IEEE P802.11  
Wireless LANs

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| Tx/Rx Procedure and TXTIME Comment Resolution | | | | |
| Date: 31 March 2011 | | | | |
| Author(s): | | | | |
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Abstract

This document provides resolutions for CIDs 516, 517, 518, 521, 522, 520, 519, 536, 523, 524, 526, 527, 528, 531, 1316, 533, 534, 478, 96, 540, 543, 544.

511, 512, 514, 515, 673, 674

644

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| 516 | 22.3.21 | 146 | 14 | "A modulation rate change" is stale | A change in MCS and/or number of STSs | A | agree |

**TGac editor: modify D0.2 P145L1, as follows**

The encoding method is based on the FEC\_CODING, CH\_BANDWIDTH, NUM\_STS, STBC, MCS, and NUM\_USERS parameter of the TXVECTOR. A change in MCS and/or number of space-time streams , if any, is initiated starting with the SERVICE field data, as described in 22.3.2.

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| 517 | 22.3.21 | 146 | 23 | As written "PHY-TXSTART" is a state, but in reality it is a primitive that cannot be disabled. Ditto P146L29 | Replace by "PSDU transmission" or equivalent | A | agree |

**TGac editor: modify D0.2 P145L10--19, as follows**

Transmission can be prematurely terminated by the MAC through the primitive PHY-TXEND.request. PSDU transmission is terminated by receiving a PHY-TXEND.request. In single user transmission, normal termination occurs after the transmission of the final bit of the last PSDU octet, according to the number OFDM symbols indicated supplied in the N\_SYM field. Zero to seven bits are stuffed to make the C-PSDU length an integral multiple of the OFDM symbol length.

The packet transmission is completed and the PHY entity enters the receive state.

Each PHY-TXEND.request is acknowledged with a PHY-TXEND.confirm primitive from the PHY.

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| 518 | 22.3.21 | 147 | 30 | "Non-VHT Preamble" and "VHT-Training" are not defined | Change to L-STF and L-LTF, and VHT-LTFs. Ditto P147L18, P148L22, P151L29 | P | Agree in Principle. Change to “non-vht training symbols” and “vht training symbols” |

**TGac editor: modify D0.2 Fig22-21, as follows**



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| 521 | 22.3.21 | 148 | 6 | "and encoding" looks out of place | "Get encoding (bits per symbol)" probably makes sense but belongs at SETUP MPDU TX | P | Agree in principle. Modified to “…and scramble and encode”. Also modified “TX PLCP Data” box wrt CID 516. |
| 522 | 22.3.21 | 148 | 28 | "decrement bit count by bits per symbol" should be "Decrement bit count by 8" | As in comment | A | Agree |
| 520 | 22.3.21 | 148 | 35 | "N\_Sym > 0" should be "N\_Sym >0 or Bit\_Count > 0 | As in comment | P | Agree in principle. Changed “Decrement bit” to return to “TX PSDU OCTET” when bit count > 0 |
| 519 | 22.3.21 | 148 | 53 | "Set length count" - should be "symbol count"? | As in comment | A | Agree |

**TGac editor: modify D0.2 Fig22-22, as follows**



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| 523 | 22.3.22 | 149 | 13 | Subject not clear | Upon the PMD receiving … | A | Agree |
| 524 | 22.3.22 | 149 | 14 | Subject not clear | is indicated by the PLCP to the MAC | A | Agree |

**TGac editor: modify D0.2 P147L7, as follows**

Upon the PMD receiving the transmitted PLCP preamble, PMD\_RSSI.indication shall report a receive signal strength to the PLCP. This activity is indicated by the PLCP to the MAC via a PHY-CCA.indication.

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| 536 | 22.3.22 | 149 | 10 | "VHT-SIGA in order to set the max duration" yet SIGA doesn't help here | Delete VHT-SIGA | A | Agree. (Comment refers to P149L24.) |

**TGac editor: modify D0.2 P146L18, as follows**

After the PHY-CCA.indication(BUSY, channel-list) is issued, the PHY entity shall begin receiving the training symbols and searching for L-SIG in order to set the maximum duration of the data stream.

