IEEE P802.11
Wireless LANs

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| LB 190 PHY CIDs (Comment Resolution for D4.0) |
| Date: 8 November 2012 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Eldad Perahia | Intel Corporation |  |  | eldad.perahia@intel.com |

Abstract

This document provides resolutions for CIDs: 7317, 7320, 7101, 7027, 7034, 7278, 7070, 7279, 7072, 7073, 7074, 7076, 7077, 7078, 7080, 7079, 7280, 7081, 7281

**Clause 22 comments:**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 7317 | 208.00 | 22 | It should be allowed to not transmit anything to an MU PPDU recipient, after the APEP, rather than having to transmit padding | Allow this | J | Rejected - receiver implementations would likely be negatively affected by an option to not transmit anything on some portions of some streams within a single PPDU, e.g. consider the effect of the ensuing power change at the receiver. |
| 7320 | 208.00 | 22 | The block size/througput per BCC encoder should be specified, as they were for HT, to justify the N\_ES values given in the tables (in HT you can easily verify that in the tables in 20-6, all MCSes where the LGI rate is >= 300 Mbps have N\_ES = 2, else N\_ES = 1) | Steal the HT terminology and adjust the numbers | J | REJECTED - There is no need to block size/throughput per BCC encoder used to choose N\_ES. Implementers only require the actual values in the tables to build interoperable devices. |

**Clause 22.1.1 comments:**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 7101 | 208.17 | 22.1.1 | An HT AP needs to support Nss=2 for 20 MHz (REVmc, P1835L42). Since a VHT AP is not required to support Nss=2, it is reasonable to not mandate Nss=2 support in HT mode of a VHT AP. | Change "a VHT STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory PHY specifications defined in Clause 20" to "a VHT STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory PHY specifications \_for a non-AP HT STA\_ defined in Clause 20". | A | Agreed - Refer to changes in 12/1296 under CID 7101 heading. |
| 7027 | 208.22 | 22.1.1 | Implies this is both UL or DL MIMO | Be specific - refer to DL-MU-MIMO | V | Revised – agree in principle. Refer to changes in 12/1296 under CID 7027 heading. |
| 7034 | 209.39 | 22.1.3.3 | Given we're removed the PMD, delete "or sublayer" 2x | As in comment | A | Agreed - Refer to changes in 12/1296 under CID 7034 heading. |

**TGac editor: modify TGac D4.0 P208L17-18 as follows:**

In addition to the requirements in Clause 22, a VHT STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory PHY specifications for a non-AP HT STA defined in Clause 20.

**TGac editor: modify TGac D4.0 P208L20-24 as follows:**

The VHT PHY is based on the HT PHY defined in Clause 20, which in turn is based on the OFDM PHY defined in Clause 18. The VHT PHY extends the maximum number of space-time streams supported to eight and provides support for downlink multi-user (MU) transmissions. A downlink MU transmission supports up to four users with up to four space-time streams per user with the total number of space-time streams not exceeding eight.

**TGac editor: modify TGac D4.0 P209L38-41 as follows:**

The service of a layer is the set of capabilities that it offers to a user in the next higher layer. Abstract services are specified here by describing the service primitives and parameters that characterize

each service. This definition is independent of any particular implementation.

**Clause 22.3.20 comments:**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 7278 | 305.17 | 22.3.20 | NOTE 1 states that VHT Training symbols are per user | Correct wording of NOTE 1 as follows:"For MU the A-MPDU is per user in the MAC sublayer; VHT-SIG-B, and Data are per user in the PHY layer in Figure 22-32 and the number VHT Training Symbols depends on the total number of space-time streams across all users." | V | Revised - It is correct that the VHT Training Symbols are per user. Refer to changes in 12/1296 under CID 7278 heading. |
| 7070 | 305.60 | 22.3.20 | N\_SYM appears once in the draft - here | "...according to the number of OFDM symbols indicated supplied in the N\_{SYM}" => "...according to the calculated number of OFDM symbols, N\_{SYM}" | A | Agreed. Refer to changes in 12/1296 under CID 7070 heading. |
| 7279 | 305.60 | 22.3.20 | Text references N\_SYM field. What does this refer to? | Replace "In an SU transmission, normal termination occurs after the transmission of the final bit of the last PSDU octet, according to the number of OFDM symbols indicated supplied in the N\_SYM field" with "In an SU transmission, normal termination occurs after the transmission of the final bit of the last PSDU octet"Note that PSDU\_LENGTH has already been calculated to match the number of symbols and that the PHY padding bits are not supplied by the MAC. | V | Revised – The equation for N\_SYM is given in 22.4.3. To clarify “field” is deleted and reference added. Refer to changes in 12/1296 under CID 7279 heading. |
| 7072 | 307.12 | 22.3.20 | A good reference for NON\_HT is clause 18 not clause 20 | "Refer to clause 18 or 20" | J | Reject – the rationale for only referring to clause 20 is let the clause 20 transmit state machine illustrate the flow for choosing between HT and NON\_HT. |
| 7073 | 307.23 | 22.3.20 | "non-VHT training symbols" is not well defined nearby - not in 22.3.20 nor fig 22-32 | Replace non-VHT training by L-STF, L-LTF. Not sure that we need BPSK rate 1.2 either | V | Revised – agree in principle. Refer to changes in 12/1296 under CID 7073 heading. |

