IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Comment resolution to CIDs 15990, 17031 and 17033 | | | | |
| Date: 2019-01-16 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Jarkko Kneckt | Apple Inc. | Cupertino, CA |  | jkneckt@apple.com |
| Guoqing Li | Apple Inc. |  |  |  |
| Youhan Kim | Qualcomm |  |  |  |

Abstract

The submission is a comment resolution for three CIDs: 15990, ~~16487~~, 17031 and 17033 related to the Opering Mode (OM).

R0 – Original version where the UL MU Data Disable and UL MU Data BFRP disable are under the same capability field

R1 – Separate capability bits for UL MU Data Disable and UL MU Data BFRP disable. The Table 9-18b was showing many track changes

R2 ­– Updates from November ax MAC group. Table 9-18b is updated to show the track changes correctly, comment 16487 resolution updated

R3 – Removed resolutions of CID 16487, the CID is assigned to Po-Kai. Updated the clause numbers to match with D3.3.

R4 – Changes done in IEEE meeting on Tue PM 3 session.

R5 – Editorial clean ups for the submission and capability element is added as agreed in IEEE meeting on Tue PM3 session.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 15990 | 336.23 | "UL MU data transmission is suspended" is not clear because it is not clear whether the special case of a Trigger frame that solicits from a single STA is "UL MU" | At the referenced location change "only UL MU data transmission is suspended but UL MU control response transmissions in response to a Basic Trigger frame or a frame with TRS Control subfield present is not suspended" to "only transmission of QoS Data frames in HE TB PPDUs is suspended but transmission of Control frames in HE TB PPDUs in response to a Basic Trigger frame or a frame with TRS Control subfield present is not suspended" | Revised.  A non-AP STA operates similarly regardless of the number of STAs in a Trigger frame. Thus, also a Trigger frame triggering a single device is not allowed if UL MU data transmissions are disallowed.  A Beam Forming Report Poll (BFRP) trigger may solicit very large UL packets. The “UL MU Data transmission suspended” should be capable to control whether the STA responses to BFRP Trigger frames.  - TGax editor to make changes as shown in 11-18/1831r5 that are marked with CID 15990. |
| ~~16487~~ | ~~333.00~~ | ~~Table 27-9 is missing HE and the Columns are referring to VHT.~~ | ~~Make the following change:~~  ~~Edit Table 27-9:~~  ~~1. Delete the last two columns as the intent is to signal the Nss for 160MHz and not the center frequency~~  ~~2. Change the header of the column starting with "VHT NSS Support" to "NSS Support"~~ |  |
| 17031 | 73.21 | "Trigger based UL MU Control response transmission triggered by a Basic Trigger frame or a frame with TRS Control subfield present soliciting only Ack, or Multi-STA BlockAck frames are enabled by the STA (see 27.8.3 (Transmit operating mode (TOM) indication))." How about is other Trigger frames? Is a response triggered by a BFRP, MU-BAR, MU-RTS, BSRP, GCR MU-BAR, BQRP, or NFRP enabled? Please clarify it. | As in comment. | Revised. Agree in principle with the comment. The UL MU Data Disallow subfield controls BFRP and basic Trigger frame types. Other Trigger types use is not controlled.  BFRP may generate very large response and it may not be possible for a STA to transmit. STA is added a control whether it responses to BFRP Triggers  - TGax editor to make changes as shown in 11-18/1831r5 that are marked with CID 17031. |
| 17033 | 336.23 | "...indicate that only UL MU data transmission is suspended but UL MU control response transmissions in response to a Basic Trigger frame or a frame with TRS Control subfield present is not suspended (see 27.5.3 (UL MU operation) except only Ack or BlockAck frame transmission is allowed)." Is only data transmission is suspended? Does it means that an UL MU mangement frame is not suspended? Pleasse clarify it. Also please clarify whether a response triggered by a BFRP, MU-BAR, MU-RTS, BSRP, GCR MU-BAR, BQRP, or NFRP is not suspedned. (refer the comment that I submitted in 9.2.4.6a.2.) | As in comment. | Revised.  When the the OM Control UL MU Data Disable RX Support is set to 1, the UL MU Disallow value 0 and UL MU Data Disallow value 1 define that the STA does not respond to BFRP and responds to basic Trigger frame only with ACK and BA. Values 1 and 0 indicate that and responds to basic Trigger frame only with ACK and BA and the STA responds to BFRP without power constraint. The STA responds to all other Trigger frame types. - TGax editor to make changes as shown in 11-18/1831r5 that are marked with CID 17033. |

