IEEE P802.11
Wireless LANs

|  |
| --- |
| Resolutions to CIDs related to TDD Scheduling, Channel Access and Power Save-Part 2 |
| Date: 2018-11-07 |
| Author(s): |
| Name | Company | Address | Phone | email |
| Cheng Chen | Intel |  |  | cheng.chen@intel.com |
| Oren Kedem | Intel |  |  | oren.kedem@intel.com |
| Carlos Cordeiro | Intel |  |  | carlos.cordeiro@intel.com |
| Claudio da Silva | Intel |  |  | claudio.da.dilva@intel.com |

Abstract

This submission proposes resolutions to 39 CIDs related to TDD scheduling, MIMO channel access and power save. These CIDs include:

3265 3437 3438 3439 3440 3441 3442 3483 3484 3485 3486 3490 3567 3568 3653 3691 3726 3096 3097 3261 3262 3294 3459 3360 3405 3406 3408 3417 3434 3436 3463 3474 3735 3664 3669 3716 3737 3738 3739

The CIDs are in reference to Draft IEEE 802.11ay/D2.0, the proposed resolutions are in reference to Draft IEEE 802.11ay/D2.1 and IEEE 802.11REVmd\_D1.5.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3265 | 10.40.11.4.3 P221 L6 | "and with a CSD between the transmissions in different antennas as defined in 29.4.7.2." | The CSD definitions don't seem to cover 4.32 GHz and wider channels. Define these. |

**Proposed resolution:** Revised.

Replace “and with a CSD between the transmissions in different antennas as defined in 29.4.7.2.” to “and with a CSD between the transmissions in different antennas as defined in 29.4.7.2 and 29.4.7.3.2.”.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3437 | 10.40.11.4.2 P220 L23 | The grant ack responding to MU-MIMO grant frame does not need to have a CT, because the opposite direction in MU only allows SISO PPDU | allow the STA uses SISO in opposite direction to send grant ack w/o CT |

**Proposed resolution:** Revised

*Change P221 L27-L46 in D2.1 as follows:*

If an EDMG STA receives a Grant frame with a control trailer indicating an SU-MIMO or MU-MIMO transmission, or hybrid beamforming training and is able to receive the SU-MIMO or MU-MIMO transmission or perform hybrid beamforming training at the target time indicated by the Grant frame, the EDMG STA shall:

* Transmit a Grant Ack frame in response to the received Grant frame. ~~For this transmitted Grant Ack frame, the TXVECTOR parameter SCRAMBLER\_INIT\_SETTING shall be set to CONTROL\_TRAILER and the parameter CT\_TYPE shall be set to GRANT\_RTS\_CTS2Self.~~
* In the case when the STA received a Grant frame with a control trailer indicating SU-MIMO transmission, for this transmitted Grant Ack frame, the TXVECTOR parameter SCRAMBLER\_INIT\_SETTING shall be set to CONTROL\_TRAILER and the parameter CT\_TYPE shall be set to GRANT\_RTS\_CTS2Self. ~~i~~If it uses SU-MIMO for the transmission in the opposite direction, i.e., from the responder to the initiator, or desires to announce the hybrid beamforming protocol in the opposite direction, the TXVECTOR parameter NEXT\_TX\_SISO of the Grant Ack shall be set to NextTxMultiAntenna. The control trailer shall also indicate the corresponding DMG antenna configuration for the upcoming SU-MIMO transmission or hybrid beamforming training in the opposite direction using the TXVECTOR parameter TX\_SECTOR\_CONFIG\_INDEX. If the responder STA intends to use SISO for the transmission in the opposite direction, the TXVECTOR parameter NEXT\_TX\_SISO of the Grant Ack shall be set to NextTxSingleAntenna.
* Configure its DMG antennas according to the settings included in the control trailer of the received Grant frame within a time period determined by the value of the Allocation Duration field plus the value of the Duration field of the received Grant frame starting from the PHY-TXEND.indication primitive of the Grant frame transmission.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3438 | 10.40.11.4.3 P221 L43 | If CTS-to-self is used to initiate SU-MIMO channel access, can the responding STA send SU-MIMO in opposite direction, as previously signaled in a grant ack CT? Based on L14 it seems allowed but no protection for SU-MIMO is performed, also no corresponding bullet mirroring L26 | Clarify whether SU-MIMO in opposite direction is allowed in case of CTS-to-self |

