IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution of “Procedures common to the DCF and EDCAF” related CIDs | | | | |
| Date: 2018-02-25 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Oren Kedem | Intel |  |  | oren.kedem@intel.com |
| Carlos Cordeiro | Intel |  |  | carlos.cordeiro@intel.com |
| Solomon Trainin | Qualcomm |  |  | strainin@qti.qualcomm.com |
|  |  |  |  |  |

Abstract

This submission proposes resolutions to 1473,1474, 1641,1957,1958,1959,1963,2120,2121,2122,2123, 2124,2247, 2248,2249, 2250, 2251, 2253, 2254, 1568, 1569, 1573 CIDs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1473 | 10.3.2.14 | I think by "to the desired channel bandwidth" we mean to say "the channel bandwidth of the packet to be transmitted after receiving a corresponding CTS frame". | Clarify. | Revised    As proposed in the above text:  An EDMG STA transmitting an RTS frame carried in non-EDMG duplicate format and addressed to an EDMG STA in order to establish TXOP for transmission of only SISO PPDU, shall set the TXVECTOR parameter CH\_BANDWIDTH to the set of channels **as achieved according to rules specified in 10.22.2.12**. |
| 1474 | 10.3.2.14 | "the transmitting EDMG STA shall set the TXVECTOR parameter SCRAMBLER\_ INIT\_SETTING to Channel\_BW." This is ambiguous. | Specify how this is done or provide a reference. | Revised:  Definition of SCRAMBLER\_ INIT\_SETTING was changed to accomodate |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1641 | 10.3.2.7 | The wording is confusing, does the CTS can have different bandwidth or not? I guess, dynamic bandwidth is allowed? | Please clarify | Revised: |
| 1957 | 10.3.2.7 | CH\_BANDWIDTH parameter in RXVECTOR may not indicate actual channel width the RTS is sent. It should be CH\_BANDWIDTH\_IN\_NON\_EDMG instead | Replace CH\_BANDWIDTH by CH\_BANDWIDTH\_IN\_NON\_EDMG |
| 1958 | 10.3.2.7 | CH\_BANDWIDTH parameter in RXVECTOR may not indicate actual channel width the RTS is sent. It should be CH\_BANDWIDTH\_IN\_NON\_EDMG instead | Replace CH\_BANDWIDTH by CH\_BANDWIDTH\_IN\_NON\_EDMG |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1959 | 10.3.2.7 | Align with already established scrambler encoding | replace by "CBW216, CBW432, CBW648, CBW864, CBW216+216, or CBW432+432" |  |
| 1963 | 10.3.2.7 | Align with already established scrambler encoding | replace by "CBW216, CBW432, CBW648, CBW864, CBW216+216, or CBW432+432" |  |
| 2120 | 10.3.2.7 | "If a DMG CTS frame or a DMG DTS frame is transmitted in a non-EDMG duplicate PPDU (channel width equal to 4.32 GHz or wider), the transmitting EDMG STA shall set the TXVECTOR parameter  CH\_BANDWIDTH\_IN\_NON\_EDMG equal to the CH\_BANDWIDTH parameter."    It is not clear what is the diffrence beween CH\_BANDWIDTH\_IN\_NON\_EDMG and CH\_BANDWIDTH parameter. The CH\_BANDWIDTH\_IN\_NON\_EDMG indicates the channel width of the PPDU transmitted with DMG control modulation in duplicate mode which is what the DMG CTS and DMG DTS frames are used. CH\_BANDWIDTH on the other hand indicates the channel width of the transmitted PPDU that may take EDMG format or NON\_EDMG format....is the case above referring to the CH\_BANDWIDTH with NON\_EDMG format? If yes, please be specific. | As suggested |  |
| 2121 | 10.3.2.14 | "If a DMG CTS frame or a DMG DTS frame is transmitted in a non-EDMG PPDU (channel width equal to 2.16 GHz), the transmitting EDMG STA may set the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_EDMG equal to the CH\_BANDWIDTH parameter."    I assume the above statement is referring to the case where the CH\_BANDWIDTH parameter with condition of FORMAT is NON\_EDMG. However, in page 225, the value column for this parameter does not have CBW216. Also why may is used and not shall? if it is not not set to equal to CH\_BANDWIDTH, what else it should set | clarify |  |
| 2122 | 10.3.2.7 | "Otherwise, the STA shall not respond with a DMG CTS frame. The STA may respond with a DMG DTS frame in a non-EDMG or non-EDMG duplicate PPDU after a SIFS. The DMG DTS frame's TXVECTOR parameter CH\_BANDWIDTH shall be set to be equal or less than the value of the RTS frame's RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_EDMG." The CH\_BANDWIDTH\_IN\_NON\_EDMG should be CH\_BANDWIDTH | as suggested |  |
| 2123 | 10.3.2.14 | "An EDMG STA transmitting an RTS frame carried in non-EDMG duplicate format and addressed to an  EDMG STA shall set the TXVECTOR parameter CH\_BANDWIDTH to the desired channel bandwidth.".  This statement is not consistent to the text on page 105 line 23.  To make it consistent, it should read "  An EDMG STA transmitting an RTS frame carried in non-EDMG duplicate format and addressed to an  EDMG STA shall set the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NONE\_EDMG equal to the CH\_BANDWIDTH". | as suggested |  |
| 2124 | 10.3.2.14 | The use of CH\_BANDWIDTH\_IN\_NON\_EDMG and CH\_BANDWIDTH parameter is not consistent as noticed in clause 10.3.2.7. Simialry this applies to 10.7.6. If there is indeed issue, the spec needs to carefully review with these parameters | Fix it |  |
| 2247 | 10.3.2.7 | RXVECTOR should be CH\_BANDWIDTH\_IN\_NON\_EDMG | change to CH\_BANDWIDTH\_IN\_NON\_EDMG |  |

