IEEE P802.11  
Wireless LANs

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| Resolutions to CIDs related to Channel Access | | | | |
| Date: 2019-05-03 | | | | |
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Abstract

This submission proposes resolutions to 15 CIDs related to channel access raised towards 11ay D3.0. These CIDs include:

4014 4024 4025 4069 4063 4068 4229 4303 4386 4390 4418 4459 4471 4472 4473

The CIDs are in reference to Draft IEEE 802.11ay/D3.0 and IEEE 802.11REVmd D2.0.

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| CID | Clause | Comment | Proposed change |
| 4014 | 10.47.3  P246 L8 | The following statement needs additional clarification it states: If both the TXOP holder and TXOP responder are EDMG STAs, the TXOP responder 7 shall not transmit frames with "a bit set to 1" in the TXVECTOR parameter CH\_BANDWIDTH.... "a bit set to 1" is ambiguous. | Here is text to consider. "If both the TXOP holder and TXOP responder are EDMG STAs, and if any bit in the CH\_BANDWIDTH parameter in the RXVECTOR of the received Grant frame was 0, the TXOP responder shall not transmit frames with the corresponding bit in the TXVECTOR parameter CH\_BANDWIDTH set to 1, and shall be subject to the channel access rules in 10.40.11.2.1." |

**Proposed resolution: Accept.**

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| CID | Clause | Comment | Proposed change |
| 4024 | 3.2  P22 L23 | secondary1 channel should not include 2.16+2.16 case. In the 2.16 and 2.16 only primary and secondary are used. | Remove the 2.16+2.16 |
| 4025 | 3.2  P22 L26 | secondary2 channel should not include 2.16+2.16 case. In the 2.16 and 2.16 only primary and secondary are used. | Remove the 2.16+2.16 |
| 4069 | 10.24.2.13  P217 L22 | "Transmit a 2.16+2.16 GHz mask PPDU if the secondary, secondary1 or secondary2 channels were 22 idle during an interval of PIFS immediately preceding the start of the TXOP" The list of channels to be idle should be Prmary and Secondary. | Fix the text |

**Discussion:**

Secondary1 and Secondary2 channel are used in EDMG channelization for 2.16+2.16 case (See Figure 2, P79). 2.16+2.16 can be transmitted in Primary and any secondary channels (primary+seconday/secondary1/secondary2)

**Proposed resolution: Reject**

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| CID | Clause | Comment | Proposed change |
| 4063 | 10.3.2.9  P205 L1 | The parameter "Channel\_BW" is used in the text, but not defined. There is a definition that is appropriet in Table 51. They should be linked in the text. | Add explicit text that "Channel\_BW" is defined in Table 51. |

**Discussion:**

The parameter Channel\_BW is already defined in Table 46 and Section 29.3.3.2.4.1.

**Proposed resolution: Reject.**

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| CID | Clause | Comment | Proposed change |
| 4068 | 10.24.2.13  P217 L7 | "Transmit a 8.64 GHz mask PPDU if the secondary, secondary1 and secondary2 channels are contiguous and secondary, secondary1 and secondary2 were idle during an interval of PIFS immediately preceding the start of the TXOP" Why all the subsections are not stating that the primary has to be idle as well. | Add "primary" |

**Discussion:**

At the beginning of this paragraph, it already says “If a STA is permitted to begin a TXOP (as defined in 10.24.2.4 (obtaining an EDCA TXOP))”…So the assumption is that the STA has already performed channel access in the primary channel. Moreover, this is exactly the writing style for channel access with multiple channels in REVmd and 11ax (see 10.24.2.5) too.