* OM Control

***Note to ax Editor. Please replace the paragraph above the Table 9-18b. Please delete the third column from the Table 9-18b and make the changes to the table as shown below.***

The encoding of the UL MU Disable and the UL MU Data Disable subfields is shown in Table 9-18b (UL MU Disable and UL MU Data Disable subfields encoding). **(#15990, #17031, #17033)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | UL MU Disable and UL MU Data Disable subfields encoding | | |  |
| UL MU Disable subfield | UL MU Data Disable subfield | ~~Interpretation by an AP that transmits a value of 0 in the OM Control UL MU Data and BFRP Disable RX Support in the HE Capability element~~  (#15990, #17031, #17033) | | ~~Interpretation by an AP that transmits a value of 1 in the OM Control UL MU Data and BFRP Disable RX Support in the HE Capability element~~  Meaning(#15990, #17031, #17033) |
| 0 | 0 | **~~All trigger based UL MU operations are enabled by the STA as defined in 27.5.3 (UL MU operation).~~** **(#15990, #17031, #17033)** | | All trigger based UL MU operations are enabled by the STA as defined in 27.5.3 (UL MU operation). |
| 0 | 1 | **~~All trigger based UL MU operations are enabled by the STA as defined in 27.5.3 (UL MU operation).~~ (#15990, #17031, #17033)** | | **~~Trigger based UL MU Data transmis- sion triggered by a Basic Trigger frame is suspended. Trigger based UL MU Control response transmission triggered by a Basic Trigger frame or a frame with TRS Control subfield present solicit- ing only Ack, or Multi-STA BlockAck frames are enabled by the STA (see 27.9.3 (Transmit operating mode (TOM) indication)).~~**  The STA does not respond to Basic Trigger frames or frames with a TRS Control subfield except with Ack or BlockAck frames (see 27.8.3 (Transmit operating mode (TOM) indication)). Responses to other Trigger types are unaffected.  **(#15990, #17031, #17033)** |
| 1 | 0 | **~~All triggered UL MU transmissions are suspended by the STA. The STA will not respond to a received Trigger frame or TRS Con- trol subfield.~~ (#15990, #17031, #17033)** | | **~~All triggered UL MU transmissions are suspended by the STA. The STA will not respond to a received Trigger frame or TRS Con- trol subfield.~~**  The STA does not respond to any received Trigger frames or frames with a TRS Control subfield. All triggered UL MU transmissions are suspended by the STA. **(#15990, #17031, #17033)** |
| 1 | 1 | **~~Reserved(#15011)~~ (#15990, #17031, #17033)** | | **~~Reserved~~**  The STA does not respond to BFRP Trigger frames, Basic Trigger frames or frames with a TRS Control subfield except with Ack or BlockAck frames. Responses to other Trigger types are unaffected.  **(#15990, #17031, #17033)** |

* + 1. General(#12841)

***TG ax Editor: Please change as shown below:***

The maximum number of HE spatial streams that the HE STA supports in reception(#16036) for a given HE-MCS as a function of the received HE PPDU bandwidth *BW* at an HE STA transmitting an OM Control subfield is defined in Equation (27-4).