**Revised:**

Suggested new definition of TXVECTOR parameters

CH\_BANDWIDTH – the set of channels on which the frame is transmitted

CH\_BANDWIDTH\_SIGNALING – Encoded value represent the set of channels on which the frame is transmitted.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2248 | 10.3.2.7 | DMG DTS should not be sent in duplicate because the NAV/NAV-SA/NAV-DA conveyed in DTS is of primary channel. If a legacy OBSS STA y receives a DTS from STA x on y's primary channel which is x's secondary channel, STA y may set NAV and prevent its transmission even if STA y senses CCA clear on its primary channel. | Specify DMG DTS is only sent on primary channel | Rejected: |
| 2250 | 10.3.2.7 | This bullet should not exist because STA does not mainatin NAV on secondary channels | remove the bullet | Rejected |

**Discussion:**

There is a motivation to send the DTS in multiple channels in order to cancel the RTS sent in multiple channels.

The rules to send the DTS allow below options:

* Sending DTS in non-EDMG on primary
* Sending DTS in non-EDMG duplicate mode on multiple channels with NAV=0
* Sending DTS in non-EDMG duplicate mode on multiple channels with accurate NAV per channel

11ay does not require STA to maintain NAV on secondary but does not disallow it, STA implementation may maintain NAV on secondary and make a good use of it.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2249 | 10.3.2.7 | NAV-TA | Should be NAV-SA | Accepted: |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2251 | 10.3.2.7 | A STA shall not respond DMG DTS to RTS with SU/MU MIMO field set to 1 in CT. This interferes with simultaneous CTS from other STAs in the same group | add such requirement | Revised:  Below restriction was inserted:  An EDMG STA that is addressed by an RTS frame sent in non-EDMG duplicate PPDU **format to establish TXOP TXOP for transmission of only SISO PPDU** shall behave as follows:  And below rule:  An EDMG STA that is addressed by an RTS frame sent to establish TXOP for transmission of MIMOO PPDU shall follow the procedure defined in section 10.36.11.4. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2253 | 10.3.2.14 | Not clear why SCAMBLER\_INIT\_SETTING cannot be set to Control\_trailer | add 'or Control\_trailer' | Rejected:  Auther intention is that SISO TXOP shall not be used with Control Trailer and only with Channel\_BW. The CT doesn’t add any additional information on top of Channel\_BW |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2254 | 10.3.2.7 | How can header-A and CT both present? | clarify the requirement | Revised:  Requirement that handle the conflict of both option was removed since it is not feasible as commented. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1568 | 10.3.2.14 | please add 4.32+4.32 GHz case | add CBW432+432 | Revised:  Definition was changed and doesn’t require the modification |
| 1573 | 10.3.2.7 | please add 4.32+4.32 GHz case | add CBW432+432 | Revised:  Definition was changed and doesn’t require the modification |

**Discussion:**

TXVECTOR’s CH\_BANDWIDTH parameter indicated by the values CBW216, CBW432, CBW648, CBW864, CBW216+216 and CBW432+432 does not provide the information on which channels the PPDU should be transmitted. For example CBW216+216 could indicate PPDU in many channel numbers (1,3), (2,5), (4.5) etc.

TXVECTOR’s CH\_BANDWIDTH\_IN\_NON\_EDMG is assigned with the same value of CH\_BANDWIDTH parameter, however it cannot carry the same value as it is diffenrently encoded

Hence there is a need to redefine those parameters and modify the RTS/CTS sections accordingly.