**Proposed resolution:** Revised

*Change P222 L22-L25 in D2.1 as follows:*

If an SU-MIMO initiator transmits a DMG CTS-to-self frame to a responder ~~and if the Grant Required field within the responder’s EDMG Capabilities element is 1~~, following an SU-MIMO transmission to the responder the initiator should configure its receive DMG antennas according to the settings included in the control trailer of the last Grant Ack frame received from the responder. The responder should use the same antenna setting indicated in the last transmitted Grant Ack frame to perform transmissions to the initiator in the opposite direction.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3439 | 10.40.11.4.4 P224 L17 | ...an MU group that the responder belongs to and is able to perform the MU-MIMO reception...' Such responder is required to send a CTS, but a STA belong to a MU group may not necessarily be a member of the specific MU-MIMO transmission configuration index. | allow such STA not belonging to the config index of the RTS not to respond CTS |

**Proposed resolution:** Revised

*Change P225 L17-L18 in D2.1 as follows:*

When ~~If~~ a responder receives an RTS frame addressed to an MU group and belongs to the corresponding MU-MIMO transmission configuration indicated in the Control Trailer, ~~that the responder belongs to and~~ if it is able to perform the MU-MIMO reception, the responder shall:

*Change P225 L33-L36 in D2.1 as follows:*

When a ~~A~~ responder ~~that~~ receives a DMG CTS-to-self frame addressed to an MU group and belongs to the corresponding MU-MIMO transmission configuration indicated in the Control Trailer, if it is able to perform the MU-MIMO reception, ~~that the responder belongs to~~ it shall configure its antennas according to the settings indicated in the RXVECTOR parameters MU\_MIMO\_TX\_CONFIG\_TYPE and MU\_MIMO\_TX\_CONFIG\_INDEX of the received CTS-to-self frame.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3440 | 10.40.11.4.4 P224 L21 | The scramble initiation in RTS indicates CT, but CTS has no CT in this case | The CTS is sent with CT echoing the RTS CT |

**Proposed resolution:** Revised

*Change P225 L19-L22 in D2.1 as follows:*

* Transmit a DMG CTS frame back to the initiator employing the most recent SISO antenna configuration used between the responder and the initiator. The TA field of the DMG CTS shall be set to the broadcast MAC address. ~~and the Scrambler Initialization field shall be set to the same value as the Scrambler Initialization field of the PPDU that contained the received RTS frame.~~

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3441 | 10.40.11.4.4 P224 L36 | 10%x(...) rule does not seem necessary for the case of CTS-to-self because the MU-PPDU following CTS-to-self is from the same transmitter, and no simultaneous CTS is performed by non-AP STAs | remove the requirement |

**Proposed resolution**: Revised

*Change P225 L33-L38 as follows:*

A responder that receives a DMG CTS-to-self frame addressed to an MU group that the responder belongs to shall configure its antennas according to the settings indicated in the RXVECTOR parameters MU\_MIMO\_TX\_CONFIG\_TYPE and MU\_MIMO\_TX\_CONFIG\_INDEX of the received CTS-to-self frame. The MU-MIMO transmission or hybrid beamforming shall begin a SIFS ~~+ 10% × (aSlotTime – aAirPropagationTime)~~ interval following the end of the DMG CTS-to-self frame transmission by the initiator. This is shown in Figure 124.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3442 | 10.40.11.4.3 P222 L1 | should be SU-MIMO reception | as in comment |

**Proposed resolution:** Accepted

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3483 | 9.4.2.267 P141 L21 | Table 22 refers to the Bitmap and Access Type Schedule field encoding, in later section in the document it is referred to slot types as of type simplex Rx and simples TX and referring to this table. It is not defined in the table which encoding represent simplex RX and which represent simplex TX. | Please redefine encoding 1 and 2 to show which is simplex RX and which is simplex TX. It is also possible to add a statement to define the type of slots in addition to the operation of the DMG AP/PCP and non-AP/PCP during the TDD slot. |

