IEEE P802.11
Wireless LANs

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| CID 4219, 4220, 4225 |
| Date: 2019-03-12 |
| Author(s): |
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Abstract

This submission proposes resolutions to CID 4219, 4220, and 4225.

The CID is in reference to Comment database on Draft IEEE 802.11ay/D3.0.

Revision 0: Initial proposal

# Comment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **PP.LL** | **Comment** | **Proposed Change** | **Suggested Resolution** |
| 4219 | 351.08 | According to at 11.2.7.2.2, there is a sentence "A non-AP EDMG STA may set the Triggered Unscheduled PS subfield to one..." Sounds like this is optional for non-AP EDMG STA to use Triggered Unscheduled PS. It would be preferrable to define a MIB variable to control the use of Triggered Unschduled PS. | Please consider the following changes:1. Add dot11EDMGTriggeredUnscheduledPSActivated entry to Annex C.2. Define dot11EDMGTriggeredUnscheduledPSActivated as control variable, written by an external management entity.3. Use dot11EDMGTriggeredUnscheduledPSActivated variable to express the STA is operating the feature. | REJECT:The triggered unscheduled PS is defined as a part of the 802.11ad. The comment should go to REVmd instead of TGay. |

# Discussion:

The commenter is asking to add MIB variable to control Triggered Unscheduled PS operation. However, the feature is defined in 802.11ad and if we implement the suggested change, the change would span greater area than what we have in 802.11ay draft specification. The comment should go to REVmd instead of TGay.

# Proposed resolution:

Reject.

The triggered unscheduled PS is defined as a part of the 802.11ad. The comment should go to REVmd instead of TGay.

# Comment:

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| --- | --- | --- | --- | --- |
| **CID** | **PP.LL** | **Comment** | **Proposed Change** | **Suggested Resolution** |
| 4220 | 741.10 | There is no MIB variable associated with Scheduled RD feature. | Add MIB variable for Scheduled RD enablement | REVISED: Adopt changes proposed in doc11-19/471r0 |

# Discussion:

The commenter is asking to add MIB variable to control Scheduled RD enablement. However, it seems that the Scheduled RD is automatically enabled when the STA supports MU-MIMO. Suggest to refer to MIB variable that specifies MU-MIMO capability, instead of defining a new MIB. Maybe, it is better to remove the Scheduled RD Supported field in the MAC Capabilities subelement.

# Proposed resolution:

**9.4.2.250.6 MAC Capabilities subelement**

***To TGay Editor: Change the 4th paragraph of the 9.4.2.250.6 as follows:***

The Scheduled RD Supported field is set to 1 to indicate that the EDMG STA supports the scheduling procedure of the RD protocol described in 10.30.3 and 10.30.4. This field is set to 1 if the STA supports MU-MIMO, i.e., dot11EDMGMIMOSupport is either muAndSuMimo (2) or reciprocalMuMimoAndSuMimo (3). Otherwise, this field is set to 0.

**10.30.3 Rules for RD initiator**

***To TGay Editor: Change the 3rd paragraph of the 10.30.3 as follows:***

If an RD initiator and an RD responder are EDMG STAs and both STAs support MU-MIMO and scheduling procedure of the RD protocol, then the RD initiator may set the ack policy of MPDUs contained in A-MPDU transmitted within an RDG PPDU to Scheduled Ack. In this case, the RD initiator shall include at least one Block Ack Schedule frame with Response Offset and Response Duration fields set to nonzero values in an A-MPDU transmitted within the RDG PPDU. If an A-MPDU is transmitted not as a part of an EDMG MU PPDU, the RD initiator shall set the value of the Response Offset field in the Block Ack Schedule frame equal to SIFS.

**10.30.5 Reverse direction for EDMG DL MU-MIMO**

***To TGay Editor: Change the 1st paragraph of the 10.30.5 as follows:***

An EDMG STA with dot11EDMGMIMOSupport equal to either muAndSuMimo (2) or reciprocalMuMimoAndSuMimo (3) shall support the reverse direction for EDMG DL MU-MIMO mechanism described in this subclause.

