IEEE P802.11
Wireless LANs

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| CID Resolution – Part III, Clause 30.3 |
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Abstract

This document proposes resolution for CIDs 1298, 2067, 1804, 1907, 2068, 2069, 2070, 1447, 1548, 2071, 1908, 2072, 1171, 1299, 1301, 1448, 1666, 1810, 2073, 2074, 2075, 1502, 1577, 1603, 1450, 1274, 1277, 1449, 2078, 1275, 1276, 1451, 1452, 1909, 1604, 1503, 2076, 1667, 1811, 1839, 1840, 2077, 1453, 2082, 1278, 2083, 1032, 1085, 1279, 1302, 1303, 1304, 1305, 1454, 2084, 1830, 1427, 1562, 1607, 1669, 1913, 2087, 2225, 2333, 2085, 2086, 2088, 1608, 1831, 1806, 1585, 1586, 1583, 1829, 1612, 1856, 1014, 1306, 1854, 1662, 1663, 1664, 1606, 1088, 1857, 1564, 1505, [1]. (87)

**CID 1298, 2067**

*Comment:*

"PSDUs are converted to and from PPDUs" - I don't thing the way PPDUs are converted to PSDUs is described in 30.4, 30.5, 30.6. It is mostly left to implementation

Awkward sentence

*Proposed change:*

Remove "and from" from the sentence

Replace "... in which PSDUs are converted to and from PPDUs" to "... for converting PSDUs to and from PPDUs"

*Resolution:*

Accepted.

*Editor: change the text as below, page 237, line 24, [2]*

Subclauses 30.4, 30.5 and 30.6 provide a procedure for converting PSDUs to PPDUs. During transmission, the PSDU is processed (i.e., scrambled, coded, and modulated) and appended to the PHY preamble to create the PPDU. At the receiver, the PHY preamble is processed to aid in demodulation and delivery of the PSDU.

**CID 1804, 1907, 2068, 2069**

*Comment:*

"... by both EDMG STAs and STAs that are compliant with Clause 20". It should be more reader friendly if we say "... by both EDMG STAs and DMG STAs."

Statement "STAs compliant with Clause 20" is confusing. EDMG STAs are compliant with clause 20. Why not simply DMG STAs ?

In clause 30, new STAs are identified as "EDMG STAs", then the legacy STAs should be identified as "DMG STAs"

In clause 30, new STAs are identified as "EDMG STAs", then the legacy STAs should be identified as "DMG STAs"

*Proposed change:*

Replace "both EDMG STAs and STAs that are compliant 22 with Clause 20. To be decodable by STAs compliant with Clause 20 and EDMG STAs, the following 23 applies" with "both DMG STAs and EDMG STAs. To be decodable by DMG STAs and EDMG STAs, the following 23 applies".

Use correct terminology

Replace "...timing by both EDMG STAs and STAs that are compliant with Clause 20" with "...timing by both EDMG STAs and DMG STAs that are compliant with Clause 20"

Replace "To be decodable by STAs compliant ..." with "To be decodable by DMG STAs compliant ...". Make this update throughout the draft

*Resolution:*

Revised.

*Editor: change the text as below, page 237, line 30, [2]*

Two preamble formats are defined. For EDMG format operation, the preamble has a non-EDMG portion and an EDMG portion. The non-EDMG portion of the EDMG format preamble enables detection of the PPDU and acquisition of carrier frequency and timing by both DMG and EDMG STAs. To be decodable by DMG and EDMG STAs compliant with Clause 20, the following applies:

**CID 2070**

*Comment:*

Estimation of MIMO channels is not always necessary, and the text should reflect this

*Proposed change:*

Insert "may" between "format preamble" and "enables estimation"

*Resolution:*

Revised.

*Editor: change the text as below, page 238, line 1, [2]*

The EDMG portion of the EDMG format preamble enables estimation of the channel to support demodulation of the PSDU transmitted over 2.16 GHz, 4.32 GHz, 6.48 GHz, 8.64 GHz, 2.16+2.16 GHz, and 4.32+4.32 GHz bandwidths with single and multiple spatial streams. The EDMG portion of the EDMG format preamble also includes the EDMG-Header-A field and may include EDMG-Header-B field.

**CID 1447**

*Comment:*

Change a MU to an MU

*Proposed change:*

Change a MU to an MU

*Resolution:*

Accepted.

*Editor: change the text as below, page 238, line 9, [2]*

A single PPDU format is defined for all EDMG PHYs: the EDMG PPDU format. Figure 117 shows the EDMG PPDU format and all possible fields. Not all fields are transmitted in an EDMG PPDU. Fields are included depending on whether the PPDU is a SU PPDU, an MU PPDU, or A-PPDU.

**CID 1548, 2071**

*Comment:*

"In the description of Data field of Table 28:

'carriers' should be a typo of 'carries'"

Table 28, Field = Data, the word "carriers" is wrong

*Proposed change:*

As per comment

Replace "carriers" with "carries"

*Resolution:*

Accepted.

*Editor: change the text as below, page 238, line 14, [2]*

The fields of the EDMG PPDU format are summarized in Table 28.

1. —Fields of the EDMG PPDU

|  |  |
| --- | --- |
| Field | Description |
| L-STF | Non-EDMG Short Training field |
| L-CEF | Non-EDMG Channel Estimation field |
| L-Header | Non-EDMG Header field |
| EDMG-Header-A | EDMG Header A field |
| EDMG-STF | EDMG Short Training field |
| EDMG-CEF | EDMG Channel Estimation field |
| EDMG-Header-B | EDMG Header B field |
| Data | The Data field carries the PSDU(s) |
| TRN | Training sequences field |

The EDMG-Header-A, EDMG-STF, EDMG-CEF and EDMG-Header-B fields exist only in EDMG PPDUs.

**CID 1908**

*Comment:*

Use of terminology "non-EDMG" for L-STG etc may not age well as standard evolves. For next generation, does non-EDMG include that generation as well as DMG ?

*Proposed change:*

Use correct terminology. Not sure of what it should be; DMG ?

*Resolution:*

Rejected.

*Discussion:*

Editor follows the approach approved in the legacy VHT PHY. Please see below.



**CID 2072**

*Comment:*

Figure 118 should be Figure 117

*Proposed change:*

Figure 118 should be numbered Figure 117. In fact, after this figure, the Figure numbering is off by 1

*Resolution:*

Rejected.

*Discussion:*

No issues with Figures numbering observed.

**CID 1171**

*Comment:*

"concatenation of a plurality of EDMG PPDUs" - stick to plain English

*Proposed change:*

"concatenation of EDMG PPDUs"

*Resolution:*

Accepted.

*Editor: change the text as below, page 238, line 19, [2]*

An EDMG A-PPDU is defined as a concatenation of EDMG PPDUs defined in 30.3.2.1. An EDMG A-PPDU shall be transmitted to a single user and shall not be transmitted to multiple users. Figure 118 shows the EDMG A-PPDU format and all possible fields.

**CID 1299**

*Comment:*

"TRN field is appended only once at the end of an EDMG A-PPDU" - Doesn't have to be appended.

*Proposed change:*

Replace with "TRN field may be appended only once at the end of an EDMG A-PPDU"

*Resolution:*

Accepted.

*Editor: change the text as below, page 238, line 23, [2]*

The first PPDU of an EDMG A-PPDU includes L-STF, L-CEF, L-Header, EDMG-Header-A, EDMG-STF, EDMG-CEF, and Data fields, and each subsequent PPDU includes EDMG-Header-A and Data fields only. TRN field may be appended only once at the end of an EDMG A-PPDU.

**CID 1301, 1448**

*Comment:*

"where Tc=1/1.76 GHz." This text is confusing because actual Tc=1/1.76nsec. However Tc is a commonly used constant which is defined in table 55

Tc is the unit of time, so the description should be clear. In addition, for consistency, c should be subscript on Tc

*Proposed change:*

replace "where Tc=1/1.76 GHz." with "where Tc is defined in table 55."

Change the description 'Tc = 1/1.76 ns' or 'Tc = 0.57 ns'. In addition, change Tc format for the consistency with Clause 20 (Table 20-4)

*Resolution:*

Revised.

