IEEE P802.11  
Wireless LANs

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| Comment resolutions for CIDs to clause 27.8 | | | | |
| Date: 2017-01-16 | | | | |
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|  |  |  |  |  |

Abstract

The submission provides resolutions to comment related to clause 27.8 Operating mode indication.

The submission provides solutions to CIDs: 3077, 3218, 4783, 5196, 5197, 5948, 6192, 7023, 7024, 7025, 7026, 7027, 7404, 7507, 7613, 7615, 7617, 7890, 7970, 9592, 3217, 3219, 3220, 3221, 4784, 5198, 5199, 5679, 5949, 6013, 6015, 6016, 6017, 6157, 6158, 6190, 7028, 7029, 7030, 7031, 7202, 7247, 7614, 7616, 8085, 8720, 9409, 9723, 9724, 9725, 9726 and 9939.

Normative text including changes done as a response to the letter ballow comments:

**3.4 Abbreviations and acronyms**

*Instructions to ax Editor: Change as shown below.*

OMIOperati~~on~~ng (5197) mode indication

**9.2.4.6.4.3 Operating Mode**

*Instructions to ax Editor: Change as shown below.*

The Channel Width subfield indicates the operating channel width supported by the STA in reception, and is set to 0 for primary 20 MHz, 1 for primary 40 MHz, 2 for primary 80 MHz, and 3 for primary 160 MHz and primary 80+80 MHz. (6016, 9939)

**27.8 Operating mode indication**

**27.8.1 General**

*Instructions to ax Editor: Make the changes as shown below.*

An HE STA can change its operating mode setting either using the procedure described in 11.42 (Notification of operating mode changes), or the procedure described in this subclause.

Operating mode indication (OMI) is a procedure used between an OMI initiator and an OMI responder. An HE STA that transmits a frame including an OM~~I A-~~Control subfield (7507) is defined as an OMI initiator. An HE STA that receives a frame including an OM~~I A-~~Control subfield (7507) is defined as an OMI responder.

If dot11TxOMIOptionImplemented (7890, 4783) is true, an HE STA may send to a STA that indicated OMI A-Control support in its HE Capabilities element a (7970) QoS Data or QoS Null frame that contains the OM~~I A-~~Control subfield (7507) to indicate a change in its receive and/or transmit operating parameters. If dot11RxOMIOptionImplemented (7890,4783) is true, an HE STA implements the reception of a QoS Data or QoS Null frame that contains the OM Control subfield that indicates a change in receive and/or transmit operating parameters (4783) and the HE STA shall set the OMI A-Control Support subfield in the HE MAC Capabilities Information field to 1. (3077) An HE AP shall set dot11OMIRXOptionImplemented (7890,4783) to true and the HE AP shall implement the reception of the OM~~I A-~~Control subfield (7507).

When a BSS uses both Operating Mode Indication and Operating Mode Notification, the channel width and the RX NSS of the OMI Initiator shall be set to the value of the latest received Operating Mode Indication or Operating Mode Notification.

The OMI initiator shall indicate a change in its receive operating mode by including the OM~~I A-~~Control subfield (7507) in a QoS Data or QoS Null frame that solicits an ~~immediate~~ (7024, 7025,7026,7027) acknowledgement and is addressed to the OMI responder. The ~~OMI A-Control field indicates that the~~ OMI initiator shall support~~s~~ (7617) receiving PPDUs with a bandwidth up to the value indicated by the ~~Rx~~ (5196) Channel Width subfield and with a number of spatial streams up to the value indicated by the Rx NSS subfield of the OM Control subfield (7617) as defined in 27.8.2 (Receive operating mode (ROM) indication). The Channel Width subfield also indicates the largest bandwidth the STA assesses the CCA for which the STA transmits a Bandwidth Query Report (BQR). (5948)

The OMI initiator shall indicate a change in its transmit operating mode by including the OM~~I A-~~Control subfield (7507) in a QoS Data or QoS Null frame that solicits an acknowledgement frame and is addressed to the OMI responder as defined in 27.8.3 (Rules for transmit operation mode (TOM) indication).

**27.8.2 Receive operating mode (ROM) indication**

*Instructions to ax Editor: Make the change as shown below.*

The ROM indication allows the OMI initiator to adapt the maximum operating channel width and/or the maximum number of spatial streams it can receive from the OMI responder.

An OMI initiator that sent the frame including the OM~~I A-~~Control subfield (7507) should change its OMI parameters, Rx NSS and ~~Rx~~ (5196) Channel Width, as follows:

— When the OMI initiator changes an OMI parameter from higher to lower, it should make the change for that parameter only after the TXOP in which it received~~ing~~ (3219) the ~~immediate~~ (7024, 7025,7026,7027) acknowledgement from the OMI responder.

— When the OMI initiator changes an OMI parameter from lower to higher, it should make the change for that parameter at latest after ~~either after~~ ACK Timeout has expired or after receiving the ~~immediate~~(7024, 7025,7026,7027) acknowledgement from the OMI responder which ever occurs earlier. (3218,7247)

If the OMI initiator is an HE AP, the OMI initiator should be capable to receive in bandwidth and with NSS that is the highest value of the latest Channel Width subfields and Rx NSS subfields that the OMI initiator has successfully indicated in OM Control subfield or in Operating Mode field to any associated STA. (3077, 6192, 7023)

NOTE—In the event of transmission failure of the frame containing the OMI A-Control field, the OMI initiator attempts the recovery procedure defined in 10.22.2.7 (Multiple frame transmission in an EDCA TXOP).

