IEEE P802.11
Wireless LANs

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| CR for HE-SIG-B |
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Abstract

This submission proposes resolutions for the following comments on HE-SIG-B of TGax D2.0:

* 11725, 13468, 13469, 13474, 13478, 13635, 13643, 14081, 14082, 14171

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Change the text baseline to D2.2. Some minor revisions on the resolution.

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.***

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| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 11725 | 28.3.10.8 | 421.34 | The HE-SIG-B signaling specification is very complicated; and it will be helpful to provide examples to illustrate how the resource allocation is signalled in some typical scenarios | Add examples to illustrate the meaning of these signaling fields | **Revised.**Agree to add some examples for HE SIG B signaling. *TGax Editor*: Please change the text (marked as CID 11725) as indicated in **doc.: IEEE 802.11-18/0352r1** |
| 13468 | 28.3.10.8.3 | 423.29 | Unclear sentence: "... is carried as the last User field in theThe User Specific field of an HE-SIG-B content channel consists of one or more HE-SIG-B content channel 1.". Looks like part of the sentence is left-over from a previous version. | Correct | **Revised.**Refer to resolution for CID 14077 in **doc.: IEEE 802.11-18/0051r1** |
| 13469 | 28.3.10.8.3 | 423.59 | Convoluted and unclear sentence: "HE-SIG-B content channel 1 and HE-SIG-B content channel 2 carries RU allocation signaling at 242-toneRU granularity that overlap with the 20 MHz segments in which the content channels are carried (including duplication)." | Clarify sentence. | **Revised.**Agree to clarify the sentence. *TGax Editor*: Please change the text (marked as CID 13469) as indicated in **doc.: IEEE 802.11-18/0352r1** |
| 13474 | 28.3.10.8.5 | 427.04 | Should "indexes" be "indicates"? | See comment | **Revised.**Instruction to Editor: Please change “indexes” to “indicates”. |
| 13478 | 28.3.10.8.6 | 431.21 | Use consistent wording. Currently it says "Set to 1 to indicate" (line 21), "Set to 0 indicates" (line 24). | See comment | **Revised.**Agree to change to consistent wording. *TGax Editor*: Please change the text (marked as CID 13478) as indicated in **doc.: IEEE 802.11-18/0352r1** |
| 13635 | 28.3.10.8.5 | 426.16 | The HE SIG B resource allocation signaling is sophisticate, suggest to add some examples in the Annex to help people synchronize the understanding. | Add some HE SIG B signaling examples in Annex. | **Revised.**Agree in principle. See resolution for CID 11725.  |
| 13643 | 28.3.10.8.5 | 428.33 | The description is not accurate for "01110011" (996-tone RU with no User fields....) . Since on each HE-SIG-B content channel there are 2 RU allocation subfields. One subfield signal 0 user does not mean there are no user field on this HE-SIG-B content channel. | Change the definition of this entry to "996-tone RU with 0 user indicated in this RU allocation subfield" | **Revised.**Agree in principle. See resolution for CID 13407 in document IEEE802.11-18/0118r6.  |
| 14081 | 28.3.10.8.5 | 426.37 | What about preamble punctured cases? | Clarify that N=2 even for preamble punctured 80 MHz PPDU, and N=4 for preamble punctured 160/80+80 MHz PPDU. | **Rejected.**As specified in PP489Ln55, “When preamble puncturing happens in an HE MU PPDU, the HE MU PPDU is still treated as an 80 MHz PPDU…” So current spec text “*N* = 2 for an 80 MHz HE MU PPDU ” is clear that N=2 also for preamble punctured 80MHz PPDU.  |
| 14082 | 28.3.10.8.6 | 431.25 | As written, if any User field indicated DCM=0, then the entire PPDU (all RUs) do not use DCM. | Clarify whether the DCM bit in User field is applicable only to a particular RU only, or to the entire PPDU. | **Revised.**Agree in Principle. Clarify the spec for DCM=0 case.*TGax Editor*: Please change the text (marked as CID 14082) as indicated in **doc.: IEEE 802.11-18/0352r1** |
| 14171 | 28.3.10.8.3 | 423.28 | Looking at "When assigned, the User field corresponding to the center 26-tone RU that spans subcarriers [-16:-4, 4:16] is carried as the last User field in theThe User Specific field of an HE-SIG-B content channel consists of one or more HE-SIG-B content channel 1." It does not make sense. something mixed up when it modified.For example, it would be modified below.When assigned, the User field corresponding to the center 26-tone RU that spans subcarriers [-16:-4, 4:16] is carried as the last User field in the HE-SIG-B content channel 1. And the desciption is written by two different font size. | as in comment | **Revised.**Refer to resolution for CID 14077 in **doc.: IEEE 802.11-18/0051r1** |