*Editor: change the text as below, page 239, line 20, [2]*

The pre-EDMG modulated fields when transmitted on each secondary channel shall have a relative delay with respect to the corresponding fields transmitted over the primary channel that is between zero (inclusive) and *Tc* (inclusive), where *Tc* is defined in Table 56. The relative delay applicable to each secondary channel transmission may be different from each other, so long as it follows the aforementioned rule.

**CID 1666, 1810**

*Comment:*

Spelling correction.

Correct spelling of "refered"

*Proposed change:*

"refered" should be "referred".

change spelling to "referred"

*Resolution:*

Accepted.

*Editor: change the text as below, page 239, line 14, [2]*

For an EDMG A-PPDU transmission, the fields of the non-EDMG portion of the EDMG format preamble and the EDMG-Header-A field of the EDMG portion of the EDMG format preamble of the first EDMG PPDU form the pre-EDMG modulated fields, and subsequent fields in the EDMG A-PPDU are referred to as EDMG modulated fields (see Figure 118).

**CID 2073, 2074**

*Comment:*

Run on sentence

Run on sentence

*Proposed change:*

Break up sentence by putting a period after "... modulated fields" and capitalizing "The subsequent ..."

Break up sentence by putting a period after "... modulated fields" and capitalizing "Subsequent fields ..."

*Resolution:*

Accepted.

*Editor: change the text as below, page 239, line 10, [2]*

For a single PPDU transmission, the fields of the non-EDMG portion of the EDMG format preamble and the EDMG-Header-A field of the EDMG portion of the EDMG format preamble form the pre-EDMG modulated fields. The subsequent fields in the PPDU are referred to as EDMG modulated fields (see Figure 117).

For an EDMG A-PPDU transmission, the fields of the non-EDMG portion of the EDMG format preamble and the EDMG-Header-A field of the EDMG portion of the EDMG format preamble of the first EDMG PPDU form the pre-EDMG modulated fields. The subsequent fields in the EDMG A-PPDU are referred to as EDMG modulated fields (see Figure 118).

**CID 2075**

*Comment:*

Reference is incorrect

*Proposed change:*

Reference 30.5.10 is incorrect. It should be "30.4.6.2 or 30.5.10.3"

*Resolution:*

Revised.

*Editor: change the text as below, page 239, line 17, [2]*

For 4.32 GHz, 6.48 GHz and 8.64 GHz EDMG PPDU transmissions, the pre-EDMG modulated fields shall be transmitted using the non-EDMG duplicate format ( 30.5.10.4.2.2).

**CID 1502, 1577, 1603**

*Comment:*

"In ""For an EDMG control model PPDU,""

model is a typo of mode.

Also, this subclause (L-STF definition) should include definition for L-STF for non-EDMG duplicate format, then, ""other types of EDMG PPDUs"" here should include non-EDMG duplicate PPDUs with SC modulation class."

Typo

For an EDMG control MODEL ...

*Proposed change:*

"change as follows:

""For an EDMG control mode PPDU and non-EDMG duplicate PPDU transmitted with control modulation class, the L-STF is defined in 20.4.3.1.2. For the other types of EDMG PPDUs and non-EDMG duplicate PPDU transmitted with SC modulation class, the L-STF is defined in 20.3.6.2."""

"control model PPDU" shall be changed as "control mode PPDU"

For an EDMG control MODE ...

*Resolution:*

Accepted.

*Editor: change the text as below, page 239, line 27, [2]*

For an EDMG control mode PPDU, the L-STF is defined in 20.4.3.1.2. For other types of EDMG PPDUs, the L-STF is defined in 20.3.6.2.

**CID 1450**

*Comment:*

Introduce the reference clause and table for further information regarding non-EDMG portion

*Proposed change:*

Include Table 20-4 for reference

*Resolution:*

Revised.

*Editor: change the text as below, page 239, line 25, [2]*

The non-EDMG portion of the EDMG format preamble includes the L-STF, L-CEF and L-Header fields. These fields are defined at the SC chip rate *FC* equal to 1.76 GHz in 20.4.3.1.2, 20.3.6.2, 20.3.6.3, 20.4.3.2, and 20.6.3.1.

**CID 1274**

*Comment:*

Sscrambler initialization field should be set to be random as possible. Suggest to replace "Reserved" with "Random" for B2 and B3 in Table 29

*Proposed change:*

as in comment

*Resolution:*

Rejected.

*Discussion:*

The reserved bits were introduced for future usage in 11ay+ devices, therefore they are reserved and not random. This was discussed in the group.

**CID 1277**

*Comment:*

the number of channels (eight channels) defined in Table 33 is different from that (six channels) defined in Table 30.

*Proposed change:*

modify based on the definition of EDMG channelization (Figure 120)

*Resolution:*

Revised.

*Editor: change the text as below, page 243, line 8, [2]*

Table 33 — Compressed BW field definition

|  |  |  |
| --- | --- | --- |
| Bandwidth of PPDU | 2.16 GHz channel number(s) over which PPDU is transmitted | Compressed BW field value |
| 2.16 GHz | Any one of 1, 2, 3, 4, 5, 6 | 0 |
| 4.32 GHz | 2 and 3, 4 and 5 | 1 |
| 1 and 2, 3 and 4, 5 and 6, | 2 |
| 6.48 GHz | 1 through 3, 3 through 5 | 3 |
| 2 through 4, 4 through 6 | 4 |
| 8.64 GHz | 1 through 4, 2 through 5, 3 through 6 | 5 |
| 2.16+2.16 GHz | 1 and 3, 4 and 6, 2 and 4, 3 and 5 | 6 |
| 1 and 4, 2 and 5, 3 and 6,  | 7 |
| 1 and 5, 2 and 6, 1 and 6 | 8 |
| 1 and 2, 3 and 4, 5 and 6, 2 and 3, 4 and 5 | 9 |
| 4.32+4.32 GHz | 1-2 and 3-4, 2-3 and 4-5, 3-4 and 5-6, 1-2 and 4-5, 1-2 and 5-6, 2-3 and 5-6 | 10 |

**CID 1449, 2078**

*Comment:*

Change Tc to mathematical format

*Proposed change:*

Change Tc to mathematical format for consistency

*Resolution:*

Accepted.

*Editor: change the text as below, page 240, line 25, [2]*

* For an EDMG SC mode PPDU or an EDMG OFDM mode PPDU, the L-Header field is the same as the DMG SC mode PHY header (see Table 20-17) with the following changes:
* The reserved bit 46 shall be set to 1 to indicate the presence of the EDMG-Header-A field. This implies that the PPDU is an EDMG PPDU; and
* The Last RSSI field shall be redefined as shown in Table 31; and
* The 5 LSBs of the Length field shall be redefined as shown in Table 32. Moreover, the remaining bits of the Length field shall be set so that the spoofing error is smaller than one SC symbol block (512×*Tc*) and non-negative; and
* The Additional PPDU field and the Beam Tracking Request field shall both be set to zero.

**CID 1275, 1276, 1451, 1452, 1909**

*Comment:*

replace Turnaround field bit B0 in Table 29 with Bt

Replace Channel bandwidth value (B0 B1 B2 B3 B0) in Table 30 with (B0 B1 B2 B3 Bt)

All other combinations on Table 29 should be specified clearly. When B0 of Scrambler Initialization field is set to 1, it would indicate channel bandwidth given PPDU contains RTS, DMG CTS or DMG DTS frame, so instead of describing all other combinations, better to have separate column to set B0=1 and describe

LSB clarification for value calculation and the distinction on the first B0 from Scrambler and the last B0 from Turnaround field should be made in Table 30 Channel bandwidth value column

use of two B0s may be confusing to the reader.

*Proposed change:*

as in comment

as in comment

Make one column with B0 of Scrambler Initialization field set to 1 and make a description

Change the description of Channel bandwidth value so that B0 of leftmost and rightmost should be distinguished clearly or change the bit notation, e.g., X0 X1 X2 X3 B0 as Xi is for scrambler and B0 is for turnaround. In addition, indicate which is the LSB bit for value calculation

use B0\* for second B0

*Resolution:*

Revised.

