IEEE P802.11
Wireless LANs

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| Resolution for CMMG MAC related CIDs 4217,4218, and 4250 |
| Date: 2020-05-27 |
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##### This submission present proposed resolution for CIDs 4217, 4218, and 4250. The proposed changes are based on REVmd/D3.0.

##### Revision history:

##### R0 – initial version

##### R1 – update the proposed resolution for CID 4250

##### R2 – update the proposed resolution for CIDs 4217 and 4218

##### R3 and R4 – update the proposed resolution for CIDs 4217 and 4218 based on the feedback received from the April 22nd, 2020, CRC call.

R5 – add proposed resolution for CIDs 4216 and 4201 to the existing resolution for CIDs 4217 and 4218. Changes made for CID 4217 are highlighted in yellow. Changes made for CID 4201 are highlighted in purple.

##### R6 – further revise the proposed resolution for CIDs 4217 and 4218 based on inputs received. Separate the proposed resolutions for CIDs 4201 and 4216 from those for CIDs 4217 and 4218.

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| CID | Clause | Page | Line | Comments | Proposed Change |
| 4217 |  9.4.2.229.2 | 1442 | 49 | No behaviour is associated with the Antenna Pattern Reciprocity field in the CMMG Capabilities Info field | In Figure 9-754--CMMG Capabilities Info field format change "Antenna Pattern Reciprocity" to "Reserved" and delete the "Antenna Pattern Reciprocity" row in Table 9-313--Subfields of the CMMG Capabilities Info field format |
| 4218 | 9.4.2.229.2 | 1442 | 49 | No behaviour is associated with the Antenna Pattern Reciprocity field in the CMMG Capabilities Info field | Add behaviour modelled on that given for DMG in 10.42.6.4.4 Antenna configuration setting during a beam refinement transaction |

**Discussion:**

This comment is related to Figures 9-753 and 9-754 (c.f. bits 38, 39, 40):





It is also related to the last paragraph of subclause 10.42.6.4.4 that the commenter points out:



We agree with the direction the commenter proposes in CID 4218 to add the behavior associated with the Antenna Pattern Reciprocity field.

UPDATED: Inputs from Assaf and Alecs:

*In 11-20-0371r5 you are proposing, among other things, to remove the Antenna Reciprocity field from the CMMG capabilities field. This raises a question. For DMG STAs, this field is used within the DMG beamforming protocol, described in 10.42. CMMG STAs use the same protocol (see paragraph at bottom of page 2027 of D3.0). The text in 10.42 ignores CMMG capabilities fields, so I agree that the field is not used, however, for the beamforming protocol it is needed, as it dictates behavior of STAs using the protocol. I think it is better to keep this field (at one bit) and add to the paragraph in page 2027 that when references are made to DMG capabilities fields, CMMG STAs shall use the same named fields in their CMMG capabilities field.*

UPDATED: Action in response to input from Assaf and Alecs:

When compared with 0371r4, this revision undoes the removal of the 7-bit Antenna Reciprocity subfield. Instead, the number of bits of this subfield is reduced from 7 to 1 to make it consistent with DMG’s in Figure 9-550. Please refer to the text highlighted in red below for the action.

**Proposed Resolution for CIDs 4217 and 4218:**

Revised

**At page 1442, lines 29-64 (Figure 9-754—CMMG Capabilities Info field format):**

* Replace “Number of DMG Rx Antennas” with “Number of Rx Antennas”.
* Increase the number of bits of the Number of Rx Antennas subfield from 1 to 2, i.e., replace B28 with B28 and B29, because 2 bits are required to indicate the total number of receive antennas of the STA (see Table 9-313).
* Shift the bit position of the Supports Other\_AID subfield from B29 to B30.
* Shift the bit position of the RXSS Tx Rate Supported subfield is from B30 to B31.
* Reduce the number of bits of the Antenna Reciprocity subfield from 7 to 1 and the bit location is B32.
* Decrease the number of bits of the Antenna Pattern Reciprocity subfield from 3 to 1, because only 1 bit is required to indicate whether the transmit antenna pattern associated with an AWV is the same as the receive antenna pattern for the same AWV or not.
* Shift the bit position of the 1-bit Antenna Pattern Reciprocity subfield to B33.
* Shift the bit positions of the Total Number of Sectors subfield from B41-B47 to B34-B40.
* Shift the bit positions of the Heartbeat Elapsed Indication subfield from B48-B50 to B41-B43.
* Shift the bit positions of the MCS Feedback subfield from B51-B52 to B44-B45.
* Shift the bit position of the RD Responder subfield from B53 to B46.
* Reduce the number of reserved bits from 2 to 1 and shift the bit position of the Reserved subfield from B54-B55 to B47.