***TGax Editor: Please add a new annex W for HE-SIG-B encoding examples at the end of D2.2 as shown below.***

**Annex W**

(informative)

**Examples of HE-SIG-B**

In the following HE-SIG-B examples, unsigned binary format numbers are used to represent bit sequences in different fields in HE-SIG-B in the order of transmission. The transmission order is LSB first for all HE-SIG-B fields except for CRC field, which is MSB first from C7 to C4 as introduced in 28.3.10.7.3 (CRC computation). In the rest of this annex, we are padding 0s as example. And the padding bits are not all included in the HE-SIG-B bit sequence for illustration simplicity. Minimum bits of 0s are padded to make the two HE-SIG-B content channels have equal length and are integer times of 4 bits. Hex format numbers are used to represent the whole HE-SIG-B per each content channel. The hex numbers are also in the order of transmission.

Example 1: HE-SIG-B with resource allocation signaling for 80MHz HE MU PPDU.

 **Table W-1 – Resource allocation signaling example 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| RU | 484-tone RU1 | 26-tone RU19 (Central 26-tone RU) | 242-tone RU3 | 242-tone RU4 |
| SS0 | STA ID 1441, MCS10, LDPC | STA ID 1443, MCS3, BCC, 1SS, no beamforming, no DCM | STA ID 1444, MCS4, BCC, 2SS, Tx beamforming | STA ID 1445, MCS 8, BCC |
| SS1 | STA ID 1446, MCS7, BCC |
| SS2 | STA ID 1442, MCS9, LDPC | N/A | STA ID 1447, MCS6, BCC |
| SS3 | STA ID 1448, MCS5, BCC |

The user fields for the two MU-MIMO STAs on the 484-tone RU1 will be splited to 2, 0 on two HE-SIG-B content channels to balance their load. User field of STA 1441, 1442, 1443 and 1444 will be placed on HE-SIG-B content channel 1 while user field of STA 1445, 1446, 1447 and 1448 will be placed on HE-SIG-B content channel 2. The fields and the whole HE-SIG-B in this example is shown in table W-2 below:

 **Table W-2 – HE-SIG-B for example 1**

|  |  |  |
| --- | --- | --- |
|  | HE-SIG-B content channel 1 | HE-SIG-B content channel 2 |
| Common field | 10010011 00000011 1 1111 000000 | 01001110 11000011 1 1100 000000 |
| User fields | STA 1441 | 10000101101 0010 0101 0 1 | STA 1445 | 10100101101 0000 0001 0 0 |
| STA 1442 | 01000101101 0010 1001 0 1 | STA 1446 | 01100101101 0000 1110 0 0 |
| CRC&tail | 0011 000000 | CRC&tail | 1101 000000 |
| STA 1444 | 00100101101 100 1 0010 0 0 | STA 1447 | 11100101101 0000 0110 0 0 |
| STA 1443 | 11000101101 000 0 1100 0 0 | STA 1448 | 00010101101 0000 1010 0 0 |
| CRC&tail | 1000 000000 | CRC&tail | 1001 000000 |
| Padding | 0 | Padding | 0 |
| Hex number for HE-SIG-B | 0x9303F810B49545A529804B648C5A18400 | 0x4EC3E014B40465A1C681CB41815A14480 |

Example 2: HE-SIG-B with resource allocation signaling for 80MHz full BW MU-MIMO with >1 users.

