IEEE P802.11
Wireless LANs

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| Clarification on EDMG-MCS Field Definition |
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Abstract

This document provides a clarification on differential EDMG-MCS signalling defined in D1.2 in Table 43 and Table 46.

*Discussion:*

The Table 43 in D1.2 defines the rules for Differential EDMG-MCS signalling. It introduces four levels of modulation, but for EDMG SC mode standard defines five modulation types with different number of bits per constellation point, namely, π/2-BPSK (1 bit), π/2-QPSK (2 bits), π/2-8-PSK (3 bits), π/2-16-QAM (4 bits), π/2-64-QAM (6 bits) (or π/2-64-NUC).

For example, if Base MCS defines the π/2-QPSK modulation type and Differential EDMG-MCS is set to 1, it is not clear should we change the modulation type to π/2-8-PSK (3 bits) or π/2-16-QAM (4 bits). The proposed changes below clarify the rules.

*Editor: introduce changes in Table 43 as shown below*

Table 43—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.Each Differential EDMG-MCSiSS subfield, 1 ≤ *iSS* ≤ 8, defines the modulation and coding scheme for spatial stream *iSS*, respectively. All spatial streams have the same code rate defined by the Base MCS subfield. A Differential EDMG-MCSiSS subfield is reserved if spatial stream *iSS* is not defined. The rules for Differential EDMG-MCS fields signaling are defined in Table 44 and Table 45 for EDMG SC and EDMG OFDM modes accordingly. The Differential EDMG-MCS indicates the possible modulation change relative to one defined by the Base MCS.  |
| 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 |

*Editor: add Tables 44 and 45 as below*

Table 44— Rules for differential EDMG-MCS signaling for EDMG SC mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Base MCS modulation type** | **Differential EDMG-MCS = 0** | **Differential EDMG-MCS = 1** | **Differential EDMG-MCS = 2** | **Differential EDMG-MCS = 3** |
| π/2-BPSK | π/2-BPSK | π/2-QPSK | π/2-16-QAM | π/2-64-QAM orπ/2-64-NUC1 |
| π/2-QPSK | π/2-QPSK | π/2-16-QAM | π/2-64-QAM orπ/2-64-NUC | NA2 |
| π/2-8-PSK | π/2-8-PSK | NA | NA | NA |
| DCM π/2-BPSK3 | DCM π/2-BPSK | NA | NA | NA |
| π/2-16-QAM | π/2-16-QAM | π/2-64-QAM orπ/2-64-NUC | NA | NA |
| π/2-64-QAM | π/2-64-QAM | NA | NA | NA |
| π/2-64-NUC | π/2-64-NUC | NA | NA | NA |

NOTE 1 – the π/2-64-QAM or π/2-64-NUC modulation type is selected based on the NUC Applied field in the EDMG-Header-A.

NOTE 2 – the “NA” entry in the Table 44 denotes the not allowed mode of transmission.

NOTE 3 – the DCM π/2-BPSK modulation type is selected by setting the Base MCS modulation type to π/2-BPSK and DCM BPSK Applied filed to 1 in the EDMG-Header-A. This type of modulation is applied for SU PPDU transmission only.

Table 45— Rules for differential EDMG-MCS signaling for EDMG OFDM mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Base MCS modulation type** | **Differential EDMG-MCS = 0** | **Differential EDMG-MCS = 1** | **Differential EDMG-MCS = 2** | **Differential EDMG-MCS = 3** |
| DCM BPSK | DCM BPSK | DCM QPSK | 16-QAM | 64-QAM |
| DCM QPSK | DCM QPSK | 16-QAM | 64-QAM | NA1 |
| 16-QAM | 16-QAM | 64-QAM | NA | NA |
| 64-QAM | 64-QAM | NA | NA | NA |

NOTE 1 – the “NA” entry in the Table 45 denotes the not allowed mode of transmission.

*Editor: introduce changes in Table 46 as shown below*

**Table 46 - 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 in the range 1 – 4194303.  |
| 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 fields 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 field. The rules for Differential EDMG-MCS fields signaling are defined in Table 44 and Table 45 for EDMG SC and EDMG OFDM modes accordingly. The Differential EDMG-MCS indicates the possible modulation change relative to one defined by the Base MCS.If the number of spatial streams is 1 (per user), then the Differential EDMG-MCS2 field is reserved. |
| DifferentialEDMG-MCS2 | 2 | 36 |
| Superimposed Code Applied | 1 | 38 | See Table 43 |

**SP:**

Do you agree to accept the changes proposed in (11-18-1102-01-00ay Clarification on EDMG-MCS Field Definition) to the spec draft?

**References:**

1. Draft P802.11ay\_D1.2