**Proposed resolution:** Revised

*TGay editor to change TX/RX to Simplex TX/Simplex RX in Table 22.*

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3484 | 9.4.2.267 P141 L21 | The Encoding 0 is defined as (N/A;TDD slot unassigned). If the only use of the encoding is to define the TDD slot as unassigned N/A should be removed | consider removing N/A and defining what is meant by unassigned |

**Discussion:**

1. N/A is placed there to indicate in this case there is no applicable behaviour of AP/PCP and non-AP and non-PCP STA.
2. The name “unassigned” already clearly indicates in this case the corresponding TDD slot is unassigned, i.e., not assigned to any STA.
3. When the type of the TDD slot is “unavailable”, the corresponding behaviour of both AP/PCP and non-AP/non-PCP STA should also be not applicable.

**Proposed resolution:** Revised

*TGay editor to add an “N/A” in the row corresponding to “Encoding 3” to indicate the behaviour in this case is also N/A.*

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3485 | 9.4.2.267 P141 L21 | Encoding 3 in Bitmap and Access Type Schedule field coding is defined as unavailable. The unavailable encoding need to be defined | define what is meant by unavailable |

**Discussion:**

1. Section 10.40.6.2.2 L26-L27 and L40-L42 in P215 in D2.1 already specifies the behaviour of AP/PCP and non-AP and non-PCP STA

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3486 | 9.4.2.267 P141 L29 | Padding is used to make the size of the Slot Category field an integer number and a reserved TDD slot category is used for that. There are 2 reserved field category. In case in the future one is used, it is better to decide on one reserved value, for example 3, to be used. | consider choosing one of the reserved values (3 for example) to be used for padding and keep the other value reserved for future use |

**Discussion:**

1. This should be done when we determine to use one of the reserved values for something else, and then we can choose the remaining one for the padding.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3490 | 10.40.11.4.2 P219 L13 | The STATE parameter of PHY-CCA.indication is BUSY if the assessment of the channel by the PHY determines that the channel on at least one of the MIMO TX antennas is not idle and is IDLE if the assessment of the channel on all of the MIMO TX antennas by the PHY determines that the channel is idle. It should be specified that this is for the MIMO TX antennas intended to be used.Also the statements about "MIMO channel was idle and busy for an interval of PIFS" should add (intended to be used) after mentioning the MIMO TX antennas | consider adding "intended to be used" after the MIMO TX antennas |

**Proposed resolution:** Accepted

*TGay editor to perform the changes as indicated in the proposed change.*

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3567 | 10.40.11.4.3 P221 L43 | Need to add the condition "and is able to perform the SU-MIMO reception or hybrid beamforming training," to the rule of responder that receives CTS-2-Self same as in RTS | Change to :A responder that receives a DMG CTS-to-self frame with a control trailer indicating a SU-MIMO44 transmission or hybrid beamforming training addressed to itself and is able to perform the SU-MIMO reception or hybrid beamforming training shall : |

**Proposed resolution:** Accepted

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3568 | 10.40.11.4.4 P221 L43 | Add rule for MU Responder that receives CTS-To-Self in addition to reception of RTS | As in comment |

**Discussion:**

1. The rules are already defined in L33-L38 in P225 (the third to last paragraph in section 10.40.11.4.4).

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3653 | 11.2.7.1 P314 L15 | Awake BI is scheduled by the DMG Wakeup Schedule element and the Table 11-3 (Power states for an awake BI) is part of the schedule. (IEEE P802.11-REVmd/D1.2, July 2018) The element and the table are not relevant for the scheduled access that the TDD access is part of. | Remove definitions of the TDD slots from the Table 11-3 Power states for an awake BI |

**Discussion:**

1. Table 11-3 applies to both SPs and CBAPs. Therefore, the table also captures power states for schedueled access.
2. All TDD operations happen in TDD SPs, which are also SPs. Since Table 11-3 applies to SPs, it naturally applies to TDD SPs too. The claim that “The DMG Wakeup Schedule elment and Table 11-3 are not relevant for the scheduled access that the TDD access is part of” is not true and lacks justification.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3691 | 10.40.11.4.4 P224 L26 | It should be mentioned that a successful reception of DMG CTS is not required since requirements of a time difference of T\_GInormal at initiator is very challenging. Note, that T\_Gi normal is 1/3 of airPropagationTime | As in comment, add e.g. "NOTE: A successful reception of DMG CTS frames at the initiator is not required for MU-MIMO access procedure" |

