­IEEE P802.11  
Wireless LANs

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| Comment Resolution for CID 2183 (PHY Data Field Other) | | | | |
| Date: 2016-05-16 | | | | |
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Abstract

This document contain comment resolutions for CID 2183, corresponding to sections 26.3.10.7. However, complete resolution of CID 2183 requires additional updates to sectsion 26.3.9.7.4, section 26.3.9.8.1.2, and section 26.3.10.14.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

# CID for Section 26.3.10.7

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number(C)** | **Page(C)** | **Line(C)** | **Comment** | **Proposed Change** | **Resolution** |
| 2183 | Tianyu Wu | 26.3.10.7 | 142 | 21 | The BCC interleaver parameters for DCM modulations are not defined. No interleaver designed for DCM+BPSK and interleaver for DCM with other modulations are also not clear. | Define BCC interleaver parameters for DCM modulations. | Revised.  Baed on passed PHY motion #156, copy the BCC interleaver table for DCM cases in 11-16/0621r0 into section 26.3.10.7 and provide appropriate text to the added interleaver parameter tables. Additionally, add the BCC interleaver parameters for HE-SIG-A and HE-SIG-B without DCM as same as BCC interleaver paremter for 20MHz VHT data field.  Correct the text referencing the interleaver parameter for HE-SIG-A and HE-SIG-B in section 26.3.9.7.4 and 26.3.8.1.2. Correct the text referencing the DCM interleaver parameter in section 26.3.10.14.  *TGax Editor*: make changes for section 26.3.9.7.4, 26.3.9.8.1.2, 26.3.10.7, and 26.3.10.14 as in 11-16-0816-00-00ax CR-for-CID-on-PHY-data-field-other |

**Discussion:**

Section 26.3.10.7:

* Include the interleaver sizes for DCM case which was agreed in PHY motin #156.
* The proposed changes are specified on top of 11ax D0.2.
* It should be noted that there was no formal agreement on the interleaver parameter for HE-SIG-B without DCM. However, 11ac 20MHz BCC interleaver is perfect fit. Therefore, we propose to additionally add 11ac 20MHz BCC interleaver parameter with 1 spatial stream as the interleaver parameters for HE-SIG-B without DCM.

Section 26.3.9.7.4:

* Correct the interleaver reference for HE-SIG-A to 26.3.10.7.

Section 26.3.9.8.1.2:

* Correct the interleaver reference for HE-SIG-B to 26.3.10.7.

Section 26.3.10.14:

* Correct the interleaver reference for DCM in 26.3.10.14.

**Proposed Text Changes for Section 26.3.10.7:**

The following contains the proposed changes to on top of changes to section 26.3.10.7 to 11ax D0.2. Only the changes effected by CID 2183 are marked.

------------- Begin Text Changes ---------------

**26.3.10.7 BCC interleavers**

(#1866)For ease of explanation, the operation of the interleaver is described only for the SU case. For user u in the r-th RU of an MU transmission, the interleaver operates in the same way on the output bits for the user from the stream parser by replacing *NSS*, *NCBPSS*, *NCBPSSI*, and *NBPSCS* with *NSS,r,u*, *NCBPSS,r,u*, *NCBPSSI,r,u* and *NBPSCS,r,u*, respectively. That is, the operation of the interleaver is the same as if the transmission were an SU one, consisting of bits from only that user.

The BCC interleaver operation is specified in 21.3.10.8 (BCC interleaver). For data field when DCM is not applied(#2183), the values of the interleaver parameters, *NCOL*, *NROW*, and *NROT* are selected based on the RU size of the user, and are given in Table 26-24 (BCC interleaver parameters for data field without DCM(#2183)).