**Proposed resolution: Reject**

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| CID | Clause | Comment | Proposed change |
| 4229 | 10.7 P340 L14 | There is no description if distributed scheduling runs based on the assumption that neighboring BSSs maintain their own local TSFs without time sync coordination. CID1796 pointed out the problem in the previous ballot. Resolution to the CID1796 reads "The AP/PCP estimates the timing of its neighbors' allocations based on when it received its neighbors' ESEs" in 11-18/905r0. However, coordinating multiple AP's SPs without having clock drift compensation is extremely difficult, as the orthogonal channel time among APs will be moving all the way due to clock drift. Also, CID3359 pointed out the same issue in the previous ballot. Resolution to the CID3359 mentioned that the misalignment is small enough to cause packet loss. However, it does not solve long term clock drift problem. The standard should define practical use of the distributed scheduling protocol. For your information, MCCA defined for mesh STA has similar characteristic. We may be able to reuse some portion of the feature for distributed scheduling protocol. | Please specify how we cope with clock drift for distributed scheduling protocol. Otherwise, remove the distributed scheduling protocol which is impractical. |

**Proposed resolution: Revised**

*Add the following paragraph after the first paragraph of section 10.71.3:*

While not engaged in communication within its BSS, a distributed scheduling enabled EDMG PCP or EDMG AP shall listen for DMG Beacon frames from neighboring PCPs or APs to determine their upcoming transmission schedules by parsing the Extended Schedule elements and EDMG Extended Schedule elements contained in received DMG Beacon frames. This may require listening on different channels, since neighbor PCPs or APs may operate in different primary channels.

If an AP or PCP determines that the BTI of a neighbor AP or PCP is overlapping or getting close to overlapping its own BTI in time, the AP or PCP may use the procedure in 11.30.2 to move the TBTT of its BSS to remove or avoid the overlap. The procedure to determine when two BTIs are overlapping or drifting too close to overlapping in time is implementation dependent.

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| CID | Clause | Comment | Proposed change |
| 4303 | 11.1.3.3.4  P346 L23 | This section describes good tools to decide on whether TDD SP device that is using the whole beaocn interval is present or not. However there is no tools to allow any device to share the channel with the TDD SP device if posisible especially since the slot schedule element sharing is optional | An indication of how the TDD SP uses the channel is needed to be advertised. This can be percentage of chnnel usage or perentage of unoccupied slots. Please consider add such tool. |

**Discussion:**

Indicating the percentage of channel usage or percentage of unoccupied slots does not help much, because other STAs still do not know the specific scheduling within a TDD SP. Instead, the reservation of a TDD SP is included in Extended Schedule element, and other DMG/EDMG STAs will simply treat the TDD SPs as conventional SPs. As a result, as long as the Extended Schedule element is transmitted in the Beacon frame, other STAs will be able to know the percentage of beacon interval TDD SPs will occupy.

**Proposed resolution: Revised**

*Change P242 L1-3 in Section 10.40.6.1 as follows:*

The schedule of the DTI of a beacon interval shall be communicated through the Extended Schedule element and, in an EDMG BSS, also through the EDMG Extended Schedule element. The AP or PCP transmits the Extended Schedule element in either or both an Announce frame or a DMG Beacon frame. If the Extended Schedule element includes at least one TDD SP, it shall be transmitted in a DMG Beacon frame.

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| CID | Clause | Comment | Proposed change |
| 4386 | 8.3.5.12.2  P78 L9 | Table 1 should be updated with channels 7,8 | As in comment |