**Proposed resolution:** Revised

*Add the following note before the last paragraph of 10.40.11.4.4 in D2.1:*

Note: If the RTS/CTS frame exchange is used in the MU-MIMO channel access, a successful reception of DMG CTS frame at the initiator is not required for MU-MIMO channel access procedure.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3726 | 10.43.9.3.1 P270 L36 | There are some contradiction between the sentences below:In Draft P802.11ay\_D2.0, page 270-271: "An asymmetric link is present between a pair of STAs when in one STA the difference between the maximum receive antenna gain and the quasi-omni receive antenna gain is higher than 15 dB, while for the other STA this difference is at most 15 dB."NOTE--As specified in 20.9.1, 15 dB is the sensitivity difference between the DMG control mode and the DMG SC mode ......."In Draft P802.11REVmd\_D1.2, page 3017: DMG STAs use a quasi-omni antenna pattern. The antenna gain of the main beam of a quasi-omni antenna pattern shall be at most 15 dB lower than the antenna gain in the main beam for a directional pattern. | Revise the text, in Draft P802.11REVmd\_D1.2, page 3017, to something like: "DMG STAs that do not support TDD beamforming (see 10.43.10) use a quasi-omni antenna pattern. The antenna gain of the main beam of a quasi-omni antenna pattern shall be at most 15 dB lower than the antenna gain in the main beam for a directional pattern, unless the STA is an EDMG STA that supports beamforming for asymmetric links (see 10.43.9.3), in which case this difference in antenna gain may be greater than 15 dB. " |

Discussion:

1. P338 L5-8 in 20.9.1 in D2.1 already resolves this comment.

**Proposed resolution:** Revised

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3096 | 10.3.2.9 P175 L31 | CTS and DMG CTS procedure is silent about the use of static and dynamic mode consistent with the VHT. The current text in 11ay seems to suggest that the channel BW and channel for the TXOP will be set by the CTS. The is similar to the dynamic mode of VHT, in which the BW set in the CTS shall be less than or equal to the BW set in the RTS.  The static mode could be usueful in whihc allows the initiator set the precedence of the BW used in the TXOP. | Clearly specify the rules related to dynamics and static model. |

**Discussion:**

1. Letting CTS to determine the channel BW and channel for the TXOP in cases of channel bonding/aggregation is to make sure the initiator will not occupy secondary channels that are busy. Otherwise if it is solely determined by the initiator, it is easy to create interference for other ongoing transmitssions in secondary channels.

11ay is also motiviated not to do static since BW since CCA is directional unlike legacy WiFi. In 2.4G/5G the CCA done by the initiator will be mostly likely the same result as the responder CCA. However, this is not the case for 60GHz.

1. If the initiator does not want partial BW requested, it can always send a CF-END frame, and the responder can also send a CF-END frame to enable 3rd-party STAs to reset the NAV (see 9.3.1.6).

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3097 |  | CID 2019 of LB231 has not implemented as there seems to be technical error with the resolution. The comment is repeated below:EDMG header A which is signaled by setting bit-46=1 in the the L-Header, which represent EDMG SC PPDU (or EDMG OFDM PPDU). However, none of the field in the EDMG Header-A indicates aggregation. It looks like two bits B37 and B46 are used to signal the support of DMG PPDU, DMG AMPDU, EDMG PPDU, and EDMG AMPDU. This needs to be clearly specified in the spec | Add a table to indicate the use of bit B46 and B37B46 B37 Expected format ~~behavior~~0      0     DMG  PPDU0      1     DMG AMPDU1      0     EDMG PPDU1      1     EDMG AMPDU (EDMG A (including EDMG     Single MPDU)" |

**Discussion:**

1. There is no EDMG Single MPDU in 11ay.

**Proposed resolution:** Revised

*Add the following table after Figure 159 and change the first paragraph of 29.3.2.1 as follows:*

A single PPDU format is defined for all EDMG PHYs: the EDMG PPDU format. Figure 159 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 an SU PPDU, an MU PPDU, or A-PPDU. Table xxx shows the expected format of PPDU depending on values of specific bits in the L-Header.

