IEEE P802.11  
Wireless LANs

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| REVmd SB1 PHY CR—CIDs 4232, 4233, 4448, 4459, 4548 | | | | |
| Date: 2020-04-22 | | | | |
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Abstract

Resolutions for REVmd SB1 comments on various PHY topics: 4232, 4233, 4448, 4459, 4548.

Change history:

r0 (2020-04-22): Initial draft.

## Comments 4232, 4233

(PHY-SEC Legacy PHY comment group)

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| **CID** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 4233 | Mark Rison | 2959.38 | 7.3.10.6 | "The start of (#2601)an OFDM transmission at a receive level greater than or equal to the minimum  modulation and coding rate sensitivity (-82 dBm for 20 MHz channel spacing, -85 dBm for 10 MHz  channel spacing, and -88 dBm for 5 MHz channel spacing) shall " -- the parenthesis is duplication | Replace the material in the parenthesis with "see 17.3.10.2 Receiver minimum input sensitivity". Since the same requirement applies to any OFDM modulation and coding, change the cited text to start "The start of (#2601)an OFDM transmission at a receive level greater than or equal to the minimum  modulation and coding rate sensitivity across all modulations and codings (". Make similar changes in other places where similar duplication occurs: "rate sensitivity (-82 + 20 = -62 dBm) in the 20 MHz channel.", "10 dB (-72 dBm for 20 MHz, -69 dBm for 40 MHz).", "The start of a DMG SC mode transmission at a receive level greater than the minimum sensitivity for MCS 1 (-68 dBm)", "coding rate sensitivity (-82 + 20 = -62 dBm)", "coding rate sensitivity (-88 + 20 = -68 dBm in", "a threshold (-68 dBm for 6 MHz," + 4 more in same subclause, "the minimum sensitivity for MCS 1 (-71 dBm)", "sensitivity for CMMG control mode (-78 dBm)", "The start of a CMMG SC mode transmission at a receive level greater than the minimum sensitivity for  MCS 0 (-74 dBm for 540 MHz, -71 dBm for 1080 MHz)", "The start of a CMMG OFDM mode or CMMG SC mode transmission at a receive level greater than  the minimum sensitivity for MCS 0 (-74 dBm for 540 MHz" |

## Discussion for 4232, 4233

Comment 4232 is identical to comment 4233, except that the proposed resolution is truncated after “(“.” at the end of the fifteenth line in the table above. It seems there was some sort of glitch, and that really there is only one comment that was submitted twice.

The clause number given is incorrect: it should be 17.3.10.6.

The cited text in Clause 17 has been stable for a very long time: the basic structure goes back to 802.11a, which was approved in September 1999, and the only changes since then were the modifications for 10 MHz and 5 MHz channels added by 802.11j, which was approved in September 2004. Even when subsequent amendments that defined PHYs for the 5 GHz band added variations on the Clause 17 definition, no change was made to Clause 17 itself in the amendments or in subsequent rollups.

As far as Clause 17 is concerned, the meaning would be the same with or without the proposed change. It seems that any conceivable gain in making the change (which would, at best, be vanishingly small) is more than offset by setting a precedent of reopening long-settled text. The proposed resolution is therefore that we should leave well enough alone.

In the other cited clauses, the extra information provided for a prospective implementer seems to be enough to offset any concerns about avoiding duplication. For these sections, too, there is little danger that drafters of future amendments will find it difficult to maintain the text.

## Proposed resolution for 4232, 4233

REJECTED. In each section cited by the commenter’s proposed resolution, the current text is not incorrect and it violates no style requirement.

## Comment 4448

(PHY-SEC HT-VHT comment tab)

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| **CID** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 4448 | Mark Rison |  |  | "at the output of the antenna connector" -- an antenna has no IO | Change to "at the transmit antenna connector" throughout (5x) |

## Discussion for 4448

The cited text appears at 920.22 (9.4.1.19 Max Transmit Power field), 920.41 (9.4.1.20 Transmit Power Used field), 1380.17 (9.4.2.190 S1G Open Loop Link Margin Index element), 1525.5 and 1525.8 (both 9.6.6.4 Link Measurement Request frame format).

“Antenna connector” is defined at 157.45. It is a “measurement point of reference for [] RF measurememts”. It is “the point in the STA architecture that is … the input of the antenna (output of the transmitter) for radio transmission.”

(Where should the measurement be made? The antenna connector. And what is the antenna connector? It’s where measurements should be made.)

The commenter is correct that the “output” of an antenna connector is not defined.

In physical implementations, it may be that there is no obvious point in the device that separates ‘antenna’ from ‘not antenna’. The current definition of “antenna connector” works well in this case: in essence there is a virtual or infinitesimal connector that links the “output of the transmitter” (output of the ‘not antenna’ part) to the “input of the antenna”. Since the virtual or infinitesimal connector changes nothing, it doesn’t matter whether we make a measurement at the output of the ‘not antenna’ part or the input of the ‘antenna’ part: they are essentially the same point.

