IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LB234 Channel Aggregation CIDs | | | | |
| Date: 2018-10-24 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Assaf Kasher | Qualcomm |  |  | akasher@qti.qualcomm.com |
| Alecsander Eitan | Qualcomm |  |  | eitana@qti.qualcomm.com |
| Solomon Trainin | Qualcomm |  |  | strainin@qti.qualcomm.com |

Abstract

This document proposes resolution to 3 11ay LB234 CIDs – 3191, 3192, 3192

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3191 | 375.00 | 4 | 29.3.3.3.2.2 | "For 2.16+2.16 GHz PPDU transmission, the first NTX/2 transmit chains shall be used for transmission on the primary channel and the second NTX/2 transmit chains shall be used for transmission on the secondary channel. For 4.32+4.32 GHz PPDU transmission, the first NTX/2 transmit chains shall be used for transmission on the primary and secondary channels and the second NTX/2 transmit chains shall be used for transmission on the secondary1 and secondary2 channels." The Second and Third sentences are behavioral and should not be part of header fields description. They should be removed | Remove these two sentences (move to 29.4.7.3.3) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3192 | 415.00 | 29.4.7.3.3 | It is not clear what wave form should be used in each band in 2.16+2.16 and 4.32+4.32. Is it the same waveform or different waveform. This is the place to connect between bands, transmit chains and TRN wavefomrs | Define which waveform is transmitted in each of the bands of 2.16+2.16. Is it the same or different, and if several transmit chains are assigned, what is the order of assignment of waveforms to bands and transmit chains |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3193 | 466.00 | 29.5.10.4.4.4 | It is not clear what wave form should be used in each band in 2.16+2.16 and 4.32+4.32. Is it the same waveform or different waveform. This is the place to connect between bands, transmit chains and TRN wavefomrs | Define which waveform is transmitted in each of the bands of 2.16+2.16. Is it the same or different, and if several transmit chains are assigned, what is the order of assignment of waveforms to bands and transmit chains |

Proposed Resolution: **Revised**

**Discussion:**

The assignment of aggreagated channels to transmit chains in the standard, is a bit opaque, especially when it comes to modulation formulas. We propose to clarify it using the formula exaplaining how the signal is modulated to RF. This formula is missing from the draft although it exists in most PHY clauses. We add the clause to describe it and propose minor fixes to some other formula. The text in channel header section will be modified by replacing “shall” with “are” to make it less normative.

***TGay Editor: isnert the following subclause after 29.3.3.2 P 370L16:***

**29.3.3.3 Mathematical Description of Signals**

**29.3.3.3.1 General**

The transmitted signal is described in complex base-band signal notation. The actual transmitted signal in the transmit chain is related to the complex baseband signal by the following relation:

Where is the center frequency of the carrier.

The trasmitted signal is generated by modulating the complex baseband signal which consists of the fields defined in 29.3.2.1 (General) and 29.3.2.1 (EDMG A-PPDU format). The waveform is defined for various SC and control mode frame formats in 29.4.7.7.2, 29.4.4.7.3.4, 29.4.7.3.5, 29.5.10.3.1, 29.5.10.4.4.5 and 29.5.10.4.5.5. The wave form is define in 29.6.10.3.3 and 29.6.10.4.3 for OFDM signals.

**29.3.3.3.2 Channel Aggregation**

If the PPDU is a channel aggregation PPDU (TXVECTOR parameter CHANNEL\_AGGREGATION set to AGGREGATE) the number of transmit chains is even and the lower indices transmit chains are transmitted in the primary channel (primary+secondary for 4.32+4.32GHz transmission) and the higher indices transmit chains are transmitted in the secondary channel (secondary1+secondary2 for 4.32+4.32GHz transmission). In this case the transmitted signal is:

Where is the center frequency of the primary channel (primary+secondary in 4.32+4.32GHz transmission), and is the center frequency of the secondary channel (secondary1+secondary2 in 4.32+4.32GHz transmission).

***TGay Editor: Modify the formula in P458L6 as follows:***

***TGay Editor: Modify the formula in P458L14 as follows:***

***TGay Editor: Modify the formula in P459L1 as follows:***

***TGay Editor: Modify the formula in P459L8 as follows:***

***TGay Editor: Modify the text in P379L3-8 as follows:***

For 2.16+2.16 GHz and 4.32+4.32 GHz PPDU transmission, the total number of transmit chains, *NTX*, is an even number. For 2.16+2.16 GHz PPDU transmission, the first *NTX*/2 transmit chains are used for transmission on the primary channel and the second *NTX*/2 transmit chains are used for transmission on the secondary channel. For 4.32+4.32 GHz PPDU transmission, the first *NTX*/2 transmit chains are used for transmission on the primary and secondary channels and the second *NTX*/2 transmit chains are used for transmission on the secondary1 and secondary2 channels

***TGay Editor: Add the following text at P456L15***

* Channel Aggregation. In this case is an even number. The spatial mapping matrix has a block structure in which space time streams 1 through are assigned to transmit chains 1 through (transmit chains of the primary or primary+secondy channels) and space time streams through are assigned to transmit chain (transmit chain of the secondary or secondary1+secondary2 channels).

***TGay Editor: in P448L6 and P500L8 replace “BRP PPDU” with “BRP Packet”***

**SP**

Do you agree to accept the resolution of CIDs 3191, 3192, 3193 as specified in 11-18-1788-00-00ay-LB234-Channel-Aggregation-CIDs into the spec draft?

**References:**

**[1] Draft P802.11ay\_D2.1**