IEEE P802.11  
Wireless LANs

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Abstract

This submission proposes the signalling for the number of transmit chains of a TRN field.

**30.2.2 30.2.2** **TXVECTOR and RXVECTOR parameters**

***Add one parameter in Table 8 as follows:***

Table 8—TXVECTOR and RXVECTOR parameters

| Parameter | Condition | Value | TXVECTOR | RXVECTOR |
| --- | --- | --- | --- | --- |
| FORMAT |  | Determines the format of the PPDU.  Enumerated type:  NON\_EDMG indicates Clause 20 or non-EDMG duplicate format. In this case, the modulation is determined by the NON\_EDMG\_MODULATION parameter.  EDMG indicates EDMG format. | Y | Y |
| NON\_EDMG\_MODULATION | FORMAT is NON\_EDMG | In TXVECTOR, indicates the format type of the transmitted non-EDMG PPDU.  In RXVECTOR, indicates the estimated format type of the received non-EDMG PPDU.  Enumerated type:  C\_MODE indicates Clause 20 control mode format  SC\_MODE indicates Clause 20 SC mode format  NON\_EDMG\_DUP\_C\_MODE indicates non-EDMG duplicate format | Y | Y |
| Otherwise | Not present | N | N |
| L\_LENGTH | FORMAT is NON\_EDMG | Indicates the length of the PSDU in octets in the range of 1 to 262 143. This value is used by the PHY to determine the number of octet transfers that occur between the MAC and the PHY. | Y | Y |
| Otherwise | Not present | N | N |
| L\_MCS | FORMAT is NON\_EDMG | Indicates the MCS used to transmit the PSDU as defined in Clause 20. | Y | Y |
| Otherwise | Not present | N | N |
|  | ***Editor Note: Need to add all DMG parameters from Table 20-1. EDMG parameters start from here.*** |  |  |  |
| EDMG\_TRN\_LEN | FORMAT is EDMG |  | Y | Y |
| RX\_TRN\_PER\_TX\_TRN | FORMAT is EDMG |  | Y | Y |
| EDMG\_TRN\_P | FORMAT is EDMG |  | Y | Y |
| EDMG\_TRN\_M | FORMAT is EDMG |  | Y | Y |
| EDMG\_TRN\_N | FORMAT is EDMG |  | Y | Y |
| TRN\_SEQ\_LENGTH | FORMAT is EDMG | Indicates the length of the Golay sequence to be used to transmit the TRN subfields present in the TRN field of the PPDU. Enumerated Type:   * Normal: The Golay sequence has a length of 128×*NCB*. * Long: The Golay sequence has a length of 256× *NCB*. * Short: The Golay sequence has a length of 64× *NCB*.   *NCB* represents the integer number of contiguous 2.16 GHz channels over which the TRN subfield is transmitted and 1 ≤ *NCB* ≤ 4. | Y | Y |
| TRN\_RX\_PATTERN | FORMAT is EDMG | Indicates the receive antenna pattern to be used when measuring TRN-Units present in a received PPDU.  Enumerated type:  Quasi-omni: Indicates that quasi-omni AWV should be used  Directional: Indicates that directed AWV should be used.  The parameter is valid only when the PACKET-TYPE is TRN-T-PACKET and EDMG\_TRN\_LEN is greater than 0. | Y | Y |
| EDMG\_BEAM\_TRACKING\_REQUEST | FORMAT is EDMG | This parameter indicates whether beam tracking is requested.  Enumerated type:  Beam Tracking Requested or Beam Tracking Not Requested | Y | Y |
| CONTROL\_TRAILER | FORMAT is NON\_EDMG | Indicates whether the control trailer is present in the PPDU:  Enumerated type:  Present  Not Present | Y | Y |
| Otherwise | Not present | N | N |
| CT\_TYPE |  | Indicates the content of the control trailer:  Enumerated type:  CTS\_DTS  GRANT\_RTS\_CTS2self  SPR | Y | Y |
| CH\_BANDWIDTH | FORMAT is EDMG | In the TXVECTOR, indicates the channel width of the transmitted PPDU. In the RXVECTOR, indicates the channel width of the received PPDU.  Enumerated type:  CBW216 for 2.16 GHz  CBW432 for 4.32 GHz  CBW648 for 6.48 GHz  CBW864 for 8.64 GHz  CBW216+216 for 2.16+2.16 GHz  CBW432+432 for 4.32+4.32 GHz | Y | Y |
| FORMAT is NON\_EDMG | In TXVECTOR, indicates the channel width of the transmitted PPDU.  In RXVECTOR, indicates the estimated channel width of the received PPDU.  Enumerated type:  CBW432, CBW638, CBW864, CBW216+216, or CBW432+432 | Y | Y |
| CH\_BANDWIDTH\_IN\_NON\_EDMG | FORMAT is NON\_EDMG | In the TXVECTOR, if present, indicates the channel width of the PPDU transmitted with DMG control modulation class in duplicated mode, which is signaled via the scrambling sequence or in the control trailer. In the RXVECTOR, if valid, indicates the channel width of the received PPDU, which is signaled via the scrambling sequence or in the control trailer. Enumerated type: CBW216, CBW432, CBW638, CBW864, CBW216+216, or CBW432+432 if NON\_EDMG\_MODULATION equals NON\_EDMG\_DUP\_C\_MODE | O | Y |
| Otherwise | Not present | N | N |
| EDMG-ADD-PPDU | FORMAT is EDMG | Enumerated Type:  ADD-PPDU indicates that this EDMG PPDU is immediately followed by another EDMG PPDU with no IFS or preamble on the subsequent EDMG PPDU.  NO-ADD-PPDU indicates no additional EDMG PPDU follows this EDMG PPDU. | Y | Y |
| NUM\_TX\_CHAIN | FORMAT is EDMG and EDMG\_TRN\_LEN >0 and EDMG\_BEAM\_TRACKING\_REQUEST is set to Beam Tracking Requested | The value of this field indicates the number of transmit chains used in the transmission of the PPDU. | Y | Y |