*Editor: change the text as below, page 240, line 10, [2]*

* For a control mode PPDU, the L-Header field is the same as the DMG control mode header field (see Table 20-11) and the reserved bits 22 and 23 shall be both set to 1. In this case:
* The combination of the Turnaround field and the Scrambler Initialization field indicates the transmission mode:
* If Turnaround field bit is 0, then the interpretation of the Scrambler Initialization field is defined in Table 29.
* If Turnaround field bit is 1 and the PPDU contains an RTS, a DMG CTS or a DMG DTS frame, then the interpritation of the Scrambler Initialization field is defined in Table 30 and indicates the channel bandwidth of the PPDU. Otherwise, the Scrambler Initialization field is reserved.
* If the control mode PPDU is an EDMG control mode PPDU, the Length field shall be set so that the spoofing error is non-negative and less than or equal to 150 ns, except for PPDU durations between 347.56 µs and 347.93 µs and between 349.10 µs and 350.76 µs where the maximum spoofing error shall be 0.37 µs and 1.66 µs, respectively.

Table 29 —Definition of Scrambler Initialization field when transmitted using the control mode if the Turnaround field bit is 0

|  |  |
| --- | --- |
| **Scrambler Initialization field** | **Definition** |
| **B0** | **B1** | **B2** | **B3** |
| 0 | 0 | R | R | Indicates the presence of the control trailer in the PPDU. The content of the control trailer depends on the type of frame contained in the PPDU (see 30.3.7). |
| 0 | 1 | R | R | Indicates the presence of the EDMG-Header-A field. This implies that the PPDU is an EDMG control mode PPDU. |
| 1 | 0 | R | R | Reserved |
| 1 | 1 | R | R | Reserved |

NOTE – “R” in Table 29 indicates that these bits are reserved.

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Table 30 —Definition of Scrambler Initialization field when transmitted using the control mode if the Turnaround field bit is 1

|  |  |  |
| --- | --- | --- |
| **Scrambler Initialization field** | **Desired channel bandwidth** | **2.16 GHz channel(s) making up desired channelization** |
| **B0** | **B1** | **B2** | **B3** |
| 0 | 0 | 0 | 0 | 2.16 GHz | Anyone of 1, 2, 3, 4, 5, 6 |
| 1 | 0 | 0 | 0 | 4.32 GHz or2.16+2.16 GHz | 1 and 2, 3 and 4, 5 and 6 |
| 0 | 1 | 0 | 0 | 4.32 GHz or2.16+2.16 GHz | 2 and 3, 4 and 5, 1 and 6 |
| 1 | 1 | 0 | 0 | 6.48 GHz | 1 through 3, 5 through 6 |
| 0 | 0 | 1 | 0 | 6.48 GHz | 2 through 4 |
| 1 | 0 | 1 | 0 | 6.48 GHz | 3 through 5 |
| 0 | 1 | 1 | 0 | 8.64 GHz or4.32+4.32 GHz | 1 through 4 |
| 1 | 1 | 1 | 0 | 8.64 GHz or4.32+4.32 GHz | 2 through 5 |
| 0 | 0 | 0 | 1 | 8.64 GHz or4.32+4.32 GHz | 3 through 6 |
| 1 | 0 | 0 | 1 | 2.16+2.16 GHz | 1 and 3, 4 and 6 |
| 0 | 1 | 0 | 1 | 2.16+2.16 GHz | 2 and 4, 3 and 5 |
| 1 | 1 | 0 | 1 | 2.16+2.16 GHz | 1 and 4, 2 and 5, 3 and 6 |
| 0 | 0 | 1 | 1 | 2.16+2.16 GHz | 1 and 5, 2 and 6 |
| 1 | 0 | 1 | 1 | 4.32+4.32GHz | 1 – 2 and 4 – 5 |
| 0 | 1 | 1 | 1 | 4.32+4.32GHz | 2 – 3 and 5 – 6 |
| 1 | 1 | 1 | 1 | 4.32+4.32GHz | 1 – 2 and 4 – 6 |

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**CID 1604**

*Comment:*

"Values not listed in Table 30 are reserved"

*Proposed change:*

Are those values reserved OR can those (B2 B3) be used for scrambler initialization?

*Resolution:*

Revised.

*Discussion:*

If Turnaround filed is set to 0, then bits B2 and B3 are reserved, i.e. set to 0 at the transmitter and ignored by the receiver. If Turnaround field is set to 1, then B2 and B3 are as defined in table 30.

**CID 1503, 2076**

*Comment:*

"""For a control mode PPDU, the L-Header field is the same as the DMG control mode header field""

It is unclear whether NON\_EDMG\_DUP\_C\_MODE is included in the scope of this bullet."

Need to be more specific about which control mode

*Proposed change:*

"Suggest to change the text as follows:

""For an EDMG control mode PPDU and a non-EDMG duplicate PPDU transmitted with control modulation class, the definition of the L-Header fields are the same as the DMG control mode header fields (see Table 20-11) and the reserved bits 22 and 23 shall be both set to 1."""

Replace "For an EDMG control mode PPDU, the L-Header field is the same as the DMG control mode header field (see Table 20-11) except that the reserved bits 22 and 23" with "For a control mode PPDU, the L-Header field is the same as the DMG control mode header field (see Table 20-11) and the reserved bits 22 and 23"

*Resolution:*

Revised.

*Editor: change the text as below, page 240, line 10, [2]*

For an EDMG control mode PPDU and a non-EDMG control mode PPDU transmitted with the control trailer or carrying the bandwidth signalling, the L-Header field is the same as the DMG control mode header field (see Table 20-11) except that the reserved bits 22 and 23 shall be both set to 1.

**CID 1667, 1811**

*Comment:*

Spelling correction.

Correct spelling of "remaning"

*Proposed change:*

"remaning" should be "remaining".

change spelling to "remaining"

*Resolution:*

Accepted.

*Editor: change the text as below, page 240, line 31, [2]*

If the actual A-PPDU duration is unknown at the point in time of L-Header transmission, the remaining bits of the Length field shall be set such that the PPDU duration calculated based on the L-Header shall be within the range of the actual PPDU duration of the first PPDU in the A-PPDU to the smaller of aPPDUMaxTime and remaining TXOP duration.

**CID 1839**

*Comment:*

Bit 46 is used to indicate the presence of the EMDG-Header-A field. In Table 20-17 of 802.11-2016, bit 46 doesn't exist as a Reserved bit.

*Proposed change:*

Check bit 46 and determine if this bit was assigned elsewhere of if it's a typo in 802.11-2016 Table 20-17.

*Resolution:*

Rejected.

*Discussion:*

This is not true, reserved bit 46 exists. See Table 20-17. Actually 3 reserved bits are defined, i.e. 45, 46, and 47.

**CID 1840**

*Comment:*

Table 31 Field name (GI/CP Length) CP not defined.

*Proposed change:*

Define CP in text or reference clause

*Resolution:*

Revised.

*Editor: change the text as below, page 243, line3, [2]*

Table 31 - Definition of bit allocation of Last RSSI field when transmitted using the EDMG SC or EDMG OFDM mode

|  |  |  |
| --- | --- | --- |
| Bit number | Field name | Definition |
| B0 | IsSC | If set to 1, this field indicates that the PSDU is modulated using SC (see 30.5). Otherwise if set to 0, this field indicates that the PSDU is modulated using OFDM (see 30.6). If modulated using SC, the PPDU is termed as EDMG SC (mode) PPDU. If modulated using OFDM, the PPDU is termed as EDMG OFDM (mode) PPDU. |
| B1 | IsSISO | If set to 1, this field indicates that the PPDU is a single stream PPDU. Otherwise, the PPDU encodes more than one stream. |
| B2-B3 | GI Length | For an EDMG SC PPDU, this field indicates the type of GI used in the PPDU (see 30.5.9) and is set as follows: set to 0 for short GI, set to 1 for normal GI, and set to 2 for long GI. Value 3 is reserved. |

**CID 2077**

*Comment:*

Simplify sentence

*Proposed change:*

Replace "If the control mode PPDU is an EDMG control mode PPDU" with "For an EDMG control PPDU"

*Resolution:*

Accepted.

*Editor: change the text as below, page 240, line 14, [2]*

* For an EDMG control mode PPDU, the Length field shall be set so that the spoofing error is non-negative and less than or equal to 150 ns, except for PPDU durations between 347.56 µs and 347.93 µs and between 349.10 µs and 350.76 µs where the maximum spoofing error shall be 0.37 µs and 1.66 µs, respectively.

