IEEE P802.11
Wireless LANs

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| Annex Z Example for small RUs/MRUs |
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Abstract

This submission proposes draft text (Baseline P802.11be D1.3) to add a new example to Annex Z to cover the case of small RUs/MRUs and punctured channels.

**Revisions:**

Rev 0: first draft of the document.

Rev 1: revise the discussion, modify the entries of Table Z-40, and correct the encoding of CC1 in Table Z-41.

Discussion (Not a part of the PDT):

802.11be has an elegant signalling designation that allows for the flexible allocation of resources which encompasses several different scenarios and use cases. Further, it defines the use of small and large MRUs along with small and large RUs. In the current spec draft, Annex Z provides very useful examples for developers to understand the encoding of EHT-SIG with different RU/MRU configurations and allocations

To complement the signalling examples provided in Annex-Z, this contribution presents a new example of the EHT-SIG encoding. The main goal of this example is to cover other resource allocation signalling scenarios which includes:

* punctured channels,
* small RUs, and
* small MRUs combined with large RUs/MRUs.

These scenarios are not included in the existing examples in Annex-Z.

The allocation of small RUs/MRUs involves encoding more than one User field in the User Specific field of the EHT-SIG content channel for the same 20 MHz subchannel. This would necessitate including a significantly large number of User fields in the same content channel of the EHT-SIG. Moreover, not all allocations are allowed in any 20 MHz since the allowed allocations may differ based on the location of a specific 20 MHz subchannel in an 80 MHz subblock. For example, in the fourth 20 MHz of an 80 MHz subblock (the green box in the figure below) the only allowed 106+26-tone MRU is MRU8. Accordingly, only the allocation of index 50 is allowed, but not index 48. However, in the third 20 MHz subchannel (the red box), the only allowed 106+26-tone MRU is MRU5 in which the index 48 is allowed, but not index 50. Indicating these cases in a new example would be helpful for developers to identify the allowed allocations as indicated in the figure below and to show the flexibility of the resource allocation with combination of small and large RUs/MRUs in 802.11be.

Discussion End

***TGbe Editor: Please add the following text in annex Z (802.11be Draft 1.3)***

Discussion End

**Instruction to the editor: please add the following at the end of Annex Z of P802.11be D1.3**

# Z.12 EHT-SIG Example 8

An example of the EHT-SIG field with U-SIG overflow and resource allocation signalling for a 160 MHz OFDMA transmission using EHT MU PPDU are shown in [Table Z-38 (U-SIG overflow](#bookmark14) [example 8)](#bookmark14) and [Table Z-39 (Resource allocation signalling example 8)](#bookmark15) respectively. This example covers the cases with preamble puncturing, small RUs and small MRUs combined with large RUs/MRUs.

**Table Z-38—U-SIG overflow example 8**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Indication** | **Meaning** |
| Spatial Reuse | 1111 | PSR\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED. |
| GI+LTF Size | 11 | 4 EHT-LTF and 3.2 µs GI. |
| Number Of EHT-LTF Symbols | 010 | 4 EHT-LTF symbols. |
| LDPC Extra Symbol Segment | 1 | An LDPC extra symbol segment is present. |
| Pre-FEC Padding Factor | 01 | A pre-FEC padding factor of 1. |
| PE Disambiguity | 0 | The condition in Equation (36-94) is not met. |
| Disregard | 1111 |  |

**Table Z-39—Resource allocation signalling example 8**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **RU/MRU** | **242-tone RU 1** | **484+242-tone MRU 1****([]-242-484)** | **484+242-tone MRU 8****(484-242-[])** | **106-tone RU15** | **106+26-tone** **MRU 16** |
| SS0 | Punctured | STA-ID 1441,EHT-MCS 10, LDPC, 2SS | STA-ID 1443,EHT-MCS 8, LDPC, 2SS, Txbeamforming | STA-ID 1444,EHT-MCS 4, BCC, Tx beamforming | STA-ID 1445,EHT-MCS 7, BCC, Tx beamforming |
| SS1 | N/A |
| SS2 | STA-ID 1442,EHT-MCS 4, LDPC, 2SS | N/A |
| SS3 |

In this example, the EHT-SIG content channels per 80 MHz frequency subblock are set to the same values by the AP. The EHT-SIG content channels per 80 MHz frequency subblock can also be different. The illustration of an RU Allocation subfield for each of the four 80 MHz frequency subblocks is given in [Table Z-40 (Resource Allocation subfield illustration for each 80 MHz frequency subblock example 8)](#bookmark10).