**Proposed Text:**

**30.2.2 TXVECTOR and RXVECTOR parameters**

The parameters in Table 27 are defined as part of the TXVECTOR parameter list in the PHY-  
TXSTART.request primitive and/or as part of the RXVECTOR parameter list in the PHY-  
RXSTART.indication primitive.

The value of the CH\_BANDWIDTH parameter in the TXVECTOR and RXVECTOR defines the value  
that the *NCB* parameter takes in the EDMG PHY definition throughout this clause. The *NCB* parameter  
represents the number of contiguous 2.16 GHz channels used for a transmission. For example, if the CH\_BANDWIDTH parameter is set to “010000” or “010010”, then *NCB* is set to 1. If the CH\_BANDWIDTH parameter is set to “011000” or “110011”, then *NCB* is set to 2. If the CH\_BANDWIDTH parameter is set to “001110” , then *NCB* is set to 3, and if the CH\_BANDWIDTH parameter is set to “011110”, then *NCB* is set to 4.

**Table 27 —TXVECTOR and RXVECTOR parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **RXVECTOR** | **TXVECTOR** |
| CH\_BANDWIDTH | FORMAT is EDMG | In the TXVECTOR, indicates the set of channels on which the PPDU is transmitted and the value of BW field in EDMG Header-A. In the RXVECTOR, indicates the value of the BW field in the EDMG Header-A of a received PPDU.  Enumerated type: Bitmap defined as the BW field specified in Table 36. | Y | Y |
| FORMAT is NON\_EDMG | In the TXVECTOR, indicates the set of channels on which the PPDU is transmitted. In the RXVECTOR, indicates the estimated set of channels on which PPDU was received.  Enumerated type: Bitmap defined as the BW field specified in Table 36. | Y | Y |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **RXVECTOR** | **TXVECTOR** |
| CH\_BANDWIDTH\_SIGNALING | FORMAT is NON\_EDMG | Indicates the channel bandwidth signaling of the PPDU transmitted in NON\_EDMG\_DUP\_C\_MODE transmtited via the Channel\_BW field defined in Table 30. | Y | Y |

*Insert new parameter in TXVECTOR*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **RXVECTOR** | **TXVECTOR** |
| EDMG\_\_CHANNEL\_TYPE | FORMAT is EDMG | Indicates the transmission and reception type of the PPDU in case the number of channels indicated in CH\_BANDWIDTH is greater than 1.  Enumerated type:  CH\_BONDING,  CH\_AGGREGATION | Y | Y |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **RXVECTOR** | **TXVECTOR** |
| SCRAMBLER\_INIT\_SETTING | FORMAT is EDMG | Indicates the configuration of the Turnarround and Scrambler Initialization fields of a control mode PPDU as defined in Table 29:  Enumerated type:  EDMG-Header-A | Y | Y |
| FORMAT is NON\_EDMG | Indicates the configuration of the Scrambler  Initialization field of a control mode PPDU.  Enumerated types are:  In case NON\_EDMG\_DUP\_C\_MODE is Channel\_BW or Control\_Trailer  Otherwise is Scrambler | Y | Y |

Table 29 —Definition of Scrambler Initialization field when transmitted using the control mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Turnarround** | **Scrambler Initialization field** | | | | **Definition** |
| **B43** | **B0** | **B1** | **B2** | **B3** |
| 0 | 0 | 0 | R | R | Control\_Trailer:  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 | 0 | 1 | R | R | EDMG-Header-A:  Indicates the presence of the EDMG-Header-A field. This implies that the PPDU is an EDMG control mode PPDU. |
| 0 | 1 | 0 | R | R | Reserved |
| 0 | 1 | 1 | R | R | Reserved |
| 1 | B0 | B1 | B2 | B3 | Channel\_BW:  Indicate the presence of channel bandwidth information via the Scrambler Initialization field (see Table 30) |

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

**Table 36 —EDMG-Header-A field structure and definition for a SU PPDU**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Number of bits** | **Start bit** | **Description** |
| SU/MU Format | 1 | 0 | Generated from the NUM\_USERS parameter in the TXVECTOR. 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 | Generated from the EDMG\_CHANNEL\_TYPE parameter in the TXVECTOR.  Set to 0 in case EDMG\_BONDING.  Set to 1 in case EDMG\_AGGREGATION. |
| BW | 8 | 2 | A bitmap as indicated by CH\_BANDWIDTH parameter in the TXVECTOR which 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 | Corresponds to the TXVECTOR parameter PRIMARY\_CHANNEL. Contains the 3 LSBs of the primary channel number of the BSS minus one. |

**30.7 EDMG transmit procedure**

*Change line 20 in page 368 as follow*

The EDMG-STF and EDMG-CEF fields are not transmitted if total number of channels used for transmission as indicated in the CH\_BANDWIDTH parameter is equal to 1, EDMG\_MODULATION parameter is set to  
EDMG\_SC\_MODE, the number of space-time streams NUM\_STS is set to 1, and STBC is set to 0 (see  
30.2.2, Table 27).