**CID 1453**

*Comment:*

Change 'are different than' to 'is different from'

*Proposed change:*

As commented

*Resolution:*

Accepted.

*Editor: change the text as below, page 245, line 20, [2]*

The EDMG-Header-A field carries information required to interpret EDMG PPDUs. The definition of the EDMG-Header-A is the same for EDMG SC mode and EDMG OFDM mode PPDU, but is different from the definition for EDMG control mode PPDU.

**CID 2082**

*Comment:*

Incorrect word

*Proposed change:*

Replace "interpret" with "demodulate"

*Resolution:*

Accepted.

*Editor: change the text as below, page 245, line 19, [2]*

The EDMG-Header-A field carries information required to demodulate EDMG PPDUs. The definition of the EDMG-Header-A is the same for EDMG SC mode and EDMG OFDM mode PPDU, but are different than the definition for EDMG control mode PPDUs.

**CID 1278**

*Comment:*

the definition of the first N\_TX/2 and the second N\_TX/2 transmit chains cannot be applied to the case of 4.32 + 4.32 GHz

*Proposed change:*

clarify N\_TX/2 transmit chains for primary+secondary and other N\_TX/2 transmit chains for secondary1+secondary2

*Resolution:*

Revised.

*Editor: change the text as below, page X, line Y, [2]*

For 2.16+2.16 GHz and 4.32+4.32 GHz PPDU transmission, the total number of transmit chains, *NTX*, shall be an even number. For 2.16+2.16 GHz bandwidth configuration, the first *NTX*/2 transmit chains shall be used for transmission on the primary channel and the second *NTX*/2 transmit chains shall be used for transmission on the secondary channel (see 30.3.4). For 4.32+4.32 GHz bandwidth configuration, the first *NTX*/2 transmit chains shall be used for transmission on the primary and secondary channels and the second *NTX*/2 transmit chains shall be used for transmission on the secondary1 and secondary2 channels (see 30.3.4).

**CID 2083**

*Comment:*

Table 34: PSDU Length is missing the range of octets

*Proposed change:*

Specify that the Length of the PSDU field ranges from 14 - 1023 octets

*Resolution:*

Accepted.

*Editor: change the text as below, page 246, line 1, [2]*

Table 34—EDMG-Header-A1 subfield definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| BW | 8 | 0 | See Table 36 |
| Primary Channel Number | 3 | 8 | See Table 36 |
| PSDU Length | 10 | 11 | Length of the PSDU field in octets; range 14 – 1023. |
| EDMG TRN Length | 8 | 21 | See Table 36 |
| RX TRN-Units per Each TX TRN-Unit | 8 | 29 | See Table 36 |
| EDMG TRN-Unit P | 2 | 37 | See Table 36 |
| EDMG TRN-Unit M | 4 | 39 | See Table 36 |
| EDMG TRN-Unit N | 2 | 43 | See Table 36 |
| TRN Subfield Sequence Length | 2 | 45 | See Table 36 |
| TRN-Unit RX Pattern | 1 | 47 | See Table 36 |

**CID 1032**

*Comment:*

Table 36: "Number of Transmit Chains" field, not clear why it is reserved when beam tracking request is 0.

*Proposed change:*

Remove the condition on beam tracking request flag

*Resolution:*

Accepted.

*Editor: change the text as below, page 250, line 1, [2]*

|  |  |  |  |
| --- | --- | --- | --- |
| Number of Transmit Chains | 3 | 98 | Corresponds to TXVECTOR parameter NUM\_TX\_CHAINS. The value of this field plus 1 indicates the number of transmit chains used in the transmission of the PPDU. The value of the field plus 1 also indicates the total number of orthogonal sequences in a TRN field (see 30.9.2.2.5).  |

**CID 1085**

*Comment:*

In case of channel aggregation the first NSS/2 spatial streams are mapped to the primary channel and the second NSS/2 streams are mapped to the secondary channel. It is not consistent with definition for Control PHY. Control PHY operates with transmit chains.

*Proposed change:*

Replace NSS with NTX.

*Resolution:*

Revised.

*Editor: change the text as below, page 247, line 10, [2]*

For 2.16+2.16 GHz and 4.32+4.32 GHz PPDU transmission, the total number of transmit chains, *NTX*, shall be an even number. For 2.16+2.16 GHz bandwidth configuration, the first *NTX*/2 transmit chains shall be used for transmission on the primary channel and the second *NTX*/2 transmit chains shall be used for transmission on the secondary channel (see 30.3.4). For 4.32+4.32 GHz bandwidth configuration, the first *NTX*/2 transmit chains shall be used for transmission on the primary and secondary channels and the second *NTX*/2 transmit chains shall be used for transmission on the secondary1 and secondary2 channels (see 30.3.4).

*Editor: change the text as below, page 247, line 3, [2]*

**CID 1279**

*Comment:*

replace "two DMG SC symbols" with "two DMG SC blocks of symbols"

*Proposed change:*

as in comment

*Resolution:*

Revised.

*Editor: change the text as below, page 246, line 16, [2]*

The EDMG-Header-A field has a fixed size of two DMG SC symbol blocks (see Clause 20) comprising of 112 data bits followed by a 16 bit CRC.

**CID 1302, 1303, 1304, 1305**

*Comment:*

Consider adding a reference to the subclause where phase hopping is defined

Consider adding a reference to the subclause where open loop precoding is defined

Consider adding a reference to the subclause where super imposed LDPC code is defined

Consider adding a reference to the subclause where first path training is defined

*Proposed change:*

as in comment

*Resolution:*

Accepted.

*Editor: change the text as below, page 250, line 1, [2]*

|  |  |  |  |
| --- | --- | --- | --- |
| Phase Hopping | 1 | 93 | Corresponds to TXVECTOR parameter PHASE\_HOPPING. If set to 1 in an EDMG OFDM mode PPDU, this field indicates that phase hopping modulation is used, (see 30.6.8.3.11). Otherwise this field is set to 0. This field is reserved in an EDMG SC mode PPDU, or if the transmitter or receiver do not support phase hopping. |
| Open Loop Precoding | 1 | 94 | Corresponds to TXVECTOR parameter OPEN\_LOOP\_PC. If the Phase Hopping field is set to 1, this field indicates if open loop precoding is used. If this field is 1, open loop precoding is used, (see 30.6.8.3.11). Otherwise, open loop precoding is not used. If the Phase Hopping field is reserved, this field is also reserved. |
| Superimposed Code Applied | 1 | 96 | Corresponds to TXVECTOR parameter LDPC\_SUPERIMPOSED. If the LDPC code rate is 7/8 and this field is set to zero, it indicates puncturing code with codeword length 624 or 1248 is applied, (see 30.5.9.4.3 and 30.6.8.2.3).If the LDPC code rate is 7/8 and this field is set to one, it indicates that superimposed code with codeword length 672 or 1344 is applied, (see 30.3.6.2 and 30.3.6.7).In all other cases, this field is reserved. |
| First Path Training | 1 | 103 | Corresponds to the TXVECTOR parameter FIRST\_PATH\_TRAINING. When set to 1, indicates that the TRN field appended to this PPDU is used for first path beamforming training, (see 10.38.9.6). Set to 0 otherwise. This field is reserved when the EDMG TRN Length field is equal to 0. |

**CID 1454**

*Comment:*

one higher, two higher, three higher seems not clear.

*Proposed change:*

Put the proper noun between one/two/three and higher, e.g., one-level higher order modulation

*Resolution:*

Revised.

*Editor: change the text as below, page 251, line 3, [2]*

Table 37—EDMG-MCS field definition

|  |  |  |  |
| --- | --- | --- | --- |
| Subfield | Number of bits | Start bit | Description |
| Base MCS | 5 | 0 | Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| Differential EDMG-MCS1 | 2 | 5 | Each of these differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one level higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two levels higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three levels higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates π/2-64-QAM, π/2-64-NUC, or 64-QAM modulation.The Differential EDMG-MCS index shall not indicate the modulation order exceeding the π/2-64-QAM or π/2-64-NUC for EDMG SC mode and 64-QAM for EDMG OFDM mode. |
| Differential EDMG-MCS2 | 2 | 7 |
| Differential EDMG-MCS3 | 2 | 9 |
| Differential EDMG-MCS4 | 2 | 11 |
| Differential EDMG-MCS5 | 2 | 13 |
| Differential EDMG-MCS6 | 2 | 15 |
| Differential EDMG-MCS7 | 2 | 17 |
| Differential EDMG-MCS8 | 2 | 19 |

**CID 2084**

*Comment:*

Table 35: What happens if MCS\_k ... MCS\_8 are not used? What value do you set them to?