**TGac editor: modify TGac D4.0 P305L17 as follows:**

NOTE 1—For MU the A-MPDU is per user in the MAC sublayer; and the VHT Training Symbols, VHT-SIG-B, and

Data are per user in the PHY layer in Figure 22-32, with the number VHT Training Symbols depending on the total number of space-time streams across all users..

**TGac editor: modify TGac D4.0 P305L58-60 as follows:**

In an SU transmission, normal termination occurs after the transmission of the final bit of the last PSDU octet, according to the number of OFDM symbols indicated by $\_{}$ (see 22.4.3).

**TGac editor: modify TGac D4.0 P307L23, Figure 22-33 as follows:**

TX L-STF

TX L-LTF

**Clause 22.3.21 comments:**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 7074 | 308.16 | 22.3.21 | "Upn receiving the transmitted PHY preamble .." needs to be conditioned on "overlapping the prinary 20 MHz channel" for P308 L18 to be correct | Insert "overlapping the prinary 20 MHz channel" | A | Agreed - Refer to changes in 12/1296 under CID 7074 heading. |
| 7076 | 308.61 | 22.3.21 | "shall decode SIGB" not conditioned on supporting MU | change in "the PHY, in a STA that is MU Bfee capable," | A | Agreed - Refer to changes in 12/1296 under CID 7076 heading. |
| 7077 | 309.06 | 22.3.21 | "MU NSTS" doesn't exist | Change to "MU[u] STS, u = 0,1,2,3. Ditto P309L21 | A | Agreed - Refer to changes in 12/1296 under CID 7077 heading. |
| 7078 | 309.06 (309.60?) | 22.3.21 | This equation applies to SU and MU since no restriction is made at P309L54 and there is other MU material e.g. at P308L61. Then PSDU\_LENGTH is curious ... because it is "Y" in RXECTOR agreed it doesn't take a "u" ... but NES, NDBPS are all user-dependent ... | The definitions for these terms at the top of P310 should acknowledge that, strictly speaking, in a MU PPDU these are user-dependent terms, and we are omitting the user index ... which is really p[g] (using the notation at top of P309) | J | Reject – When the receiver is computing Equation 22-102 all the parameters are single user. |
| 7080 | 310.11 | 22.3.21 | This equation and also (22-104) applies to SU and MU since the intro is about SU and MU . Then PSDU\_LENGTH is curious ... because it is "Y" in RXECTOR agreed it doesn't take a "u" ... but NDBPS is user-dependent ... | The definitions for these terms at P310L42 should acknowledge that, strictly speaking, in a MU PPDU these are user-dependent terms, and we are omitting the user index ... which is really p[g] (using the notation at top of P309) | J | Reject – When the receiver is computing Equation 22-104 all the parameters are single user. |
| 7079 | 310.11 | 22.3.21 | Given the para starting at P309L54 applies ot SU and MU, therefore the para startign at P310L11 exlcuding the last sentence should be moved ahead of P309L54 | Move as in comment | J | Reject – both paragraphs apply to both SU and MU. The first paragraph applies to BCC and the second paragraph applies to LDPC |
| 7280 | 310.14 | 22.3.21 | Inaccurate description of SU/MU Coding fields | MU[x] does not refer to user x as implied in the text. MU[x] contains information for the user u with x=USER\_POSITION[u].Correct description accordingly. | J | Reject – The use of MU Coding fields matches the description in VHT-SIG-A: “… B2 indicates the coding used for user 0…”“… B4 indicatescoding for user 1…”“… B5 indicatescoding for user 2…”“…B6 indicatescoding for user 3..:” |
| 7081 | 310.20 | 22.3.21 | Using NSYMinit here is really confusing and probably actually incorrect. Recall in (22-60), NSYMinit is per user, and liable to be different per user, from (22-61). Then how come here it can suddenly be common to all users? | We need an "intermediate" term that is like Nsym,init but \*after\* multiuser padding so it is equal for all users | V | Revised – Equations 22-60 and 22-61 are applicable to the encoding process and therefore apply to multiple users.Equation 22-103 is applicable to the decoding process and therefore only applies to the particular user.The confusion might have come from the reference to Equation 22-57 in D4.0 P310L18. This is deleted. Furthermore, the use of the same parameter name on encode and decode is also confusing. This is changed.Refer to changes in 12/1296 under CID 7081 heading. |
| 7281 | 311.25 | 22.3.21 | RSSI measurement is indicated in the wrong place | Figure 22-34 shows "Measure RRSI" to take place starting at L-LTF. In Table 22-1, RSSI is described as "measured during the reception of the VHT-LTF field".Move arrow to correct location (or delete) | V | Revised –Refer to discussion and changes in 12/1296 under CID 7281 heading. |

