IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | LB258 PHY CIDs – Part 1 | | | | | | Date: 2022-03-29 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm |  |  | [youhank@qti.qualcomm.com](mailto:youhank@qti.qualcomm.com) | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for the following comments from comment collection on P802.11-REVme D1.0:

2260, 1603, 1604, 1312, 2160, 2365, 1731, 2375, 1590, 1366, 1367, 1935, 1200

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 2260

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 2260 | 15.3.2 | 3419.44 | In clause 15 all occurrences of MPDU have been replaced with PSDU in the text, but not in Figure 15-1. | Please replace MPDU in Figure 15-1 with PSDU. Please apply the same correction to Figure 15-6 on P3423L44, Figure 15-7 on P3425L9, L37, Figure 15-8 on P3246L9 Figure 15-9 on P3428L25, L30, L41, Figure 16-7 on P3452L25, L29, L38, Figure 23-49 on P3989L49 |

**Discussion**

I have checked the PHY clauses, and confirm that the use of the term MPDU is limited to cases where they intentionally refer to “MPDU”.

E.g. REVme D1.1 P3443L48

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| The MAC uses the PHY service, so each MPDU corresponds to a PSDU that is carried in a PPDU |

**Proposed Resolution: CID 2260**

REVISED

**Note to commenter:**

The proposed text updates below essentially implement all the changes suggested by the commenter. The resolution is not marked as “ACCEPTED” because (1) one of the cited locations is incorrect (P3246L9 should have been P3426L9) and (b) we need to provide the updated Visio files to the Editor.

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 2260 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0520-00-000m-lb258-phy-cides-part-1.docx>

**Proposed Text Updates: CID 2260**

*Instruction to TGme Editor: Update Figure 15-1 on REVme D1.1 P3421 as shown below.*

Chart, diagram, line chart

Description automatically generated





*Instruction to TGme Editor: Update Figure 15-6 on REVme D1.1 P3425 as shown below.*

Diagram

Description automatically generated with low confidence





*Instruction to TGme Editor: Update Figure 15-7 on REVme D1.1 P3427 as shown below.*

Diagram

Description automatically generated





*Instruction to TGme Editor: Update Figure 15-8 on REVme D1.1 P3428 as shown below.*

Chart, line chart

Description automatically generated





*Instruction to TGme Editor: Update Figure 15-9 on REVme D1.1 P3430 as shown below.*

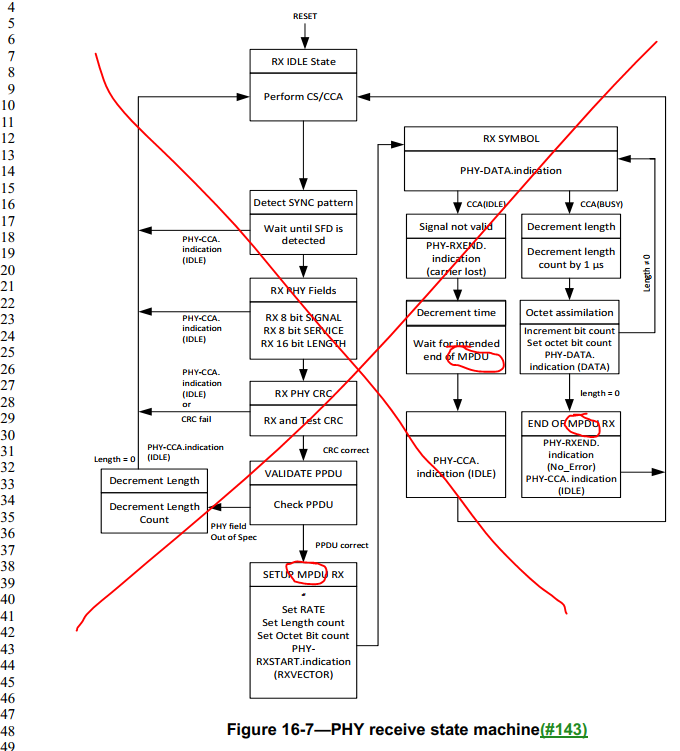
Diagram, schematic

Description automatically generated





*Instruction to TGme Editor: Update Figure 16-7 on REVme D1.1 P3454 as shown below.*