*Proposed change:*

State that if an MCS is not used, then the differential MCS value shall be set to 0

*Resolution:*

Revised.

*Editor: change the text as below, page 251, line 2, [2]*

Table 37 —EDMG-MCS field definition

|  |  |  |  |
| --- | --- | --- | --- |
| Subfield | Number of bits | Start bit | Description |
| Base MCS | 5 | 0 | Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| Differential EDMG-MCS1 | 2 | 5 | Generated from TXVECTOR parameter EDMG\_MCS.The Differential EDMG-MCS1, Differential EDMG-MCS2, … , and Differential EDMG-MCS8 define the modulation and coding scheme for the spatial stream 1, spatial stream 2, … , and spatial stream 8 respectively. All spatial streams have the same code rate defined by the Base MCS.Each of these differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates 64-QAM/NUC modulation.If the number of spatial streams is *NSS* < 8, then the *NSS* Differential EDMG-MCS fields shall be used and the remaining Differential EDMG-MCS fields shall be reserved. For an EDMG SC mode, if the Base MCS is MCS 12 or 13 and π/2-8-PSK Applied field is 1, then all Differential EDMG-MCS subfields shall be set to 0. |
| Differential EDMG-MCS2 | 2 | 7 |
| Differential EDMG-MCS3 | 2 | 9 |
| Differential EDMG-MCS4 | 2 | 11 |
| Differential EDMG-MCS5 | 2 | 13 |
| Differential EDMG-MCS6 | 2 | 15 |
| Differential EDMG-MCS7 | 2 | 17 |
| Differential EDMG-MCS8 | 2 | 19 |

**CID 1830**

*Comment:*

64-QAM/NUC is not defined in Table 37

*Proposed change:*

Add definition and add reference back in clause 30.5.9.5.1

*Resolution:*

Revised.

*Editor: change the text as below, page 251, line 2, [2]*

Table 37—EDMG-MCS field definition

|  |  |  |  |
| --- | --- | --- | --- |
| Subfield | Number of bits | Start bit | Description |
| Base MCS | 5 | 0 | Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| Differential EDMG-MCS1 | 2 | 5 | Each of these differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates π/2-64-QAM, π/2-64-NUC, or 64-QAM modulation (see Table 57 and Table 77). |
| Differential EDMG-MCS2 | 2 | 7 |
| Differential EDMG-MCS3 | 2 | 9 |
| Differential EDMG-MCS4 | 2 | 11 |
| Differential EDMG-MCS5 | 2 | 13 |
| Differential EDMG-MCS6 | 2 | 15 |
| Differential EDMG-MCS7 | 2 | 17 |
| Differential EDMG-MCS8 | 2 | 19 |

**CID 1427, 1562, 1607, 1669, 1913, 2087, 2225, 2333**

*Comment:*

There is a TBD

*Proposed change:*

Please define

*Resolution:*

Revised.

*Editor: change the text as below, page 253, line 29, [2]*

The EDMG-Header-A encoding and modulation for SC and OFDM EDMG A-PPDU is defined in 30.5.7 and 30.6.6, respectively.

**CID 2085**

*Comment:*

Order of paragraphs is incorrect

*Proposed change:*

Move last sentence to the top of the section to make it more clear, since the operations describe in this paragraph occurs first

*Resolution:*

Revised.

*Editor: change the text as below, page 253, line 30, [2]*

The EDMG-Header-A encoding and modulation for EDMG control mode PPDU is defined in 30.4.5.

**CID 2086**

*Comment:*

Fix wording

*Proposed change:*

Replace "To each data word b = b1 or b = b2, append 440 zeros bits 0 = (0\_1, 0\_2, ..., 0\_440) and 168 parity bits ..." with "For each data word b = b1 or b = b2, append 440 zeros bits 0 = (0\_1, 0\_2, ..., 0\_440) and generate 168 parity bits ..."

*Resolution:*

Accepted.

*Editor: change the text as below, page 253, line 10, [2]*

* For each data word  or , append 440 zero bits  and generate 168 parity bits  to create a codeword , such that , parity bits are computed applying LCW = 672, R = ¾ LDPC matrix defined in 20.6.3.2.3.2

**CID 2088**

*Comment:*

Table 40: PSDU Length is missing the range of octets

*Proposed change:*

Specify the range for Length of the PSDU field

*Resolution:*

Accepted.

*Editor: change the text as below, page 255, line 1, Table 40, [2]*

Table40—EDMG-Header-B field structure and definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Scrambler Seed | 7 | 0 |  |
| PSDU Length | 22 | 7 | Length of the PSDU field in octets; range 1 – 4194303. |

**CID 1608**

*Comment:*

Consider the differential EDMG-MCS concept in NUC Applied field.

*Proposed change:*

Change "EDMG-MCS1 field or EDMG-MCS2 field" to "differential EDMG-MCS1 field or EDMG-MCS2 field"

*Resolution:*

Revised.

*Editor: change the text as below, page 255, line 1, Table 40, [2]*

|  |  |  |  |
| --- | --- | --- | --- |
| NUC Applied | 1 | 39 | Corresponds to the TXVECTOR parameter NUC\_MOD. If this field is set to 1, π/2-64-NUC is applied at the transmitter for the MCSs indicated by the Base MCS, Differential EDMG-MCS1 field and the Differential EDMG-MCS2 field, if supported. If an indicated MCS does not support π/2-64-NUC, then π/2-64-QAM uniform constellation is applied for this particular MCS.If set to 0, π/2-64-QAM uniform constellation is applied for MCSs signalled in the Base MCS, Differential EDMG-MCS1 and the Differential EDMG-MCS2 field.  |

*Editor: change the text as below, page 248, line 1, [2]*

|  |  |  |  |
| --- | --- | --- | --- |
| NUC Applied | 1 | 63 | Corresponds to the TXVECTOR parameter NUC\_MOD. If this field is set to 1, π/2-64-NUC is applied at the transmitter for all MCSs indicated within the EDMG-MCS field, if supported. If a Differential EDMG-MCS indicated within the EDMG-MCS field does not support π/2-64-NUC, then π/2-64-QAM uniform constellation is applied for this particular MCS.If set to 0, π/2-64-QAM uniform constellation is applied for all MCSs signalled in the EDMG-MCS field.  |

**CID 1831**

*Comment:*

64-QAM/NUC is not defined in Table 40

*Proposed change:*

Add definition and add reference back in clause 30.5.9.5.1

*Resolution:*

Revised.

*Editor: change the text as below, page 255, line 1, Table 40, [2]*

Table 40 — EDMG-Header-B field structure and definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Scrambler Seed | 7 | 0 |  |
| PSDU Length | 22 | 7 | Length of the PSDU field in octets. |
| Base MCS | 5 | 29 | Generated from TXVECTOR parameter EDMG\_MCS. Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| DifferentialEDMG-MCS1 | 2 | 34 | Generated from TXVECTOR parameter EDMG\_MCS.The Differential EDMG-MCS1 and Differential EDMG-MCS2 define the modulation and coding scheme for the spatial stream 1 and spatial stream 2 respectively. All spatial streams have the same code rate defined by the Base MCS.Each of the differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one level higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two levels higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three levels higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates π/2-64-QAM, π/2-64-NUC, or 64-QAM modulation (see Table 57 and Table 77).If the number of spatial streams is set to 1 (per user), then the Differential EDMG-MCS2 field shall be reserved.  |
| DifferentialEDMG-MCS2 | 2 | 36 |

**CID 1806**

*Comment:*

Table 40 refers to two different flavors of rate 7/8 LDPC code. It seems odd to have two distinct codes of the same data rate defined in the same amendment. For purposes of interoperability (since both are optional) and for ease of design choice for implementers, it would be better to select one of them and delete the other.