~~If an OMI mode change is reported during a TXOP then the change should occur at least after that TXOP.~~ (3219)

The OMI responder shall use the values indicated by the Rx Channel Width and Rx NSS subfields of the most recently received OMI A-Control field sent by the OMI initiator to ~~send~~ as transmit parameters for sending (4784) PPDUs to the OMI initiator in subsequent TXOP.

After transmitting the acknowledgement ~~frame immediate response immediate acknowledgement~~ (7614, 7031, 3220, 6157, 7024, 7025,7026,7027) for the frame containing the OM~~I A-~~Control subfield (7507), the OMI responder may transmit subsequent SU PPDUs or MU PPDUs that are addressed to the OMI initiator.

NOTE—A subsequent PPDU is a PPDU that is intended for the ROM Initiator and needs not be the immediately following PPDU.

**27.8.3 Rules for transmit operation mode (TOM) indication**

*Instructions to ax Editor: Make the changes as shown below.*

The TOM indication allows the OMI initiator to suspend responding to any variant of the Trigger frame or to adapt the maximum operating channel width and/or the maximum number of spatial streams it can transmit as a response to a Trigger frame from the OMI responder. (3217, 6158)

An OMI initiator that is a non-AP STA may indicate changes in its transmit parameters by sending a frame that contains the OM~~I A-~~Control subfield (7507) to the OMI responder that is an AP (6158,7616).

The OMI initiator shall set:

— The UL MU Disable subfield to 1 to indicate suspension of the UL MU operation (see 27.5.2 (UL MU operation); otherwise it shall set the UL MU Disable subfield to 0 to indicate resumption or continuation of participation in UL MU operation.

• An AP that is an OMI initiator shall set the UL MU Disable subfield to 0.

— The Tx NSS subfield to the maximum number of Nss that the STA ~~will~~ may (7029) use in response to Trigger frames.

*Instructions to ax Editor: Please make this sentence as part of bulleted list.* ~~NOTE~~—The Channel Width subfield indicates the maximum channel width that the STA will use in response to Trigger frames. (5679, 7028, 7202, 9725)

An OMI initiator that sent the frame including the OM Control subfield should change its OMI parameters, Tx NSS, UL MU Disallow and Channel Width, as follows:

— When the OMI initiator changes an OMI parameter from higher to lower, it should make the change for that parameter only after the TXOP in which it received the acknowledgement from the OMI responder.

— When the OMI initiator changes an OMI parameter from lower to higher, it should make the change for that parameter at latest either after ACK Timeout has expired or after receiving the acknowledgement from the OMI responder. (5199)

An OMI responder that successfully received a frame containing an OM~~I A-~~Control subfield (7507) from an OMI initiator:

— Shall consider the OMI initiator as not responding to any variant of Trigger frame and not responding to UL MU response scheduling Control subfield ~~participating in UL MU operation~~ (6190) for subsequent TXOPs (see 27.5.2 (UL MU operation)) when the UL MU Disable subfield is 1 in the received OM~~I A-~~Control subfield (7507)

NOTE—The STA sets the UL MU Disable subfield to 1 to indicate that it will not respond to ~~all~~ any variant~~s~~ (6013, 8085, 8720) of the Trigger frame and will not respond to UL MU response scheduling Control Subfield.

NOTE—A device may have multiple radios that can result to difficult in-deivce coexistence challenges. The device might set UL MU Disable subfield to 1 if it has trouble responding to Trigger frames because the timing or high transmit power would cause interference with another radio in the device. (5198)

—  Shall consider the OMI initiator as participating in UL MU operation for subsequent TXOPs when the UL MU Disable subfield is 0 in the received OMI A-Control field in which case:

* + The maximum number of spatial streams that the OMI initiator can transmit in response to Trigger frames is indicated in the Tx NSS subfield of the OM~~I A-~~Control subfield (7507)
  + The maximum channel width over which the OMI initiator can transmit in response to Trigger frames is indicated in the Channel Width subfield of the OM~~I A-~~Control subfield (7507)
* —  Shall indicate a number of spatial streams in the Per User Info field of a Trigger frame, which contains the AID of the OMI initiator, that is less than or equal to the number of spatial streams that is calculated from the Tx NSS subfield of the OM~~I A-~~Control subfield (7507) received ~~by~~ from (6016) the OMI initiator
* —  Shall indicate a channel width in the RU Allocation subfield of the Per User Info field of a Trigger frame, containing the AID of the OMI initiator, that is within the bandwidth ~~less than or equal to the value~~ (3221,9726) specified in the Channel Width subfield of the OM~~I A-~~Control subfield (7507) received ~~by~~ from (6016) the OMI initiator

**Annex C**

(normative)

**ASN.1 encoding of the MAC and PHY MIB**

**C.3 MIB Detail**

*Instructions to ax Editor: Please make changes shown below. Please continue list accordingly.*

Dot11HEStationConfigEntry ::=

SEQUENCE {

dot11HEULMUResponseSchedulingOptionImplemented TruthValue,

dot11ULMUMIMOOptionImplemented TruthValue,

dot11OFDMARandomAccessOptionImlemented TruthValue,

dot11HEControlFieldOptionImplemented TruthValue,

dot11OMITxOptionImplemented TruthValue,

dot11OMIRxOptionImplemented TruthValue,

(7890,4783)

dot11OMITxOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is

capable of generating frames with an OM ~~I A-~~Control field. The capability

is disabled, otherwise."