**Proposed Resolution: Revised.**

*Replace Table 1 with the one below:*

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| Configuration indicated in the Primary Channel field and in the BSS Operating Channels field | | Channel definition | | | |
| Number of channels | Channels set | Primary | Secondary | Secondary1 | Secondary2 |
| 1 | Ch(i)  I=(0), (1), (2), (3), (4), (5), (6), (7) | Ch(i) | N/A | N/A | N/A |
| 2 | Ch(i), Ch(k)  (i,k) = (0,1),(0,2), (0,3), (0,4), (0,5), (0,6), (0,7), (1,2), (1,3), (1,4), (1,5), (1,6), (1,7), (2,3), (2,4), (2,5), (2,6), (2,7), (3,4), (3,5), (3,6), (3,7), (4,5), (4,6), (4,7), (5,6), (5,7), (6,7) | Ch(i) | Ch(k) | N/A | N/A |
| Ch(k) | Ch(i) | N/A | N/A |
| 3 | Ch(i), Ch(k), Ch(l)  (i,k,l) = (0,1,2), (1,2,3), (2,3,4), (3,4,5), (4,5,6), (5,6,7), (0,1,3), (0,1,4), (0,1,5), (0,1,6), (0,1,7), (1,2,4), (1,2,5), (1,2,6), (1,2,7), (2,3,5), (2,3,6), (2,3,7), (3,4,6), (3,4,7), (4,5,7) | Ch(i) | Ch(k) | Ch(l) | N/A |
| Ch(k) | Ch(i) | Ch(l) | N/A |
| Ch(l) | Ch(k) | Ch(i) | N/A |
| 3 | Ch(i), Ch(k), Ch(l)  (i,k,l) = (0,2,3), (0,3,4), (0,4,5), (0,5,6), (0,6,7), (1,3,4), (1,4,5), (1,5,6), (1,6,7), (2,4,5), (2,5,6), (2,6,7), (3,5,6), (3,6,7), (4,6,7), (0,2,4), (0,2,5), (0,2,6), (0,2,7), (0,3,5), (0,3,6), (0,3,7), (0,4,6), (0,4,7), (0,5,7), (1,3,5), (1,3,6), (1,3,7), (1,4,6), (1,4,7), (1,5,7), (2,4,6), (2,4,7), (2,5,7), (3,5,7) | Ch(i) | Ch(k) | Ch(l) | N/A |
| Ch(k) | Ch(l) | Ch(i) | N/A |
| Ch(l) | Ch(k) | Ch(i) | N/A |
| 4 | Ch(i), Ch(k), Ch(l), Ch(m)  (I,k,l.m) = (0,1,2,3), (1,2,3,4), (2,3,4,5), (3,4,5,6), (4,5,6,7),  (0,1,3,4), (0,1,4,5), (0,1,5,6), (0,1,6,7), (1,2,4,5), (1,2,5,6), (1,2,6,7), (2,3,5,6), (2,3,6,7), (3,4,6,7),  (0,1,3,5), (0,1,3,6), (0,1,3,7), (0,1,4,6), (0,1,4,7), (0,1,5,7), (1,2,4,6), (1,2,4,7), (1,2,5,7), (2,3,5,7) | Ch(i) | Ch(k) | Ch(l) | Ch(m) |
| Ch(k) | Ch(i) | Ch(l) | Ch(m) |
| Ch(l) | Ch(m) | Ch(k) | Ch(i) |
| Ch(m) | Ch(l) | Ch(k) | Ch(i) |
| 4 | Ch(i), Ch(k), Ch(l), Ch(m)  (I,k,l.m) = (0,1,2,4), (0,1,2,5), (0,1,2,6), (0,1,2,7), (1,2,3,5), (1,2,3,6), (1,2,3,7), (2,3,4,6), (2,3,4,7), (3,4,5,7) | Ch(i) | Ch(k) | Ch(l) | Ch(m) |
| Ch(k) | Ch(i) | Ch(l) | Ch(m) |
| Ch(l) | Ch(k) | Ch(i) | Ch(m) |
| Ch(m) | Ch(l) | Ch(k) | Ch(i) |
| 4 | Ch(i), Ch(k), Ch(l), Ch(m)  (I,k,l.m) = (0,2,3,4), (0,3,4,5), (0,4,5,6), (0,5,6,7), (1,3,4,5), (1,4,5,6), (1,5,6,7), (2,4,5,6), (2,5,6,7), (3,5,6,7),  (0,2,4,5), (0,2,5,6), (0,2,6,7), (0,3,5,6), (0,3,6,7), (0,4,6,7), (1,3,5,6), (1,3,6,7), (1,4,6,7), (2,4,6,7),  (0,2,4,6), (0,2,4,7), (0,2,5,7), (0,3,5,7), (1,3,5,7) | Ch(i) | Ch(k) | Ch(l) | Ch(m) |
| Ch(k) | Ch(l) | Ch(m) | Ch(i) |
| Ch(l) | Ch(m) | Ch(k) | Ch(i) |
| Ch(m) | Ch(l) | Ch(k) | Ch(i) |
| 4 | Ch(i), Ch(k), Ch(l), Ch(m)  (I,k,l.m) = (0,2,3,5), (0,2,3,6), (0,2,3,7), (0,3,4,6), (0,3,4,7), (0,4,5,7), (1,3,4,6), (1,3,4,7), (1,4,5,7), (2,4,5,7) | Ch(i) | Ch(k) | Ch(l) | Ch(m) |
| Ch(k) | Ch(l) | Ch(i) | Ch(m) |
| Ch(l) | Ch(k) | Ch(i) | Ch(m) |
| Ch(m) | Ch(l) | Ch(k) | Ch(i) |