*Instruction to TGme Editor: Update Figure 23-49 on REVme D1.1 P3991 as shown below.*

Diagram, schematic

Description automatically generated





# CID 1603, 1604

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1603 | 15.4.42 | 3431.29 | "The DSSS PHY shall operate in the frequency range of 2.4 GHz to 2.4835 GHz as allocated by regulatory bodies in (#296)China, the United States and its territories, and Europe" is missing Japan (cf. 16.3.6.2). Anyway, it's also allocated in lots of other places | Change to "The DSSS PHY shall operate in the frequency range of 2.4 GHz to 2.5 GHz as allocated by regulatory bodies" |
| 1604 | 16.3.6.2 | 3457.43 | "The HR/DSSS PHY shall operate in the 2.4-2.4835 GHz frequency range, as allocated by regulatory bodies in (#296)China, the United States and its territories, Europe, and Japan, or in the 2.471-2.497 GHz frequency range, as allocated by regulatory authority in Japan". It's also allocated in lots of other places | Change to "The HR/DSSS PHY shall operate in the frequency range of 2.4 GHz to 2.5 GHz as allocated by regulatory bodies" |

**Discussion**

REVme D1.0 P3431

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REVme D1.0 P3457

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The commenter is incorrect in CID 1603 that Japan is missing. However, the suggested text by to commenter seems fine, so propose to accept.

**Proposed Resolution: CIDs 1603, 1604**

ACCEPTED

# CID 1312

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1312 | 17.3.2.2 | 3477.46 | Figure 17-4 is not an illustration of the transmitted PPDU, it is only showing the traninging fields. | We already said at the start of 17.3.2.1 that Figure 17-1 shows the format of the PPDU. Perhaps just delete the cited sentence? Or, if something is needed to reference Figure 17-4, then the wording needs to be aligned to the content of the figure. |

**Discussion**

REVme D1.1 P3479L46 is the sentence under question.

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And Figure 14-4 is at REVme D1.1 P3484:

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So, Figure 17-4 is part of a different section (17.3.3), and there is no clear need for the 17.3.2.2 (Overview of the PPDU encoding process) to refer to Figure 17-4. Hence, suggest to delete the cited sentence.

**Proposed Resolution: CID 1312**

REVISED

**Note to commenter:**

Agree that the cited sentence is not needed.

**Instruction to TGme Editor:**

Delete the sentence spanning D1.1 P3479L46-47 (“An illustration of … (SYNC))).”).

# CID 2160

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 2160 | 17.3.5.5 | 3489.9 | "NOTE 3--The receiving PHY cannot determine whether the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT was present, but it does not matter since descrambling the DATA field is the same either way." -- first half duplicates previous NOTE | Change to "NOTE 3--Descrambling the DATA field is the same irrespective of whether the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT was present." |

**Discussion**

REVme D1.1 P3491

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Commenter is saying that the beginning portion of NOTE 5 duplicates that of NOTE 4, which is true.

The change suggested by the commenter in redline is

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| NOTE 4—The receiving PHY in an HE STA cannot determine whether the CH\_BANDWIDTH\_IN\_NON\_HT, DYN\_BANDWIDTH\_IN\_NON\_HT or SCRAMBLER\_INITIAL\_VALUE parameters were present in the TXVECTOR of the transmitting PHY; therefore, the receiving PHY in an HE STA always includes values for the CH\_BANDWIDTH\_IN\_NON\_HT, DYN\_BANDWIDTH\_IN\_NON\_HT, and SCRAMBLER\_INITIAL\_VALUE parameters in the RXVECTOR if the PPDU is a non-HT PPDU. It is the responsibility of the MAC to determine the validity of the RXVECTOR parameters CH\_BANDWIDTH\_IN\_NON\_HT, DYN\_BANDWIDTH\_IN\_NON\_HT, and SCRAMBLER\_INITIAL\_VALUE.  NOTE 5—Descrambling the DATA field is the same irrespective of whether the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT was present. |

The general direction seems fine, but the commenter is missing the TXVECTOR parameters DYN\_BANDWIDTH\_IN\_NON\_HT and SCRAMBLER\_INITIAL\_VALUE.

