IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | D3.0 PHY CR | | | | | | Date: 2020-03-23 | | | | | | 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 SA ballot on P802.11-REVmd D3.0:

4344, 4429, 4171, 4172, 4173, 4535, 4450, 4322, 4604, 4022, 4023, 4544, 4368

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 resolution to CID 4022 to include update in S1G.

# CID 4344

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4344 | 17.3.9.3 | 2952.63 | "NOTE 2--For rules regarding TX center frequency leakage levels by VHT STAs, see 21.3.17.4.2 (Transmit center frequency leakage)." -- what about HT STAs then? Why does the OFDM PHY need to care about rules for VHT STAs? | Delete the cited NOTE, first para of 17.3.9.7.2 Transmitter center frequency leakage, NOTE 3 in 19.3.18.1 Transmit spectrum mask, first para of 19.3.18.7.2 Transmit center frequency leakage |

**Background**

Following are the four places the commenter is proposing to delete.

D3.0 P2952

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D3.0 P2955

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D3.0 P3056

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D3.0 P3060

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**Proposed Resolution: CID 4344**

**Rejected**

TX center frequency leakage is mostly a function of the RF circuit implementation, and is mostly agnostic to the PPDU type being transmitted such as non-HT, HT or VHT. Note that Clause 21 (VHT) have more stringent requirement for TX center frequency leakage than Clause 17 or 19. Furthermore, VHT devices could transmit a 20 MHz PPDU (including non-HT or HT) in an 80 or 160 MHz channel, where the TX center frequency leakage would be outside of the 20 MHz spectrum actively modulated by the PPDU. And Clause 17 and 19 do not clearly specify the TX center frequency requirement for those cases. Hence, if a VHT capable device is transmitting a non-HT or HT PPDU, IEEE 802.11 is requiring that the TX center frequency leakage requirement be that defined in Clause 21. Hence, the information the commenter is proposing to delete is essential to the standard and should not be deleted.

# CID 4429

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4429 | 19.3.2 | 2996.39 | 11md: "19.3.2 PPDU format Two formats are defined for the PPDU: HT-mixed format and HT-greenfield format. These two formats are called HT formats. Figure 19-1 (PPDU format) shows the non-HT format  and the HT formats. There is also an MCS 32 format" -- but MCS 32 is an HT format | Change the sentence starting "There is also an MCS 32 format" to "The HT formats can be used for MCS 32 that provides the lowest rate in a 40 MHz channel (see 19.3.11.11.5 (Transmission in MCS 32 format))" |

**Discussion**

Commenter’s proposed change on top of D3.2 P2984:

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| **19.3.2 PPDU format**  Two formats are defined for the PPDU: HT-mixed format and HT-greenfield format. These two formats are called *HT formats*. Figure 19-1 (PPDU format) shows the non-HT format and the HT formats. The HT formats can be used for MCS 32 that provides the lowest rate in a 40 MHz channel (see 19.3.11.11.5 (Transmission in MCS 32 format)). |

The “MCS 32” is applicable for HT only. So instead of “HT format can be used for MCS32”, “HT format includes MCS 32” seems more appropriate.

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| **19.3.2 PPDU format**  Two formats are defined for the PPDU: HT-mixed format and HT-greenfield format. These two formats are called *HT formats*. Figure 19-1 (PPDU format) shows the non-HT format and the HT formats. The HT format includes MCS 32 that provides the lowest rate in a 40 MHz channel (see 19.3.11.11.5 (Transmission in MCS 32 format)). |

**Proposed Resolution: CID 4429**

**Revised**.

The “MCS 32” is applicable for HT only. So instead of “HT format can be used for MCS32”, “HT format includes MCS 32” seems more appropriate.

Instruction to Editor: At D3.2 P2984L41, change “There is also an MCS 32 format (specified in 19.3.11.11.5 (Transmission in MCS 32 format)) used for MCS 32 that provides the lowest rate in a 40 MHz channel.” to “The HT format includes MCS 32 that provides the lowest rate in a 40 MHz channel (see 19.3.11.11.5 (Transmission in MCS 32 format)).”

