…

 is the power difference of the *k*-th subcarrier of a given field within an OFDM symbol, which is  for all the subcarriers of the L-STF, L-LTF, HE-STF and HE-LTF fields in the HE ER SU PPDU. For the L-SIG and RL-SIG fields of an HE ER SU PPDU,  
  
For the HE-SIG-A and Data fields in an HE ER SU PPDU, and all fields in other HE PPDUs, .

# CID 15793

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15793 | 28.3.19.1 | 560.30 | "For tests in this subclause ... [e]ach output port of the transmitting STA shall be connected through a cable to one input port of the Device Under Test." This is ambiguous because it is not clear what it covers. There are only two items in this subclause that are described as "tests": Receiver Miminum Input Sensitivity and Adjacent Channel Rejection. Is the intention that the specification of a cabled measurement applies only to these? The requirement for nonadjacent channel rejection is not described as a test, but does mention a measurement; does this fall under the cabled scenario also? Or is the intention to specify all normative requirements in this subclause in terms of cabled measurements? In particular, 28.3.19.6 (CCA Sensitivity) falls under thie same subclause; are CCA requirements to be understood as applying only to cabled measurements? It seems there is a difference of opinion on this; if so, the specification should resolve the ambiguity. In partciular, CCA requirements should apply to over-the-air transmissions. (1) The CCA function's entire utility and importance depends on its performance in normal--i.e., wireless--operation; (2) CCA-ED (extra requirements in some regulatory domains) in particular seems to imply an over-the-air context; (3) the current text is best read (I believe) as implying an over-the-air context for CCA, since the word "test" is not used, so the proposed change to the draft is a clarification rather than a material change to required device functionality. [N.B.: A similar comment for the failed letter ballot on D2.0 was rejected on the basis that this "test" language appears in the baseline and a suggestion that the comment should be submitted to TGmd. This is a completely unsatisfactory resolution. The baseline contains some clauses with the cabled language and others without it, so the precedent cuts both ways. And the cabled language was first added in TGn; if it was in order to add it then, it's in order to take it out now. And finally TGmd is not currently dealing with HE functionality and it's not clear it ever will, so the only venue in which the HE question can be addressed is TGax. \*\*If this comment is rejected on a similar basis, I plan to file a formal complaint with the 802.11WG, and, if necessary, with the IEEE 802 Executive Committee.\*\* | Change "For tests in this subclause" to "For receiver minimum input sensitivity, adjacent channel rejection, and nonadjacent channel rejection". |

**Background**

D3.2 P577:

|  |
| --- |
|  |

Sections under 28.3.17:

|  |
| --- |
|  |

**Proposed Resolution: CID 15793**

**Revised**. While the commenter may be correct that some regulatory domains may require or imply over-the-air testing for some of the ‘measurements’, it is not the intent of the IEEE standard to address all the regulatory requirement – or is it practical to do so given that the regulatory rules change over time. Rather, device manufacturers are responsible to adhere to any regulatory requirements even if they are not specified in the IEEE 802.11 standard (see for example D3.2 28.3.21). The view of this reviewer is that the current draft language is written based on cabled testing to meet the specific requirements in the P802.11ax draft, which again does not preclude additional over-the-air requirements by regulatory bodies. In order to keep the requirements in the 11ax draft clearer, this reviewer feels that keeping the tests to be performed under cabled conditions is practical for IEEE specification compliance point of view.

The commenter does have a point that not all ‘measurements’ are referred to as ‘tests’ in the subclause 28.3.17 which may be causing some additional confusion.

Proposed text update in 11-18/1849r1 for CID 15793 addresses some of the concerns by the commenter by (a) replacing the term ‘test’ by individual names of the requirements (e.g. ‘receiver minimum input sensitivity’), and (b) adding a note indicating that additional test requirements/methods may be needed to meet regulatory requirements.

**Proposed Text Updates: CID 15793**

* Receiver specification
* General

*TGax Editor: Update D3.2 P577L44 as shown below.*

For receiver minimum input sensitivity, adjacent channel rejection, nonadjacent channel rejection, receiver maximum input level and CCA sensitivity requirements described in this subclause, the input levels are measured at the antenna connectors and are referenced as the average power per receive antenna. The number of spatial streams under test shall be equal to the number of utilized transmitting STA antenna (output) ports and also equal to the number of utilized Device Under Test input ports. Each output port of the transmitting STA shall be connected through a cable to one input port of the Device Under Test.

