IEEE P802.11  
Wireless LANs

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| 802.11 TGac WG Letter Ballot LB188  Proposed resolutions on Miscellaneous PHY Comments | | | | |
| Date: 2012-09-05 | | | | |
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##### Comments are based on 11ac D3.0. Proposed resolutions are based on 11ac D3.0 or D3.1 (as indicated in each resolution). Changes indicated by a mixture of Word track-changes and instructions. For equation changes, Latex notation is sometimes used. E.g. a\_{xyz}^b denotes axyzb

Following CIDs are covered in this document (total 12):

PHY: 6178, 6319, 6603, 6604, 6605, 6181, 6335, 6606, 6607, 6608, 6609, 6180

Color coding:

GREEN : Strawpoll passed

YELLOW : Discussed but deferred

History:

R1: Updated during presentation in the ad hoc meeting (CIDs 6178, 6319, 6603, 6604, 605, 6181 passed motion during July 2012 session, and have already been incorporated into D3.1).

R2: Updated resolution to 6335, 6606, 6607, 6608, 6609, 6180.

R3: Updated resolution to 6606, 6607, 6608, 6609, 6180.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6178 | 192.31 | 22.2.4.1 | Section reference is incorrect. TX center frequency leakage is 22.3.18.4.2. | Change '22.3.18.5.2' to '22.3.18.4.2' twice on P192L31 (once in the box for Clause 20, and another in the the box for Clause 18). |

**Discussion:**

Context (P192)



As the commenter has noted, sections 20.3.20.7.2 and 18.3.9.7.2 are the transmit center frequency leakage sections. The corresponding section in clause 22 is 22.3.18.4.2.





**Proposed Resolution:**

CID 6178:

ACCEPT.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6335 | 192.61 | 22.2.4.2 | "detected as a NON\_HT OFDM PPDU" is not exact. "detected as a non-HT PPDU and the RXVECTOR parameter NON\_HT\_MODULATION is OFDM" is better. | As in comment. |

**Discussion:**

Context (D3.0 P192):





Note that for a non-HT PPDU not using the bandwidth signaling TA, the detection/distinction between OFDM vs. NON\_HT\_DUP\_OFDM modulation type is not mandatory, and the detection scheme is implementation specific. Even for non\_HT PPDUs using the bandwidth signaling TA, the ultimate distinction between OFDM vs. NON\_HT\_DUP\_OFDM is performed by the MAC. Also note that there is no RX procedure for NON\_HT\_DUP\_OFDM packets in Clause 22. Hence, it is reasonable to assume that most PHY RX implementations would follow the RX procedure defined in Clause 18 for all non-HT PPDUs.

**Proposed Resolution:**

CID 6335:

REVISE. See proposed text change in 11-12/0810r3 under CID 6335 which clarifies the VHT PHY behavior when the FORMAT parameter is equal to NON\_HT.

**Proposed Text Change:**

*Change D3.1 P198L44 as follows:*

When a PHY-TXSTART.request(TXVECTOR) primitive with the FORMAT parameter equal to NON\_HT and the NON\_HT\_MODULATION parameter equal to OFDM is issued, the behavior of the VHT PHY is defined in Clause 18 with additional requirements described in 22.3.9.1 (Transmission of 20 MHz NON\_HT PPDUs with more than one antenna) and 22.3.18.4.2 (Transmit center frequency leakage) instead of 18.3.9.7.2 (Transmitter center frequency leakage). The Clause 22 TXVECTOR parameters in Table 22-1 (TXVECTOR and RXVECTOR parameters) are mapped to Clause 18 TXVECTOR parameters in Table 18-1 according to Table 22-3 (Mapping of the VHT PHY parameters for NON\_HT operation) and the Clause 18 PHY-TXSTART.request(TXVECTOR) primitive is issued.

NOTE—When the FORMAT parameter is set to NON\_HT and the NON\_HT\_MODULATION parameter is set to NON\_HT\_DUP\_OFDM in a PHY-TXSTART.request(TXVECTOR) primitive, the behavior of the VHT PHY is defined in Clause 22.

When the VHT PHY receives a Clause 22 PHYCONFIG.request(PHYCONFIG\_VECTOR) primitive, the VHT PHY shall issue a Clause 18 PHYCONFIG.request(PHYCONFIG\_VECTOR) primitive but with the OPERATING\_CHANNEL and CHANNEL\_OFFSET parameters discarded from PHYCONFIG\_VECTOR. In order to transmit a non-HT PPDU on the primary channel, the MAC shall configure dot11CurrentFrequency to dot11CurrentPrimaryChannel before transmission.

