**IEEE P802.11
Wireless LANs**

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| **802.11****MU EDCA parameters update frame** |
| **Date:** 2019-05-02 |
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**Abstract**

This document provides comment resolution for REVmd letter ballot CID 21443.

NOTE – the baseline for these modifications includes the changes proposed in 19/413r2

R0: Initial draft

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| 21443 | 26.2.7 | 303.43 | The AP may wish to provide different MU EDCA parameters to each associated STA.Per current draft the only way to do this is to not broadcast MU EDCA parameters element in beacons (or broadcast probe responses), and instead send unicast in (re)assoc response.However the AP may wish to update these values post-association, e.g. when medium conditions change.A means to unicast updated parameters to a particular STA in a robust action frame should be provided.This would avoid the workaround wrt QoS Capability element noted at top of page 304 | Support updating MU EDCA parameters (and, indeed, regular EDCA parameters) in a robust action frame to a specific non-AP STA |

**Proposed Resolution:** Revise by making the following modifications:

*Request editor to modify as follows:*

* Protected HE Action field

A Protected HE Action field, in the octet immediately after the Category field, differentiates the Protected HE Action frame formats. The Protected HE Action field values associated with each frame format within the HE category are defined in Table 9-524a (HE Action field values).

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| * Protected HE Action field values
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| Value | Meaning |
| 0 | HE BSS Color Change Announcement |
| 1 | HE MU EDCA Parameter Set Update |
| 2-255 | Reserved |

* + - 1. HE MU EDCA Parameter Set Update frame format

The HE MU EDCA Parameter Set Update frame is an Action or Action No ACK frame of category Protected HE. The Action field of an HE MU EDCA Parameter Set Update frame contains the information shown in Table 9-524g (HE MU EDCA Parameter Set Update frame Action field).

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| * HE MU EDCA Parameter Set Update frame Action field format
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| Order | Information |
| 1 | Category |
| 2 | Protected HE Action |
| 3 | MU EDCA Parameter Set Update element (see 9.4.2.245 (MU EDCA Parameter Set Update element)) |

The Category field is defined in Table 9-53 (Category values).

The Protected HE Action field is defined in Table 9-524e (Protected HE Action field values).

The MU EDCA Parameter Set Update element as defined in 9.4.2.245 (MU EDCA Parameter Set Update element) is always present in the frame.

No Vendor-Specific elements are present in the HE MU EDCA Parameter Set Update frame.

* EDCA operation using MU EDCA parameters

A non-AP STA that receives an MU EDCA Parameter Set element from the AP to which it is associated follows the procedure defined in this subclause.

An HE AP sets dot11MUEDCAParametersActivated to true (#15069)so that its associated STAs follow the procedure defined in this subclause.

An HE AP that has dot11MUEDCAParametersActivated equal to true shall include both the EDCA Parameter Set element and the MU EDCA Parameter Set element in all Probe Response and (Re)Association Response frames it transmits(#16502). If an HE AP has dot11MUEDCAParametersActivated equal to true, the AP shall either include both the MU EDCA Parameter Set element and the EDCA Parameter Set element or neither in a Beacon frame it transmits. (#20604) An HE AP shall set the QoS Info field of an MU EDCA Parameter Set element (if present) to the same value as the QoS Info field of an EDCA Parameter Set element (if present). An HE AP may change the MU EDCA parameters by including the MU EDCA Parameter Set element with updated MU EDCA parameters in the Beacon frames and Probe Response frames it transmits. When the EDCA Parameter Set element is included in a Beacon, Probe Response or (Re)Association Response frame, the EDCA Parameter Set Update Count subfield in the QoS Info field of the EDCA Parameter Set element(#15068) is incremented every time any of the EDCA parameters or the MU EDCA parameters change.

An HE AP may change the MU EDCA parameters of one or more associated STAs by including the MU EDCA Parameter Set element with updated MU EDCA parameters in a HE MU EDCA Parameter Set Update frame sent to that STA. In a HE MU EDCA Parameter Set Update frame, the EDCA Parameter Set Update Count subfield is reserved. The MU EDCA parameters indicated in a HE MU EDCA Parameter Set Update frame may be different from the parameters that the AP is indicating in Beacon, Probe Response and (Re)Association Response frames.

An HE STA shall update its MIB attributes that correspond to fields in an EDCA Parameter Set element or an MU EDCA Parameter Set element within an interval of time equal to one beacon interval after receiving an updated EDCA or MU EDCA parameter set in a Beacon, Probe Response or (Re)Association Response frame. When updating its MIB attributes, an HE STA stores the value of the EDCA Parameter Set Update Count subfield in the QoS Info field of the received EDCA Parameter Set element or MU EDCA Parameter Set element. (#20312, #20313, #20596)

An HE STA shall check the EDCA Parameter Set Update Count subfield value in the QoS Info field of the QoS Capability element in the most recently received Beacon frame(#16939) against the stored value to determine if the HE STA is using the current EDCA and MU EDCA parameters. If the EDCA Parameter Set Update Count subfield value is different from the stored value, then the HE STA shall send a Probe Request frame to the AP to solicit an update.(#15068)