**Table 26-24**– **BCC interleaver parameters for data field without DCM**(#2183)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **RU Size (tones)** | | | |
| **26** | **52** | **106** | **242** |
| *NCOL* | 8 | 16 | 17 | 26 |
| *NROW* | 3 × *NBPSCS* | 3 × *NBPSCS* | 6 × *NBPSCS* | 9 × *NBPSCS* |
| *NROT* (2≤*NSS* ≤ 4) | 2 | 11 | 29 | 58 |

For data field when DCM is applied, the values of the interleaver parameters, *NCOL*, *NROW*, and *NROT* are selected based on the RU size of the user, and are given in Table 26-X (BCC interleaver parameters for data field with DCM).(#2183)

**Table 26-X**– **BCC interleaver parameters for data field with DCM**(#2183)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **RU Size (tones)** | | | |
| **26** | **52** | **106** | **242** |
| *NCOL* | 4 | 8 | 17 | 13 |
| *NROW* | 3 × *NBPSCS* | 3 × *NBPSCS* | 3 × *NBPSCS* | 9 × *NBPSCS* |
| *NROT* (*NSS* = 2) | 2 | 2 | 11 | 29 |

For HE-SIG-A and HE-SIG-B when DCM is not applied, the values of the interleaver parameters, *NCOL*, and *NROW*, are given in Table 26-Y (BCC interleaver parameters for HE-SIG-A and HE-SIG-B without DCM). When DCM is applied for HE-SIG-B, the values of the interleaver parameters, *NCOL*, and *NROW,* are given in Table 26-Z (BCC interleaver parameters for HE-SIG-B with DCM). *NSS* is assumed to be 1 and *NROT* is not used for BCC interleaving for HE-SIG-A and HE-SIG-B. (#2183)

**Table 26-Y**–**BCC interleaver parameters for HE-SIG-A and HE-SIG-B without DCM**(#2183)

|  |  |
| --- | --- |
| **Parameter** | **HE-SIG-B (tones)** |
| **56** |
| *NCOL* | 13 |
| *NROW* | 4 × *NBPSCS* |

**Table 26-Z**–**BCC interleaver parameters for HE-SIG-B with DCM**(#2183)

|  |  |
| --- | --- |
| **Parameter** | **HE-SIG-B (tones)** |
| **56** |
| *NCOL* | 13 |
| *NROW* | 2 × *NBPSCS* |

-------------- End Text Changes ----------------

**Proposed Text Changes for Section 26.3.9.7.4:**

The following contains the proposed changes for section 26.3.9.7.4. Only the changes effected by CID 2183 are marked.

------------- Begin Text Changes ---------------

**26.3.9.7.4 Encoding and modulation**

For an HE SU PPDU, HE MU PPDU and HE trigger-based PPDU, the HE-SIG-A field is composed of two parts, HE-SIG-A1 and HE-SIG-A2, each containing 26 data bits. HE-SIG-A1 is transmitted before HE-SIG-A2. The HE-SIG-A symbols shall be BCC encoded at rate, R = 1/2, interleaved, mapped to a BPSK constellation, and have pilots inserted following the steps described in 17.3.5.6 (Convolutional encoder), 26.3.10.7 (BCC Interleavers)(#2183), 17.3.5.8 (Subcarrier modulation mapping), and 17.3.5.9 (Pilot subcarriers)(#2771), respectively. The constellation mappings of HE-SIG-A in HE SU PPDU, HE MU PPDU and HE trigger-based PPDU are shown in Figure 26-18 (Data tone constellation of HE-SIG-A symbols)(#2772). The first and second half of the stream of 104 complex numbers generated by these steps (before pilot insertion) is divided into two groups of 52 complex numbers, where respectively, the first 52 complex numbers form the first symbol of HE-SIG-A and the second 52 complex numbers form the second symbol of HE-SIG-A. If the TXVECTOR parameter BEAM\_CHANGE is 1, the time domain waveform for the HE-SIG-A field of an HE SU PPDU, HE MU PPDU and HE trigger-based PPDU shall be as specified in Equation (26-21).(#2287)