|  |  |  |
| --- | --- | --- |
| B46 | B37 | Expected Format |
| 0 | 0 | DMG PPDU |
| 0  | 1 | DMG A-MPDU |
| 1 | 0 | EDMG PPDU |
| 1 | 1 | EDMG A-MPDU |

Table xxx: Expected PPDU format with the values of B46 and B37 in L-Header.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3261 | 10.40.11.2.1P217 L13 | "This allows the peer EDMG STA to Choose to operate over multiple channels only after receiving such a frame and noting the value of the Allocation Duration field, thus saving power".  This statement implies the use of a Grant frame is mandatory and that is not true. | Suggest removing this text since it does not appear to be either normative nor correct. |

**Proposed resolution:** Rejected

1. The first sentence of this paragraph reads “An EDMG STA may transmit a Grant frame to a peer EDMG STA to indicate intent to transmit an EDMG PPDU to the peer STA over a 4.32 GHz, 2.16+2.16 GHz, 6.48 GHz, 4.32+4.32 GHz, or 8.64 GHz channel at the time indicated by the value of the Allocation Duration field within the Grant frame.”

Therefore, it clearly indicates the transmission of the Grant frame is a “may” behaviour, hence optional. The following sentence referred in this CID is basically introducing the possible benefits of transmitting the Grant frame.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3262 | 10.40.11.2.1P217 L22 | "An EDMG AP or EDMG PCP may use the EDMG Extended Schedule element to allocate an SP or a CBAP over channels with different bandwidths. When allocations over different channels overlap in time, the source AID and destination AID of such allocations shall be different from each other." | The phrasing here is awkward which makes it difficult to understand what is specified by this paragraph.  For example, a source AID is always different from a destination AID. I think the text is referring to simultaneous SPs and so, I think you want to say that "both the source AID and the destination AID from one allocation shall be different than both the source AID and destination AID from a simultaneous allocation> |

**Discussion:**

1. “A source AID is always different from a destination AID.”---This sentence is not true.
2. The original sentence is clearly stating when there are allocations that overlap in time, the source AID and destination AID of these allocations shall be different from each othter. The proposed text in the CID is no different from the original text.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3294 | 29.3.3.2.4.1P369 L4 | definition for channels 7,8 should be included (if possible) | - for code "0000" change to "Any one of 1,2,3,4,5,6,7,8" (add 7,8)- for code "1000" add "7 and 8"- for code "0010" add "5-7"- for code "1010" add "6-8"- for code "0011" add "3 and 7, 4 and 8" |
| 3459 | 29.3.3.2.4.1 P369 L5 | 8 channels are defined for EDMG now, the table needs to be modified (or a new mechism is needed) to signal occupied channels | revise the table to include channel numbers up to 8revise 10.3.2.18 to allow RTS/CTS for SISO to be sent with CT |

**Proposed resolution:** Revised

1. *Accept the proposed change in CID 3294.*
2. *Revise the first paragraph of 10.3.2.18 in D2.1.*

In order to establish a TXOP with a peer EDMG STA, an EDMG STA shall transmit an RTS frame. For channel combinations covered in Table 47, ~~with~~ the TXVECTOR parameter CH BANDWIDTH shall be set according to rules specified in 10.24.2.13. For those combinations that are not covered in Table 47, the TXVECTOR parameter SCRAMBLER\_INIT\_SETTING shall be set to CONTROL\_TRAILER.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3360 | 4.3.22P24 L11 | Sentence reads: "A DMG STA does not use any of the following: HCCA, power save multi-poll (PSMP), DLS, TDLS, HT-11 delayed block ack, GCR." How does DMG/EDMG STA enable STA to STA communication? To form distribution network, or allow STA-STA direct link communication, there should be a procedure to set up the link. | Please define how the STA-STA communication can be initiated with DMG/EDMG STA. |

**Discussion:**

1. STA to STA communication is already allowed. (CBAP, scheduled access, SP)

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3405 | 10.3.2.9 P176 L23 | should add a bullet/condition that DMG DTS is not sent in response to the RTS for MU-MIMO | as in comment |