# CID 4171, 4172, 4173

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4171 | 19.3.11.11.2 | 3041.32 | "When a (Ed)beamforming steering matrix is applied, the Smoothing bit(#2370) should be set to 1. It may be set to 0 otherwise(#323)(#75)." is a bit confusing. Since the first sentence is a "should" it may be set to 0 in all cases, not just "otherwise" | Change the second cited sentence to "It shall be set to 0 otherwise." |
| 4172 | 19.3.11.11.2 | 3041.32 | "When a (Ed)beamforming steering matrix is applied, the Smoothing bit(#2370) should be set to 1. It may be set to 0 otherwise(#323)(#75)." is a bit confusing. Since the first sentence is a "should" it may be set to 0 in all cases, not just "otherwise" | Change the second cited sentence to "It should be set to 0 otherwise." |
| 4173 | 19.3.11.11.2 | 3041.32 | "When a (Ed)beamforming steering matrix is applied, the Smoothing bit(#2370) should be set to 1. It may be set to 0 otherwise(#323)(#75)." is a bit confusing. Since the first sentence is a "should" it may be set to 0 in all cases, not just "otherwise" | Change the second cited sentence to "It may be set to 0." |

**Discussion**

These three comments are very similar to each other.

Commenter’s proposed change for CID4171 on top of D3.2 P3029L32:

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| When a beamforming steering matrix is applied, the Smoothing bit should be set to 1. It may be set to 0. |

Commenter’s proposed change for CID4172 on top of D3.2 P3029L32:

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| When a beamforming steering matrix is applied, the Smoothing bit should be set to 1. It should be set to 0 otherwise. |

Commenter’s proposed change for CID4173 on top of D3.2 P3029L32:

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| When a beamforming steering matrix is applied, the Smoothing bit should be set to 1. It shall be set to 0 otherwise. |

While reviewing this comment, this reviewer found error in the first sentence. The first sentence was updated in REVmd D1.0 via CID 75 (11-17/1089r12):

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| Proposed Resolution:  Revised. Replace  “ If at least 95% of the sum of the energy from all impulse responses of the time domain channels between all  space-time streams and all transmit chain inputs, induced by the CSD added according to Table 19-10  (Cyclic shift values of HT portion of packet) and the frequency-dependence in the matrix , is contained  within 800 ns, the smoothing bit should be set to 1. Otherwise, it shall be set to 0.”  with  “When a Beamforming steering matrix is applied, the smoothing bit should be set to 1. It may be set to 0 otherwise.” |

Note that the definition of the smoothing bit is

D3.2 P2770:

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And the D3.2 P2796 states Beamforming steering matrix to be:

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When Beamforming steering matrix is applied (e.g. based on compressed matrices feedback), there is possibility that the Beamforming steering matrix is not ‘continugous’ between adjancent tones. In this case, the transmitter should inform the receiver that smoothing should not be applied to this packet. However, the sentence “When a beamforming steering matrix is applied, the Smoothing bit should be set to 1.” says the opposite by mistake.

Now, going on to the original portion of the comment, even if the transmitter does not apply a Beamforming steering matrix, transmitter is not required to recommend smoothing to the receiver. Hence, ‘may’ is correct in the second sentence, with the polarity of the smoothing bit reversed.

I.e., the proposed resolution is

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| When a beamforming steering matrix is applied, the Smoothing bit should be set to 0. It may be  set to 1 otherwise. |

**Proposed Resolution: CID 4172, 4173**

**Revised**.

The relevant sentences were introduced in REVmd D1.0 (CID 75) but had error. Proposed resolution fixes this error, after which the ‘may’ in the sentence referenced by the commenter is the correct wording.

Instruction to Editor:  
At D3.2 P3029L32, change “Smoothing bit should be set to 1” to “Smoothing bit should be set to 0”.

At D3.2 P3029L33, change “It may be set to 0 otherwise” to “It may be set to 1 otherwise”.

**Proposed Resolution: CID 4171**

**Rejected**.

Proposed text change by the commenter reads “… Smoothing bit should be set to 1. It may be set to 0.” One sentence says it should be set to 1, and the sentence immediately after it says it may be set to 0, which is confusing.

Instruction to Editor:  
At D3.2 P3029L32, change “Smoothing bit should be set to 1” to “Smoothing bit should be set to 0”.

At D3.2 P3029L33, change “It may be set to 0 otherwise” to “It may be set to 1 otherwise”.

