IEEE P802.11  
Wireless LANs

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| Miscellaneous PHY, MAC, and Coex Comment Resolution for LB 178 D1.0 | | | | |
| Date: 08 September 2011 | | | | |
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|  |  |  |  |  |

Abstract

This document provides resolutions for CIDs: 3137, 3138, 3139, 2348, 3140, 2433, 3629, 3651, 2147, 2483, 3162, 2484, 2524, 3167, 2016, 2863, 2505, 2506, 3353, 3176, 3177

**Comments on Table 22-1**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 3137 | 107.55 | 22.2.1 | what is a subformat? | please clarify | A | Agree. See resolution in 11/YYYY |
| 3138 | 107.56 | 22.2.1 | can the PHY tell on receive whether a packet is OFDM or NON\_HT\_DUP\_OFDM? | please clarify | D | Disagree. Value on receive states “…estimated subformat…”, so receiver doesn’t necessarily have to choose correctly. |
| 3139 | 108.28 | 22.2.1 | In HT receive procedure, L-SIG can be ignored on received. In VHT receive procedure, L-SIG can not be ignored. So why is L-SIGVALID optional for VHT and required for HT? | please clarify | A | Agree. See resolution in 11/YYYY |
| 2348 | 108.37 | 22.2.2 | "and NON\_HT\_MOD is OFDM" but actually this applies for NON\_HT and NON\_HT\_DUP | Delete "and NON\_HT\_MOD is OFDM". And then there is no "Otherwise" for SERVICE | A | Agree. See resolution in 11/YYYY |
| 3140 | 110.19 | 22.2.2 | "SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones represented in each stream as described in 8.4.1.38 (VHT Compressed Beamforming Report field)". Change shall to is. I don't think Table 22-1 is the correct place for normative description of SNR calculation. | As in comment | D | Disagree. This is the same approach as in 11n. |

**TGac editor: modify D1.0 Table 22-1, as follows**

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| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| … |  |  |  |  |
| NON\_HT\_MODULATION | FORMAT is NON\_HT | On transmit: indicates the format type of the transmitted non-HT packet.  On receive: indicates the estimated format type of the received non-HT packet.  Enumerated type:  OFDM  NON\_HT\_DUP\_OFDM | Y | Y |
| Otherwise | Not present | N | N |
| … |  |  |  |  |
| LSIGVALID | FORMAT is HT\_MF | True if L-SIG Parity is valid  False if L-SIG Parity is not valid | N | Y |
| FORMAT is VHT | True if L-SIG Parity is valid  False if L-SIG Parity is not valid | N | Y |
| Otherwise | Not present | N | N |
| … |  |  |  |  |
| SERVICE | FORMAT is NON\_HT | Scrambler initialization, 7 zero bits + 9 reserved zero bits | Y | N |
| FORMAT is HT\_MF or  HT\_GF | Scrambler initialization, 7 zero bits + 9 reserved zero bits | Y | N |
| FORMAT is VHT | Scrambler initialization, 7 zero bits + 1 reserved zero bit | Y | N |
|  |  |  |  |
| … |  |  |  |  |

**Clause 22.3.9**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 2433 | 155.44 | 22.3.9 | "MODULATION set to OFDM" but a) there is no MODULATION param (NON\_HT\_MOD?) and b) this means there is no restriction for NON\_HT dup on CSDs | Delete "with the MOD para set to OFDM" | A | Agree. See resolution in 11/YYYY |

**TGac editor: modify D1.0 P155L44, as follows**

When a VHT device transmits a NON\_HT format PPDU

it shall apply the cyclic shifts defined in Table 22-8 (Cyclic shift values for L-STF, L-LTF, L-SIG and VHTSIG-A fields of the packet).

**SCRAMBLER**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 3629 | 156.65 | 22.3.10.2 | The description of "The Reserved and CRC fields shall be scrambled." is not suitable .On page 104, it is described that "The seven LSBs of the SERVICE field shall be set to all zeros prior to scrambling". The seven LSBs of the SERVICE field is expressed as Scrambler Initialization, so the field of Scrambler Initialization shall also be scrambled | Suggest to change to: "The SERVICE field shall be scrambled." | P | Agree in principle. The commenter’s comment is correct. Furthermore, clause 22.3.10.4 Scrambler, already states that the SERVICE field is scrambled, so the entire cited sentence can be deleted. See resolution in 11/YYYY |
| 3651 | 156.65 | 22.3.10.2 | "The Reserved and CRC fields shall be scrambled.",the description is not suitable .On page 104, it is described that 'The seven LSBs of the SERVICE field shall be set to all zeros prior to scrambling', the seven LSBs of the SERVICE field is expressed as Scrambler Initialization, so the field of Scrambler Initialization shall also be scrambled | Suggest to modify :'The Reserved and CRC fields shall be scrambled' to "the SERVICE field shall be scrambled." | P | Agree in principle. The commenter’s comment is correct. Furthermore, clause 22.3.10.4 Scrambler, already states that the SERVICE field is scrambled, so the entire cited sentence can be deleted. See resolution in 11/YYYY |

