IEEE P802.11
Wireless LANs

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| CR for 36.3.13.7 (Constellation Mapping) |
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Abstract

This submission proposes resolutions for the following CIDs:

* 4909, 7248, 8136

# Introduction

This submission proposes resolutions for the following CIDs:

* 4909, 7248, 8136

All CIDs relate to section 36.3.13.7 (Constellation Mapping).

Proposed changes are relative to 802.11be D1.1.

# Proposed resolutions

**CID 7248**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7248 | 36.3.13.7 | 489.43 | Change "determines the I value" to "determine the I value" and "determines the Q value" to "determine the Q value" | See comment | ACCEPTED |



**CID 4909**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 4909 | 36.3.13.7 | 492.03 | When DCM is used, the value of N\_SD is different from N\_SD without DCM.to make it clear, add the following text. The NSD here refers to half the value of NSD without DCM | As in comment | REVISED.Agree in principle. Instead of the proposed resolution, it appears better to refer directly to Tables 36-70 to 36-85 and Table 36-86 for the correct N\_SD value to be used with DCM, rather than defining it as half of some other value.A similar clarification needs to be made for the value of N\_CBPS,u. Editor’s instruction: implement text changes as shown in the section “Text Proposal” of 802.11-21/1537r2. |



**CID 8136**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 8136 | 36.3.13.7 | 492.09 | the third paragraph at P492. this is for a 996-tone RU or smaller. Additional description for larger tone RU should be added. Refer to the corresponding subclause in 11ax specificaion | as in comment | REVISED.Agree in principle, but additional changes are needed to cover the MRU case.Editor’s instruction: implement text changes as shown in the section “Text Proposal” of 802.11-21/1537r2. |

**Discussion**

As pointed out in CID 8136, the text below describes only a single RU (<= 996 tones):



In addition, D1.1, page 492, line 6 also states:



How this is done is not explained in detail however. By contrast, 802.11ax-2021 contains the following text:



This makes it clear(er) how processing is done for BW > 80 MHz. However, even this text does not adequately cover the case of EHT for the following reasons:

1. D1.1 doesn’t explicitly describe how DCM is to be performed for MRUs
2. 802.11ax-2021 only deals with full-bandwidth 80 MHz and 160 MHz, while 802.11be covers both punctured cases and bandwidths up to 320 MHz.

Changes that are needed in 36.3.13.7 are:

1. Clean up description of single RU <= 996 tones (see CID 4909)
2. Add description of DCM for MRUs < 996 tones
3. Add description of how to perform DCM per 80 MHz subblock for wider bandwidths

The changes are shown in the Text proposal below.

# Text proposal

Editor’s instruction: change text in 802.11be D1.1 starting on page 541, line 60 as shown below.

Also, remove the subindex “u” from *Ru*, *NBPSCS,u*, *NSD,u*, *NCBPS,u*, *NDBPS,u* in Table 36-86.

DCM is a modulation scheme that is applied to EHT-MCSs 14 and 15. It only applies to BPSK and *NSS* = 1.

~~If~~ When DCM is employed for a 996-tone or smaller RU or MRU, bit sequences are mapped to ~~a~~ pairs of symbols *d*'*k* *d*'*q**k* where *k* is in the range of 0  *k*  *NSD* – 1 and *q**k* is in the range of *NSD*  *k*  2*NSD* – 1 . For RU~~s~~ and MRU equal to or smaller than 996 tones, *q**k* = *k* + *NSD.* *NSD* values for use with DCM for each RU and MRU smaller than or equal to 996 tones are given in Table 36-70 to Table 36-78 for MCS 15 (column *NSD,u*) and in the first two rows of Table 36-86 for MCS 14.

~~For larger RU sizes, DCM is performed within each 80 MHz subblock(#1279).~~

For BPSK modulation with DCM on RU or MRU smaller than or equal to 996 tones, the input ~~stream is~~ bits of the constellation mapper are broken into groups of  *NCBPS*~~~~ *~~u~~* bits *B*0 *B*1  *BN\_CBPS~~,u~~*). *NCBPS* values for use with DCM for each RU and MRU smaller than or equal to 996 tones are given in Table 36-70 to Table 36-78 for MCS 15 (column *NCBPS,u*) and in the first two rows of Table 36-86 for MCS 14. Each bit *Bk* is BPSK modulated to a sample *d*'*k* . This generates the samples for the lower half of the data subcarriers (*k*=0, 1, …, *NSD* – 1). For the upper half of the data subcarriers, the samples are generated as *d*'*k* + *N\_SD*= *d*'*k ej(k+N\_SD)p*, *k*=0, 1, …, *NSD* – 1. Lower half and upper half of the data subcarriers refer to the first *NSD* used data subcarriers and the next *NSD* used data subcarriers respectively.

For RU or MRU sizes larger than 996 tones, DCM is performed on the segment parser output for each 80 MHz subblock(#1279). For each subblock, DCM mapping is performed as if that subblock consists of an RU or MRU of size smaller than or equal to 996 tones, as described above.