**Table Z-40—Resource Allocation subfield illustration for each 80 MHz frequency subblock example 8**

|  |  |
| --- | --- |
|  | **RU Allocation subfield illustration** |
| Content channel 1 |  Punctured 242 | 484 (0 User field) | 484-242-[], MRU 8(1 User field) | 242 (0 User field) |
| Content channel 2 |  []-242-484, MRU 1(2 User fields) | 484 (0 User field) | 484 (0 User field) | 106 + (106+26) RU15 + MRU16(2 User fields) |

In this example, STAs 1441-1445 are operating on the primary 80 MHz channel, which is the lower 80 MHz. The User field for STA 1443 is in content channel 1 while the User fields for STAs 1441, 1442, 1444, and 1445 are in content channel 2 in the lower 80 MHz. No User fields exist in the upper 80 MHz. The contents of the entire EHT-SIG field in each 80 MHz for this example is shown in [Table Z-41 (EHT-](#bookmark12) [SIG content in each 80 MHz frequency subblock for example 8).](#bookmark12)

**Table Z-41—EHT-SIG content in each 80 MHz frequency subblock for example 8**

|  |  |  |
| --- | --- | --- |
|  | **EHT-SIG content channel 1** | **EHT-SIG content channel 2** |
| Common field (U-SIG Overflow, 2 RU Allocation-1 subfields, CRC, Tail, 2 RU Allocation-2 subfields, CRC, Tail) | 1111 11 010 1 10 0 1111 | 1111 11 010 1 10 0 1111 |
| 010110000 101110000 0110 000000 | 100001100 101110000 1101 000000 |
| 000111100 001110000 1111 000000 | 101110000 010011000 1111 000000 |
|  |  |
| User Specific field | STA 1443 | 11000101101 | STA 1441 | 10000101101 |
|  |  | 0001 1 1000 1 1 |  | 0101 1 001000 |
| CRC and Tail | 1100 000000 | STA 1442 | 010001011010010 1 001000 |
| Padding |  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000000 | CRC and Tail | 1100 000000 |
| STA 1444 | 001001011010010 1 0000 1 0 |
| STA 1445 | 101001011011110 1 0000 1 0 |
| CRC and Tail | 0110 000000 |
| Padding | 000 |
| EHT-SIG field content inbinary, organized as octets(LSB first) | 11111101 01100111 10101100 00101110 00001100 00000000 11110000 11100001 11100000 01100010 11010001 11000111 10000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 | 11111101 01100111 11000011 00101110 00011010 00000101 11000001 00110001 11100000 01000010 11010101 10010000 10001011 01001010 01000110 00000000 01001011 01001010 00010101 00101101 11101000 01001100 00000000 |
| EHT-SIG field content inbinary, organized as octets(MSB first within each octet) | 10111111 11100110 00110101 01110100 00110000 00000000 00001111 10000111 00000111 01000110 10001011 11100011 00000001 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000  | 10111111 11100110 11000011 0111010001011000 10100000 10000011 1000110000000111 01000010 10101011 0000100111010001 01010010 01100010 00000000 11010010 01010010 10101000 1011010000010111 00110010 00000000 |
| EHT-SIG field content in hexa-decimal, organized as octets | BF E6 35 74 30 00 0F 87 07 46 8B 73 01 00 00 00 00 00 00 00 00 00 00 | BF E6 C3 74 58 A0 83 8C 07 42 AB 09 D1 52 62 00 D2 52 A8 B4 17 32 00 |