# Comment:

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| **CID** | **PP.LL** | **Comment** | **Proposed Change** | **Suggested Resolution** |
| 4225 | 236.07 | The sentence reads "The RD protocol shall be supporeted by an EDMG STA." However, it is likely that EDMG STA that uses TDD Channel Access does not use this feature. | 1. Replace "The RD protocol shall be supporeted by an EDMG STA." with "When dot11DMGTDDModeActivated (or something that controls TDD mode operation) is false, EDMG STA shall support RD protocol."2. Remove "For an EDMG STA, dot11RDResponderOptionImplemented shall always be set to true." at 236.14 | REVISED: Adopt changes proposed in doc11-19/471r0 |

# Discussion:

The language in clause 10.30.1 could be improved.

# Proposed resolution:

**10.30.1 General**

The RD protocol may be supported by an HT STA and by a DMG STA that is not an EDMG STA. The RD protocol shall be supported by an EDMG STA, when the STA is not operating TDD channel access. A STA receiving an RDG is never required to use the grant. The RD protocol defined in this subclause applies to ~~both types of~~ HT STAs and DMG STAs.

A DMG STA indicates support of the RD protocol feature using the Reverse Direction subfield of the DMG STA Capability Information field of the DMG Capabilities element. A STA shall set the Reverse Direction subfield to 1 in frames that it transmits containing the DMG Capabilities element if dot11RDResponderOptionImplemented is true. Otherwise, the STA shall set the Reverse Direction subfield to 0. In a DMG STA, the RDG/More PPDU subfield and the AC Constraint subfield are present in the QoS Control field.

# Some more issue found by the author of this document:

Most of the MIB variable defined in dot11EDMGBeamformingConfigTable are not referred by the main body of the specification. Need to create linkage.

# Proposed resolution:

**9.4.2.250.2 Beamforming Capability subelement**

The Requested BRP SC Blocks subfield indicates the minimum number of data SC blocks that the STA requests be included in a PPDU carrying a TRN field and transmitted to the STA. The subfield is set to dot11RequestedBRPMinDataLength.

The MU-MIMO Supported subfield indicates if the STA supports the DL MU-MIMO protocol including the MU-MIMO beamforming protocol described in 10.43.10.2.3. The subfield is set to 1 if dot11EDMGMIMOSupport is either muAndSuMimo (2) or reciprocalMuMimoAndSuMimo (3), and is set to 0 otherwise.

The Reciprocal MU-MIMO Supported subfield indicates if the STA supports the reciprocal MU-MIMO protocol specified in 10.43.10.2.3.3.3. The subfield is set to 1 if dot11EDMGMIMOSupport is reciprocalMuMimoAndSuMimo (3), and is set to 0 otherwise. This subfield is reserved if the MU-MIMO Supported field is 0.

The SU-MIMO Supported subfield indicates if the STA supports the SU-MIMO protocol including the SU-MIMO beamforming protocol described in 10.43.10.2.2. The subfield is set to 1 if dot11EDMGMIMOSupport is suMimoOnly (1), and is set to 0 otherwise.

The Grant Required subfield indicates if the STA requires reception of a Grant frame to set up a MIMO configuration. The subfield is set to set to 1 if dot11EDMGBFGrantRequired is true, and is set to 0 otherwise. The Grant Required subfield is reserved if both the MU-MIMO Supported subfield and the SU-MIMO Supported subfield are set to 0.

The DMG TRN RX Only Capable subfield indicates if the STA is capable of receiving only DMG TRNs as defined in 20.10.2.2.2, even when such TRNs are appended to an EDMG PPDU (see 29.9.2.2.3). The subfield is set to 1 if dot11EDMGBFDMGTRNRXOnly is true. Otherwise, this subfield is set to 0.

The First Path Training Supported subfield indicates if the STA supports the first path beamforming training procedure defined in 10.43.10.6. This subfield is set to 1 if dot11FirstPathTraining is true, and is set to 0 otherwise.

The Dual Polarization TRN Capability subfield is formatted as shown in Figure 47.

The Dual Polarization TRN Supported subfield is set to 1 to indicate that the repetition of the same TRN with different polarizations, as specified in 10.43.10.7, is supported by the STA. Otherwise, it is set to 0.

TRN Power Difference subfield indicates the difference, in dB, between the radiated power of consecutive TRN subfields transmitted with the same AWV but with different polarizations. The encoding of the radiated power difference is shown in Table 11.