*Proposed change:*

Delete the superimposed code everywhere in the draft. (Alternative: delete the punctured code.)

*Resolution:*

Rejected.

*Discussion:*

This was discussed many times in the group. The group decision was to proceed with two 7/8 LDPC codes.

**CID 1585**

*Comment:*

"DCM SQPSK is not defined in EDMG Header-B.

So in MU-MIMO case, it is not clear how to apply DCM SQPSK for each user."

*Proposed change:*

DCM SQPSK shall be defined in EDMG Header-B since DCM SQPSK is user specific information

*Resolution:*

Rejected.

*Discussion:*

DCM SQPSK modulation is applied for SU PPDU transmission only. This is an assumption in the draft.

**CID 1586**

*Comment:*

"STBC applied field is defined in EDMG Header-A for MU PPDU.

So in MU-MIMO case, all users shall apply STBC or all users shall not apply STBC"

*Proposed change:*

Revised.

*Resolution:*

STBC applied field shall be defined in EDMG Header-B since STBC applied field is user specific information

*Editor: remove rows 5, 6 defining STBC in Table 38, page 252, line1, [2]*

Table 38—EDMG-Header-A field structure and definition for a MU PPDU

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| SU/MU Format | 1 | 0 | See Table 36 |
| Channel Aggregation | 1 | 1 | See Table 36 |
| BW | 8 | 2 | See Table 36 |
| Primary Channel Number | 3 | 10 | See Table 36 |
|  |  |  |  |
|  |  |  |  |
| SS Descriptor Set 0 | 9 | 15 | Describes the SS assignment to the first STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 1 | 9 | 24 | Describes the SS assignment to the second STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 2 | 9 | 33 | Describes the SS assignment to the third STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 3 | 9 | 42 | Describes the SS assignment to the fourth STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 4 | 9 | 51 | Describes the SS assignment to the fifth STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 5 | 9 | 60 | Describes the SS assignment to the sixth STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 6 | 9 | 69 | Describes the SS assignment to the seventh STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| SS Descriptor Set 7 | 9 | 78 | Describes the SS assignment to the eight STA addressed within the MU PPDU. This field is formatted as described in Table 39. |
| EDMG TRN Length | 8 | 87 | See Table 36 |
| RX TRN-Units per Each TX TRN-Unit | 8 | 95 | See Table 36 |
| EDMG TRN-Unit P | 2 | 103 | See Table 36 |
| EDMG TRN-Unit M | 4 | 105 | See Table 36 |
| EDMG TRN-Unit N | 2 | 109 | See Table 36 |
| Reserved | 1 | 111 |  |
| CRC | 16 | 112 | Header Check sequence. Calculation of the header check sequence is defined in 20.3.7. |

*Editor: add rows 7, 8 defining STBC in Table 40, page 252, line 1 as below, [2]*

Table40—EDMG-Header-B field structure and definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Scrambler Seed | 7 | 0 |  |
| PSDU Length | 22 | 7 | Length of the PSDU field in octets. |
| Base MCS | 5 | 29 | Generated from TXVECTOR parameter EDMG\_MCS. Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| DifferentialEDMG-MCS1 | 2 | 34 | Generated from TXVECTOR parameter EDMG\_MCS. Each of the differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates 64-QAM/NUC modulation. |
| DifferentialEDMG-MCS2 | 2 | 36 |
| Superimposed Code Applied | 1 | 38 | Corresponds to TXVECTOR parameter LDPC\_SUPERIMPOSED. If the LDPC code rate is 7/8 and this field is set to zero, it indicates puncturing code with codeword length 624 or 1248 is applied.If the LDPC code rate is 7/8 and this field is set to one, it indicates that superimposed code with codeword length 672 or 1344 is applied.In all other cases, this field is reserved. |
| Short/Long LDPC | 1 | 39 | See Table 36. |
| STBC Applied | 1 | 40 | See Table 36. |
| NUC Applied | 1 | 41 | Corresponds to the TXVECTOR parameter NUC\_MOD. If this field is set to 1, NUC is applied at the transmitter for the MCSs indicated by the EDMG-MCS1 field or the EDMG-MCS2 field, if supported. If an indicated MCS does not support NUC, uniform constellation is applied for this particular MCS.If set to 0, uniform constellation is applied for MCSs signalled in the EDMG-MCS1 field and the EDMG-MCS2 field.  |
| Spoofing Error Length Indicator | 1 | 42 | If set to 0 in an EDMG OFDM PPDU, indicates that the spoofing error, defined as the difference between the PPDU duration calculated based on L-Header and the actual PPDU duration, is smaller than TOFDM-SYM, where TOFDM-SYM = TDFT + TGI, TDFT is the OFDM IDFT/DFT period and TGI is the guard interval duration, which is determined by bits B2 and B3 of the Last RSSI field within the L-Header of the PPDU. Otherwise, if set to 1 in an EDMG OFDM PPDU, indicates that the spoofing error is greater than or equal to TOFDM-SYM. For an EDMG SC PPDU, this field is reserved. |
| Reserved | 5 | 43 |  |
| CRC | 16 | 48 | Header Check sequence. Calculation of the header check sequence is defined in 20.3.7.  |

**CID 1583**

*Comment:*

"Beamformed field is not defined in EDMG Header-B.

So in MU-MIMO case, it is not clear how to apply beamforming for each user."

*Proposed change:*

Beamformed field shall be defined in EDMG Header-B since Beamformed field is user specific information

*Resolution:*

Accepted.

*Editor: add row in Table 40 as below, page 255, line 1, [2]*

Table40 — EDMG-Header-B field structure and definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Scrambler Seed | 7 | 0 |  |
| PSDU Length | 22 | 7 | Length of the PSDU field in octets. |
| Base MCS | 5 | 29 | Generated from TXVECTOR parameter EDMG\_MCS. Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| DifferentialEDMG-MCS1 | 2 | 34 | Generated from TXVECTOR parameter EDMG\_MCS. Each of the differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates 64-QAM/NUC modulation. |
| DifferentialEDMG-MCS2 | 2 | 36 |
| Superimposed Code Applied | 1 | 38 | Corresponds to TXVECTOR parameter LDPC\_SUPERIMPOSED. If the LDPC code rate is 7/8 and this field is set to zero, it indicates puncturing code with codeword length 624 or 1248 is applied.If the LDPC code rate is 7/8 and this field is set to one, it indicates that superimposed code with codeword length 672 or 1344 is applied.In all other cases, this field is reserved. |
| NUC Applied | 1 | 39 | Corresponds to the TXVECTOR parameter NUC\_MOD. If this field is set to 1, NUC is applied at the transmitter for the MCSs indicated by the EDMG-MCS1 field or the EDMG-MCS2 field, if supported. If an indicated MCS does not support NUC, uniform constellation is applied for this particular MCS.If set to 0, uniform constellation is applied for MCSs signalled in the EDMG-MCS1 field and the EDMG-MCS2 field.  |
| Spoofing Error Length Indicator | 1 | 40 | If set to 0 in an EDMG OFDM PPDU, indicates that the spoofing error, defined as the difference between the PPDU duration calculated based on L-Header and the actual PPDU duration, is smaller than TOFDM-SYM, where TOFDM-SYM = TDFT + TGI, TDFT is the OFDM IDFT/DFT period and TGI is the guard interval duration, which is determined by bits B2 and B3 of the Last RSSI field within the L-Header of the PPDU. Otherwise, if set to 1 in an EDMG OFDM PPDU, indicates that the spoofing error is greater than or equal to TOFDM-SYM. For an EDMG SC PPDU, this field is reserved. |
| Beamformed | 1 | 41 | See Table 36. |
| Reserved | 6 | 42 |  |
| CRC | 16 | 48 | Header Check sequence. Calculation of the header check sequence is defined in 20.3.7.  |

**CID 1829**

*Comment:*

Missing space

*Proposed change:*

Add space after the word "rate"

*Resolution:*

Rejected.

*Discussion: page 263, line 13, [2]*

*Editor uses rate-7/8 with “dash”, it is also acceptable.*

The EDMG PHY defines an additional rate-7/8 LDPC code matrix for a codeword of size equal to 672 bits, which is the same codeword size used in the DMG PHY. The definition of this LDPC code matrix follows the approach specified in 20.3.8.