**Proposed Resolution: CID 2160**

REVISED

**Note to commenter:**

The proposed text updates below extends the suggestion by the commenter by including the TXVECTOR parameters DYN\_BANDWIDTH\_IN\_NON\_HT and SCRAMBLER\_INITIAL\_VALUE.

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 2160 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0520-00-000m-lb258-phy-cides-part-1.docx>

**Proposed Text Updates: CID 2160**

*Instruction to TGme Editor: Update REVme D1.1 P3491L9 as as shown below.*

NOTE 5—Descrambling the DATA field is the same irrespective of whether any of the TXVECTOR parameters CH\_BANDWIDTH\_IN\_NON\_HT, DYN\_BANDWIDTH\_IN\_NON\_HT or SCRAMBLER\_INITIAL\_VALUE were present.

# CID 2365

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 2365 | 17.3.10.6 | 3507.34 | 17.3.10.6 has information for CCA for both operating classes requiring CCA-ED behavior and operating classes not requiring CCA-ED behavior. This makes it hard to distinguish which applies to operating classes requiring CCA-ED, and which applies to operating classes not requiring CCA-ED.  Note that HT, VHT and HE clauses avoid such confusion by having a separate subclause specific to operating classes requiring CCA-ED behavior - see 19.3.19.5.2, 21.3.18.5.2, 27.3.20.6.2. | Create a new subclause 17.3.10.6 (CCA requirements for operating classes requiring CCA-ED).  Move the paragraphs starting at the following locations to this new subclause 17.3.10.6: P3507L35 P3507L54 P3507L60 |

**Discussion**

CCA-ED is a specific behavior applicable to operating classes with behavior limit of CCA-EDBehavior.

REVme D1.0 P5796

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REVme D1.0 P5804

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And as seen above, CCA-ED is currently applicable to channels in the 3 GHz band.

The commenter is pointing out that the current way 17.3.10.6 (CCA requirements) is written is hard to distinguish what requirements apply to ‘general’ bands, while what requirements apply only to the CCA-ED applicable 3 GHz band. Specifically, only the paragraphes/sentences marked with red below are relevant to CCA-ED.

REVme D1.0 P3507-3508

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Hence, the commenter suggests separating out the subclause for CCA requirements for operating classes requiring CCA-ED. Note that Clause 19 (HT), 21 (VHT) and 27 (HE) all have separate subclause specific to CCA-ED as well.

**Proposed Resolution: CID 2365**

REVISED

**Note to commenter:**

The proposed text updates below separate out the CCA requirements for operating classes requiring CCA-ED into a separate subclause.

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 2365 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0520-00-000m-lb258-phy-cides-part-1.docx>

**Proposed Text Updates: CID 2365**

*Instruction to TGme Editor: Update REVme D1.1 P3509L30 as as shown below.*

**17.3.10.6 CCA requirements**

**17.3.10.6.1 General**

The PHY shall indicate a medium busy condition by issuing a PHY-CCA.indication primitive when the carrier sense/clear channel assessment (CS/CCA) mechanism detects a channel busy condition.

The start of an OFDM transmission at a receive level greater than or equal to the minimum modulation and coding rate sensitivity (–82 dBm for 20 MHz channel spacing, –85 dBm for 10 MHz channel spacing, and –88 dBm for 5 MHz channel spacing) shall cause CS/CCA to detect a channel busy condition with a probability > 90% within 4 μs for 20 MHz channel spacing, 8 μs for 10 MHz channel spacing, and 16 μs for 5 MHz channel spacing.

NOTE 1—CS/CCA detect time is based on finding the short sequences in the preamble, so when *TSYM* doubles, so does CS/CCA detect time.

Additionally, the CS/CCA mechanism shall detect a medium busy condition within 4 μs of any signal with a received energy that is 20 dB above the minimum modulation and coding rate sensitivity (minimum modulation and coding rate sensitivity + 20 dB resulting in –62 dBm for 20 MHz channel spacing, –65 dBm for 10 MHz channel spacing, and –68 dBm for 5 MHz channel spacing).