DEFVAL { false }

::= { dot11HEStationConfigEntry 5}(7890,4783)

*Instructions to ax Editor: Please add the new MIB parameter as shown below and renumber the following MIB parameters accordingly.*

dot11OMIRxOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is

capable of receiving frames with an OM Control field. The capability

is disabled, otherwise."

DEFVAL { false }

::= { dot11HEStationConfigEntry 6}

(7890,4783)

**Solved CIDs and their resolutions**

CID 3077

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| **Comment** | **Proposed Change** |
| The normative behavior for setting the OMI support Capabilities is missing. Please add the normative behavior on setting this field. In addition  there needs to be normative behavior on how the AP indicates ROM changes to a plurality of STAs using the OMI A-Control. | Presentation to be provided which would provide normative text which would require the AP to send OMI and receive acknowladge indication from all STAs before changing the parameters. |

Discussion: The comment is asking to add normative text to OMI A-Control Support subfield in the HE MAC Capabilities. The logic to set the value for the subfield is missing and should be added.

Additionally, the comment asks how AP changes its ROM when it has mutltiple associated STAs. This is a good question and the D1.0 discusses only link speificly on the ROM operation.

Proposed resolution:

Revised.

Agree in principle with the commenter.

The AP should be capable to receive with the largest channel width and highest NSS that it has indicated to any STA.

CID 3218

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| **Comment** | **Proposed Change** |

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| "When the OMI initiator changes an OMI parameter from lower to higher, it should make the change for that parameter either after ACK Timeout has expired or after receiving the immediate acknowledgement from the OMI responder." Does an OMI initiator has to wait per this clause? Or if it can perform the transition from lower to higher within a SIFS it should be allowed to do so. | As in the comment |

Discussion: The STA operating with larger NSS or channel width can receive the transmission with smaller NSS and channel width. The comment points out that current OMI times are setting the maximum time for the OMI initiator to change its parameter value.

Proposed resolution:

Revised.

Agree in principle with the commenter. The provided time should be the latest the time when the larger NSS or Channel width is taken into use.

CID 4783

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| **Comment** | **Proposed Change** |
| This paragraph does not provide the full picture for the OMI optionality at the STA, and mandatroy at the AP. Please rephrase such that it is clear that OMI A-Control field can be sent to a STA that has declared support of its reception (tie to HE Caps), and specify that an HE STA may set the HE Caps to 1 while the HE AP shall set it to 1. | As in comment. |
|  |

Discussion: The commenter is looking for more clear statements on the mandatory/optional definition of the ROM. The confusions seem to be caused the use of a single MIB variable to control the OMI operation.

Proposed resolution:

Revised.

Agree in principle with the commenter. The dot11OMIOptionImplemented MIB parameter should be split into two MIB parameters: dot11OMIRXOptionImplemented and dot11OMITXOptionImplemented. The AP shall set the dot11OMITXOptionImplemented to true.

CID 5196

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| **Comment** | **Proposed Change** |
| There is no "Rx Channel Width" subfield | The name of the field in Figure 9-15d is "Channel Width". Unify the naming. |

Discussion: The commenter has a valid point.

Proposed resolution:

Accepted

CID 5197

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| **Comment** | **Proposed Change** |
| Is OMI "Operating mode indication" as defined here or "Operation mode indication" as defined in 3.4 | unify the definitions |

Discussion: OMI has been discussed as operating mode indication in Clause 27.8. Clause 3.4 seems to have wrong wording and this is the only use of the operation mode indication.

Proposed resolution:

Revised. Change the 3.4 abbreviations to OMI, Operating mode indication.

CID 5948

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| **Comment** | **Proposed Change** |
| The information provided by ROM is partially overlapping with the informatiom from BQR. It is not clear if there is a rule how one relates to the other. | Please clarify. |

Discussion: The Bandwidth Query Report contains CCA indication per 20 MHz channel, the ROM indicates the maximum channel width in which the STA is capable to receive.

The ROM should define the maximum channel width in which the STA may assess CCA for BQR, similarly as a STA is not required to receive PPDUs transmitted in larger BW, the STA is not required to assess CCA to wider BW.

Proposed resolution:

Revised. The Channel Width subfield of the Receive Mode Indication limits the bandwidth the STA is required to assess for BQR.

CID6192

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| **Comment** | **Proposed Change** |
| In 11.42 Notification of operating mode changes, AP's procedure for changing its operating mode setting is well described. However, it is not clear how AP can change its operating mode with OMI A-Control field. Throughout the section 27.8, please clarify the behavior of HE AP and HE non-AP STA respectively fro changing its operating mode with OMI A-Control. | As in comment. |

Discussion.

The AP may have multiple associated STAs and the operating mode change with multiple associated STAs is not described. The AP should be capable to receive in channel width and the NSS that is the highest that it has indicated in latest ROMI parameters or Notification of the operating mode change. Thus, AP can receive all transmissions.