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| 526 | 22.3.22 | 150 | 14 | Equation is missing TLSIG | Add | A | Agree. |

**TGac editor: modify D0.2 P146L18, as follows**



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| 527 | 22.3.22 | 150 | 22 | Should use named bits, rather than bit positions | Name fields; ditto P150L30 and P150L32 | D | Disagree. Names in the the Table 22-9 are given for fields. Fields cover multiple bits. However in many cases the individual bits in a field has different purposes. Lets look at the Coding field as an example. It contains bits B2 and B3. Bit B2 indicates BCC or LDPC for SU. B3 indicates extra symbol for LDPC. The only way to identify this different information is by bit number. |
| 528 | 22.3.22 | 150 | 24 | "coding bit" but there are two coding bits in SU, and more for MU | Update text to latest SIGA definition, using named fields | P | Agree in Principle. Change coding bit to “indicate type of coding” |

**TGac editor: modify D0.2 P148L14, as follows**

In case of SU transmissions, B2 of VHT-SIG-A2 indicates the type of coding. The PHY entity shall use an LDPC decoder to decode the C-PSDU if this bit is set to 1, otherwise a BCC decoder shall be used. In case of MU transmissions, B2, B4, B5 and B6 of VHT-SIG-A2 indicate the type of coding for user 1, 2, 3 and 4, respectively. The PHY entity shall use an LDPC decoder to decode the C-PSDU for the respective user if its bit for its C-PSDU is set to 1. A BCC decoder shall be used otherwise. When an LDPC decoder is to be used, *Npld* can be computed by Equation (22-47) using *NSYM**init* obtained from Equation (22-82).

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| 531 | 22.3.22 | 150 | 43 | "intended end" is vague - insert "Determined by (22-80) | As in comment | A | Agree. |

**TGac editor: modify D0.2 P148L33, as follows**

If signal loss occurs during reception prior to completion of the PSDU reception, the error condition PHYRXEND.

indication(CarrierLost) shall be reported to the MAC. After waiting for the end of the PSDU as determined by Equation (22-80), the PHY shall set PHY-CCA.indication(IDLE) and return to RX IDLE state.

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| 1316 | 22.3.22 | 151 | 15 | The C-PSDU less the tail bits is not necessarily a whole number of octets. 0-7 padding bits may need to be removed. | Show removal of padding bits after tail bits. | A | Agree. Changed “Tail Bits  (if BCC used)” to “Pad and Tail Bits in Fig 22-23 |
| 533 | 22.3.22 | 151 | 19 | Diagram does not show dropping of pad bits | Add | A | Agree. Changed “Tail Bits  (if BCC used)” to “Pad and Tail Bits in Fig 22-23 |
| 534 | 22.3.22 | 151 | 26 | PMD\_CHAN\_MAT.ind should occur after VHT-training | Move | A | Agree. |

**TGac editor: modify D0.2 Fig22-23, as follows**



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| 478 | 22.3.22 | 152 | 1 | Figure is silent on special processing arising from partial AID | Add | P | Agree in Principle. “Special processing” at the receiver based on partial AID is optional. Many optional features are not depicted in Figure 22-24. Modified note that the state machine does not describe operation of this optional feature. |
| 96 | 22.3.22 | 152 | 23 | The reference section for non-HT PPDUs in 2.4GHz band is not needed because the specifications in Clause 22 is only for 5GHz transmission. | Delete "or 19.3.6" in Figure 22-24. | A | Agree |
| 540 | 22.3.22 | 152 | 34 | VHT-SIGA => Unsupported mode but text refers to "Reserved VHT-A Indication" | Harmonize the language | P | Agree in Principle. Text DOES refer to unsupported modes. An unsupported modes would be, for example, 2 spatial streams being received by a single stream –only capable devices. Reserved VHT-SIG-A indication is essentially an error in the sig field, e.g. reserved bit with wrong polarity. Added Reserved VHT-SIG-A indication to figure. |
| 644 | 22.3.22 | 149 | 46 | TR | Should we consider adding 'ceil()' around (L\_LENGTH + 3) / 3? | P | Agree in Principle. Refer to discussion and resolution in 11/492 |

Discussion on CID 644:

The current Equation (22-80)

  
results in RXTIME which is not a multiple of 4 us when L\_LENGTH is not a multiple of 3, which is different from what an 11a device would do. For example, when L\_LENGTH = 31 with rate = 6 Mbps, an 11a receiver would assume that there are 12 OFDM symbols (using 800 ns GI) after L-SIG. Effectively, the 11a receiver would be demodulating (and not transmitting) for 12 \* 4 us = 48 us. The Equation (22-80), however, results in an 11ac receiver to defer for only 45.33 us after L-SIG.