**TGac editor: modify TGac D4.0 P308L16 as follows:**

Upon receiving the transmitted PHY preamble overlapping the primary 20 MHz channel, the PHY measures a receive signal strength.

**TGac editor: modify TGac D4.0 P308L60 as follows:**

If the Group ID field in VHT-SIG-A has a value indicating a VHT MU PPDU (see 9.17a (Group ID and partial AID in VHT PPDUs)), the PHY, in a STA that is MU Beamformee capable, shall decode VHT-SIG-B. If the VHT-SIG-B indicates an unsupported mode, the PHY shall issue the error condition PHY-RXEND.indication(UnsupportedRate) primitive.

**TGac editor: modify TGac D4.0 P309L6-28 as follows:**

The PHY optionally filters out the PPDU based on the GroupID, MU[0-3] NSTS and Partial AID fields of VHTSIG-A and the contents of the PHYCONFIG\_VECTOR as follows:

— The PHY shall not filter out the PPDU if one of the following is true:

• (*g* = 0) and (*l00* is true) and (*partialaid* is included in PARTIAL\_AID\_LIST\_GID00)

• (*g* = 63) and (*l63* is true) and (*partialaid* is included in PARTIAL\_AID\_LIST\_GID63)

• (0 < *g* < 63) and (*m*[*g*] = 1) and (*nSTS*[*p*[*g*]] > 0)

— where

• *lNN* is the one of the LISTEN\_TO\_GID*NN* parameters of the PHYCONFIG\_VECTOR

• *m*[*g*] is the Membership Status Array field of the GROUP\_ID\_MANAGEMENT parameter of the PHYCONFIG\_VECTOR for group *g*

• *g* is the value of the GroupID field of VHT-SIG-A

• *nSTS*[*u*] is the value of the MU[u] NSTS field of VHT-SIG-A for user *u*

• p[g] is the User Position Array field of the GROUP\_ID\_MANAGEMENT parameter of the

PHYCONFIG\_VECTOR for group *g*

• *partialaid* is the value of the Partial AID field of VHT-SIG-A

— Otherwise the PHY may filter out the PPDU.

If the PPDU is filtered out, the PHY shall issue a PHY-RXEND.indication(Filtered) primitive.

**TGac editor: modify TGac D4.0 P310L16 as follows:**

When an LDPC decoder is to be used, *NSYM* *init* is obtained from Equation (22-103).

**TGac editor: Change N\_SYM to N\_SYM’ in TGac D4.0 P310 L18, 22, 37**

**Discussion on CID 7281**

In the receive procedure for 11a, 11n, and 11ac the RSSI measurement is shown occur right after the STF. This is coupled to the initial CCA indication to the MAC. A follow on RSSI measurement is required by the RXVECTOR, as follows “This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU measured during the reception of the VHT-LTF field.”. Proposal is to add an addition RSSI measurement during the VHT-LTF.

**TGac editor: modify TGac D4.0 P311 Figure 22-34 as follows:**