* + 1. Transmit operating mode (TOM) indication(#12841)

***TG ax Editor: Please change the second paragraph as shown below.***

An OMI responder may include an OM Control Capabilities element in Beacon, Probe Response and (Re-)Association Response frames it transmits to indicate a nonzero value for the OM Control UL MU Data and BFRP Disable RX Support subfield as described below. The OM Control UL MU Data and BFRP Disable RX Support subfield is 0 if the OMI responder does not include an OM Control Capabilities element in Beacon, Probe Response and (Re-)Association Response frames it transmits.

An OMI initiator that is a non-AP STA may indicate changes in its transmit parameters by sending a frame that contains the OM Control subfield to the OMI responder.

* An OMI initiator shall set the UL MU Disable subfield to 0 and the UL MU Data Disable subfield to 0 to indicate resumption or continuation of participation in all triggered UL MU operations. **(#15990, #17031, #17033)**
* The OMI initiator may set the UL MU Disable subfield to 1 (#17032) and the UL MU Data Disable subfield to 0 to indicate suspension to response to a Trigger frame or a frame carrying a TRS Control subfield as defined in 27.5.3 (UL MU operation).(#16615) **(#15990, #17031, #17033)**
  + An AP that is an OMI initiator shall set both the UL MU Disable and the UL MU Data Disable subfields to 0.
* The OMI initiator shall set the Tx NSTS subfield to the maximum *NSTS* that the STA uses for an HE TB PPDU sent in response to a Trigger frame or frame carrying a TRS Control subfield.
* The OMI initiator shall set the Channel Width subfield to the maximum operating channel width that the STA uses for an HE TB PPDU sent in response to a Trigger frame or frame carrying a TRS Control subfield.

***TG ax Editor: Please delete the third, fourth and fifth paragraphs and add two noew paragraphs as shown below.***

~~If a non-AP HE STA has received the OM Control UL MU Data Disable RX Support field in the HE Capabilities element set to 1, then the HE non-AP STA, acting as an OMI initiator, may set the UL MU Disable subfield to 0 and the UL MU Data Disable subfield to 1 to indicate that only UL MU data transmission is suspended but UL MU control response transmissions in response to a Basic Trigger frame or a frame with TRS Control subfield present is not suspended (see 27.5.3 (UL MU operation) except only Ack or BlockAck frame transmission is allowed).~~ **(#15990, #17031, #17033)**

~~An OMI initiator shall set the UL MU Disable subfield to 0 and the UL MU Data Disable subfield to 0 to indicate resumption or continuation of participation in all triggered UL MU operations.~~ **(#15990, #17031, #17033)**

~~If an HE AP has set the OM Control UL MU Data Disable RX Support field in the HE Capabilities element it transmits to 0, an associated STA shall not set the UL MU Data Disable subfield in the OM Control field to 1.~~ **(#15990, #17031, #17033)**

An OM Control subfield with UL MU Disable subfield set to 0 and the UL MU Data Disable subfield set to 1 indicates that the OMI initiator does not respond to Basic Trigger frames or frames with a TRS Control subfield except with Ack or BlockAck frames. An HE non-AP STA shall not set the UL MU Disable subfield to 0 and the UL MU Data Disable subfield to 1 in an OM Control subfield transmitted to an HE AP unless the HE non-AP STA has received an HE Capabilities element from the HE AP with OM Control UL MU Data Disable RX Support field equal to 1.

An OM Control subfield with UL MU Disable subfield set to 1 and the UL MU Data Disable subfield set to 1 indicates that the OMI initiator does not respond to BFRP Trigger frames, Basic Trigger frames or frames with a TRS Control subfield except with Ack or BlockAck frames. An HE non-AP STA shall not set the UL MU Disable subfield to 1 and the UL MU Data Disable subfield to 1 in an OM Control subfield transmitted to an HE AP unless the HE non-AP STA has received an OM Control Capabilities element from the HE AP with OM Control UL MU Data and BFRP Disable RX Support field equal to 1.(#15990, #17031, #17033)

An OMI initiator that sent a frame including the OM Control subfield should change its TOM parameters, Tx NSTS, UL MU Disable, UL MU Data Disable and Channel Width, as follows:

* If(#15369) the OMI initiator changes a TOM parameter from higher to lower, it should make the change for that parameter only after the TXOP in which it received the immediate acknowledgment from the OMI responder.
* If(#15370) the OMI initiator changes a TOM parameter from lower to higher, it should make the change for that parameter only after the TXOP in which it expects to receive acknowledgment from the OMI responder.