**Table W-3 – Resource allocation signaling example 2**

|  |  |
| --- | --- |
| RU | 996-tone RU1 |
| SS0 | STA ID 1449, MCS6, LDPC |
| SS1 |
| SS2 | STA ID 1450, MCS7, LDPC |
| SS3 | STA ID 1451, MCS8, LDPC |

In this example, SIGB Compression field in HE-SIG-A will be set to 1 and there will be no common fields on both HE-SIG-B content channels. User field for STA 1449 and STA 1450 are located on HE-SIG-B content channel 1 and user field for STA 1451 is located on HE-SIG-B content channel 2. The HE-SIG-B bit sequence is shown in table W-4 below:

 **Table W-4 – HE-SIG-B for example 2**

|  |  |  |
| --- | --- | --- |
|  | HE-SIG-B content channel 1 | HE-SIG-B content channel 2 |
| User fields | STA 1449 | 10010101101 1000 0110 0 1 | STA 1451 | 11010101101 1000 0001 0 1 |
| STA 1450 | 01010101101 1000 1110 0 1 | CRC&tail | 0101 000000 |
| CRC&tail | 0011 000000 | Padding | 000000000000000000000 |
| Hex number for HE-SIG-B | 0x95B0CAAD8E4C0 | 0xD5B02A8000000 |

Example 3: HE-SIG-B with resource allocation signaling for 80MHz full BW single user transmission using HE MU PPDU format.

**Table W-5 – Resource allocation signaling example 3**

|  |  |
| --- | --- |
| RU | 996-tone RU1 |
| SS0 | STA ID 1452, MCS8, LDPC, 2SS, Tx beamforming |
| SS1 |

In this example, SIGB Compression field in HE-SIG-A will be set to 0 and the resource allocation will be signaled as an OFDMA transmission with one user. User field for STA 1452 is located on HE-SIG-B content channel 1 and no user field on HE-SIG-B content channel 2. The HE-SIG-B bit sequence is shown in table W-6 below:

 **Table W-6 – HE-SIG-B for example 3**

|  |  |  |
| --- | --- | --- |
|  | HE-SIG-B content channel 1 | HE-SIG-B content channel 2 |
| Common field | 00001011 11001110 0 1011 000000 | 11001110 11001110 0 1110 000000 |
| User fields | STA 1452 | 00110101101 100 1 0001 0 1 | Padding bits | 000000000000000000000000000000000 |
| CRC&tail | 1100 000000 |
| Padding | 00 |
| Hex number for HE-SIG-B | 0x0BCE5806B645C00 | 0xCECE70000000000 |

***TGax Editor: Please edit the following text on D2.2 P445Ln40 as shown below.***

~~HE-SIG-B content channel 1 and HE-SIG-B content channel 2 of the 160 MHz PPDU(#14076) carries RU allocation signaling at 242-tone RU granularity that overlap with the 20 MHz segments in which the content channels are carried (including duplication).~~

HE-SIG-B content channel 1 of the 160 MHz PPDU carries RU allocation signaling for RUs that overlap the 20 MHz segments in which the HE-SIG-B content channel 1 is carried. HE-SIG-B content channel 2 carries RU allocation signaling for RUs that overlap the 20 MHz segments in which the HE-SIG-B content channel 2 is carried. (CID 13469)

***TGax Editor: Please edit the following text on D2.2 P453Ln31 as shown below.***

**28.3.10.8.6 HE-SIG-B per-user content**

…….

**Table 28-25—User field for a non-MU-MIMO allocation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Bit** | **Field** | **Number of bits** | **Description** |
| B19 | DCM | 1 | Indicates whether or not dual carrier modulation is used. Set to 1 to indicate that the HE-Data portion of the corresponding user of the HE MU  PPDU is modulated with dual carrier modulation for the MCS. (CID 13478)Set to 0 to indicate ~~indicates~~ that the payload of the corresponding user of the PPDU is not modulated with dual carrier modulation for the MCS. (CID 14082) |