The MU-MIMO Supported subfield and the Hybrid Beamforming and MU-MIMO Supported subfield indicates if the STA supports the hybrid beamforming protocol during MU-MIMO transmission, including the hybrid beamforming protocol described in 10.43.10.2.4. The subfield is set to 1 if dot11EDMGHybridMUMIMOImplemented is true, and is set to 0 otherwise. The Hybrid Beamforming and MU-MIMO Supported subfield is reserved if the MU-MIMO Supported subfield is 0.

The SU-MIMO Supported subfield and Hybrid Beamforming and SU-MIMO Supported subfield indicates if the STA supports hybrid beamforming protocol during SU-MIMO transmission, including the hybrid beamforming protocol described in 10.43.10.2.4. The subfield is set to 1 if dot11EDMGHybridSUMIMOImplemented is true, and is set to 0 otherwise. The Hybrid Beamforming and SU-MIMO Supported subfield is reserved if the SU-MIMO Supported subfield is 0.

The Largest Ng Supported subfield indicates largest value of *Ng* that the EDMG STA supports for the beamforming feedback matrix (see 9.4.2.269). The subfield is set to the value of dot11EDMGBFGrantLargestNgSupported, i.e., 0 for *Ng*=2, set to 1 for *Ng*=4, and set to 2 for *Ng*=8. Value 3 is reserved.

The Dynamic Grouping Supported subfield indicates if the EDMG STA supports dynamic grouping. The field is set to 1 if dot11EDMGBFDynamicGroupingImplemeneted is true, and is set to 0 otherwise.

**9.4.2.250.4 PHY Capabilities subelement**

If the Phase Hopping Supported subfield indicates if the STA supports phase hopping as specified in 29.6.9.3. The subfield is set to 1 if dot11EDMGPhaseHoppingImplemented is true, and is set to 0 otherwise.

If the Open Loop Precoding Supported subfield indicates if the STA supports open loop precoding as specified in 29.6.9.3. The subfield is set to 1 if dot11EDMGOpenLoopPrecodingImplemented is true, and is set to 1 otherwise.

If the DCM π/2-BPSK Supported subfield indicates if the STA supports DCM π/2-BPSK as specified in 29.5.9.5.2. The subfield is set to 1 if dot11EDMGDCMBPSKImplemented is true, and is set to 0 otherwise.

The Short CW Punctured Supported, Short CW Superimposed Supported, Long CW Punctured Supported and Long CW Superimposed Supported subfields indicate the support by an EDMG STA for LDPC code rate 7/8 with codeword length equal to 624, 672, 1248, and 1344 bits as follows:

* The Short CW Punctured Supported subfield is set to 1 if dot11EDMGShortCWPuncturedImplemented is true, and is set to 0 otherwise. The subfield indicates support for transmission and reception of LDPC code with short codeword length equal to 624 bits and code rate 7/8. The encoding procedure for short codeword length equal to 624 bits is defined in 20.6.3.2.3.
* The Short CW Superimposed Supported subfield is set to 1 if dot11EDMGShortCWSuperimposedImplemented is true, and is set to 0 otherwise. The subfield indicates support for transmission and reception of LDPC code with short codeword length equal to 672 bits and code rate 7/8. The encoding procedure for short codeword length equal to 672 bits is defined in 29.5.9.4 and parity check matrix is defined in 30.3.6.2. This field is reserved if the Short CW Punctured Supported subfield is 0.
* The Long CW Punctured Supported subfield is set to 1 if dot11EDMGLongCWPuncturedImplemented is true, and is set to 0 otherwise. The subfield indicates support for transmission and reception of LDPC code with long codeword length equal to 1248 bits and code rate 7/8. The encoding procedure for long codeword length equal to 1248 bits is defined in 29.5.9.4.
* The Long CW Superimposed Supported subfield is set to 1 if dot11EDMGLongCWSuperimposedImplemented is true, and is set to 0 otherwise. The subfield indicates support for transmission and reception of LDPC code with long codeword length equal to 1344 bits and code rate 7/8. The encoding procedure for long codeword length equal to 1344 bits is defined in 29.5.9.4. This field is reserved if the Long CW Punctured Supported subfield is 0.

The SC Maximum Number of SU-MIMO Spatial Streams Supported subfield is set to dot11EDMGSCMaxSUSpatialStreams minus 1. The subfield indicates the maximum number of SU-MIMO spatial streams for the EDMG SC modulation class that the STA can demodulate. The value of dot11EDMGSCMaxSUSpatialStreams is in the range 1 to 8, with the value being equal to the subfield representation plus 1.