**TGac editor: modify D1.0 P156L65, as follows**

**Regulatory requirements**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 2147 | 177.04 | 22.3.13 | Blank sub-clause | Fill in sub-clause or delete | A | Agree. Filled in subclause with text from equivalent subclause in 11n. See resolution in 11/YYYY |

**TGac editor: add follow paragraph in 22.3.13, as follows**

Wireless LANs (WLANs) implemented in accordance with this standard are subject to equipment certification and operating requirements established by regional and national regulatory administrations. The PMD specification establishes minimum technical requirements for interoperability, based upon established regulations at the time this standard was issued. These regulations are subject to revision or may be superseded. Requirements that are subject to local geographic regulations are annotated within the PMD specification. Regulatory requirements that do not affect interoperability are not addressed in this standard. Implementers are referred to the regulatory sources in Annex D for further information. Operation in countries within defined regulatory domains may be subject to additional or alternative national regulations.

**VHT PMD receiver specification**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 2483 | 185.01 | 22.3.19.1 | "non-STBC modes, 800ns GI and BCC" but "non-STBC modes is not a defined term. | e.g. "PPDUs using BCC and LONG\_GI but not STBC" (assuming the magic number 800 ns is replaced by LONG\_GI). Search "non-STBC modes" and fix 3x | D | Disagree. There is a definition for non-STBC in 802.11REVmbD9.0 |
| 3162 | 185.35 | 22.3.19.2 | Currently no band plan exists where adjacent 160 MHz channels is allowed. The question is whether we create the requirement now even if the condition does not exist, or we wait for new spectrum to open up in which the condition could exist (e.g. 5330-5490 opening up) and then add the requirement. My preference is to leave the requirement, but to add a statement that it only needs to be met if the frequency plan allows for the condition. | Add statement at end of subclause, "Measurement of adjacent channel rejection for 160 MHz is only required if such a frequency band plan is permitted by regulatory authorities." | P | Agree in principle. See resolution in 11/YYYY |
| 2484 | 187.51 | 22.3.19.5.2 | "<4us" is a duplicate definition | Replace by a reference to 22.4.4 | A | Agree. See resolution in 11/YYYY |

**TGac editor: add as last paragraph in 22.3.19.2, as follows**

Measurement of adjacent channel rejection for 160 MHz operation in a regulatory domain is only required if such a frequency band plan is permitted in that regulatory domain.

**TGac editor: modify D1.0 P187L51, as follows**

With >90% probability, the PHY shall detect the start of a PPDU that occupies at least the primary 20 MHz channel under the conditions listed in Table 22-22 (Conditions for CCA BUSY on the primary 20 MHz) within a period of aCCATime (see 22.4.4) and hold the CCA signal busy (PHY\_CCA.indicate(BUSY, channel-list)) for the duration of the PPDU.

**Annex S**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 2524 | 242.37 | S.0 | My understanding of the valuable 11/517 is that it has a command line interface only, no GUI | Confirm and if so, delete "and graphic user i/f (GUI)"; exist->exists | P | Agree in principle. See resolution in 11/YYYY |
| 3167 | 242.37 | S.0 | I don't believe the VHT waveform generator has a GUI | change to "A command line interface is used to configure the tool. | A | Agree. See resolution in 11/YYYY |
| 2016 | 242.45 | S.1 | Is this section still needed? | Clarify | P | Agree in principle. Even though the new VHT waveform generator includes HT modes, it is still useful to leave information on the HT waveform generator to give people a reference to the older model specific to HT and configuration interface very similar to 19.2.2 TXVECTOR. The two subclauses have been combined. See resolution in 11/YYYY |

**TGac editor: modify clause S.0, as follows**

As an informative extension to this standard, waveform generator tools have been written to model the

PHY transmission process described in Clause 17 (Orthogonal frequency division multiplexing (OFDM)

PHY specification), Clause 18 (Extended Rate PHY (ERP) specification), Clause 19 (High Throughput

(HT) PHY specification) and Clause 22.

The waveform generators can be downloaded from the public IEEE 802.11 document website. The waveform generator code that includes Clause 17, 18, and 19 may be found in document 11-06/1715, and the waveform generator description may be found in document 11-06/1714 (HT code). A description of the waveform generator that includes Clause 17, 19, and 22 and the waveform generator code itself may be found in document 11-11/0517 (VHT code).