Proposed resolution:

Revised. The AP should be capable to receive in channel width and the NSS that is the highest it has successfully indicated in latest ROMI parameters or Notification of the operating mode change. This ensures that AP can receive transmissions from all STAs.

CID7023

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| **Comment** | **Proposed Change** |
| It is not clear whether AP can change its operation mode with the OMI indication. In cases where AP includes OMI in multiple MPDUs in DL HE MU PPDU format, and only subset of STAs acknowledges the MPDUs, what is the AP's behavior for changing OMI settings? In baseline spec, 11.42 Notification of operating mode changes, AP/non-AP STA's behavior for operation mode change is differently described. Therefore, OMI also should clarify AP's behaviour in clear manner. | Clarify the behavior of OMI A-Control for AP and non-AP STAs clearly. |

Discussion. The commenter asks AP operation logic, when it performs OMI to multiple associated STAs. The commenter is asking when the AP may change its channel width and NSS. The AP shall be capable to receive on highest chanel witdth and NSS that a STA may use.

The unsuccessful transitions are redone and they are not considered, i.e. if ACK is not received, the transition to lower channel width or NSS cannot be done.

Proposed Resolution:

Revised. The AP is capable to receive in channel width and the NSS that is the highest that it has successfully indicated in latest ROMI parameters or Notification of the operating mode change. This ensures that AP can receive transmissions from all STAs.

CID7024, CID7025, CID7026, CID 7027, several comments on Immediate ACK to ROMI

CID 7024:

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| **Comment** | **Proposed Change** |
| Does including OMI A-Control in an MPDU require change to the Ack Policy of the MPDU to immediate ack? | Change from "solicits an immediate acknowledgement" to "solicits an acknowledgement" |

CID7025

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| **Comment** | **Proposed Change** |
| ROM is requiring "an immediate acknowledgement" in Line 36 and TOM is requiring "an acknowledgement" in Line 45. Why they require different Ack Policy for an MPDU that contains each. Please clarify the difference or harmonize the wording. | As per comment. |

CID 7026

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| **Comment** | **Proposed Change** |
| From "the immediate acknowledgement", does OMI requires a certain Ack Policy for the MPDU that contains it? Otherwise, remove "immediate". | As per comment. |

CID7027

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| **Comment** | **Proposed Change** |
| From "the immediate acknowledgement", does OMI requires a certain Ack Policy for the MPDU that contains it? Otherwise, remove "immediate". | As per comment. |

Discussion: The comments are asking does MPDUs that contain OMI A-Control field require immediate acknowledgement? The immediate acknowledgement may require the change of the ACK mode which easily generates overhead.

Proposed Resolution to all CIDs:

Revised. The immediate acknowledgement is not needed. Any acknowledgement to a frame carrying the OMI A-Control field is enough. The ROM and TOM should have the same operating requirements.

CID 7404

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| **Comment** | **Proposed Change** |
| The spec says: "An HE STA can change its operating mode setting either using the procedure described in 11.42 (Notification of operating mode changes), or the procedure described in this subclause. " The 2 procedures should be harmonized so that they provide the same capabilities (same changes of mode of operation) | Modify the notification of operating mode changes using omn frames so that the transmit operating mode changes are also supported. |

Discussion: The Comment does not provide reasoning why the Operating Mode Notification and Operating Mode Indication should provide the same operation and should be harmonized.

The Operating Mode Notification and Operating Mode Indication have fundamental differences in their capabilities. For instance, Operating Mode Notification enables an AP to indicate its operating mode change signaling by using Beacon frames.

Also, the signaling in Operating Mode Notification, 9.4.2.166(Operating Mode Notification element) and signaling in Operating Mode Indication, 9.2.4.6.4.3(Operating Mode) are different. For instance, No LDPC field and RX NSS Type field are not present in OMI. Similarly, TX NSS and UL MU Disallow fields are not present in OMN element.

Proposed Resolution:

Rejected. The Operating Mode Notification and Operating Mode Indication mechanisms are different and they are not planned to offer the same capabilities. No Changes done to the ax draft.

CID7507

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| **Comment** | **Proposed Change** |
| Throughout 27.8, "OMI A-Control field" should be changed to "OM Control subfield" | As per comment |

Discussion: The commenter has valid point. A-Control subfield may contain one or more Control fields and one variant of the Control field is called as Operating Mode.

Proposed Resolution:

Accepted.

CID7613

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| **Comment** | **Proposed Change** |
| Why management frmae is not mentioned here? | Add management frame. |

Discussion: There are two mechanism to change operating modes, OMI and OMN. 802.11ax D0.1 letter ballot had a resolution to CID1568 that denied the OMI use in management frame. The Operating Mode Notification shall not be present in the management frame to ensure that two contradicting Channel width or RX NSS values cannot be given in a management frame.

Proposed resolution:

Rejected. As discussed in the CID1568, having both OMN and OMI present in the management frame may result to interworking problems.

CID7615

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| **Comment** | **Proposed Change** |
| The following behavior should be added: a ROM intiator shall not transmit ROMI to a STA that doesn't support the receiption of A-Control with ROMI. | As in comment |

Discussion: The commenter has valid point. There is no point to send OM Control to a STA that does not understand it. The comment is similar to 7970.