NOTE 2—The requirement to detect a channel busy condition for any signal 20 dB above the minimum modulation and coding rate sensitivity (minimum modulation and coding rate sensitivity + 20 dB resulting in –62 dBm for 20 MHz channel spacing, –65 dBm for 10 MHz channel spacing, and –68 dBm for 5 MHz channel spacing) is a mandatory energy detect requirement on all Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) receivers.

**17.3.10.6.2 CCA requirements for operating classes requiring CCA-ED**

For improved spectrum sharing, CCA-ED is required in some bands. The behavior class indicating CCA-ED is given in Table D-2 (Behavior limits). The operating classes requiring the corresponding CCA-ED behavior class are given in E.1 (Country information and operating classes). The PHY of a STA that is operating within an operating class that requires CCA-ED shall operate with CCA-ED.

For the operating classes requiring CCA-Energy Detect (CCA-ED), the PHY shall also indicate a medium busy condition when CCA-ED detects a channel busy condition. CCA-ED shall detect a channel busy condition when the received signal strength exceeds the CCA-ED threshold as given by dot11OFDMEDThreshold. The CCA-ED thresholds for the operating classes requiring CCA-ED are subject to the criteria in D.2.5 (CCA-ED threshold).

# CID 1731

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1731 | 18.4.8.2 | 3528.2 | "The PER of the ERP-DSSS modes shall be as specified in 16.3.8.2 (Receiver minimum input level sensitivity)." -- 16.3.8.2 is CCK, and in any case "the ERP-DSSS modes" is not clear | Delete the cited sentence |

**Discussion**

Comment is on the following yellow sentence.

REVme D1.0 P3527-3528

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Commenter is correct that 16.3.8.2 is CCK.

REVme D1.1 P3468

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However, the comment that “ERP-DSSS modes” is not clear is not accurate because it is defined in Clause 3.2 (Definitions specific to IEEE Std 802.11).

REVme D1.1 P221

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Given these, it seems appropriate to change “ERP-DSSS” to “ERP-CCK”.

**Proposed Resolution: CID 2365**

REVISED

**Note to commenter:**

ERP-DSSS and ERP-CCK are defined terms in Clause 3.2. Commenter is correct that the reference 16.3.8.2 is on CCK, not DSSS. Hence, the proposed text updates below changes ERP-DSSS to ERP-CCK.

**Instruction to TGme Editor:**

At REVme D1.1 P3530L2, change “ERP-DSSS” to “ERP-CCK”.

# CID 2375

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 2375 | 19.3.12.3.6 | 3601.54 | There is a typo in D1 matrix in Equation (19-83). O should be deleted from D1. | its value should be non-zero. |

**Discussion**

19.3.12.3.6 is on compressed beamforming feedback matrix.

The commenter is pointing out that the “O” marked with a red circle in Equation (19-83) below is an editing error.

REVme D1.1 P3603:

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The corresponding equation in IEEE 802.11n-2009 was

IEEE 802.11n-2009 P310:

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Hence the commenter is correct on the editing error.

However, Equation (19-83) has more error than that upon further review – even in the original Equation (20-83) in IEEE 802.11n-2009.

Note that Equation (19-83) is  as written in REVme D1.1 P3603L47. And the matrices *G* and *V* are supposed to be  square matrices:

REVme D1.1 P3602:

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However, *G* is a 4x4 matrix in Equation (19-83), and the size of *D* is unclear.

Furthermore, Equation (19-84) also has the same issue of incorrect *G* matrix dimension, and unclear size of the *D* matrix.

REVme D1.1 P3604:

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**Proposed Resolution: CID 2375**

REVISED

**Note to commenter:**

The proposed text updates below fix the issue pointed out by the commenter on Equation (19-83), as well as fix the incorrect dimension of matrices in equations (19-83) and (19-84).