# CID 4535

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4535 | 19.4.4 | 3079.16 | Table 19-25--HT PHY characteristics is not clear on slot time in 2G4 (what does short = and long = mean?) | As it says in the comment |

**Background**

D3.2 P3067

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Note that clause 18 also has similar language:

D3.2 P2969

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Proposed text change by the reviewer:

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| * ERP characteristics | |
| Characteristic | Value |
| aSlotTime | If dot11OperatingClassesRequired is false:  Long slot time = 20 µs Short slot time = 9 µs  If dot11OperatingClassesRequired is true:  Long slot time = 20 µs plus any coverage-class-dependent aAirPropagationTime (see Table 9-97 (Coverage Class field parameters))  Short slot time = 9 µs plus any coverage-class-dependent aAirPropagationTime (see Table 9-97 (Coverage Class field parameters)) |

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| * HT PHY characteristics | |
| Characteristics | Value |
| aRIFSTime | 2 µs |
| aSlotTime | When operating in the 2.4 GHz band:  If dot11OperatingClassesRequired is false, long slot time = 20 µs  If dot11OperatingClassesRequired is true, long slot time = 20 µs plus any coverage-class-dependent aAirPropagationTime (see Table 9-97 (Coverage Class field parameters))  If dot11OperatingClassesRequired is false, short slot time = 9 µs  If dot11OperatingClassesRequired is true, short slot time = 9 µs plus any coverage-class-dependent aAirPropagationTime (see Table 9-97 (Coverage Class field parameters))  When operating in the 5 GHz band:  If dot11OperatingClassesRequired is false, 9 µs  If dot11OperatingClassesRequired is true, 9 µs plus any coverage-class-dependent aAirPropagationTime (see Table 9-97 (Coverage Class field parameters)) |

**Proposed Resolution: CID 4535**

**Revised**.

The “Long” and “Short” refer to long slot time and short slot time, respectively. Proposed resolution makes this clearer, in both clause 18 and 19.

Instruction to Editor: In D3.2,

Change “Long = 20 us” to “Long slot time = 20 us” at P2969L13, P2969L18, P3067L16, P3067L17.

Change “Short = 9 us” to “Short slot time = 9 us” at P2969L14, P2969L20, P3067L22, P3067L23.

# CID 4450

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4450 | 19.5 | 3080.45 | N\_TBPS is not used anywhere | Delete the last row of Table 19-26--Symbols used in MCS parameter tables |

**Discussion**

D3.2 P3068

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Agree that N\_TBPS is not used any where in the draft.

**Proposed Resolution: CID 4450**

**Accepted**.

# CID 4322

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4322 | 21.2.2 | 3145.22 | numberOfOctets is not a defined operator (also in Table 22-1 and Table 23-1) | Add a definition of the operator to 1.5 or C.1 |

**Discussion**

D3.2 P3133

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Note that there are two more places using numberOfOctets.

D3.2 P3265

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D3.2 P3319

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All three places have the exact same phrase, and it is simpler to just reword the phrase to not use the undefined function numberOfOctets. For example, proposal is to change P3133 as below.

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| TXPWR\_LEVEL\_INDEX | FORMAT is VHT | The allowed values for the TXPWR\_LEVEL\_INDEX parameter are in the range 1 to *N*/2, where *N* is the number of octets in dot11TxPowerLevelExtended. This parameter is used to indicate which of the available transmit output power levels defined in dot11TxPowerLevelExtended shall be used for the current transmission. | Y | N |
| Otherwise | See corresponding entry in Table 19-1 (TXVECTOR and RXVECTOR parameters(#2560)) | | |

**Proposed Resolution: CID 4322**

**Revised**.

Proposed resolution updates the text to avoid using the undefined function numberOfOctets().

Instruction to Editor:

At D3.2 P3133L21, P3265L51 and P3319L35, change “1 to numberOfOctets(dot11TxPowerLevelExtended)/2” to “1 to *N*/2, where *N* is the number of octets in dot11TxPowerLevelExtended”.

# CID 4604

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4604 | 21.3.6 | 3175.8 | "For a VHT MU PPDU, NDBPS is undefined" -- so NDBPS only applies to HE SU PPDUs, so u will always be 0, so there is no point definining NDBPS,u | Delete NDBPS,u from Table 21-6 |

**Discussion**

D3.2 P3163

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Note that N\_DBPS,u is used in 21.5.