The OFDM Maximum Number of SU-MIMO Spatial Streams Supported subfield is set to dot11EDMGOFDMMaxSUSpatialStreams minus 1. The subfield indicates the maximum number of SU-MIMO spatial streams for the EDMG OFDM modulation class that the STA can demodulate. The value of dot11EDMGOFDMMaxSUSpatialStreams is in the range 1 to 8, with the value being equal to the subfield representation plus 1.

The NUC TX Supported subfield is set to 1 if dot11EDMGNUCTXImplemented is true, and is set to 0 otherwise. This subfield indicates that the STA supports transmission of PPDUs using non-uniform constellation.

The NUC RX Supported subfield is set to 1if dot11EDMGNUCRXImplemented is true, and is set to 0 otherwise. This subfield indicates that the STA support reception of PPDUs using non-uniform constellation. Otherwise, this subfield is set to 0.

The π/2-8-PSK Supported subfield is set to 1 if dot11EDMG8PSKImplemented is true, and is set to 0 otherwise. The subfield indicates that the STA supports SC MCS 12 and SC MCS 13 using 8-PSK modulation.

The Number of Concurrent RF Chains subfield is set to dot11EDMGNumConcurrentRFChains minus 1. The value of the subfield plus one indicates the maximum number of concurrent transmit or receive chains of the STA. The value of this subfield ranges from 0 to 7. The value of this field is less than or equal to the value of the Number of DMG Antennas subfield in the Antenna Polarization Capability field.

The STBC Supported subfield is set to dot11EDMGSTBCImplemented. It is set to 1 to indicate that the STA supports single stream STBC reception. It is set to 2 to indicate that the STA supports one or more spatial stream STBC reception; in this case, the maximum number of spatial streams which can be decoded is limited by the minimum of four and the value of the SC Maximum Number of SU-MIMO Spatial Streams Supported subfield for an EDMG SC PPDU and the value of the OFDM Maximum Number of SU-MIMO Spatial Streams Supported subfield for an EDMG OFDM PPDU. This field set to 0 to indicate that the STA does not support STBC. Value 3 is reserved.

The EDMG A-PPDU subfield is set to 1 if dot11EDMGAPPDUImplemented is true, and is set to 0 otherwise. The subfield indicates that the STA supports EDMG A-PPDU as described in 10.15.

The Long CW subfield is set to 1 if dot11EDMGLongCWImplemented is true, and is set to 0 otherwise. The subfield indicates that the STA supports LDPC codeword of length 1344 on code rates ½, 5/8, 3/4 and 13/16. If this subfield is 0, the Long CW Punctured Supported and Long CW Superimposed Supported subfields are set to 0.

**C.3 MIB details**

Dot11PHYEDMGEntry ::=

SEQUENCE {

dot11CurrentChannelWidth INTEGER,

dot11CurrentChannelCenterFrequencyIndex0 Unsigned32,

dot11CurrentChannelCenterFrequencyIndex1 Unsigned32,

dot11CurrentPrimaryChannel Unsigned32,

dot11EDMGPolarizationCapability OCTET\_STRING,

dot11EDMGSCMaxSUSpatialStreams Unsigned32,

dot11EDMGOFDMMaxSUSpatialStreams Unsigned32,

dot11EDMGNumConcurrentRFChains Unsigned32,

dot11EDMGPhaseHoppingImplemented TruthValue,

dot11EDMGOpenLoopPrecodingImplemented TruthValue,

dot11EDMGDCMBPSKImplemented TruthValue,

dot11EDMGShortCWPuncturedImplemented TruthValue,

dot11EDMGShortCWSuperimposedImplemented TruthValue,

dot11EDMGLongCWPuncturedImplemented TruthValue,

dot11EDMGLongCWSuperimposedImplemented TruthValue,

dot11EDMGNUCTXImplemented TruthValue,

dot11EDMGNUCRXImplemented TruthValue,

dot11EDMG8PSKImplemented TruthValue,

dot11EDMGSTBCImplemented INTEGER,

dot11EDMGAPPDUImplemented TruthValue,

dot11EDMGLongCWImplemented TruthValue

}

# Reference:

[1] Draft P802.11REVmd D3.0

[2] 11-19/297 “Comments on 11ay/D3.0”