Proposed resolution:

Revised.

Agree in principle with the commenter. There is no point to send OM Control to a STA that does not understand it.

CID 7617

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| **Comment** | **Proposed Change** |
| NSS behavior is not harmonized with HE Capabilities element. | Change the nomative behavior to make them consistent. |

Discussion. The commenter has a valid point. Currently, there is no normative shall word for the OMI initiator to ensure the NSS are actually in use.

Proposed resolution:

Revised. Agree in principle with the commenter. Currently, there is no normative shall word for the OMI initiator to ensure the NSS are actually in use.

CID 7890

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| **Comment** | **Proposed Change** |
| Is dot11OMIOptionImplemented for tx, rx or both? | Change the para at the cited location to "If dot11OMIOptionImplemented is true, an HE STA may send a QoS Data or QoS Null frame that contains the OMI A-Control field to indicate a change in its receive and/or transmit operating parameters and shall support the reception of the OMI A-Control field. If dot11OMIOptionImplemented is false, an HE STA shall not send a QoS Data or QoS Null frame that contains the OMI A-Control field and shall ignore the OMI A-Control field if received. An HE AP shall set dot11OMIOptionImplemented to true." At 421.28 change "generating" to "transmitting and receiving" and change "the station" to "the non-AP STA" |

Discussion: The commenter is asking on the dot11OMIOptionImplemented MIB parameter definition. The OMI is mandatory for AP to receive, but optional for STA to receive. The OMI is optional to transmit for all STAs. A single MIB parameter cannot clearly indicate this combination of the mandatory/optional features. For instance, a non-AP STA may be capable to transmit frames with OM Control subfield, but they may not be capable to receive these frames.

As proposed to resolution to the CID4783 two MIB parameters are needed to indicate capabilities more clearly.

Proposed Resolution: Revised.

Two MIB parameters: dot11TXOMIOptionImplemented and dot11RXOMIOptionImplemented are needed. TX indicates capability to send and RX indicates capability to receive frames with OM Control subfield.

CID7970

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| **Comment** | **Proposed Change** |
| No mention of support of OMI A-Control in receiver | Change "If dot11OMIOptionImplemented is true, an HE STA may send a QoS Data or QoS Null frame that contains the OMI A-Control field to indicate a change in its receive and/or transmit operating parameters." to "If dot11OMIOptionImplemented is true, an HE STA may send to a STA that indicated OMI A-Control support in its HE Capabilities element a QoS Data or QoS Null frame that contains the OMI A-Control field to indicate a change in its receive and/or transmit operating parameters." |

Discussion: The commenter has valid point. There is no point ot send OM Control to a STA that does not understand it.

Proposed Resolution:

Revised. Agree in principle with the commenter. The wording is good, but not exactly matching, beacuase other CIDs have changed other parts of the proposed text.

CID9592

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| **Comment** | **Proposed Change** |
| Could an HE AP STA be an OMI initiator? If it is not possible, add 'non-AP'. | As in comment. |

Discussion: The commenter is asking may a non-AP STA be OMI Responder. Yes, a non-AP STA may be OMI Responder, depending on its capabilities. It is optional to support dot11RXOMIOptionImplemented.

Proposed Resolution:

Rejected. Yes, HE AP may be OMI initiator, depending on the non-AP STA capabilities. There are no changes to the normative text, so the comment is rejected.

CID3217

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| **Comment** | **Proposed Change** |
| Should there be a similar sentence for TOM as this sentence from ROM 27.8.2: "The ROM indication allows the OMI initiator to adapt the maximum operating channel width and/or the maximum number of spatial streams it can receive from the OMI responder." | As in the comment |

Discussion: The commenter is requesting an overview of the clause to be added to TX Operating Mode Indication. It is typical to have such an overview and it micely introduces the operation.

Proposed resolution:

Revised. Agree in principle with the commenter. The introduction is added to the clause.

CID3219

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| **Comment** | **Proposed Change** |
| There should be a distiction between higher-to-lower vs lower-to-higher BW/SS change for this sentence: "If an OMI mode change is reported during a TXOP then the change should occur at least after that TXOP." | As in the comment |

Discussion: The commenter is asking to differentiate the transition directions. The transition from lower to higher already defines when exactly the parameters should be taken into use. In transition from higher to lower, the only statement is that it should occur after the acknowledgement is received. The commented sentence seems to propose the duration when the parameters are taken in to use.

Proposed resolution:

Revised. Agree in principle with the commenter. The commented sentence seems to relate to transitions from the higher to lower. The sentence is moved under to this transition.

CID3220

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| **Comment** | **Proposed Change** |
| Needs rewrtting: "After transmitting the acknowledgement frame immediate response immediate acknowledgement for the frame containing the OMI A-Control field, ..." | "After transmitting the acknowledgement frame immediate response for the frame containing the OMI A-Control field, ..."? |

Discussion: Yes, the sentence is unclear. The sentence is just saying that “after transmitting acknowleddgement…

Proposed resolution:

Revised. Agree in principle with the commenter. The sentence is clarified.

