IEEE P802.11
Wireless LANs

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| Resolution to CIDs about asymmetric beamforming and MIMO channel access |
| Date: 2018-07-09 |
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Abstract

This submission proposes resolutions to the following 8 CIDs:

1191, 1476, 1478, 1479, 1492, 1896, 1973, 2236

The CIDs are in reference to Draft IEEE P802.11ay/D1.0. The resolutions are in reference to Draft IEEE P802.11ay/D1.3.

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| CID | Clause | Comment | Proposed change |
| 1191 | 9.3.1.22 | The TGm style for repeated fields is to define a field (in this case the Sector Feedbacks field) to contain the repeating item, and then make a statement about its content. This enables an explicit statement to be made about the multiplicity of the field. | Replace "Sector Feedback 1" to "Sector Feedback N" fields with a single "Sector Feedbacks".Add after 36.11 "The Sector Feedbacks field contains one or more Sector Feedback fields." |

**Proposed resolution:** Accepted

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| CID | Clause | Comment | Proposed change |
| 1476 | 10.36.11.4.2 | 802.11n and 802.11ac managed to operate MIMO in billions of devices without a MIMO access procedure. It is not at all clear why this is necessary for all 802.11ay devices. | Make the SU-MIMO channel access procedure entirely optional. Allow devices to transmit MIMO frames without it. |

**Proposed resolution:** Rejected

1. 11n and 11ac are operating in the lower bands and omni reception and transmission are dominant, and it is easy for devices to hear the activities nearby. In 11ay where operations happen in higher bands, most data transmissions are performed in a directional way.
2. The SU-MIMO responder STA has to configure its antennas accordingly prior to a MIMO transmission. Without the SU-MIMO channel access, it has no way to know a MIMO transmission is upcoming. As a result, channel access is needed here.

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| CID | Clause | Comment | Proposed change |
| 1478 | 10.36.11.4.3 | The requirement to transmit an RTS frame in all SU-MIMO sectors is unnecessary. Also the "small delay" between sectors is ambiguous. | Remove the first 2 sentences of this paragraph. |
| 1479 | 10.36.11.4.3 | The requirement to transmit a CTS frame in all SU-MIMO sectors is unnecessary. Also the "small delay" between sectors is ambiguous. | Remove this sentence |

**Proposed resolution:** Revised

1. NAV protection is needed in all channels that will be used during the SU-MIMO transmission.
2. The document 11-18-0723-04-00ay-resolution-to-cids-related-to-mimo-channel-access already defnes the small delay.

*Change the last paragraph of 10.37.11.4.3 in D1.3 as follows:*

The SU-MIMO initiator may send a CF-END frame to reset the NAV and release the remaining time of the TXOP. The CF-END frame ~~shall be~~is sent using the same set of DMG antennas and antenna configuration during the SU-MIMO transmission or hybrid beamforming training and a CSD between the transmissions in different antennas as defined in 29.4.7.2.

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| CID | Clause | Comment | Proposed change |
| 1492 | 10.38.9.3.3 | Listen period is not defined. Maybe it would help to show the listen period in Figure 104. | Add a definition for listen period. |

**Proposed resolution:** Revised

*Change the first sentence of the 3rd bullet of the 1st paragraph in 10.38.9.3.3 as follows:*

A responder may transmit more than one consecutive SSW frame within one beamforming training allocation~~listen period~~

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| CID | Clause | Comment | Proposed change |
| 1896 | 10.38.9.3.3 | "For this transmitted DMG CTS frame, the TXVECTOR parameter SCRAMBLER\_INIT\_SETTING shall be set to CONTROL\_TRAILER and the parameter CT\_TYPE shall be set to CTS\_DTS. If it uses SU-MIMO for the transmission in the reverse direction, the SISO/MIMO field shall be set to 1 and the SU/MU MIMO field shall be set to 0. The DMG CTS frame should be transmitted using all SU-MIMO sectors, with a small delay between each sector. The control trailer also indicates the corresponding DMG antenna configuration for the upcoming SU-MIMO transmission in the reverse direction." The CTS\_DTS CT does not contain any antenna configuration information so this solution is technically incorrect. | Add antenna configation information to the CTS\_DTS CT or change the CT type to RTS\_CTS\_CTS2Self. |

**Discussion:**

1. This CID is already resolved in D1.3.

**Proposed resolution:** Rejected

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| CID | Clause | Comment | Proposed change |
| 1973 | 9.4.2.252 | Receive Direction subfield format - the number of bits for Sector ID and DMG antenna ID are not commensurate with what is used in the rest of the spec. | Increase number of bits for sector ID to 11 and number of bits for DMG antenna ID to 3 |

**Proposed resolution:** Accepted

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| CID | Clause | Comment | Proposed change |
| 2236 | 9.4.2.252 | Need to restrict BW and Channel Aggregation settings when Asymmetric Beamforming Training is set to 1 | specify that BW, Channel Aggregation, Scheduling Type subfields are reserved when Asymmetric Beamforming Training is set to 1 |

**Discussion:**

1. Agree that BW and Channel Aggregation subfields should be reserved when Asymmetric Beamforming Traing is set to 1, because asymmetric beamforming is basically used to establish a control PHY link between two STAs. After this control PHY link is established, they can proceed to communication in a bonded or an aggregated channel.
2. The Asymmetric Beamforming Training subfield is only present when Scheduling Type field is set to 1. As a result, when Asymmetric Beamforming Training subfield is set to 1, it means the Scheduling Type field can only be set to 1.

**Proposed resolution:** Revised

*Insert the following paragraph after Figure 60 in D1.3*

The Channel Aggregation and BW subfields are defined in Table 50. These fields specify the channel(s) over which the allocation is scheduled on. The Channel Aggregation and BW subfields are reserved when the Asymmetric Beamforming Training subfield is set to 1.

**Straw Poll:**

* **Do you agree to accept comment resolutions as proposed in doc 11-18/1108r0?**