The TOM parameters UL MU Disable and UL MU Data Disable changes from higher to lower if(#15371) its value changes from 0 to 1. The change of UL MU Disable from 1 to 0 and UL MU Data Disable from 0 to 1 is a change from lower to higher.(#17034)

An OMI responder that successfully receives a frame containing an OM Control subfield from an OMI initiator performs the following operations.

***TG ax Editor: Please change as shown below:***

An AP OMI responder shall not send any Trigger frames or frames carrying a TRS Control subfield to a non-AP STA OMI initiator for subsequent TXOPs (see 27.5.3 (UL MU operation)) if the UL MU Disable subfield is 1 and UL MU Data Disable subfield is 0 (18/1246r8) (#12841)

An AP OMI responder shall not send any Trigger frames or frames carrying a TRS Control subfield to a non-AP STA OMI initiator for subsequent TXOPs (see 27.5.3 (UL MU operation)) if the UL MU Disable subfield is 1 and UL MU Data Disable subfield is 0 in the most recently received OM Control subfield sent by the STA. (#15990, #17031, #17033) (#12841)

NOTE—A device might have multiple radios that can create difficult in-device coexistence challenges. The device might set UL MU Disable subfield to 1 and the UL MU Data Disable subfield to 0 if it has trouble responding to a Trigger frame or a frame carrying a TRS Control subfield because the timing or high transmit power would cause interference with another radio in the device.

***TG ax Editor: Please add two new paragraphs as shown below.***

An OMI responder that has transmitted the OM Control UL MU Data Disable RX Support subfield set to 1 shall regard an OMI initiator as capable of:

* Only transmitting Ack and BlockAck frames (#15990) in HE TB PPDUs as a response to Basic Trigger frames or as a response to a frame with a TRS Control subfield when the UL MU Disable subfield is equal to 0 and the UL MU Data Disable subfield is equal to 1 in the most recently received OM Control subfield from that OMI initiator. **(#15990, #17031, #17033)**

An OMI responder that has transmitted the OM Control UL MU Data and BFRP Disable RX Support subfield set to 1 shall regard an OMI initiator as capable of:

* Not responding to BFRP Trigger frames and only transmitting Ack and BlockAck frames in HE TB PPDUs as a response to Basic Trigger frames or as a response to a frame with a TRS Control field if the UL MU Disable subfield is equal to 1 and the UL MU Data Disable subfield is equal to 1 in the most recently received OM Control subfield from that OMI initiator. (#14331)(#15990, #17031, #17033)

NOTE – The UL MU Data Disable subfield does not control the use of MU-BAR, MU-RTS, BSRP, GCR MU-BAR, BQRP, and NFRP Trigger frames. **(#15990, #17031, #17033)**

An OMI responder shall consider the OMI initiator as participating in UL MU operation for subsequent TXOPs if the UL MU Disable subfield is 0(#15372) in the most recently received OM Control subfield with the following restrictions:

— The maximum *N* that the OMI initiator can transmit in response to a Trigger frame or frame car-rying a TRS Control subfield is indicated in the Tx NSTS subfield of the OM Control subfield

— The maximum operating channel width over which the OMI initiator can transmit in response to a Trigger frame or frame carrying a TRS Control subfield is indicated in the Channel Width subfield of the OM Control subfield

***TG ax Editor: Please delete the paragraph as shown below.***

~~An OMI responder that has transmitted the OM Control UL MU Data Disable RX Support subfield set to 1 shall regard an OMI initiator as capable of participating in UL MU operation only for the purpose of trans- mission of acknowledgments if(#15373) the UL MU Disable subfield is equal to 0 and the UL MU Data Disable subfield is equal to 1 in the most recently received OM Control subfield from that OMI initiator.~~ (#15990, #17031, #17033)

The OMI responder shall indicate a number of spatial streams, *NSS*, 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 *NSTS* that is calculated from the Tx NSTS subfield of the OM Control subfield received from the OMI initiator.