**CID 1612**

*Comment:*

In the matrices, the i of the Pi should be subscript

*Proposed change:*

As in comment (4 occurrences)

*Resolution:*

Revised.

*Discussion:*

This was already fixed as a part of CID 1007 resolution. Obsolete.

**CID 1856**

*Comment:*

Fix grammar in Table 52

*Proposed change:*

In Description Field of MU-MIMO Transmission Configuration Type change "Sets" to "Set" and "sets" to "set"

*Resolution:*

Accepted.

*Editor: change the text as below, page 267, line 1, [2]*

Table52—Control trailer definition when CT\_TYPE is GRANT\_RTS\_CTS2self

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Number of bits | Start bit | Description |
| Channel Aggregation | 1 | 0 | See Table 36 |
| BW | 8 | 1 | See Table 36 |
| Primary Channel Number | 3 | 9 | See Table 36 |
| SISO/MIMO | 1 | 12 | Set to 0 to indicate that the following transmission from this STA is performed in SISO. Set to 1 to indicate that the following transmission from this STA is performed in MIMO. |
| SU/MU MIMO | 1 | 13 | Set to 0 to indicate SU-MIMO, and set to 1 to indicate MU-MIMO. Reserved when SISO/MIMO is set to 0. |
| TX Sector Combination Index | 6 | 14 | Indicates the TX sector combination (as defined in 9.4.2.253) and the corresponding RX AWVs to be used in the following SU-MIMO transmission. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 1. |
| EDMG Group ID | 8 | 20 | Indicates the EDMG Group ID of target MU group. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 0. |
| MU-MIMO Transmission Configuration Type | 1 | 28 | Set to 1 to indicate the MU-MIMO transmission configuration was obtained from the MU-MIMO BF training of downlink type; set to 0 to indicate the MU-MIMO transmission configuration was obtained from MU-MIMO BF training of uplink type. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 0. |
| MU-MIMO Transmission Configuration Index | 3 | 29 | Indicates the MU-MIMO transmission configuration (as defined in 9.4.2.262) to be used in the following MU-MIMO transmission. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 0. |
| Reserved | 96 | 32 | Set to 0 by the transmitter and ignored by the receiver. |
| CTCS | 16 | 128 | Contains the CRC-16 computed over the content of the control trailer. This field is computed as defined in section 20.3.7 |

**CID 1014**

*Comment:*

PHY-CCA.indication(BUSY,RX-Antenna-ID) is not defined.

*Proposed change:*

Change RX-Antenna-ID to channel-list.

*Resolution:*

Rejected.

*Discussion: page 268, line 17, [2]*

The primitive RX-Antenna-ID can include 3 parameters, namely, STATE, IPI-REPORT, channel-list (see 8.3.5.12.2). RX-Antenna-ID is issued as a part of the IPI-REPORT.

**CID 1306**

*Comment:*

If only two spatial stream are allowed per MU user, why are two differential MCSs needed - only one base MCS and differential MCS are needed

*Proposed change:*

Remove Differential EDMG MCS1

*Resolution:*

Rejected.

*Discussion:*

It was discussed in the group. The current approach uses Base MCS + 8 Differential MCSs in case of SU and Base MCS + 2 Differential MCSs in case of MU. Comparing to the approach with Base MCS + 7 Differential MCSs / Base MCS + 1 Differential MCS, it allows to select any MCS for the special stream 1, not the always the lowest MCS.

Assuming that this is more general approach and we still have enough bits in the headers (cost is 2 bits), we propose to keep the current definition.

**CID 1854**

*Comment:*

"pi/2-8PSK is not defined in EDMG Header-B.

So in MU-MIMO case, it is not clear how to apply pi/2-8PSK for each user."

*Proposed change:*

pi/2-8PSK shall be defined in EDMG Header-B since pi/2-8PSK is user specific information

*Resolution:*

Accepted.

*Editor: change the text as below, page 255, line 1, Table 40, [2]*

Table 40—EDMG-Header-B field structure and definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Scrambler Seed | 7 | 0 |  |
| PSDU Length | 22 | 7 | Length of the PSDU field in octets. |
| Base MCS | 5 | 29 | Generated from TXVECTOR parameter EDMG\_MCS. Indicates the lowest index of the modulation and coding scheme that is used to define the modulation and coding scheme of the spatial streams. |
| DifferentialEDMG-MCS1 | 2 | 34 | Generated from TXVECTOR parameter EDMG\_MCS. Each of the differential MCS subfields is set as follows:* 0: indicates the same MCS as the Base MCS subfield
* 1: indicates one higher order modulation than the Base MCS subfield with the same code rate
* 2: indicates two higher order modulation than the Base MCS subfield with the same code rate
* 3: indicates three higher order modulation than the Base MCS subfield with the same code rate

If the MCS indicated by the value of the Base MCS subfield has a code rate of 1/2, then each of the differential MCS subfields shall not be set to the value that indicates 64-QAM/NUC modulation. |
| DifferentialEDMG-MCS2 | 2 | 36 |
| Superimposed Code Applied | 1 | 38 | Corresponds to TXVECTOR parameter LDPC\_SUPERIMPOSED. If the LDPC code rate is 7/8 and this field is set to zero, it indicates puncturing code with codeword length 624 or 1248 is applied.If the LDPC code rate is 7/8 and this field is set to one, it indicates that superimposed code with codeword length 672 or 1344 is applied.In all other cases, this field is reserved. |
| NUC Applied | 1 | 39 | Corresponds to the TXVECTOR parameter NUC\_MOD. If this field is set to 1, NUC is applied at the transmitter for the MCSs indicated by the EDMG-MCS1 field or the EDMG-MCS2 field, if supported. If an indicated MCS does not support NUC, uniform constellation is applied for this particular MCS.If set to 0, uniform constellation is applied for MCSs signalled in the EDMG-MCS1 field and the EDMG-MCS2 field.  |
| π/2-8-PSK Applied | 1 | 40 | See Table 36. |
| Spoofing Error Length Indicator | 1 | 41 | If set to 0 in an EDMG OFDM PPDU, indicates that the spoofing error, defined as the difference between the PPDU duration calculated based on L-Header and the actual PPDU duration, is smaller than TOFDM-SYM, where TOFDM-SYM = TDFT + TGI, TDFT is the OFDM IDFT/DFT period and TGI is the guard interval duration, which is determined by bits B2 and B3 of the Last RSSI field within the L-Header of the PPDU. Otherwise, if set to 1 in an EDMG OFDM PPDU, indicates that the spoofing error is greater than or equal to TOFDM-SYM. For an EDMG SC PPDU, this field is reserved. |
| Reserved | 6 | 41 |  |
| CRC | 16 | 48 | Header Check sequence. Calculation of the header check sequence is defined in 20.3.7.  |

**CID 1662, 1663, 1664**

*Comment:*

Remove references to Table 36

*Proposed change:*

Remove reverence to Table 36 and place the appropriate description texts for "Channel Aggregation", "BW", and "Primary Channel Number" fields. This will improve readability.

Remove reverence to Table 36 and place the appropriate description texts for "Channel Aggregation", "BW", and "Primary Channel Number" fields. This will improve readability.

Remove reverence to Table 36 and place the appropriate description texts for "Channel Aggregation" and "Primary Channel Number" fields. This will improve readability.

*Resolution:*

Rejected.

*Discussion:*

The reference to Table 36, reduces the number of places where we have a duplicated text. If one changes the text in Table 36, then one needs to change it in all other places where it is duplicated. This creates the source of mistakes in the draft. To avoid this, it was decided to use references.

**CID 1606**

*Comment:*

There are more parameters that can change for A-PPDU transmission

*Proposed change:*

Add e.g. TRN configuration P, M, N as those values are reserved if TRN LENGTH is zero. Same for "number of transmit chains", "DMG TRN", ...

*Resolution:*

Accepted.