While it is true that 11ac transmitters shall set L\_LENGTH to be multiple of 3 (Equation (22-14)), it may be possible that some future 802.11 amendments would make use of L\_LENGTH values which are not multiple of 3. Hence, it would be prudent to modify Equation (22-80) to



for compatibility with potential future enhancements in 802.11.

Furthermore we should clarify in the receive procedure what happens if the VHT PHY receives a packet that is determined to be a valid 802.11 signal and has a valid L-SIG parity bit but an L\_LENGTH is not a multiple of 3. If the field following L-SIG is not HT-SIG or VHT-SIG-A, the receive procedure currently refers to 17.3.4. In this case, 17.3.4 (11a receive procedure) states that the PHY shall ensure that CCA is busy based on the duration. If its determined that VHT-SIG-A follows L-SIG, this additional error condition is added to the list in which the PHY still defers based on RXTIME in Eq. 22-80.

**TGac editor: modify D0.2 Eq 22-80, as follows**

(#644) (22-80)

**TGac editor: modify D0.2 P147L27, as follows**

If a valid L-SIG parity bit is indicated, the VHT PHY shall maintain PHY-CCA.indication(BUSY, channel-list) for the predicted duration of the transmitted frame, as defined by RXTIME in Equation (22-85), for all supported modes, unsupported modes, Reserved VHT-SIG-A Indication, invalid VHT-SIG-A CRC, and invalid L-LENGTH value. Invalid L-LENGTH is defined as a value not following Equation (22-14).

**TGac editor: modify D0.2 P147L38, as follows**

If the VHT-SIG-A indicates an invalid CRC or Reserved VHT-SIG-A Indication or if L-LENGTH is invalid, the PHY shall issue the error condition PHY-RXEND.indication(FormatViolation).

**TGac editor: modify D0.2 Fig22-23, as follows**



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| 543 | 22.4.3 | 154 | 35 | This section is to determine TXTIME, so we don't need definitions, we need equations/values. Thus refer to Section 22-5 not table 22-5 | Change references at P154L35, P154L37, P154L65, P155L2, P155L19, L155L40, P155L42 (also the latter needs clarification for MU) | D | Disagree. The transmitter has all these values already. The pointers are to make it easier for the reader to find the definitions for all the parameters. Same thing was done in 11n. |
| 544 | 22.4.3 | 154 | 45 | using is | using BCC is | P | Agree in principle. Eq 22-51 is for both BCC and LDPC. This seems to have been a grammatical mistake, therefore deleted “using” |

**TGac editor: modify D0.2 P152L32, as follows**

The total number of data symbols in the data portion of the packet, *NSYM*, for a MU packet is given by Equation (22-51).

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| 511 | 22.3.21 | 145 | 49 | What happens if this second option is selected? Nothing seems to be said | Define | P | Agree in principle. Modified text to refer to Clause 20 as in 11/490 |
| 512 | 22.3.21 | 145 | 47 | Seems to needs some mandatory language here | "shall be selected". Also "option" is perhaps the wrong word here - try "sub-procedures" or "sequences" | D | Disagree. This is the same language as in 11n. |
| 514 | 22.3.21 | 145 | 62 | "Note under some circumstances" is vague - needs a reference (and should be most circumstances rather than some circumstances, with a SIFS transmission/response as the main exception?) | As in comment | D | Disagree. This is the same language as in 11n. |
| 515 | 22.3.21 | 145 | 64 | Subject of actin is not clear | shall be initiated by the PLCP | A | Agree. |
| 673 | 22.3.21 | 145 | 61 | What are the circumstances to use the latest value of PHY-CCA? | Please clarify | D | Disagree. This is the same language as in 11n. However, the circumstances include the condition during backoff prior to accessing the medium. |
| 674 | 22.3.21 | 145 | 62 | What is the lastest PHY-CCA.indication? How old it may be and how often it is updated | Please clarify | D | Disagree. This is the same language as in 11n. However, the lastest PHY-CCA.indication is determined from the PHY continuously  evaluating CCA during  backoff prior to the MAC accessing the medium. |

**TGac editor: modify D0.2 P144L33, as follows**

The second option is to follow the transmit procedure in Clause 20 if the FORMAT field of PHY-TXSTART.request(TXVECTOR) is set to HT\_MF or HT\_GF or NON\_HT.

**TGac editor: modify D0.2 P144L49, as follows**

Transmission of the PPDU shall be initiated by the PLCP after receiving the PHYTXSTART.request(TXVECTOR) primitive.