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| CID | Clause | Comment | Proposed change |
| 4390 | 10.40.11.2.2  P247 L40 | “To perform the procedure specified in 10.24.2.13, an EDMG STA shall be capable of performing energy detection on each channel identified in the STA’s EDMG Operation element.”  The term “in the STA’s EDMG Operation element” is not accurate since the “EDMG Operation element” is advertised by AP/PCP and not by the STA. In addition, the STA may support only subset of the AP advertised EDMG Operation element hence doesn’t required to be able performing Energy Detection on all AP’s EDMG Operation channels | change to :  To perform the procedure specified in 10.24.2.13, an EDMG STA shall be capable of performing energy detection on each of its supported channels that are identified in the AP/PCP EDMG Operation element. |

**Proposed resolution: Accept**

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| CID | Clause | Comment | Proposed change |
| 4418 | 11.2.7.2.2 P2182 L47 | There is no clear defined solution of group addressed frames delivery to STAs operating in PS mode without a wakeup schedule (Comment to IEEE P802.11-REVmd/D2.1, February 2019) | The solution shall awake non-AP STAs for groupcast delivery and allow AP to protect transmission of the group addressed frames in multiple directions. See submission 11-19-0281-00-00ay TDD Slot timing CID resolution.  See submission 11-19-0282-00-00ay Delivery of group addressed frames to STAs operating in PS mode without a wakeup schedule - CID resolution |

**Discussion:**

The issue identified in this CID can be solved using existent scheduling mechanism. For example, the AP can always use DMS to deliver group addressed frames.

**Proposed resolution: Reject**

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| CID | Clause | Comment | Proposed change |
| 4459 | 11.20.3 P357 L22 | "When dot11UTCTSFOffsetActivated is false, the Time Advertisement and Time Zone elements shall not be included in Beacon and Probe Response frames" In the previous sentence the Announce frame is defined to include the element, so it shall be mentioned in this sentence as well. | Add Announce to the list. |

**Proposed resolution: Revised**

*Change the first paragraph of 11.20.3 (P357, L17-L22) as follows:*

When dot11UTCTSFOffsetActivated is true, the Time Advertisement and Time Zone elements shall be included in all Probe Response frames, and the Time Advertisement element shall be included in the Beacon frame every dot11TimeAdvertisementDTIMInterval DTIMs, the Time Advertisement element shall be included in the DMG Beacon frame or in the Announce frame at least every dot11DMGTimeAdvertisementBeaconInterval. When dot11UTCTSFOffsetActivated is false, the Time Advertisement and Time Zone elements shall not be included in Beacon, Probe Response, or Announce frames. ~~and Probe Response frames.~~

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| CID | Clause | Comment | Proposed change |
| 4471 | 10.24.2.13  P217 L36 | Regarding CID 3738, the resolution is "Rejected" with the following reason. - 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.  I disagree with this resolution. This is very simple rule, there is no confusion, so you don't need to emphasize this. Also, the normative text is the requirement for the implementation. Because the "shall not" behavior is not testable, the spec recommends not using "shall not" sentence. | Remove the following redundant sentence. "An EDMG STA that initiates a PPDU transmission to peer EDMG STA shall not set the TXVECTOR parameters CH\_BANDWIDTH and CHANNEL\_AGGREGATION of the PPDU to the channels in which the CCA were not idle according to Table 1," |

**Discussion:**

It is preferred to keep the normative text to help readers to have a better understanding of the behaviors. However, we propose to follow the commenter’s suggestions to change the way we describe the text.