*Editor: change the text as below, page 247, line 13, [2]*

In case of an EDMG A-PPDU, the SU/MU Format field shall be set to 0. Except for the PSDU Length, EDMG-MCS, EDMG TRN Length, RX TRN-Units per Each TX TRN-Unit, EDMG TRN-Unit P, EDMG TRN-Unit M, EDMG TRN-Unit N, TRN Subfield Sequence Length, TRN-Unit RX Pattern, EDMG Beam Tracking Request, EDMG Beam Tracking Request Type, DMG TRN, and Additional EDMG PPDU fields, all fields in an EDMG-Header-A contained in an EDMG A-PPDU shall have the same value as in the EDMG-Header-A of the preceding EDMG PPDU within the A-PPDU, if any. The EDMG TRN Length field shall be set to 0 for all EDMG PPDUs, except for the last EDMG PPDU where it may be set to a nonzero value. This implies that the RX TRN-Units per Each TX TRN-Unit, EDMG TRN-Unit P, EDMG TRN-Unit M, EDMG TRN-Unit N, TRN Subfield Sequence Length, TRN-Unit RX Pattern, EDMG Beam Tracking Request, EDMG Beam Tracking Request Type, and DMG TRN shall be reserved for all EDMG PPDUs, except the last EDMG PPDU.

**CID 1088**

*Comment:*

"The amendment includes 3 occurrences of ""TBD""

pp 253 line 29

pp 262 line 16

pp 262 line 18"

*Proposed change:*

Replace TBD or delete them.

*Resolution:*

Resolved.

P 253, line 29, resolved as a part of CID 1427, 1562, 1607, 1669, 1913, 2087, 2225, and 2333.

P 262, line 18 and 26, resolved as a part of (11-18-0167-00-00ay-mask-comments-resolution).

**CID 1857**

*Comment:*

In clause 30.3.7, CTCS is not defined in Tables 51, 52 and 53 and not described in the text.

*Proposed change:*

"In the CTCS Description column in Tables 51, 52 and 53 change the text to read "" The Control Trailer Check Sequence (CTSC) is computed as defined in section 20.3.7""

Add a note in section 20.3.7 stating CTSC uses the CRC-16 the same as HCS."

*Resolution:*

Revised.

*Editor: change the text as below, page 266, line 2, page 267, line 1, 3, and page 268, line 1, Table 51, 52, and 53, [2]*

Table 51—Control trailer definition when CT\_TYPE is CTS\_DTS

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Channel Aggregation | 1 | 0 | See Table 36 |
| BW | 8 | 1 | See Table 36 |
| Primary Channel Number | 3 | 9 | See Table 36 |
| SISO/MIMO | 1 | 12 | Set to 0 to indicate that the following transmission from this STA is performed in SISO. Set to 1 to indicate that the following transmission from this STA is performed in MIMO. |
| SU/MU MIMO | 1 | 13 | Set to 0 to indicate SU-MIMO, and set to 1 to indicate MU-MIMO. Reserved when SISO/MIMO field is set to 0. |
| EDMG Group ID | 8 | 14 | This field indicates the MU-MIMO group of STAs that will be involved in the following MU-MIMO transmission. Reserved when the SU/MU MIMO field is set to 0. |
| Reserved | 106 | 22 | Set to 0 by the transmitter and ignored by the receiver. |
| CTCS | 16 | 128 | Control Trailer Check Sequence (CTCS) is a CRC-16 computed over the content of the control trailer. The CRC-16 is computed as defined in section 20.3.7. |

Table52—Control trailer definition when CT\_TYPE is GRANT\_RTS\_CTS2self

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Number of bits | Start bit | Description |
| Channel Aggregation | 1 | 0 | See Table 36 |
| BW | 8 | 1 | See Table 36 |
| Primary Channel Number | 3 | 9 | See Table 36 |
| SISO/MIMO | 1 | 12 | Set to 0 to indicate that the following transmission from this STA is performed in SISO. Set to 1 to indicate that the following transmission from this STA is performed in MIMO. |
| SU/MU MIMO | 1 | 13 | Set to 0 to indicate SU-MIMO, and set to 1 to indicate MU-MIMO. Reserved when SISO/MIMO is set to 0. |
| TX Sector Combination Index | 6 | 14 | Indicates the TX sector combination (as defined in 9.4.2.253) and the corresponding RX AWVs to be used in the following SU-MIMO transmission. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 1. |
| EDMG Group ID | 8 | 20 | Indicates the EDMG Group ID of target MU group. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 0. |
| MU-MIMO Transmission Configuration Type | 1 | 28 | Sets to 1 to indicate the MU-MIMO transmission configuration was obtained from the MU-MIMO BF training of downlink type; sets to 0 to indicate the MU-MIMO transmission configuration was obtained from MU-MIMO BF training of uplink type. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 0. |
| MU-MIMO Transmission Configuration Index | 3 | 29 | Indicates the MU-MIMO transmission configuration (as defined in 9.4.2.262) to be used in the following MU-MIMO transmission. Reserved if the SISO/MIMO field is set to 0 or the SU/MU MIMO field is set to 0. |
| Reserved | 96 | 32 | Set to 0 by the transmitter and ignored by the receiver. |
| CTCS | 16 | 128 | Control Trailer Check Sequence (CTCS) is a CRC-16 computed over the content of the control trailer. The CRC-16 is computed as defined in section 20.3.7. |

Table 53—Control trailer definition when CT\_TYPE is SPR

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| Channel Aggregation | 1 | 0 | See Table 36 |
| BW | 8 | 1 | Indicates the requested channel width or channel number of the allocation.If the IsChannelNumber field is set to 1, the BW field indicates the requested channel number for the allocation per the channel numbers defined in Annex E.If the IsChannelNumber field is set to 0, the BW field indicates a channel width using the bitmap format of the BW field defined in Table 36. In this case, the channel width can be allocated on any channel number. |
| Primary Channel Number | 3 | 9 | See Table 36 |
| IsChannelNumber | 1 | 12 | Indicates whether the value in the BW subfield represents a channel width or a channel number (see 11.4.13.3).  |
| Reserved | 115 | 13 | Set to 0 by the transmitter and ignored by the receiver. |
| CTCS | 16 | 128 | Control Trailer Check Sequence (CTCS) is a CRC-16 computed over the content of the control trailer. The CRC-16 is computed as defined in section 20.3.7. |

**CID 1564**

*Comment:*

The description about control trailer is wrong :"The control trailer is one LDPC codeword with 18 data octets and 21 parity octets. "

*Proposed change:*

Please fix it

*Resolution:*

Rejected.

*Discussion:*

It is not clear what is wrong and what should be fixed. The CID should be more specific.

**CID 1505**

*Comment:*

The rate-7/8 matrix in Table 50 doesn't have approximate lower triangular (trapezoid) form, while all the other matrices in DMG and EDMG are approximate lower triangular. This may complicate the encoding process.

*Proposed change:*

Switch the 1st row with the 2nd in table 50. Switch each 0 with 1 on the 1st and 3rd rows in Table 49. These changes result in only the re-arrangement (re-order) of the parity bits, and may not affect the performance.

*Resolution:*

Rejected.

*Discussion:*

The low triangular form of the macro matrix (defining cyclic shifts, not a final bit matrix), does not guarantee that after substitution of permutation matrices Pi into it, the final bit matrix will have a low triangular form.

To get a low triangular bit matrix, one always needs to permute the rows.

Propose to keep the definition of the matrix as it is in the spec today.

**SP:**

Do you agree to accept the proposed resolutions for CIDs 1298, 2067, 1804, 1907, 2068, 2069, 2070, 1447, 1548, 2071, 1908, 2072, 1171, 1299, 1301, 1448, 1666, 1810, 2073, 2074, 2075, 1502, 1577, 1603, 1450, 1274, 1277, 1449, 2078, 1275, 1276, 1451, 1452, 1909, 1604, 1503, 2076, 1667, 1811, 1839, 1840, 2077, 1453, 2082, 1278, 2083, 1032, 1085, 1279, 1302, 1303, 1304, 1305, 1454, 2084, 1830, 1427, 1562, 1607, 1669, 1913, 2087, 2225, 2333, 2085, 2086, 2088, 1608, 1831, 1806, 1585, 1586, 1583, 1829, 1612, 1856, 1014, 1306, 1854, 1662, 1663, 1664, 1606, 1088, 1857, 1564, 1505 in (11-18-0210-02-00ay CID Resolution - Part III)?

**References:**

1. 11-18-0067-01-00ay-11ay-d1-0-comment-database
2. Draft P802.11ay\_D1.0