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 2375 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0520-00-000m-lb258-phy-cides-part-1.docx>

**Proposed Text Updates: CID 2375**

19.3.12.3.6 Compressed beamforming feedback matrix

*Instruction to TGme Editor: Update Equation (19-83) at REVme D1.1 P3603L52 as as shown below.  
(NOTE to TGme Editor: Changes relative to the existing equation is marked in RED color to help the Editor identify the required changes. Also, note that the 4th matrix of new Equation (19-83) has a “diagonal three-dots” which might be a bit hard to see, but that needs to be ‘edited’ into the REVme draft.)*

 (19-83)

*Instruction to TGme Editor: Update Equation (19-84) at REVme D1.1 P3604L9 as as shown below.  
(NOTE to TGme Editor: Changes relative to the existing equation is marked in RED color to help the Editor identify the required changes.)*

 (19-84)

# CID 1590

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1590 | 19.3.21 | 3621.19 | Figure 19-27--PHY receive state machine has a "test Parity" but no action based on this test. Also in Figure 17-20--PHY receive state machine the "p" is lowercase even though it's I think referring to the field name. Also in Figure 27-63--PHY receive state machine if midambles are not present the downward arrow after the parity check is not labelled | Label the arrow down as "Parity check passes" and add an arrow going left labelled "Parity check fails". In Figure 17-20 change "test parity" to "test Parity". In Figure 27-63--PHY receive state machine if midambles are not present label the downward arrow out of RX L-SIG "Parity and RATE checks pass" |

**Proposed Resolution: CID 1590**

REVISED

**Note to commenter:**

All the necessary information needed to demodulate an HT-mixed format PPDU is contained within the HT-SIG. Hence, it is not necessary to have received the L-SIG correctly (e.g. L-SIG parity passes) in order to demodulate an HT-mixed format PPDU. Therefore, it is not appropriate to add in Figure 19-27 that the receiver should continue with the next steps of the demodulation only if the Parity check has passed.

As for the comments on Figure 17-20 and Figure 27-63, the corresponding changes are made in the text changes below.

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 1590 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0520-00-000m-lb258-phy-cides-part-1.docx>

**Proposed Text Updates: CID 1590**

*Instruction to TGme Editor: Update REVme Figure 17-20 at D1.1 P3514 as as shown below.*

Diagram

Description automatically generated





*Instruction to TGme Editor: Update REVme Figure 27-63 at D1.1 P4484 as as shown below.*

Diagram, schematic

Description automatically generated





# CID 1366

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1366 | 21.2.4 | 366.58 | It's an "HT-mixed format PPDU" (not "HT-mixed PPDU") | Replace "HT-mixed PPDU" with "HT-mixed format PPDU"). Same thing at P3700.8, P3700.16, and P3700.22. |

**Proposed Resolution: CID 1366**

ACCEPTED

# CID 1367

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1367 | 21.2.4 | 366.59 | It's an "HT-greenfield format PPDU" (not "HT-greenfield PPDU") | Replace "HT-greenfield PPDU" with "HT-greenfield format PPDU"). Same thing at P3700.10, P3700.17, P3700.23, P5050.59, and P5050.62. |

**Proposed Resolution: CID 1367**

REVISED

**Note to commenter:**

Agree that it should be “HT-mixed format PPDU”. There are one more location which needs similar change, hence the resolution is a “REVISED”.

**Instruction to TGme Editor:**

Change “HT-greenfield PPDU” to “HT- greenfield format PPDU” at REVme D1.1

P3701L59

P3702L10

P3702L18

P3702L23

P5056L49

Change “HT- greenfield PPDUs” to “HT- greenfield format PPDUs” at REVme D1.1

P5053L9

P5053L11

# CID 1935

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1935 | 21.3.18 | 3785.3 | "For tests in this subclause" is not clear as to whether it includes child subclauses | Change to "For tests in this subclause and its subsubclauses" |

**Background**

REVme D1.0 P3785~3789

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| …    …    …    … |

**Proposed Resolution: CID 1935**

REJECTED

21.3.18 (VHT receiver specification) consists of six subclauses (21.3.18.1 – 21.3.18.6). All the tests are within those child clauses, and there are no tests at the 21.3.18 level itself. Hence there is no confusion that the statement “For tests in this subclause” refers to the tests in the child clauses of this subclause.

# CID 1200

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 1200 | 27.2.2 | 4301.27 | Correct the wrong formula. Change "TXOP\_DURATION - 512 / 8" to "(TXOP\_DURATION - 512) / 128" | As per comment |

**Background**

REVme D1.0 P4301

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**Proposed Resolution: CID 1200**

ACCEPTED

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