**30.9.2.2.6 TRN subfield definition**

***Change the 4th paragraph as follows:***

Table 49 defines the TRNiSTS subfield that shall be used for given total number of space-time streams and space-time stream number *iSTS*, 1 ≤ *iSTS* ≤ 8. The total number of transmit chains is the value indicated in the TXVECTOR or RXVECTOR NUM\_TX\_CHAIN

**-------------------------------------------------------------------------------------------------------------------30.3.3.3.2.3 Definition for EDMG SC mode and EDMG OFDM mode PPDUs**

***Change Table 17 as follows:***

1. 7—EDMG-Header-A field structure and definition for a SU PPDU

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| SU/MU Format | 1 | 0 | Indicates whether the PPDU is a SU PPDU or a MU PPDU. Set to 0 to indicate a SU PPDU and set to 1 otherwise. |
| Channel Aggregation | 1 | 1 | Set to 0 to indicate that the BW field specifies a 2.16 GHz, 4.32 GHz, 6.48 GHz or 8.64 GHz channel PPDU. Set to 1 to indicate that the BW field specifies a 2.16+2.16 GHz or 4.32+4.32 GHz PPDU. |
| BW | 8 | 2 | A bitmap constructed from the CH\_BANDWIDTH parameter in the TXVECTOR and that indicates the 2.16 GHz channel(s) over which the PPDU is transmitted on. If a bit is set to 1, it indicates that the corresponding channel is used for the PPDU transmission; otherwise if the bit is set to 0, the channel is not used. Bit 0 corresponds to channel 1, bit 1 corresponds to channel 2, and so on. |
| Primary Channel Number | 3 | 10 | Contains the 3 LSBs of the primary channel number of the BSS minus one |
| Beamformed | 1 | 13 | Set to 1 to indicate that channel estimate smoothing is recommended. Set to 0 otherwise. |
| Short/Long LDPC | 1 | 14 | Indicates the LDPC codeword length used in the PSDU. Set to 0 for LDPC codeword of length 672. Set to 1 for LDPC codeword of length 1344. |
| STBC Applied | 1 | 15 | If set to 1, indicates that STBC was applied at the transmitter. Otherwise, set to 0. |
| PSDU Length | 22 | 16 | Length of the PSDU field in octets. |
| Number of SS | 3 | 38 | The value of this field plus one indicates the number of SSs transmitted in the PPDU. |
| EDMG-MCS | 21 | 41 | If the number of SSs, as indicated by the Number of SS field, is 4 or less, the EDMG-MCS field is as defined in Table 18. Otherwise, the EDMG-MCS field is as defined in Table 19. |
| DCM SQPSK Applied | 1 | 62 | If set to 1, indicates that DCM SQPSK (30.5.7.4.2) was applied at the transmitter. Otherwise, set to 0. |
| NUC Applied | 1 | 63 | If any of the MCSs indicated within the EDMG-MCS field does not support non-uniform constellation, uniform constellation is applied for all MCSs and this field is reserved.  Otherwise and if this field is set to 1, non-uniform constellation is applied at the transmitter for the MCSs indicated within the EDMG-MCS field. If set to 0, uniform constellation was applied. |
| EDMG TRN Length | 8 | 64 | Indicates the number of TRN-Units present in the TRN field of the PPDU. |
| RX TRN-Units per Each TX TRN-Unit | 8 | 72 | This field is reserved if the value of the EDMG TRN Length field is 0. Otherwise, the value of this field plus one indicates the number of consecutive TRN-Units in the TRN field for which the transmitter remains with the same transmit AWV. |
| EDMG TRN-Unit P | 2 | 80 | For EDMG BRP-TX and EDMG BRP-RX/TX packets, the value of this field describes the number of TRN subfields in a TRN-Unit which are transmitted with the same AWV as the preamble and data field, as defined in 30.9.2.2.5. Possible values for this field are:   * 0: indicates zero TRN subfields * 1: indicates one TRN subfield * 2: indicates two TRN subfields * 3: indicates four TRN subfields   For EDMG BRP-RX packets, this field is reserved. |