*<omitted>*

For an HE extended range SU PPDU, the HE-SIG-A field is composed of four parts, i.e. HE-SIG-A1, HE-SIG-A2, HE-SIG-A3 and HE-SIG-A4, each part containing 26 data bits. These four parts are transmitted sequentially from HE-SIG-A1 to HE-SIG-A4. HE-SIG-A1 and HE-SIG-A2 have the same data bits. HE-SIG-A3 and HE-SIG-A4 have same data bits. The data bits of HE-SIG-A1 and HE-SIG-A3 shall be BCC encoded at rate, R = 1/2, interleaved, mapped to a BPSK constellation, and have pilots inserted. HE-SIG-A2 shall be BCC encoded at rate, R = 1/2, mapped to a QBPSK constellation without interleaving(#912) and have pilots inserted. The constellation mappings of the HE-SIG-A field in an HE extended range SU PPDU is shown in Figure 26-19 (Data tone constellation of HE-SIG-A symbols). The QBPSK constellation on HE-SIG-A2 is used to differentiate between an HE extended range SU PPDU and an HE MU PPDU when *m* = 1 in Equation (26-17), which indicates HE MU PPDU or HE extended range SU PPDU(#1687). HE-SIG-A4 shall be BCC encoded at rate, R = 1/2, mapped to a BPSK constellation without interleaving(#913) and have pilots inserted. BCC encoding, Data interleaving, constellation mapping and pilot insertion follow the steps described in 17.3.5.6 (Convolutional encoder), 26.3.10.7 (BCC Interleavers)(#2183), 17.3.5.8 (Subcarrier modulation mapping), and 17.3.5.9 (Pilot subcarriers)(#2774), respectively.

*<omitted>*

-------------- End Text Changes ----------------

**Proposed Text Changes for Section 26.3.9.8.1.2:**

The following contains the proposed changes to section 26.3.9.8.1.2. Only the changes effected by CID 2183 are marked.

------------- Begin Text Changes ---------------

**26.3.9.8.3 Time domain encoding**

In each 20 MHz band, the bits in the Common Block field shall have CRC and tail bits added and then be BCC encoded at rate R = ½. Padding bits are not added after the common block.

In the User Specific field, in any 20 MHz band, the bits corresponding to two STAs (i.e. two User fields) are encoded together. Specifically, the STAs scheduled in the HE MU PPDU(#Ed) are split into groups of two. Each group of two User fields shall have CRC and tail bits added and then BCC encoded at rate R = ½ using the encoder described in 17.3.5.6 (Convolutional encoder)(#307). If the number of users is even, padding bits are added to round up the number of symbols to the nearest integer. If the number of users is odd, the User Block field corresponding to the last user, who is not grouped, is encoded after adding tail and CRC bits and only then are any padding bits added. The padding bits added ensure that both content channels have the same number of symbols. The specific method of generating padding bits is TBD. When the code rate is not equal to ½, the convolutional encoder output bits for each field (including padding bits) are concatenated, then the concatenated bit streams are punctured continuously as described in 17.3.5.6 (Convolutional encoder)(#307).

(#2183)The coded bits are interleaved as in 26.3.10.7 (BCC Interleavers) (#2183).The interleaved bits are mapped to constellation points from the MCS specified in HE-SIG-A and have pilots inserted following the steps described in (#2183)17.3.5.8 (Subcarrier modulation mapping) and 17.3.5.9 (Pilot subcarriers)(#307), respectively.

*<omitted>*

-------------- End Text Changes ----------------

**Proposed Text Changes for Section 26.3.10.14:**

The following contains the proposed changes to section 26.3.10.14

------------- Begin Text Changes ---------------

### 26.3.10.14 Dual carrier modulation

The constellation mapper for DCM is defined in 26.3.10.8 (Constellation mapping). The LDPC tone mapper for DCM is defined in 26.3.10.10 (LDPC tone mapper). The BCC interleaver for DCM is defined in 26.2.10.7(#2183).(#335)

-------------- End Text Changes ----------------