CID3221

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| **Comment** | **Proposed Change** |
| " Shall indicate a channel width in the RU Allocation subfield of the Per User Info field of a Trigger frame, containing the AID of the OMI initiator, that is less than or equal to the value specified in the Channel Width subfield of the OMI A-Control field received by the OMI initiator". The relationship between the Channel Width subfield and the RU Allocation subfield should be specified more percisely. | "Shall indicate a channel width in the RU Allocation subfield of the Per User Info field of a Trigger frame, containing the AID of the OMI initiator, that is within the bandwidth specified by the Channel Width subfield of the OMI A-Control field received by the OMI initiator" |

Discussion: The commenter is requesting more precise definition how Channel Width affects to the RU allocations. The provided language is more clear.

Proposed resolution:

Revised. Agree in principle with the commenter.

OMI A-Control field name has changed, otherwise the proposed wording is accepted.

CID 4784

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| **Comment** | **Proposed Change** |
| "Rx Channel Width" => "Channel Width". "To sent PPDUs" => "as transmit parameters for sending PPDUs" | As in comment. |

Discussion: Channel Width is the correct term as proposed in the comment.

The proposed change for the OMI Responder clarifies the operation.

Proposed resolution: Accepted.

CID5198

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| **Comment** | **Proposed Change** |
| There is nothing in 27.5.2 describing what happens when UL MU Disable subfield is 1. UL MU is a critical feature for enhancing efficiency. What is the rationale for allowing non-AP STAs to disable UL MU operation? | Describe the purpose of allowing non-AP STAs to disable UL MU operation |

Discussion: The Commenter is asking for a rationale to disable UL MU in a STA. The UL MU may be disabled when a STA is not capable to follow AP’s instructions to UL MU transmissions. For instance, the STA is not capable to maintain the transmission power level requested by the AP for UL MU transmissions, due to its internal implementation or co-existence of multiple radios in the same device. In these situations, the STA may be capable to still use EDCA for UL frames transmission.

Proposed resolution:

Revised. Agree in principle with the commenter. An information Note is added to instruct when a STA might set UL MU Disable field to 1.

CID5199

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| **Comment** | **Proposed Change** |
| It seems like there needs to be a requirement that the non-AP STA does not discontinue participating in UL MU until it gets an acknowledgement from the AP. For example, if the AP did not receive the TOM, then it may continue to include the non-AP STA in UL MU exchanges. | Mandate that the non-AP STA needs to wait to discontinue participating in UL MU until it gets an acknowledgement from AP. Essentially even though this is part of TOM, processing of the trigger by the non-AP STA is a receive function. |

Discussion: The commenter is asking on acknowledgments in TOM exchange. The clause 27.8.1 that is common to ROMI and TOMI provides guidance that acknowledgements are present in both signaling flows. The OMI Parameter change is direction dependent and there is a difference is transition performed from lower to higher values or from higher to lower values. Clause 27.8.2 provides good language to explain when OMI Initiator adopts the parameters and this should be reused in TOM clause.

Proposed resolution:

Revised. Agree in principle with the commenter. The procedure how OMI Initiator starts to use of the new ROM and TOM parameters is direction dependent and they both should use the same logic.

CID5679

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| **Comment** | **Proposed Change** |
| Why this sentence is a note. It should be another bullitin item followig the previous bullitin. | Make this sentence a bulitin item followintg the previous one. |

Discussion: The Note contains normative text and should be changed to normative text.

Proposed resolution:

Accepted.

CID5946

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| **Comment** | **Proposed Change** |
| The spec says "The OMI responder shall use the values indicated by the Rx Channel Width and Rx NSS subfields of the most recently received OMI A-Control field sent by the OMI initiator to send PPDUs to the OMI initiator in subsequent TXOP". It seems the channel availability information obtained from BQR is not considered here. | Please clarify. |

Discussion: The commenter is asking to use the channel availability information from BQR in OMI clauses. The OMI defines the maximum bandwidth in which the STA may transmit or receive. The BQR defines a report which bands the CCA assess as Idle. The BQR is a recommendation and helps the STA to select the used channels wisely. BQR does not limit the bands that a STA may use.

Proposed Resolution.

Rejected. The clause is defining the OMI principles and it should focus to explain OMI related operation as precisely as possible. BQR among other mechanisms are not related to OMI and they easily confuse the reader.

CID6013

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| **Comment** | **Proposed Change** |
| The NOTE is currently unclear. The NOTE sounds like a STA with UL MU Disable would respond to some Trigger frame variants. | Change the Note :"... that it will not respond to any variant of the Trigger frame." |

Discussion: The commenter has valid point.

Proposed resolution: Accepted.

CID6015

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| **Comment** | **Proposed Change** |
| The TOMI description has repetition. The lines 29 -30 and lines 48 - 49 define the maximum channel width a STA may use. | Delete the lines 48 - 49, and change the note in line 29-30 to normative text. |

Discussion: The repetition is needed, because the first part discusses on the OMI initiator and the later discusses on the OMI responder.

Proposed resolution: Rejected. There is no repetition. The first part discusses on the OMI initiator and the later discusses on the OMI responder.

CID6016

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| **Comment** | **Proposed Change** |
| The OMI information should be received from the OMI Initiator, not received by the OMI initiator. | Change the sentence in line 52 to read:"... of spatial streams that is indicated in the TX NSS subfield of the OMI A-Control field that is last received from the OMI initiator. |

Discussion: The received by means that the frames are received by the OMI initiator, which does not make sense here, because the text is discussing on the OMI responder operation. Received from means that OMI initiator has send the frames and this is more appropriate wording.