**Proposed resolution:** Revised

*Change the second bullet in P177 L24 in 10.3.2.9 in D2.1 as follows:*

* Unless for the case of RTS frame for MU-MIMO channel access (see 10.40.11.4.4), ~~T~~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 and shall set the TXVECTOR parameters as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3406 | 10.3.2.9 P176 L29 | DTS in duplicate mode makes more sense if sent in BW which is (part of) the BW of the RTS/CTS setting the NAV-SA/DAe.g. STA x overheard RTS/CTS with NAV-SA/DA occupies ch1~3 and STA x sending DTS has primary channel=ch2. Then STA x receives RTS on ch2~4. In this case DTS can be sent from STA x on ch2~3 with a non-zero NAV value set by NAV-SA/DA. DTS does not need to be sent on ch4 because the STA x does not need to keep ch4 busy | as in commentthink about it after reading the text and discuss the suggested resolution.  |

**Discussion:**

1. This requires additional requirement for the STA to record and keep the information of the specific busy channels that caused to set the NAV.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3408 | 10.3.2.18 P179 L25 | a PPDU using a single transmit chain' should be 'a SISO PPDU using multiple transmit chains' | as in comment |

**Proposed resolution:** Accepted

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3417 | 10.26.5.1 P193 L3 | Not clear why 'Ack Policy subfield in the QoS Control field set to Block Ack' | remove this sentence |

**Discussion:**

This is for immediate blockack, so we need to set the Ack Policy subfield to Block Ack.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3434 | 10.40.7.3P216 L1 | For dynamic allocation of SP in CBAP/SP,can  the dynamically allocated BW be different/smaller than from the original CBAP/SP?e,g. the original CBAP is 4.32GHz but dynamically allocated SP is 2.16GHze.g. the original CBAP/SP is 4.32GHz but dynamically allocated SP is 2.16GHz on primary and another SP on secondary (for 2 pairs of STAs) and 2 dynamically allocated SP occupy the same time | clarify the BW requirement for dynamic allocation |

**Discussion:**

1. For the second example, the spec already allows such behaviour. See 10.40.11.2.1 “If the allocation is an SP, then the allocation does not have to include the primary channel.”
2. For the first example, see the proposed text as follws.

**Proposed resolution:** Revised

*Change P218 L25-37 in 10.40.7.3 in D2.1 as follows:*

An EDMG AP or EDMG PCP may use the EDMG Extended Schedule element to allocate an SP or a CBAP over channels with different bandwidths. When allocations over different channels overlap in time, the source AID and destination AID of such allocations shall be different from each other. Channels used for such allocations shall be included in the EDMG Operation element transmitted by the AP or PCP. An allocation and channel access within the allocation follow the following rules:

* If the allocation is an SP, then:
	+ The allocation does not have to include the primary channel.
	+ If the allocation does not include the primary channel, the allocation shall not span more than one 2.16 GHz channel.
	+ If the allocation is a scheduled CBAP, then channel access during the allocation shall include the primary channel
	+ ~~If the CBAP Only field is equal to 1, then channel access within the CBAP shall include the primary channel.~~
* Any transmissions within the allocation shall not exceed the corresponding bandwidth for this allocation.

If the CBAP Only field transmitted in the Beacon is equal to 1, then channel access within the CBAP of the corresponding DTI shall include the primary channel.

*Change P217 L2-L26 in 10.40.7.3 in D2.1 as follows:*

During an SP between a source DMG STA and a destination DMG STA, the source DMG STA may transmit a Grant frame to the destination DMG STA to relinquish the remainder of the SP to the destination DMG STA. In the Allocation Info field of the transmitted Grant frame, the source DMG STA shall set source AID field to the AID of the destination DMG STA, the destination AID field to the AID of the source DMG STA, the AllocationType field set to indicate SP, and the Allocation Duration field set to a value of 32 768 as defined in 9.5.2 (Dynamic Allocation Info field). The Duration field in the Grant frame shall be set to the time remaining in the SP minus TXTIME (Grant frame) minus aSIFSTime. The Beamforming Training subfield within the Beamforming Control field of the Grant frame shall be set to 0. Upon transmission of the Grant frame with the Beamforming Training field equal to 0, fFor the remainder of the SP, the roles of source DMG STA and destination DMG STA are swapped between the STAs. If both the source STA and destination STA are EDMG STAs, the destination STA shall not transmit frames with a channel bandwidth that is greater than the value of the CH\_BANDWIDTH parameter in the RXVECTOR of the received Grant frame, and shall be subject to the channel access rules in 10.40.11.2.1.