| EDMG TRN-Unit M | 4 | 82 | For EDMG BRP-TX packets, the value of this field plus one indicates the number of TRN subfields in a TRN-Unit in which the transmitter may change AWV at the beginning of each TRN subfield transmission, as defined in 30.9.2.2.5. For EDMG BRP-RX/TX packets, the value of this field plus one indicates the number of TRN subfields in a TRN-Unit transmitted with the same AWV following a possible AWV change, as defined in 30.9.2.2.5. For EDMG BRP-RX packets, this field is reserved. |
| EDMG TRN-Unit N | 2 | 86 | For EDMG BRP-TX packets, the value of this field indicates the number of consecutive TRN subfields within EDMG TRN-Unit M which are transmitted using the same AWV, as defined in 30.9.2.2.5. Possible values for this field are:   * 0: indicates one TRN subfield * 1: indicates two TRN subfields * 2: indicates three TRN subfields if EDMG TRN-Unit M is equal to 3, 6, 9 or 12; indicates eight TRN subfields if EDMG TRN-Unit M is equal to 8 or 16. * 3: indicates four TRN subfields   For EDMG BRP-RX and EDMG BRP-RX/TX packets, this field is reserved. |
| TRN Subfield Sequence Length | 2 | 88 | This field is reserved if the value of the EDMG TRN Length field is 0. Otherwise, this field indicates the length of the Golay sequence used to transmit the TRN subfields present in the TRN field of the PPDU and is set as follows:   * Set to 0 to indicate normal sequence length of 128× *NCB* * Set to 1 to indicate long sequence length of 256× *NCB* * Set to 2 to indicate short sequence length of 64× *NCB* * Value 3 is reserved   *NCB* represents the integer number of contiguous 2.16 GHz channels over which the TRN subfield is transmitted and 1 ≤ *NCB* ≤ 4. |
| TRN-Unit RX Pattern | 1 | 90 | If set to 1 in a BRP-TX packet, indicates that the measurements of the TRN-Units is to be done using a quasi-omni antenna pattern. Otherwise if set to 0 in a BRP-TX packet, indicates that the measurements of the TRN-Units is to be done using a directional AWV receive antenna configuration. For all other cases, this field is reserved. |
| EDMG Beam Tracking Request | 1 | 91 | Corresponds to the TXVECTOR parameter EDMG\_BEAM\_TRACKING\_REQUEST.  Set to 1 to indicate the need for beam tracking (10.38.7); otherwise, set to 0.  The EDMG Beam Tracking Request field is reserved when the EDMG TRN Length field is 0. |
| Phase Hopping | 1 | 92 | If set to 1 in an EDMG OFDM mode PPDU, this field indicates that phase hopping is used. 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 | 93 | 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. Otherwise, open loop precoding is not used. If the Phase Hopping field is reserved, this field is also reserved. |
| Additional EDMG PPDU | 1 | 94 | A value of 1 indicates that this EDMG PPDU is immediately followed by another EDMG PPDU with no IFS or preamble in between the PPDUs. A value of 0 indicates that no additional EDMG PPDU follows this EDMG PPDU. |
| Number of transmit chains | 3 | 95 | 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 subfield as defined in 30.9.2.2.6  This field is reserved when the EDMG TRN Length field is set to 0 or EDMG Beam Tracking Request is set to 0. |
| Reserved | 14 | 98 | Set to 0 by the transmitter and ignored by the receiver. |
| CRC | 16 | 112 | Header Check sequence. Calculation of the header check sequence is defined in 20.3.7. |