IEEE P802.11
Wireless LANs

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| Comment resolutions for transmit block diagrams |
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Abstract

This document proposes resolutions for the transmit block diagrams in section 22.3.3.

Revision History

R0: Iinitial version.

Notes on this document:

* Comments are from: 11-11-0907-04-00ac-lb178-comments-tgac-d1-0.xls
* Comments refer to: Draft P802.11ac\_D1.0. pdf
* In providing instruction for spec editing, the following conventions are used.
	+ Red text indicates changes to be applied to existing text in Draft P802.11ac\_D1.0.pdf.
	+ Text in blue is text copied from the Draft P802.11REVmb\_D8.0.pdf that was not shown in the 11ac draft and that need be added to the draft, with the modifications shown in green.
	+ Text in black is unmodified text from Draft P802.11ac\_D1.0.pdf.
	+ Italic light gray text indicates instruction to the editor.

Proposed Resolutions

* **Comments related to the block diagram for VHT-SIG-B field (CID 2299 and 2962)**

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| 2299 | Gong, Daning | 22.3.3 | 119 | 54 | T | There is lack of figures to show the transmitter block diagrams of the following cases: 1) VHT-SIG-B field in MU packet using one frequency segment; 2) VHT-SIG-B field in SU packet using two frequency segments; 3) VHT-SIG-B field in ~~SU~~ MU packet using two frequency segments | Suggest to add the corresponding figures and explanations. | Agree in principle. See resolution in 11/1009r0.  | PHY |
| 2962 | Luo, Zhendong | 22.3.3 | 119 | 54 | T | As described in 22.3.8.2.6, the VHT-SIG-B bits for 40/80/160/80+80 MHz channels are the repetition of a basic VHT-SIG-B bit sequence with some padded zeros. Therefore, if BW > 20 MHz, the current construction of Figure 22-3 will lead to multiple redundant BCC encoding operations on the basic VHT-SIG-B bit sequence, and thus significantly increase the complexity of generating VHT-SIG-B. | Delete the block "VHT-SIG-B Bit repetition if BW > 20 MHz" and insert two blocks between "BCC encoder" and "BCC interleaver". The first block is "Coded VHT-SIG-B Bit Repetition if BW > 20 MHz", and the second block is "Zero Padding if BW > 40 MHz". | Counter. See resolution in 11/1009r0.  | PHY |
| 2999 | Luo, Zhendong | 22.3.3 | 119 | 54 | T | The current construction in Figure 22-3 will lead to multiple redundant BCC encoding operations, and thus increase the complexity of generating VHT-SIG-B significantly. | Move the block "VHT-SIG-B Bit repetition if BW > 20MHz" to the position following the block "constellation mapper". Then, some extra operations such as BCC encoder, interleaver, and constellation mapping can be avoided, and the complexity can be reduced significantly. | Counter. See resolution in 11/1009r0. | PHY |

**Discussion:**

(CID 2299)

VHT-SIG-B field is defined to indicate Length and MCS information for each STA of DL MU PPDU. Ttherefore, as the comment suggested, the transmit block diagram for VHT SIG-B field in MU packet should be added. To add the block diagrams for the cases of two frequency segment is redundant because VHT-SIG-B information on secondary segment is completely identical to that on primary segment.

(CID 2962, 2999)

As the comment suggested, one possible implementation for repetition of VHT-SIG-B information is done at the output of BCC encoder function, which will reduce BCC encoding operations. To add some notes will be helpful information. On the other hands, current transmit block diagram for VHT-SIG-B suggests that the repetition VHT-SIG-B information is done on information bit basis. This configuration is straitforward approach from the definition of VHT-SIG-B field and suitable for a typical example. Therefore, there is no need to change Figure 22-3.

Instead, a note can be added to suggest that an alternative transmit block configuration for VHT-SIG-B bit repetition.

**Proposed response to CID 2299**:

***Add the following figure for the transmit block diagram of VHT-SIG-B for MU Case on P120L1 and revise the numbers of Figure 22-4 through Figure 22-7 accordingly:***



**Figure 22-4- Transmit block diagram 3 (VHT-SIG-B field in MU packet using one frequency segment)**

**Proposed response to CIDs 2962 and 2999**:

***Add the following note to the bottom of Figure 22-3:***

Note:

* “VHT-SIG-B Bit Repetition” function may also be done at the output of BCC Encoder block.

* **A comment related to the pilot insertion function for block diagrams (CID 2913)**

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| 2913 | Liu, Siyang | 22.3.3 | 119 | 39 | T | There is no pilot insertion block in Figures 22-2 through 22-7. | Need to add the pilot insertion block in these figures. | Disagree. See the discussion below.  | PHY |

**Discussion:**

As the comments point out, Figures 22-2 through 22-7 do not have pilot insertion function. It follows the existing transmit block diagrams for non-HT and HT PPDUs in REVmb D8.0:

* Figure 17-12 for trasmit block diagram of non-HT PPDU
* Figure 19-2 for non-HT portion of HT PPDU
* Figure 19-3 for HT portion of HT PPDU

Section 22.3.4 mentions that the pilot insertion functions are included in other blocks. For example, in L-SIG, “IDFT” block does include iplot insertion function.