**Proposed resolution: Revise**

*Change the paragraph in 10.24.2.13 P217 L36-L39 as follows:*

An EDMG STA that initiates a PPDU transmission to peer EDMG STA shall ~~not~~ set the TXVECTOR parameters CH\_BANDWIDTH and CHANNEL\_AGGREGATION of the PPDU to a subset of the channels in which the CCA were ~~not~~ idle according to Table 1, and shall set the TXVECTOR parameter SCRAMBLER\_INIT\_SETTING to a value that provides bandwidth information to the peer STA.

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| CID | Clause | Comment | Proposed change |
| 4472 | 10.24.2.13  P217 L7 | Regarding CID 3737, The resolution is "Rejected" with the following discussion. - 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.  Here is the proposed changes. a) Transmit a 8.64 GHz mask PPDU on [channel list] if the secondary, secondary1 and secondary2 channels are ... | As in comment. |

**Discussion:**

The feasible “[channel list]” list parameter is defined in Table 1 based on the BSS Operating Channels field and Primary Channel field within the EDMG Operation element. Therefore, we can add this clarification.

**Proposed resolution: Revised**

*Change the paragraph of P217 L4-L6 as follows:*

If a STA is permitted to begin a TXOP (as defined in 10.24.2.4 (Obtaining an EDCA TXOP)) and the STA has at least one MSDU pending for transmission for the AC of the permitted TXOP, the STA shall perform exactly one of the following actions on primary, secondary, seconday1, and secondary2 channels defined in Table 1, which is based on the BSS Operating Channels field and Primary Channel field within the EDMG Operation element transmitted by an EDMG AP or an EDMG PCP:

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| CID | Clause | Comment | Proposed change |
| 4473 | 10.24.2.13  P216 L23 | Regarding CID 3735, I disagree with the proposed changes.  In 29.3.8, The receiver shall issue the PHY-CCA.indication(BUSY,primary/secondary/secondary1/secondary2) for any signal 20 dB above the minimum sensitivity for a 2.16 GHz PPDU using SC MCS 1 at any of the channels (primary/secondary/secondary1/secondary2) the receiver is open to receive in for at least aDMGCCAEDDetectTime.  When the receiver detects the signals on the secondary1 and the secondary2, which channel-list is included in the issued PHY-CCA.indication primitive? If the secondary2 is included in the channel-list, the MAC is considering that the secondary1 is idle. But, it is not correct.  The PHY-CCA.indication is one shot event in a baseline spec. Are you thinking that the PHY will generate the multiple PHY-CCA.indication primitives for all busy channels? If yes, it is totally different behavior and you have to use a new primitive instead of the PHY-CCA.indication primive. | As in comment. |

**Discussion:**

The definition of channel list in PHY-CCA.indication in 802.11 REVmd 2.0 reads as follows:

“When STATE is IDLE or when, for the type of PHY in operation, CCA is determined by a single channel, the channel-list parameter is absent. Otherwise, it carries a set indicating which channels are busy. The channel-list parameter in a PHY-CCA.indication primitive generated by a VHT or S1G(11ah) STA contains at most a single element. Table 8-5 (The channel-list parameter elements) defines the members of this set.”

As a result, only the channel list in PHY-CCA.indication of VHT and S1G STA contains at most a single element. For other types of STAs, channel list carries a set indicating which channels are busy, which can include multiple elements. This is also clarified in Section 8.3.5.12.2, P77 L4-L7 in D3.0 as follows:

“In case of an EDMG STA, the channel-list parameter contains the primary and secondary channels and may contain the secondary1 and secondary2 channels, while the RX-antenna-ID parameter indicates a set of IDs of the DMG antennas in which the channel indication is provided.”

However, current 11ay spec text in Section 8.3.5.12.2 has mistakenly included “EDMG” in the following sentence (P77 L3):

“The channel-list parameter in a PHY-CCA.indication primitive generated by a VHT, EDMG or S1G STA contains at most a single element.”

Therefore, “EDMG” should be deleted from this sentence.

**Proposed resolution: Revise**

*Change the following sentence in Section 8.3.5.12.2 P77 L3 as follows:*

The channel-list parameter in a PHY-CCA.indication primitive generated by a VHT~~, EDMG~~ or S1G STA contains at most a single element.

**Straw Poll:**

* **Do you agree to accept comment resolutions as proposed in doc 11-19/0664r1?**