During a TXOP between a TXOP holder and a TXOP responder, the TXOP holder may transmit a Grant frame to the TXOP responder to relinquish the remainder of the TXOP to the TXOP responder. In the transmitted Grant frame, the TXOP holder shall set source AID field to the AID of the TXOP responder, the destination AID field to the AID of the TXOP holder, the AllocationType field set to indicate CBAP, and the Allocation Duration field set to a value of 32 768 as defined in 9.5.2 (Dynamic Allocation Info field). The Duration field in the Grant frame shall be set to the time remaining in the TXOP minus TXTIME (Grant frame) minus aSIFSTime. The Beamforming Training subfield within the Beamforming Control field of the Grant frame shall be set to 0. Upon transmission of the Grant frame with the Beamforming Training field equal to 0, for the remainder of the TXOP, the roles of TXOP holder and TXOP responder are swapped between the STAs. If both the TXOP holder and TXOP responder are EDMG STAs, the TXOP responder shall not transmit frames with a channel bandwidth that is greater than the value of the CH\_BANDWIDTH parameter in the RXVECTOR of the received Grant frame, and shall be subject to the channel access rules in 10.40.11.2.1.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3436 | 10.40.11.2.1 P217 L10 | indicated by the value of the allocation duration field'. Should be the allocation duration + NAV of the grant frame, after PHY-TXEND of the grant frame, as in p220 L 6 | as in comment |

**Proposed resolution:** Revised

*Change P218 L13-L16 in 10.40.11.2.1 in D2.1 as follows:*

An EDMG STA may transmit a Grant frame to a peer EDMG STA to indicate intent to transmit an EDMG PPDU to the peer STA over a 4.32 GHz, 2.16+2.16 GHz, 6.48 GHz, 4.32+4.32 GHz, or 8.64 GHz channel at the time indicated by the value of the Allocation Duration field plus the Duration field of the Grant frame after the PHY-TXEND.indication primitive within the Grant frame. This allows the peer EDMG STA to:

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3463 | 10.73.1P309 L13 | The AMPDU contans MPDUs with TIDs that corresponds to the primary AC'This is not always true in the case of DL-MU because AMPDU to STA1 may have primary AC MPDUs but AMPDU to STA2 may not have primary AC MPDUs | condition the bullut on the case of AMPDU in a SU-PPDU |

**Discussion:**

The rule applies to individual A-MPDU addressed to each STA, not across A-MPDUs addressed to multiple STAs.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3474 | 10.24.2.13P186 L22 | From the resolution of CID 1733 (LB 231), "Besides, this paragraph is just duplicated from VHT in REVmd".   Let's not reproduce/continue prior mistakes.  Just add a sentence that no channel list present means all channels are idle. | Add a sentence, "If the MAC receives a PHY-CCA.indication primitive with no channel-list parameter present, all channels are considered idle." |
| 3735 | 10.24.2.13 P186 L23 | "If the MAC receives a PHY-CCA.indication primitive with the channel-list parameter present, the channels considered busy are defined in Table 36."Which channel is busy is not relevant on the protocol description.For deciding a transmission bandwidth of a PPDU, knowing which channels were idle is needed.On this purpose, previous 11n/11ac/11ax spec have defined the idle channel list.Define how to determine the idle channels from the PHY-CCA.indication primitive. | As in the comment. |

**Proposed resolution:** Revised

*Add the following sentence to the end of the first paragraph of 10.24.2.13:*

Channels not indicated as busy are considered idle.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3664 | 9.7.3P173 L1 | "Except for the EOF subfield, all Block Ack Schedule frame subfields have the same value."  There is no EOF subfield in the frame (9.3.1.23 Block Ack Schedule frame format) | Remove the sentence "Except for the EOF subfield, all Block Ack Schedule frame subfields have the same value." |