*Note to the Editors: The changes are summarized below (with changes marked in red)*

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| --- | --- | --- | --- | --- | --- | --- | --- |
| B0 B1 | B2 | B3 | B4 B5 | B6 | B7 | B8 | B9 |
| MaximumMPDULength | SupportedChannelWidth Set | TxSTBC | RxSTBC | Short GI for540 MHz | Short GI for1080 MHz | SupportedMIMO | Heart beat |
| Bits: 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| B10 B11 | B12 | B13 | B14 | B15 | B16 | B17 | B18 B23 |
| TPC | Number ofSoundingDimensions CMMG | TXOP PS | ProtectedBlock Ack | CMMG LinkAdaptationCapable | Rx AntennaPatternConsistency | TxAntennaPatternConsistency | Fast LinkAdaptation |
| Bits: 2 | 1 | 1 | 1 | 1 | 1 | 1 | 6 |
| B24  | B25 B26 | B27 | B28 B29 | B30 | B31 | B32 | B33 |
| RXSSLengthS | Color | PSH andInterferenceMitigation | Number ofRx Antennas | SupportsOther\_AID | RXSS TxRateSupported | AntennaReciprocity | AntennaPatternReciprocity |
| Bits: 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 |
| B34 B40 | B41 B43 | B44 B45 | B46 | B47 |  |  |  |
| TotalNumber ofSectors | HeartbeatElapsedIndication | MCSFeedback | RDResponder | Reserved |  |  |  |
| Bits: 7 | 3 | 2 | 1  | 1 |  |  |  |

**At page 1442, lines 10-18 (Figure 9-753—CMMG Capabilities element format),**

• Change the number of octets of the CMMG Capabilities Info field from 7 to 6.

• Replace “CMMG Capabilites Info” with “CMMG Capabilities Info”.

• Replace “Transmit Beamforming Capabilites” with “Transmit Beamforming Capabilities”.

**At page 2059, after line 47, i.e., after the end of the last paragraph in subclause 10.42.6.4.4 (Antenna configuration setting during a beam refinement transaction), insert the following paragraph:**

A STA that sets to 1 the Antenna Pattern Reciprocity subfield in the CMMG Capabilities Info field in the CMMG Capabilities element it transmits and that receives a BRP-RX PPDU from a peer STA that also sets to 1 the Antenna Pattern Reciprocity subfield in the CMMG Capabilities Info field in the CMMG Capabilities element it transmits shall use the same AWV that was configured with the BRP-RX PPDU in subsequent transmissions and receptions with the peer STA during the DTI. This allows STAs that use reciprocity to shorten the beamforming training time.

**At page 1444, lines 61-64 and page 1445 lines 16-19 (Table 9-313—Subfields of the CMMG Capabilities Info field format):**

* Replace “Number of RX DMG Antennas” to “Number of RX Antennas”.
* ~~Delete the row corresponding to the DMG Antenna Reciprocity subfield.~~
* Replace “DMG Antenna Reciprocity subfield” with “Antenna Reciprocity subfield”.

**At page 1449, line 53 (Table 9-316—Subfields of the Transmit Beamforming Capabilities field):**

* Replace “CMMG Capability Information field” with “CMMG Capabilities Info field”.

**At page 1449, lines 62-63 (9.4.2.229.6 CMMG AP or PCP Capability Information field):**

* Replace “CMMG STA Capability Information field” with “CMMG Capabilities Info field”.