Proposed resolution:

Accepted.

CID 6017

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| **Comment** | **Proposed Change** |
| The Channel Width subfield of the ROMI should be allocated from the primary channel, not from other channels. The Current wording in TOMI field limits the maximum RU Bandwidth, but does not ensure that the indicated RU Bandwidth is in the primary channel. | Add to the end of the sentence in the line 57:" and allocated in the primary channel. " |

Discussion: The commenter requests that channel is allocated in the priary channel of the STA. This assumption seems to be present in all transmissions within 802.11ax.

Proposed resolution: Revised. Agree in principle with the commenter. Change the definition of the operating mode control field to include primary in its definition.

CID6157

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| **Comment** | | | **Proposed Change** | | |
| 189.08 | | 27.8.2 |  | |  | The sentence is broken. Meanwhile, it seems not very necessary to have this paragraph. | | Rewrite the sentence or delete it |

Discussion:

The comment is discussing on the sentence:” After transmitting the acknowledgement frame immediate response immediate acknowledgement for the frame containing the OMI A-Control field, the OMI responder may transmit subsequent SU PPDUs or MU PPDUs that are addressed to the OMI initiator.”

The sentence is corrected and it seems to say that ACK is transmitted before the SU PPDU and MU PPDU transmissions.

Proposed resolution:

Revised.

Agree in principle with the commenter. The sentence is corrected.

CID6158

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| **Comment** | **Proposed Change** |
| The AP as the TOM initiator should be singled out rather than meshed in the descriptions for STAs | Put line 25 at the beginning of this section and clearly mention whether AP can have TOM indication |

Discussion: The comment is asking to clarify whether AP can be TOM initiator. The TOM parameters are controlling UL MU transmissions and AP does not receive a Trigger frame or participate to these transmissions.

Proposed resolution:

Revised. Agree in principle with the commenter.

It should be clearly mentioned that AP does not operate as TOM initiator. A new summary paragraph is added to the 27.8.3 that explains the TOMI more clearly. The summary implicitly states that TOM is used to define UL MU parameters and transmissions as a response to the Trigger frames.

The line 25 cannot be moved on top, because the parameter is properly introduced only at line 25. The parameter value should not be specified before proper introduction of the parameter.

CID6190

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| **Comment** | **Proposed Change** |
| The description of the normative behavior of OMI responder regarding UL MU Disable subfield is not clear enough | Need to clarify |

Discussion: The commenter is asking to further clarify the text:” Not participate to any UL MU transmissions.” The current sentence does not discuss on UL MU response scheduling Control subfield use. Response to UL MU response scheduling control subfield should be denied as well.

Proposed resolution:

Revised. The sentence is clarified. Response to UL MU response scheduling control subfield should be denied as well.

CID7028

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| **Comment** | **Proposed Change** |
| Why only "The Channel Width" is indicated in "NOTE" while the similar statement for Tx NSS is not in the "NOTE"? | As per comment. |

Discussion: The Channel width should be normative text. Similar to CID 5679.

Proposed Resolution:

Revised. Agree in principle with the commenter.

CID7029, CID 7030. Duplicate comments

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| **Comment** | **Proposed Change** |
| Even though a non-AP STA indicates its max number of NSS in OMI A-Control field, the STA should use the indicated number of NSS in the soliciting Trigger frame. | Change "will use in response" to "may use in respone". |

Discussion: The commenter has valid point.

Proposed resolution: Accepted.

CID 7031

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| **Comment** | **Proposed Change** |
| What is the meaning of "After transmitting the acknowledgement frame immeidate response immediate acknowledgement" ? If OMI does not mandate the Ack Policy of the MPDU to be carried, please remove "immediate" term. | Change from "After transmitting the acknowledgement frame immeidate response immediate acknowledgement" to "After transmitting the acknowledgement frame". |

Discussion: The sentence is broken.

Proposed resolution: Accept.

CID7202

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| **Comment** | **Proposed Change** |
| The channel bandwidth setting should be normative. Delete "note", | As in comment |

Discussion: Similar to CID 5679.

Proposed resolution: Accept.

CID7247

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| **Comment** | **Proposed Change** |
| The text "If an OMI mode change is reported during a TXOP then the change should occur at least after that TXOP." is not clear whether OMI mode is changed right after the TXOP or later. | Delete "at least". |

Discussion: The comment is similar to CID3218. The OMI mode change is hard to perform in very exact time. The commented text seems to suggest the latest time when the parameter change can be done.

Proposed Resolution:

Revised. Change the at least to at latest.

CID7614

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| **Comment** | **Proposed Change** |
| The meaning of the following sentence is not clear "After transmitting the acknowledgement frame immediate response immediate acknowledgement for the frame containing the OMI A-Control field, the OMI responder may transmit subsequent SU PPDUs or MU PPDUs that are addressed to the OMI initiator." | Clarify it. |

Discussion: The comment is similar to 7031. The sentence is broken.

Proposed resolution: Revised. Agree in principle with the commenter.