The OMI responder shall indicate an RU allocation in the RU Allocation subfield of the Per User Info field of a Trigger frame or TRS Control subfield addressed to the OMI initiator, that is within the operating chan- nel width specified in the Channel Width subfield of the OM Control subfield received from the OMI initia- tor and subject to the restrictions defined in 28.3.1.2 (OFDMA).

**9.4.2.xxx OM Control Capabilities element** (#15990, #17031, #17033)

An HE STA declares its OM capabilities by transmitting the OM Control Capabilities element. The OM Control Capabilities element is defined in Table 9-xxx1 (OM Control Capabilities element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element  ID | Length | Element ID Extension | Capabilities Information |
| Octets: | 1 | 1 | 1 | 1 |

**Table 9-xxx1 OM Control Capabilities element format**

The structure of the Capabilities Information field is defined in Figure 9-xxx2 (Capabilities Information field format).

|  |  |  |
| --- | --- | --- |
|  | B0 | B1 B7 |
|  | OM Control UL MU Data and BFRP Disable RX Support | Reserved |
| Bits: | 1 | 7 |

**Figure 9-xxx2 Capabilities Information field format**

The OM Control UL MU Data And BFRP Disable RX Support field is set to 1 to indicate that the AP supports interpretation of the UL MU Disable subfield set to 1 and the UL MU Data Disable subfield set to 1 as described in 27.5.3 (UL MU operation); otherwise set to 0.

**TGax Editor: Insert the row below to Table 9-95 (Element IDs) as follows:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| OM Capabilities Information | 255 | <ANA> | NO |  |

TGax Editor: Insert the following rows in its appropriate location in the respective tables of 9.3.3.3 (Beacon frame format), 9.3.3.7 (Association Response frame format),9.3.3.9 (ReAssociation Response frame format), 9.3.3.11 (Probe Response frame format maintaining row order:

|  |  |  |
| --- | --- | --- |
| <ANA> | OM Capabilities Information | The OM Capabilities Information is optionally present if dot11HEOptionImplemented is true at an AP. |

***TGax Editor: Insert the following row in appropriate location to the table 9-173***

|  |  |  |
| --- | --- | --- |
| 197 | OM Capabilities Information | Yes |

***TGax Editor: Insert the following rows in appropriate location in the primitive service parameters of the respective clauses of 6.3.3.3.2 Semantics of the service primitive, 6.3.7.4.2 Semantics of the service primitive, 6.3.7.5.2 Semantics of the service primitive, 6.3.8.4.2 Semantics of the service primitive, 6.3.8.5.2 Semantics of the service primitive, and 6.3.11.2.2 Semantics of the service primitive.***

OM MAC Capabilities,

***TGax Editor: Insert the following rows in its appropriate location in the respective clauses of 6.3.3.3.2 Semantics of the service primitive, 6.3.7.4.2 Semantics of the service primitive, 6.3.7.5.2 Semantics of the service primitive, 6.3.8.4.2 Semantics of the service primitive, 6.3.8.5.2 Semantics of the service primitive, and 6.3.11.2.2 Semantics of the service primitive.***

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| OM Capabilities Information | As defined in OM Capabilities element | As defined in 9.4.2.XXX (OM Capabilities element) | Specifies the parameters within the OM Capabilities element that are supported by the STA. The parameter is optionally present if dot11HEOptionImplemented is true; otherwise, this parameter is not present. |