NOTE—If the QoS Capability element is present in a Beacon frame, (#Ed) the EDCA Parameter Set element and the MU EDCA Parameter Set element are not present. In this case, the only way for an HE STA to obtain the updated parameters is to send a Probe Request frame to the AP. (#20595)

If an HE STA receives an HE MU EDCA Parameter Set Update frame from its associated AP, it shall update its MIB attributes that correspond to fields in the MU EDCA Parameter Set element in that frame within an interval of time equal to one beacon interval after receiving the frame. The STA does not store the (reserved) value of the EDCA Parameter Set Update Count subfield. After updating its MIB attributes in accordance with the received HE MU EDCA Parameter Set Update frame, the STA shall not subsequently update its MIB attributes while associated with the AP until such time that the STA receives another HE MU EDCA Parameter Set Update frame or the STA receives an MU EDCA Parameter Set element in a Beacon, Probe Response or (Re)Association Response frame where the EDCA Parameter Set Update Count subfield is not equal to its stored value.

A non-AP HE STA that receives a Basic Trigger frame that contains a User Info field addressed to the STAshall update its CWmin[AC], CWmax[AC], AIFSN[AC] and MUEDCATimer[AC] state variables to the values contained in the most recently received MU EDCA Parameter Set element sent by the AP to which the STA is associated, for all the ACs from which at least one QoS Data frame was transmitted successfully by the STA in an HE TB PPDU in response to the Trigger frame. A QoS Data frame is transmitted successfully by the STA in an HE TB PPDU for an AC if it requires immediate acknowledgment and the STA receives an immediate acknowledgement for that frame, or if the QoS Data frame does not require immediate acknowledgment. (#20622, #20625, #20661, #21617)

The MUEDCATimer[AC] state variable is updated with the value contained in the MU EDCA Timer subfield of the MU EDCA Parameter Set element. The backoff counter maintenance corresponding to the updated state variables shall follow the rules in 10.22.2.2 (EDCA backoff procedure). The updated MUEDCATimer[AC] shall start at the end of the immediate response if the transmitted HE TB PPDU contains at least one QoS Data frame for that AC that requires immediate acknowledgment, and shall start at the end of the HE TB PPDU if the transmitted HE TB PPDU does not contain any QoS Data frames for that AC that require immediate acknowledgment. (#20622, #20625)

In a non-AP HE STA, each MUEDCATimer[AC] shall uniformly count down without suspension to 0 when its value is nonzero.

NOTE 1—A non-AP STA that sends a frame to the AP with an OM Control subfield containing a value of 1 in the UL MU Disable subfield or a value of 0 in the UL MU Disable subfield and a value of 1 in the UL MU Data Disable subfield does not participate in UL MU operation.(18/1496r1) As such it is exempt from updating its EDCA access parameters to the values contained in the MU EDCA Parameter Set element as defined in this subclause.

 (#20622)NOTE 2—A non-AP STA is not required to update its state variables to the values contained in the MU EDCA Parameter Set element when:

* The Trigger frame addressed to the STA is not a Basic Trigger frame
* The STA does not include QoS Data frames in the HE TB PPDU response sent in response to the Basic Trigger frame
* The STA transmits the HE TB PPDU in response to a Basic Trigger frame following the rules defined in 26.5.5 (UL OFDMA-based random access (UORA)).

NOTE 3—The TxOP limits are not updated by the procedure defined in this subclause, but by that in 10.22.2.8 (TXOP limits). (#20662)

A non-AP STA that sends frames that are not addressed to its associated AP may use the EDCA parameters values that are contained in the most recently received EDCA Parameter Set element sent by the AP with which the STA is associated, or to the default EDCA parameter values (see Table 9-137 (Default EDCA Parameter Set element parameter values if dot11OCBActivated is false)), following the rules defined in 10.2.3.2 (HCF contention based channel access (EDCA)) . (#21414)

 (#15756)

When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, then the STA shall (#21143) update CWmin[AC], CWmax[AC] and AIFSN[AC] to the values that are contained in the most recently received EDCA Parameter Set element sent by the AP with which the STA is associated. (#20624)(#16653)

A non-AP HE STA that sends a frame with an OM Control subfield with the UL MU Disable subfield set to 1 or with the UL MU Disable subfield set to 0 and the UL MU Data Disable subfield set to 1(18/1496r1) as defined in 26.9.3 (Transmit operating mode (TOM) indication) may set the MUEDCATimer[AC] for all ACs to 0 on receiving an immediate acknowledgment(#17028) from the OMI responder. The STA continues the current EDCA backoff procedure without modifying the QSRC[AC], QLRC[AC] or the backoff counter for the associated EDCAF, regardless of whether the MUEDCATimer[AC](#17015) has reached zero, until the STA invokes a new EDCA backoff procedure. The STA follows the rules defined in 10.22.2.2 (EDCA backoff procedure) for updating CW[AC].