CID7616

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| **Comment** | **Proposed Change** |
| Before sending TOMI, the initiator should make sure that the responder can receive OMI Control. Arguablly in this case the reponder can always receive the OMI Control since the responder is always AP. But the sentence is not clear that the responder is always an AP. | Change the sentence to "An OMI initiator that is a non-AP STA may indicate changes in its transmit parameters by sending a frame that contains the OMI A-Control field to the OMI responder which is an AP." |

Discussion: The commenter is asking to clarify that OMI Responder in case of TOMI is always AP. This is clarified in new text.

Proposed resolution:

Revised. Agree in principle with the commenter. The which word is changed to that, otherwisd the response is exactly the same.

CID8085

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| **Comment** | **Proposed Change** |
| Language is not quite correct | Change "all variants" to "any variant" |

Discussion: The commenter is saying that UL MU Disallowed field indicates that the STA does not respond to any variant Trigger frame.

Proposed resolution:

Accepted.

CID8720

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| **Comment** | **Proposed Change** |
| "it will not respond to all variants of the Trigger frame". Should this be "it will not respond to any variants of the Trigger frame" or are there certain types of Trigger Frame it will still respond to? | Clarify |

Discussion: The commenter is saying that UL MU Disallowed field indicates that the STA does not respond to any variant Trigger frame.

Proposed resolution:

Revised. The STA will not respond to any variant of the Trigger Frame.

CID9409

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| **Comment** | **Proposed Change** |
| OMI responder shall not transmit an action frame in HE MU PPDU to an OMI initiator with UL MU Disable subfield is set to 1 | As per comment |

Discussion: The commenter is asking can an HE AP send an action frame in MU PPDU to a HE STA that has indicated UL MU Disable subfield set to 1. The MU PPDU is DL frame and it can be send to the STA regardless of the UL MU Disable subfield value. The PPDU content is not restricted by UL MU Disallow field.

Proposed Resolution: Rejected. MU PPDU may be transmitted to a STA with UL MU Disable field indicates value 1. No changes to the draft.

CID9724

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| **Comment** | **Proposed Change** |
| "The OMI responder shall use the values indicated by the Rx Channel Width and Rx NSS subfields of the most recently received OMI A-Control field sent by the OMI initiator to send PPDUs to the OMI initiator in subsequent TXOP." Please specify how to use the values indicated by the Rx Channel Width and Rx NSS subfields of the most recently received OMI A-Control field. | Replace the corresponding paragraph with the following: "The OMI responder shall not transmit non-OFDMA PPDUs to the OMI initator in subsequent TXOP that uses a bandwidth that is greater than the channel width indicated by Rx Channel Width subfield in the most recently received OMI A-Control field from that OMI initator. The OMI responder shall not transmit OFDMA PPDUs to the OMI initator in subsequent TXOP that allocates an RU outside of the channel width indicated by Rx Channel Width subfield in the most recently received OMI A-Control field from that OMI initator. The OMI responder shall not transmit PPDUs to the OMI initator in subsequent TXOP that uses a greater number of spatial streams than indicated by Rx NSS subfield in the most recently received OMI A-Control field from that OMI initator." |

Discussion: The proposed change contains terms, like OFDMA PPDU that are not defined in .ax draft. The original text defines the operation in simple way that is possible to implement.

Proposed resolution: Reject. The proposed text is complicated and does not use the correct terminology.

CID 9725

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| **Comment** | **Proposed Change** |
| "NOTE--The Channel Width subfield indicates the maximum channel width that the STA will use in response to Trigger frames" It is a normative text. Please covert from NOTE to a next bullet of the "Tx NSS subfield" bullet. | As per comment. |

Discussion: The commenter has valid point, this is normative behavior. This is similar to CID 5679.

Proposed resolution: Accept.

CID9726

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| **Comment** | **Proposed Change** |
| "Shall indicate a channel width in the RU Allocation subfield of the Per User Info field of a Trigger frame, containing the AID of the OMI initiator, that is less than or equal to the value specified in the Channel Width subfield of the OMI A-Control field received by the OMI initiator" A channel width in the RU Allocation subfield of the Per User Info field is ambiguous. | Replace the corresponding paragrph with the following: "Shall indicate the RU Allocation subfield of the Per User Info field of a Trigger frame, containing the AID of the OMI initiator, by which the occupied channel is subset of the channel supported in the Channel Width subfield of the OMI A-Control field received by the OMI initiator" |

Discussion: The commenter is asking for clarification to the bandwidth use. The comment is similar to CID3221. The use of the bandwidth should be clarified.

Proposed resolution: Revised. Adopt the resolution of CID 3221.

CID9939

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| **Comment** | **Proposed Change** |
| This bullet is misleading. For example, if an OMI initiator sets the Channel Width to 20MHz, and the serving AP allocates this STA for UL trigger-based PPDU transmission for RU size that is less than 20MHz but is in the secondary 20MHz channel (let us assume that the trigger frame is carried in non-HT duplicated frame and the STA received only the primary 20MHz channel), the STA may not be available to transmit the frame unless the STA switches its transmission center frequency during SIFS time, which is not a normal operation. So, further clarification is needed. | As in the comment. |

Discussion: The comment is pointing out that the TOMI should allocate the channels starting form the primary channel. It is true that the allocated channel should be in primary channel. The comment is similar to CID6016.

Proposed Resolution: Revised. The Primary is added to the Channel Width field definition to ensure that transmission is within the primary channel of the STA.