As defined in 22.3.21 (PLCP receive procedure), once a PPDU is received and detected as a NON\_HT PPDU, the behavior of the VHT PHY is defined in Clause 18. The RXVECTOR parameters from the Clause 18 PHY-RXSTART.indication primitive are mapped to the Clause 22 RXVECTOR parameters as defined in Table 22-3 (Mapping of the VHT PHY parameters for NON\_HT operation). VHT PHY parameters not listed in the table are not present.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6319 | 194.08 | 22.2.4.2 | The usage of "5.0 GHz" may lead to a misunderstanding that the applicable spectrum is limited to 5.0X GHz (i.e., between 5.00 GHz and 5.10 GHz). | Change "5.0 GHz" to "5 GHz" |

**Discussion:**

Context (D3.0 P192):



‘5 GHz’ would be appropriate as the commenter has stated.

**Proposed Resolution:**

CID 6319:

ACCEPT.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6603 | 241.21 | 22.3.10.5.2 | Parsing operation includes tail bits | Change "the scrambled SERVICE, PSDU and PHY pad bits" with "the scrambled SERVICE, PSDU and PHY pad bits and the unscrambled tail bits" |

**Discussion:**

Context (D3.0 P241):



…



Note that the scrambler output contains the SERVICE, PSDU and PHY pad bits, but does not contain the tail bits. Only the SERVICE, PSDU and PHY pad bits are ‘divided’ between encoders. The tail bit is subsequently ‘appended’ to each FEC input sequence.

**Proposed Resolution:**

CID 6603:

REJECT.

Note that the scrambler output contains the SERVICE, PSDU and PHY pad bits, but does not contain the tail bits. Only the SERVICE, PSDU and PHY pad bits are ‘divided’ between encoders. The tail bit is subsequently ‘appended’ to each FEC input sequence.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6604 | 242.48 | 22.3.10.5.5 | Change "OFDM symbols" to "OFDM symbols for each user" | See Comment |

**Discussion:**

Context (D3.0 P242):



The commenter is correct that Equation (22-60) computes the initial number of OFDM symbols for each user.

**Proposed Resolution:**

CID: 6604

ACCEPT.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6605 | 243.06 | 22.3.10.5.5 | Clarify description of N\_SYM\_max\_init | Change "The initial estimate of the largest number of symbols" to "The largest initial number of symbols over all users" |

**Discussion:**

Context (D3.0 P241-242):



…



N\_sym\_init,u is the initial number of symbols for user u. Thus, the proposed resolution is appropriate.

**Proposed Resolution:**

CID 6605:

ACCEPT.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6606 | 243.13 | 22.3.10.5.5 | The algorithm for calculating N\_SYM,u is somewhat confusing. | Change description as follows:  "Then, for each user u that uses LDPC coding in the MU PPDU, the final number of symbols in the Data field (N\_SYM,u) shall be calculated as follows:  Execute steps a) to d) in 20.3.11.7.5 with N\_pld (Equation (20-35)) replaced with N\_pld,u (Equation (22-62)) and N\_avbits (Equation (20-36)) replaced with N\_avbits,u (Equation (22-63)).  N\_SYM,u for that user shall then be equal to the value of N\_SYM obtained at the end of step d) (Equation (20-41)), using these values. |
| 6607 | 243.24 | 22.3.10.5.5 | Value of N\_avbits,u can be simplified | Replace with:  "N\_avbits,u = N\_SYM\_max\_init N\_CBPS,u" |
| 6608 | 243.36 | 22.3.10.5.5 | Replace "PPDU length" with "The number of symbols in the Data field" | See comment |
| 6180 | 243.51 | 22.3.10.5.5 | Computation of Npld for user u is already defined in Equation (22-62). Also, this section is for MU PPDU, hence there is no need for the phrase "for MU PPDU". | Change "First, N\_pld shall be computed using Equation (22-57) instead of Equation (20-35). Next, for an MU PPDU, step (d) in 20.3.11.7.5 ..." to "First, replace Equation (20-35) for computing N\_pld,u with Equation (22-62), and Equation (20-36) for computing N\_avbits,u with Equation (22-63). Next, step (d) in 20.3.11.7.5 ..." |
| 6609 | 243.51 | 22.3.10.5.5 | Correctly specify N\_pld for MU as well | Replace "Npld shall be computed using Equation (22-57)" with "Npld shall be computed using Equation (22-57) for SU or Equation (22-62) for MU" |

**Discussion:**

(D3.0, P243):



Note that when looking at Equations (22-63) and (22-64), reader may think that the Navbits,u in (22-64) is the one computed in (22-63). However, the Navbits,u is the one which may have been updated in step d) of 20.3.11.7.5. Hence, the commenter of CID 6606 is correct that the current draft is somewhat confusing.