NOTE – Additional test requirements and/or test methods may be needed to meet regulatory requirements.

# CID 15600, 15601

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 15600 | 28.3.19.6.2 | 563.55 | Where is the received signal strength measured? Is it at the antenna connector (as in 17.3.10.2, 19.3.19.1 in 802.11-2016) or at the antenna input? | Please clarify. |
| 15601 | 28.3.19.6.2 | 563.55 | If we have multiple antennas at the receiver, is the received signal strength level the maximum signal strength or the average signal strength over all active receive chains? | Please clarify. |

**Background**

Comments are on D3.2 P580:

|  |
| --- |
|  |

D3.2 P577 states:

|  |
| --- |
|  |

**Proposed Resolution: CID 15600**

**Rejected**.

D3.2 P557L44 states that “For tests in this subclause, the input levels are measured at the antenna connectors”, where “this subclause” is 28.3.17. And this comment (CID 15600) is on 28.3.17.6.2 which is under 28.3.17. Hence, it is clear in the draft that the received signal strength is measured at the antenna connector.

**Proposed Resolution: CID 15601**

**Rejected**.

D3.2 P557L45 states that “For tests in this subclause, the input levels are … referenced as the average power per receive antenna”, where “this subclause” is 28.3.17. And this comment (CID 15601) is on 28.3.17.6.2 which is under 28.3.17. Hence, it is clear in the draft that the received signal strength is averaged over all receive antennas.

# CID 16826

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 16826 | 28.3.19.6.5 | 578.34 | Why are there two expressions for RXTIME (Equations (28-132) and (28-133))? The only one that applies at the receiver if (28-133) | Delete (28-132) |

**Discussion**

D3.2 P594:

|  |
| --- |
|  |

There are two definitions of RXTIME, one based on actual PPDU duration (plus signal extension) (Equation (28-132)), and another based on the duration indicated by the L-SIG Length field (Equation (28-133)). The two may differ by less than 4 usec because the duration conveyed by the L-SIG Length field is in integer multiple of 4 usec.

There are 5 places referencing Equation (28-132), and 4 places referencing Equation (28-133) in D3.2. Of these, all 4 places referencing Equation (28-133) is for the case of either

* Computation of the Duration field in MAC
* Duration for which CCA should be maintained busy if HE-SIG-A is ‘invalid’ (invalid CRC or Reserved indication)

Of the 5 places referencing Equation (28-132), 4 places are for the case of maintaining CCA busy when HE-SIG-A has been decoded correctly (e.g. CRC passed and not Reserved indication). Only one place (D3.2 P594L12) is referencing Equation (28-132) when the text indicates that it should refer to “L-SIG length” since CRC failed in HE-SIG-A. This place should be corrected.

D3.2 P592:

|  |
| --- |
|  |

D3.2 P593:

|  |
| --- |
|  |

D3.2 P594:

|  |
| --- |
|  |

D3.2 P594:

|  |
| --- |
|  |

D3.2 P594: (NOTE: This should be corrected to be Equation (28-133))

|  |
| --- |
|  |

D3.2 P88

|  |
| --- |
| … |

D3.2 P370:

|  |
| --- |
| … |

D3.2 P593:

|  |
| --- |
|  |

D3.2 P593:

|  |
| --- |
|  |

**Proposed Resolution: CID 16826**

**Revised**. Equation (28-132) is for the case when HE-SIG-A has been decoded correctly, hence it is possible to compute the exact duration of the HE PPDU. Equation (28-133) is for the case where either (a) HE-SIG-A cannot be decoded correctly (e.g. HE-SIG-A CRC failed), hence we need to rely on duration based on L-SIG length, or (b) when computing duration for the MAC fields. Hence, both equations need to be kept in the 11ax draft. There is one place where reference to Equation (28-132) needs to be fixed to reference Equation (28-133).

Instruction to TGax Editor: Change “Equation (28-132)” at D3.2 P594L12 to “Equation (28-133)”.

[End of File]