Alternatively, there might be some physical component that connects the antenna to the rest of the device. In this case, various issues involving impedance matching, power transfer, and other electrical issues come into play. A given measurement might give different results if made on the antenna side of the antenna connector physical component than if it is made on the other side of the antenna connector physical component. In such cases, it might not enough to specify that the measurement is made “at the transmit antenna connector”, as the commenter’s proposed resolution suggests: some additional information might need to be provided. It seems that in each of the five places cited, the current text is specifying one side of the antenna connector. In context, the ‘output’ of the antenna connector seems to mean the antenna side of the antenna connector. The term “input to the antenna” is used in various places and seems to be adequate to express the idea.

## Proposed resolution for 4448

REVISED. At 920.22, 920.41, 1380.17, 1525.5 and 1525.8, change “output of the antenna connector” to “the antenna connector (input to the antenna)”.

## Comment 4459

(PHY-SEC HT-VHT tab)

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| **CID** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 4459 | Mark Rison | 3318 | 22.5 | There is no question that TVHT might use signal extension (VHT doesn't) | Delete the aSignalExtension row in Table 22-25--TVHT PHY characteristics |

## Discussion for 4459

SIFS is 10 ms in all PHYs in the 2.4 GHz band, and is 16 ms for all PHYs in the 5 GHz band. When 11g was developed, this presented a potential problem for the OFDM modes newly added in the 2.4 GHz band: it was not considered reasonable to force receivers to process OFDM PPDUs in 10 ms. The solution that was adopted was for transmitters to add 6 ms of non-information-carrying transmission at the end of OFDM PPDUs in the 2.4 GHz band. In that way, it was possible to keep SIFS at 10 ms, and still give receivers the same time to process an OFDM PPDU that they would have at 5 GHz, since they could start the process at the beginning of the signal extension. Later the 6 ms of non-information-carrying transmission was changed to 6 ms of no transmission. So now transmitters send OFDM PPDUs in the same format in 2.4 GHz and 5 GHz, and are silent for 16 ms after that. The difference is that in the 2.4 GHz band, the silence is composed of 6 ms of signal extension and 10 ms of SIFS, while in the 5 GHz band, the silence is composed of 16 ms of SIFS.

Only PHYs operating in the 2.4 GHz band use signal extension.

For HT in the 5 GHz band, aSignalExtension = 0 ms (cf. Table 19-25 (HT PHY characteristics), 3079.9). Though HT PHYs in the 5 GHz band do not “use signal extension”, aSignalExtension is nevertheless defined.

For VHT PHYs, “[t]he static VHT PHY characteristics, provided through the PLME-CHARACTERISTICS service primitive, shall be as shown in Table 19-25 (HT PHY characteristics) unless otherwise listed in Table 21-29 (VHT PHY characteristics)” (3255.12). Table 21-29 does not otherwise list aSignalExtension, so aSignalExtension is defined and is equal to 0 s for VHT.

For TVHT PHYs, “[t]he static TVHT PHY characteristics, provided through the PLME-CHARACTERISTICS service primitive, shall be as shown in Table 19-25 (HT PHY characteristics)” (3317.43). This does not define aSignalExtension, because Table 19-25 only defines aSignalExtension for the 2.4 GHz and 5 GHz bands.

For consistency with VHT, TVHT should define aSignalExtension (and, of course, should set it to 0 ms). This can be done by modifying the TVHT text cited above to match the VHT text. Note that, as is, Table 22-25 is orphan text: it appears in the table of contents and on page 3318, but is not referred to anywhere else, so this text needs to be changed anyway.

## Proposed resolution for 4459

REVISED.

At 3317.43, after “The static TVHT PHY characteristics, provided through the PLME-CHARACTERISTICS service primitive, shall be as shown in Table 19-25 (HT PHY characteristics)” add “unless otherwise listed in Table 22-25 (TVHT PHY characteristics)”.

## Comment 4548

(11-19-2156-06 All SB1 comments tab)

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| **CID** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 4548 | Mark Rison |  |  | Sometimes the signal extension is part of the PPDU (or "frame" or "packet"), sometimes it's after. The correct answer is that it's part of the PPDU | Fix 2974.50 "For ERP-OFDM modes, an ERP packet is followed by a period of no transmission with a duration of  aSignalExtension called the signal extension.", 2998.14 "Transmissions of frames with the TXVECTOR parameter(#2639) NO\_SIG\_EXTN equal to false are  followed by a period of no transmission for a duration of aSignalExtension." |

## Discussion for 4548

The comment is correct. Cf. 10.3.8 (Signal extension) (1769.56): “Transmissions of frames [of relevant type] include a period of no transmission of duration aSignalExtension”.

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## Proposed resolution for 4548

REVISED.

At 2974.50, change “For ERP-OFDM modes, an ERP packet is followed by a period of no transmission with a duration of aSignalExtension called the signal extension” to “For ERP-OFDM modes, an ERP PPDU is terminated by a period of no transmission with a duration of aSignalExtension called the signal extension”.

At 2998.14, change "Transmissions of frames with the TXVECTOR parameter NO\_SIG\_EXTN equal to false are terminated by a period of no transmission for a duration of aSignalExtension."

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