Note that Equation (22-63) is basically identical to Equation (20-36) in 20.3.11.7.5 (802.11-2012, P1713):



Hence, Equation (22-63) is redundant and can instead be referred to Equation (20-36). This makes CID 6607 obsolete.

Regarding CID 6608, the commenter is correct that Nsym is the number of symbols in the data field.

As for CIDs 6180 and 6609, commenters are correct that Equation (22-57) is for SU PPDU and thus is the incorrect reference.

(D3.0, 242)



The correct reference should be Equation (22-62).

(D3.0, P243)



**Proposed Resolution:**

CID 6606:

REVISE. See proposed text changes for CIDs 6606/6607/6608/6180/6609 in 11-12/0810r3 which clarifies the confusing description.

CID 6607:

REVISE. See proposed text changes for CIDs 6606/6607/6608/6180/6609 in 11-12/0810r3 which deletes the referenced equation, and refers the reader to Equation (20-36) instead.

CID 6608:

ACCEPT. See proposed text changes for CIDs 6606/6607/6608/6180/6609 in 11-12/0810r3 for the comprehensive text change merged with changes from other CIDs.

CID 6180, 6609:

REVISE. See proposed text changes for CIDs 6606/6607/6608/6180/6609 in 11-12/0810r3 which clarifies the N\_pld definition.

**Proposed Text Change for CIDs 6606/6607/6608/6180/6609:**

*Change D3.1 P249L53 (22.3.10.5.5) as follows:*

Based on the above equation, compute the largest initial number of symbols over all users using Equation (22-61).

 (22-61)

Then, for each user *u* that uses LDPC coding in the MU PPDU, the final number of symbols in the Data field () shall be calculated as follows. First, perform step a) in 20.3.11.7.5, with the exception that  is computed using Equation (22-62) instead of Equation (20-35).(#6606)

 (22-62)

Then, perform steps b) through d) in 20.3.11.7.5 with  and  replaced with  and  respectively.  for user *u* shall then be equal to the value of  obtained at the end of step d) using Equation (20-41).(#6606)

NOTE—The purpose of going through steps a) to d) in 20.3.11.7.5 (LDPC PPDU encoding process) in the above paragraph is to compute . Thus, it is not necessary to actually encode the data using LDPC at this stage.

For BCC users, .

Then, compute the number of symbols in the Data field (#6608) using Equation (22-65).

 (22-65)

When constructing the Data field for user *u* encoded using LDPC code, the MAC follows the padding procedure described in 9.12.6 (A-MPDU padding for VHT PPDU) and delivers a PSDU that contains PSDU\_LENGTH*u* octets (see 22.4.3 (TXTIME and PSDU\_LENGTH calculation)). The PHY follows the padding procedure described in 22.3.10.1 (General) to fill  symbols, where  is defined in Equation (22-61). Then, for each user, all bits in the Data field including the scrambled SERVICE, PSDU and pad bits shall be encoded using the LDPC encoding process specified in 20.3.11.7.5 (LDPC PPDU encoding process) with the following modifications. First,  shall be computed using Equation (22-62)(#6180, 6609) instead of Equation (20-35). Also, replace  and  with  and , respectively. Next, (#6180)step (d) in 20.3.11.7.5 (LDPC PPDU encoding process) is replaced with step (d) below.

d) If  computed in Equation (22-65) is equal to , then the number of bits to be punctured, , from the codewords after encoding is computed as shown in Equation (20-38). If  computed in Equation (22-65) is greater than , then the number of bits to be punctured, , from the codewords after encoding is computed using Equation (20-39) and Equation (20-40). Note also that  has now been updated in Equation (20-39) in this case.

The punctured bits shall be equally distributed over all  codewords with the first  codewords punctured 1 bit more than the remaining codewords. Define . When , the puncturing is performed by discarding parity bits  of the first  codewords and discarding parity bits  of the remaining codewords after encoding.

When constructing the Data field for users encoded using BCC, …

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 6181 | 246.37 | 22.3.10.7 | "R" is undefined. | Change "Repeat R times" to "Repeat N\_res times". |

**Discussion:**

Context (D3.0, P246):



Note that “R” has been changed to “N\_res” in other places (P246L33).

**Proposed Resolution:**

CID 6181:

REVISE. Change P246L37 to “Repeat N\_res times (until all bits are distributed to the two subblocks).”

[EOF]