22.3.4.3 Construction of L-SIG

“e) IDFT: Insert pilots. ...”

Therefore, it should not be added pilot insertion blocks on Figures 22-2 through Figure 22-7 for consistency between the block diagrams of VHT packets and ones of non-HT or HT packets.

**Proposed response to CID 2913**:

Disagree.

* **Comments for 80+80MHz transmit block diagram (CID 2369, )**

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| 2054 | Asai, Yusuke | 22.3.3 | 123 | 26 | T | This diagram suggests that two analog and RF blocks are used to generate single 80+80 MHz spatial streams, but the configuration of transmitter is implementation dependent. | Please add some notes. | Accept: See resolution in 11/1009r0. | PHY |
| 2055 | Asai, Yusuke | 22.3.3 | 123 | 26 | T | This diagram may cause misunderstanding that a STA should have two antennas per single 80+80 MHz spatial stream because there are two RF chains per single 80+80 MHz spatial stream. | Add a coupler block to merge two RF signals of frequency segments per 80+80 MHz spatial stream. | Accept: See resolution in 11/1009r0. | PHY |
| 2056 | Asai, Yusuke | 22.3.3 | 123 | 32 | E | Add "…" between the arrows of the inputs of 2nd and 3rd IDFT blocks. | As in comment. | Accept: See resolution in 11/1009r0. | (Ed) |

**Discussion:**

(CID 2054)

Current Figure 22-7 shows one of the most typical implementation examples of 80+80 MHz transmitter because of the following reasons:

* In 80+80 MHz non-contiguous transmission, the channel center frequency difference between two frequency segments depends on the condition of available channels. To use an RF block per frequency segment, it is quite easy to adjust each frequency segment on any channel number.
* The configuration of two RF blocks per spatial stream limits that maximum bandwidth of each frequency segment to 80 MHz. It will reduce the cost of analog RF blocks. If single RF block per spatial stream is used, each RF block must support at least 320 MHz of bandwidth because minimum frequency difference between two frequency segments is 240 MHz for 80+80 MHz transmission. This makes quite difficult to comply spectfum flatness requiments defined in table 22-19.

However, whether a transmitter uses one or two RF blocks per spatial stream should be specified as implementation-dependent.

(CID 2055)

Two output signals of Analog and RF blocks shall be merged to one. Figures 22-2 to 22-6 implys that output signals of Analog and RF blocks are input signals of antennas. Figure 22-7 may mislead that a transmitter shall have two antennas per frequency segment. Therefore, the two signals for a spatial stream should be merged to one output.

(CID 2056)

Figure 22-7 should involve the cases when there are three or more spatial streams; therefore, an ellipsis between IDFTs is needed.

 **Proposed response to CID 2054**:

***Add the following note on the bottom of figure 22-7: (P123L3)***

Note:

* Single Analog and RF block per spatial stream may also be applied.

**Proposed response to CIDs 2055 and 2056**:

***Replace Figure 22-7 to the following: (P123L3)***



**Figure 22-7 – Transmit block diagram 6 (Data field in an SU packet for non-contiguous 80+80 MHz)**

* **A comment for block liss (CID 2369)**

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| 2369 | Hart, Brian | 22.3.3 | 119 | 21 | T | "Duplicate over multiple …" block is not listed in bullet summary on P118/119. Ditto P119L49 "Multiply by 1st …" | Add | Accept: See resolution in 11/1009r0.  | PHY |

**Proposed response to CID 2369**:

***Change section 22.3.3 as follows: (P118L65)***

h) Constellation mapper

i) Dupliate over multiple 20 MHz (if BW > 20MHz)

j) Multiply by 1st column of [P]u

~~i)~~ k) LDPC

...

s) Windowing

* **A comment for the block diagram of the Data field in an SUpacket (CID 2213)**

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| 2213 | Dehghan, Hossein | 22.3.3 | 120 | 41 | T | Figure shows 2 FEC encoders. Add ellipsis to indicate that the number of encoders is variable. |  | Accept: See resolution in 11/1009r0.  | PHY |

**Discussion**

The note of Figure 22-4 mentions that “There may be 1 to 12 FEC encoders when BCC eocoding is used.” However, Figure 22-4 limits the number of FEC encoder is two because of lack of an ellipsis.

**Proposed response to CID 239 and 1805**:

***Change the Figure 22-4 as follos: (P120L4)***



**Figure 22-4 – Transmitter Block diagram 3 (Data field in an SU packet using one frequency segment)**