P3243:

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**Proposed Resolution: CID 4604**

**Rejected**.

In VHT MU, each user can have different number of data bits per symbol, thus N\_DBPS,u with the subscript “u” is appropriate. And N\_DBPS,u is used in D3.2 P3243L28.

# CID 4022

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4022 | 21.3.8.2.2 | 3185.12 | For CBW20, N\_SR is 28. And, Sk for CBW20 refers Equation 19-8. But, Sk in 19-8 is specifying {-26,26}. Values for -28, -27, 27, and 28 are not defined. | Please define Sk for -28, -27, 27, and 28. |

**Background**

D3.2 P3172

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D3.2 P2999

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D3.2 P3173

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P3.2 P3161

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Note that L-SIG and VHT-SIG-A uses summation over +-26, not +-N\_SR to avoid the same issue.

D3.2 P3174

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D3.2 P3177

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**Update in R1:**

David Goodall (Morse Micro) indicated that similar change should be made for Equation (23-14) in S1G. This change has been confirmed by Yujin Noh (Newracom) as well.

D3.2 P3353

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P3.2 P3342

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**Proposed Resolution: CID 4022**

**Revised**.

Commenter is correct about the issue. Note that L-SIG and VHT-SIG-A avoids similar issue by not use the variable N\_SR, but rather using “26” in Equations (21-25) and (21-28), respectively. Hence changing N\_SR to 26 in Equation (21-20) is more appropriate. Similar change should also be made for S1G in Equation (23-14).

Instruction to Editor:

At D3.2 P3173L15 Equation (21-20), change “N\_SR” to “26”, and “k = -N\_SR” to “k = -26”.

At D3.2 P3353L46 Equation (23-14), change “N\_SR” to “26”, and “k = -N\_SR” to “k = -26”.

# CID 4023

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4023 | 21.3.8.2.3 | 3185.60 | For CBW20, N\_SR is 28. And, Lk for CBW20 refers Equation 19-11. But, Lk in 19-11 is specifying {-26,26}. Values for -28, -27, 27, and 28 are not defined. | Please define Lk for -28, -27, 27, and 28. |

**Discussion**

D3.2 P3173

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D3.2 P3000

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D3.2 P3173

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P3.2 P3161

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Note that L-SIG and VHT-SIG-A uses summation over +-26, not +-N\_SR to avoid the same issue.

D3.2 P3174

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D3.2 P3177

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**Proposed Resolution: CID 4023**

**Revised**.

Commenter is correct about the issue. Note that L-SIG and VHT-SIG-A avoids similar issue by not use the variable N\_SR, but rather using “26” in Equations (21-25) and (21-28), respectively. Hence changing N\_SR to 26 in Equation (21-23) is more appropriate.

Instruction to Editor:

At D3.2 P3173L62 Equation (21-23), change “N\_SR” to “26”, and “k = -N\_SR” to “k = -26”.

# CID 4544

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4544 | 21.3.8.3.5 | 3194.60 | "left" and "right" are not well-defined for frequencies; the correct terminology is "lower", "higher". LTF\_left, for example, looks suspect | As it says in the comment |

**Background**

D3.0 P3194

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**Proposed Resolution: CID 4544**

**Rejected**.

LTF\_left and LTF\_right are intermediate variables used to define VHT-LTF. The usage of LTF\_left and LTF\_right is clear in the standard (e.g. see Equation (21-36)), and thus there is no technical issue with the terms.

# CID 4368

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 4368 | 21.3.17.4.2 | 3235.12 | "When the RF LO is not at the center of the transmitted PPDU BW, the power measured at the location of the RF LO using resolution BW 312.5 kHz shall not exceed the maximum of -32 dB relative to the total transmit power and -20 dBm, or equivalently , where P is the transmit power per antenna in dBm, and NST is defined in Table 21-5" -- but NST is not mentioned anywhere in this bullet! | Delete ", and NST is defined in Table 21-5" in the cited text and "and NST is defined in Table 22-8 (Timing-related parameters)" at 3312.24 |

**Discussion**

D3.0 P3194

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D3.0 P3312

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Commenter is correct that the second bullet in each case do not use N\_ST.

**Proposed Resolution: CID 4368**

**Accepted**

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