IEEE P802.11  
Wireless LANs

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| Resolution of “Procedures common to the DCF and EDCAF” related CIDs | | | | |
| Date: 2018-02-25 | | | | |
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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.

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| **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 |

**D1.0 Text**

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.

**Revised text**

In order to establish TXOP for transmission of only SISO PPDUs with an EDMG STA, an EDMG STA shall transmit RTS frame with TXVECTOR parameter CH BANDWIDTH set according to rules specified in 10.22.2.12.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 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 indicate the available options |
| 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 | 1641 |

**D1.0 Text**

If an RTS frame is transmitted in a non-EDMG duplicate PPDU to establish a TXOP for transmission of  
only SISO PPDUs (CH\_BANDWIDTH\_IN\_NON\_EDMG equal to one of CBW216, CBW432, CBW638,  
CBW864, or CBW216+216), the transmitting EDMG STA shall set the TXVECTOR parameter  
SCRAMBLER\_ INIT\_SETTING to Channel\_BW.

**Revised with**

If the number of bits 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 shall be 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.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 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 | Revised |

**D1.0 Text**

If the NAV in the primary channel indicates idle, STA shall respond with a DMG CTS frame in a  
non-EDMG or non-EDMG duplicate PPDU format after a SIFS. The DMG CTS frame’s  
TXVECTOR parameter CH\_BANDWIDTH shall be set to the channel width for which their CCA  
on all secondary channels has been idle for a PIFS prior to the start of the RTS frame and that is  
less than or equal to the channel width indicated in the RTS frame’s RXVECTOR parameter  
CH\_BANDWIDTH

**Revised Text**

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.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 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 |  |
| 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 | Revised: |
| 2250 | 10.3.2.7 | This bullet should not exist because STA does not mainatin NAV on secondary channels | remove the bullet | Revised: |

**D1.0 Text**

* In case the Duration, NAV-RA and NAV-TA fields are different in different 2.16 GHz channels  
  indicated in the CH\_BANDWIDTH parameter in the RXVECTOR of the RTS frame a DMG DTS  
  frame is sent in response to, and a STA is not able to transmit DMG DTS frames that contain  
  different NAV-RA, NAV-TA, and Duration field values, the STA shall transmit the DMG DTS  
  frame in the primary channel only. The NAV-RA, NAV-TA, and Duration fields of the transmtited  
  DMG DTS frame are set as defined in the rules above for the primary channel.

**Discussion:**

There is a motivation to send the DTS in multiple channels in order to cancel the RTS NAV sent in multiple channels, however non-EDMG duplicate format doesn’t allow transmission of two different frames in different channels, frame must be duplicated. The rules to send the DTS was modified to allow below two options:

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

**Reviesed text:**

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, the STA shall set the Duration, NAV-SA and NAV-DA fields of the DMG DTS frame to zero value and shall set the TXVECTOR parameters 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.

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| **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" | Per comment 1957 |
| 1963 | 10.3.2.7 | Align with already established scrambler encoding | replace by "CBW216, CBW432, CBW648, CBW864, CBW216+216, or CBW432+432" | Per comment 1957 |
| 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 | Per comment 1957 |
| 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 | Per comment 1957 |
| 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 | Per comment 1957 |
| 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 | Per comment 1957 |
| 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 | Per comment 1957 |
| 2247 | 10.3.2.7 | RXVECTOR should be CH\_BANDWIDTH\_IN\_NON\_EDMG | change to CH\_BANDWIDTH\_IN\_NON\_EDMG | Per comment 1957 |

**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.

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

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| **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: |

**Revised Text**

In order to establish TXOP for transmission of only SISO PPDUs with an EDMG STA, an EDMG STA shall transmit RTS frame with TXVECTOR parameter CH BANDWIDTH set according to rules specified in 10.22.2.12.

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

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| **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. |

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2254 | 10.3.2.7 | How can header-A and CT both present? | clarify the requirement | Revised:  Requirement was removed. |

To provide complete bandwidth signaling information, the EDMG STA should include a control trailer in  
 the transmitted RTS frame using the procedure specified in 10.36.11.5. An EDMG STA that receives an  
 RTS frame containing a control trailer and that also contains bandwidth signaling in the PHY header shall  
 use the bandwidth signaling contained in the control trailer and ignore the one in the PHY header.

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| **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 and EDMG\_\_CHANNEL\_TYPE parameters 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. In case CH\_BANDWIDTH parameter is set to “011000”: if EDMG\_CHANNEL\_TYPE is set to CH\_AGGREGATION then *NCB* is set to 1, if EDMG\_CHANNEL\_TYPE is set to CH\_BONDING, then *NCB* is set to 2. If the CH\_BANDWIDTH parameter is set to “001110”, then *NCB* is set to 3. In case the CH\_BANDWIDTH parameter is set to “011110”: if EDMG\_CHANNEL\_TYPE is set to CH\_AGGREGATION then *NCB* is set to 2, if EDMG\_CHANNEL\_TYPE is set to CH\_BONDING, then *NCB* is set to 4.

**Table 27 —TXVECTOR and RXVECTOR parameters**

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| --- | --- | --- | --- | --- |
| **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 |

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| **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 via the Channel\_BW field defined in Table 30. | Y | Y |

*Insert new parameter in TXVECTOR*

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| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **RXVECTOR** | **TXVECTOR** |
| CHANNEL\_AGGREGATION | FORMAT is EDMG | Indicates the transmission and reception type of the PPDU in case the number of bits indicated in CH\_BANDWIDTH is more than 1.  Enumerated type:  AGGREGATE  NOT\_AGGREGATE | Y | Y |

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| **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 includes the 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

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| **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**

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| --- | --- | --- | --- |
| **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 CHANNEL\_AGGREGATE parameter in the TXVECTOR.  Set to 0 in case NOT\_AGGREGATE.  Set to 1 in case AGGREGATE. |
| 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 the number of bits set to 1 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, the STA shall set the Duration, NAV-SA and NAV-DA fields of the DMG DTS frame to zero value and shall set the TXVECTOR parameters 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.

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*

In order to establish TXOP for transmission of only SISO PPDUs with an EDMG STA, an EDMG STA shall transmit RTS frame with TXVECTOR parameter CH BANDWIDTH set according to rules specified in 10.22.2.12.

If the number of bits 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 shall be 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.

If the number of bits set in CH\_BANDWIDTH is equal 1, STA may perform one of below options:

* Follow the procedure as defined in the paragraph above.
* Transmit the RTS in non-EDMG format and shall follow the procedure defined in 10.3.2.4.

A CF-End frame sent 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 the same values as indicated by the RXVECTOR parameters of the DMG CTS frame if received or to the same values as indicated by the TXVECTOR parameters of the RTS frame otherwise.

An EDMG STA transmitting an RTS frame to establish TXOP for the transmission of at least one MIMO PPDU or SISO PPDU with Hybrid BF 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 ?