**10.3.2.7 CTS and DMG CTS procedure***Change the subclause as follow*

An EDMG STA that is addressed by an RTS frame sent in non-EDMG duplicate PPDU format to establish TXOP for transmission of only SISO PPDUs shall behave as follows:

If the NAV in the primary channel indicates idle:

* STA shall respond with a DMG CTS in non-EDMG or non-EDMG duplicate PPDU format frame after a SIFS.

In case DMG CTS is sent in a non-EDMG duplicate PPDU format, TXVECTOR parameters shall follow below setting:

* SCRAMBLER\_INIT\_SETTING shall be set to indicate Channel\_BW
* CH\_BANDWIDTH shall be set to channels that were indicated by the RTS’s RXVECTOR CH\_BANDWIDTH SIGNALING encoded value as defined in Table 30 and that CCA of the channels were idle for a duration of PIFS prior to the start of the RTS frame.
* CH\_BANDWIDTH SIGNALING value shall be set to the encoded value of the set of channels indicated by the CH\_BANDWIDTH parameter as defined in Table 30.

Otherwise:

* The STA shall not respond with a DMG CTS frame.
* The STA may respond with a DMG DTS frame in a non-EDMG or non-EDMG duplicate PPDU after a SIFS.

In case the DMG DTS frame is sent in a non-EDMG duplicate PPDU format, TXVECTOR parameters shall be set as follows:

* SCRAMBLER\_INIT\_SETTING shall be set to Channel\_BW.
* CH\_BANDWIDTH shall be set to the channels that were indicated by the RXVECTOR parameter CH\_BANDWIDTH SIGNALING of the received RTS frame
* CH\_BANDWIDTH SIGNALING value shall be set to the encoded value of the set of channels indicated by the CH\_BANDWIDTH parameter as defined in Table 30.

In case an EDMG STA responds to an RTS frame with a DMG DTS frame, the following apply:

* The STA shall set the Duration, NAV-SA and NAV-DA fields of the DMG DTS frame to 0 if the STA’s NAV is 0 or a virtual CS is not maintained by the STA on the channel.
* The STA shall set the Duration field of the DMG DTS frame to the NAV remainder if the STA’s  
  NAV is nonzero on the channel.
* Nonzero NAV information maintaed on a specific channel (i.e. Duration, NAV-SA and NAV-DA) shall not be transmitted on other channels.

An EDMG STA that is addressed by an RTS frame sent to establish TXOP for transmission of at least one MIMO PPDU shall follow the procedure defined in section 10.36.11.4.

**10.3.2.14 EDMG RTS procedure**

*Change the subclause as follow*

An EDMG STA transmitting an RTS frame addressed to an EDMG STA in order to establish TXOP for transmission of only SISO PPDUs shall set the TXVECTOR parameter CH BANDWIDTH of the transmitted RTS frame according to rules specified in 10.22.2.12.

In case the number of channels set in CH\_BANDWIDTH is greater than 1:

* The RTS frame shall be sent in non-EDMG duplicate PPDU format.
* The TXVECTOR parameter SCRAMBLER\_INIT\_SETTING is set to Channel\_BW.
* CH\_BANDWIDTH SIGNALING value shall be set to the encoded value of the set of channels indicated by the CH\_BANDWIDTH parameter as defined in Table 30.

In case the number of channels set in CH\_BANDWIDTH is equal 1, STA may perform one of below options:

* Follow the procedure as defined above.
* Transmit the RTS in non-EDMG format and, in this case, the STA shall follow the procedure defined in 10.3.2.4.

A CF-End frame used to truncate a TXOP initiated by RTS frame carried in non-EDMG duplicate format shall be sent using a non-EDMG duplicate format. The TXVECTOR parameters CH\_BANDWIDTH and CH\_BANDWIDTH SIGNALING of the CF-End frame shall be set to channels that were used for transmission as indicated by the RXVECTOR parameter CH\_BANDWIDTH SIGNALING of the RTS frame.

An EDMG STA transmitting an RTS frame to establish TXOP for the transmission of at least one MIMO PPDU follows the procedure defined in 10.36.11.4.

**30.3.3.2.4 L-Header definition  
30.3.3.2.4.1 General**

*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, DMG DTS or CF-End 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.

**SP/M:** Do you accept the resolutions given in this document ?