**At page 2059, lines 39-47 (10.42.6.4.4 Antenna configuration setting during a beam refinement transaction), replace the paragraph as follows:**

A STA that sets to 1 the Antenna Pattern Reciprocity subfield in the DMG STA Capability Information field in the DMG Capabilities element it transmits and that receives a BRP-RX PPDU from a peer STA that also sets to 1 the Antenna Pattern Reciprocity subfield in the DMG STA Capability Information field of the peer’s DMG Capabilitles element it transmits shall use the same AWV that was configured with the BRP-RX PPDU in subsequent transmissions and receptions with the peer STA during the DTI. This allows STAs that use reciprocity to shorten the beamforming training time.

**At page 2063, line 44 (10.42.9 CDMG enhanced beam tracking):**

* Replace “CDMG STA Capabilities Information field” to “CDMG STA Capability Information field”.

**At page 942, line 16 (Figure 9-132—Relay Capable STA Info field format),**

* Replace “Relay Capabilities Information” to “Relay Capability Information”

**At page 1327, line 18 (Relay Capabilities element format)**

* Replace “Relay Capabilities Information” to “Relay Capability Information”

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| CID | Clause | Page | Line | Comments | Proposed Change |
| 4250 |  10.39.6.6 | 1983 | 9 | "The actual duration of the time the STA stays in the listening mode is limited by the aCMMGPPMinListeningTime parameter." -- no such parameter | Delete the cited sentence |

**Discussion:**

The following is the paragraph of interest as pointed out by the commenter:



aCMMGPPMinListeningTime parameter is missing from the table summarizing the CMMG PHY characteristics. Its value is the same as that of the aDMGPPMinListeningTime parameter.

**Proposed Resolution:**

Revised

At page 3562 in Table 25-37 (CMMG PHY characteristics) in subclause 25.14.4 (PHY characteristic), add a new PHY parameter aCMMGPPMinListeningTime parameter with value 150 μs, and add the unit μs for the PHY parameter aCCATime.

Table 25-37—CMMG PHY characteristics

|  |  |
| --- | --- |
| PHY parameter | Value |
| …… | ……. |
| aCCATime | 3 μs |
| aCMMGPPMinListeningTime | 150 μs |
| aTxRFDelay | Implementation dependent |
| …… | ……. |

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| CID | Clause | Page | Line | Comments | Proposed Change |
| 4216 | 10.42.6.4.4 | 2059 | 39 | "DMG Antenna Pattern Reciprocity" -- no such field | Delete "DMG " (2x in the para) |

**Discussion:**

The following is the paragraph of interest:



These two instances of “DMG” are corrected by the proposed resolution for CIDs 4217 and 4218 as shown below:

***At page 2059, lines 39-47 (10.42.6.4.4 Antenna configuration setting during a beam refinement transaction), replace the paragraph as follows:***

*A STA that sets to 1 the Antenna Pattern Reciprocity subfield in the DMG STA Capability Information field in the DMG Capabilities element it transmits and that receives a BRP-RX PPDU from a peer STA that also sets to 1 the Antenna Pattern Reciprocity subfield in the DMG STA Capability Information field of the peer’s DMG Capabilitles element it transmits shall use the same AWV that was configured with the BRP-RX PPDU in subsequent transmissions and receptions with the peer STA during the DTI. This allows STAs that use reciprocity to shorten the beamforming training time.*

**Proposed resolution:**

Accept.

Note to the editors: The proposed resolution is part of the resolutions for CIDs 4217 and 4218.

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| CID | Clause | Page | Line | Comments | Proposed Change |
| 4201 | 9.4.2.229.2 | 1442 | 22 | A CMMG STA is not a DMG STA | Delete “DMG" in "Figure 9-754--CMMG Capabilities Info field format". In Table 9-313--Subfields of the CMMG Capabilities Info field format change "Number of RXDMG Antennas" to "Number of Rx Antennas" (note Rx not RX) and change "DMG Antenna Reciprocity" to "Antenna Reciprocity" (as in the figure) |

**Proposed resolution:**

Accept.

Note to the editors: The proposed resolution is part of the resolutions for CIDs 4217 and 4218.