The purpose of these tools is to promote common understanding of complex PHY algorithms, facilitate device interoperability by providing reference test vectors, and assist researchers in industry and academia to develop next generation wireless solutions.

The code is written in the MATLAB computing language and can be configured to generate test vectors for

most PHY configurations, defined by this standard. Instructions on how to configure and run the Tool are specified in the referenced document.

A command line interface is used to configure the VHT code tool. For consistency with this standard, the configuration interface is made very similar to the TXVECTOR parameters defined in 22.2.2.

A command line interface and graphic user interface (GUI) exist to configure the HT code tool. For consistency with this standard, the configuration interface is made very similar to the TXVECTOR parameters defined in 19.2.2 (TXVECTOR and RXVECTOR parameters). The waveform generator tool produces test vectors for all transmitter blocks, defined in Figure 19-2 (Transmitter block diagram 1) and Figure 19-3 (Transmitter block diagram 2), generating reference samples in both frequency and time domains. Outputs of the tool are time domain samples for all transmitting chains.

**TGac editor: delete clause S.1**

**Intolerant Bit (MAC and Coex comments)**

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| 2863, 3353 |  | 8 | Do we need a "80 MHz intolerant" bit? | Clarify | D | Disagree. In 802.11n the concept of “40 MHz intolerance” was specific to the nature of 2.4 GHz band (primarily the issue of sharing the band with BT devices). See S.5.2 in 802.11REVmb D9.0, “An additional constraint on establishing a 20/40 MHz BSS includes the allowance for any IEEE 802.11  device to explicitly prohibit the operation of the 20/40 BSS mode due to other considerations. For example, if an IEEE 802.15.1 WPAN device is operating in the area, that device is likely to be unable to communicate successfully with a paired receiver if the number of available IEEE 802.15.1 WPAN channels falls below a given threshold. Operation of a 20/40 MHz BSS in the 2.4 GHz band can contribute to the reduction of the  number of available IEEE 802.15.1 WPAN channels, possibly pushing the available channels below that threshold.  To promote sharing of the spectrum resource under such circumstances, it might be desirable to prohibit the operation of a 20/40 MHz BSS…”  Since it is not necessary, “40 MHz intolerance” is not allowed in 5 GHz in 11n. See 10.15.11 in 802.11REVmb D9.0, “A STA 5G shall set the Forty MHz Intolerant field to 0 in transmitted HT Capabilities elements and 20/40 BSS Coexistence fields.” As such, it is not necessary to include “80 MHz intolerance” in 5 GHz in 11ac. |

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| 2505 | 196.32 | 22.4.2 | Can we include dot11PHYHTTable by reference to simplify this section? (akin to the mechanism used in TX/RXVECTOR) Ditto, can we include dot11TransmitBeamformingConfigTable by reference? | As in comment | D | Disagree. There are a few options in reformatting this table. We can reference dot11PHYHTTable and dot11TransmitBeamformingConfigTable from clause 19, however not all attributes in those tables are included in the VHT PHY MIB. In this case it would be necessary to call out exclusions, which seems clumsier than the current approach. Another option is to list all the attributes with references to their HT counterpart. This also seems clumsier than the current approach. |
| 2506 | 198.17 | 22.4.2 | These BF modes apply to VHT, and are a break from the past wrt 11n. Suggest create a new MIB table (e.g. dot11VHTTransmitBeamformingConfigTable) and populate it with the MIB variables from P198L17-L29 | As in comment | A | Agreed. |

**TGac editor: modify D1.0 Table 22-23 by inserting a row between** **dot11NumberCompressedBeamformingMatrixSupportAntenna and dot11SUBeamformerOptionImplemented; in this row insert the section heading “dot11VHTTransmitBeamformingConfigTable”**

**Capability bits**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resn Status** | **Resolution** |
| 3176 | 51.11 | 8.4.2.100.2 | Couple support for STBC between VHT and HT to simplify STBC interoperability | For example this could be achieved by using HT capabiilty for 2x1, 4x2 and VHT capability for 6x3 and 8x4 for RX. Similar for TX. | D | Disagree. Coupling of STBC capability between HT and VHT is complicated by the fact that 3x2 and 4x3 is not supported in VHT. |
| 3177 | 51.11 | 8.4.2.100.2 | Couple support for LDPC between VHT and HT to simplify LDPC interoperability | For example this could be achieved by using HT capabiilty and deleting the VHT capability bit. | D | Disagree. To reduce implementation complexity, it may be desired to support LDPC for lower rate HT MCS’s, while not supporting LDPC for higher rate VHT MCS’s. |