**Proposed resolution:** Revised

*Change the last row of “Block Ack Schedule” as follows:*

|  |  |
| --- | --- |
| Block Ack Schedule | In an EDMG BSS, one or more copies of the Block Ack Schedule frame is present when transmitted within an EDMG MU PPDU. ~~Except for the EOF subfield, a~~All Block Ack Schedule frame subfields have the same value.  |

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3669 | 9.3.1.8.7P70 L5 | Where is the "EDMG Compressed BlockAck frame" defined?  It took me quite some time to work out that this is a BlockAck frame with the EDMG Compressed variant. I think the terminology in the text is very confusing, as it's not possible to find the definition of a "EDMG Compressed BlockAck frame". | Change "EDMG Compressed BlockAck frame" to "BlockAck frame EDMG Compressed variant".  Incidentally, I realise that this would result in similar changes to Draft P802.11REVmd\_D1.2.pdf.  Talking of which, there's an error in Draft P802.11REVmd\_D1.2.pdf, Page 802, Line 60 (Clause 9.3.1.8.4), as the text should refer to "Extended Compressed BlockAck frame", or as I would prefer it "BlockAck frame Extended Compressed variant". |

**Proposed resolution:** Revised

TGay editor to change the name to EDMG Compressed BlockAck frame variant.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3716 | 9.3.1.8.1P69 L6 | Why is a Management Ack subfield needed? Will it be acknowledged by a bitmap like data frames? But it says "The multi-TID A-MPDU may contain no more than one Management frame, with exception of Action no Ack frames which can occur more than once." in p.208. So, that should not be true. Then, why can't it be acknowledged like the multi-STA BlockAck in 11ax using Ack Type subfield and no bitmap? | Clarify the meaning of Management Ack subfield. Delete it if a Management frame can be acknowledged like the same with the multi-STA BlockAck in 11ax. |

**Discussion:**

1. We don’t have the multi-STA BlockAck in 11ay, so cannot use this to acknowledge management frames.
2. The definition of the subfield is already in 9.3.1.8.1.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3737 | 10.24.2.13 P187 L6 | a) Transmit a 8.64 GHz mask PPDU if...b) Transmit a 4.32+4.32 GHz mask PPDU if...c) Transmit a 6.48 GHz mask PPDU if...d) Transmit a 4.32 GHz mask PPDU if...e) Transmit a 2.16+2.16 GHz mask PPDU if...Can the STA transmit PPDU in any channel? Otherwise, please specify the channel like the bullet f. | As in comment. |

**Discussion:**

1. It is not clear what the commenter means by asking “Can the STA transmit PPDU in any channel?” For the channel bonding/aggregation scenarios, the channels that will be used to transmit PPDUs are already determined by the primary, secondary, secondary1 and secondary2 channels.

**Proposed resolution:** Rejected

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3738 | 10.24.2.13 P187 L35 | "An EDMG STA that initiates a PPDU transmission to peer EDMG STA shall not set the TXVECTOR parameter CH\_BANDWIDTH of the PPDU to the channels in which the CCA were not idle according to Table 1"It is already covered by the bullets a-f. | Remove the cited wording. |

**Proposed resolution:** Rejected

1. Bullets a-f specify the “shall” behevior while this sentence specifies the “shall not” behaviour. While the comments is right in that the indicated sentence can be concluded by bullets a-f, it is still preferred to keep the sentence as an emphasis so that it is more explicit to understand that the behaviour described in the referred sentence is prohibited.

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed change |
| 3739 | 10.24.2.13 P187 L6 | a) Transmit a 8.64 GHz mask PPDU if...b) Transmit a 4.32+4.32 GHz mask PPDU if...c) Transmit a 6.48 GHz mask PPDU if...d) Transmit a 4.32 GHz mask PPDU if...e) Transmit a 2.16+2.16 GHz mask PPDU if...The N GHz mask PPDUs are not defined. Please add the definitions in the clause 3.2. | As in comment. |

**Discussion:**

1. The correct way to resolve this CID is to replace all “x GHz mask PPDUs” with “x GHz PPDU”

**Proposed resolution:** Revised

*TGay editor to replace all “x GHz mask PPDUs” with “x GHz PPDU” related to this CID.*

**Straw Poll:**

* **Do you agree to accept comment resolutions as proposed in doc 11-18/1768r0?**