IEEE P802.11  
Wireless LANs

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| CR for MU EDCA parameters | | | | |
| Date: 2019-03-13 | | | | |
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Abstract

This document provides CR for CIDs: 20175, 20312, 20313, 20398, 20595, 20596, 20603, 20604, 20622, 20623, 20624, 20625, 20661, 20662, 20676, 20811, 21128, 21143, 21414, 21443, 21586, 21617

1. **Introduction**

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. The introduction and the explanation of the proposed changes are not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 20175 | Chunyu Hu | 26.2.7 | 303.37 | The MU EDCA procedure is lack of an explicit or implicit signaling mechanism that allows AP or non-AP STAs to exit current MU EDCA backoff period when AP stops triggering. The lack of the mechanism can cause non-AP STAs' UL traffic being delayed significantly. | Define an explicit or implicit signaling mechanism to solve this problem. |  |
| 20312 | kaiying Lv | 26.2.7 | 303.58 | Change " an updated EDCA parameter set. " to " an updated MU EDCA parameter set. " | As in comment. | Revised – apply the changes as proposed in doc 19/0413r2 |
| 20313 | kaiying Lv | 26.2.7 | 303.60 | Change " an received EDCA parameter set element. " to " an received MU EDCA parameter set element " | As in comment. | Revised – apply the changes as proposed in doc 19/0413r2 |
| 20398 | Liwen Chu | 9.4.2.245 | 191.53 | It is not clear when this MU EDCA toimer will start if AIFSN is 0. Normally MU EDCA timer starts once a HE TB PPDU with QoS Data frames is acked for AIFN not equal to 0. | Clarify it. | Reject – The rule for when the MU EDCA timer starts is independent from the AIFSN value. |
| 20595 | Mark RISON | 26.2.7 | 304.04 | "NOTE---The QoS Capability element is only present in a Beacon frame if 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." is the wrong way round | Change to "NOTE---If the QoS Capability element is present in a Beacon frame, 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." | Accepted |
| 20596 | Mark RISON | 26.2.7 | 303.43 | It is not clear that the MU EDCA param set is updated at the same time as the EDCA param set | Change at 303.56 "An HE STA shall update its MIB attributes that correspond to fields in an MU EDCA Parameter Set element within an interval of time equal to one beacon interval after receiving an updated EDCA parameter set. 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." to "An HE STA shall update its MIB attributes that correspond to fields in an EDCA Parameter Set or 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. 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." At 191.31 change " MU AC parameters" to " MU EDCA parameters". At 303.53 change "AC parameters or the MU AC parameters" to "EDCA parameters or MU EDCA parameters" | Revised – agree with the commenter. Apply the changes in section 9 and 26 by defining the behavior both for EDCA mand MU EDCA parameters. Define a MIB variable to indicate if the AP intends to advertise MU EDCA parameters so that its associated STAs apply the MU EDCA Parameters procedure, in order to clarify the normative text. Apply the changes as proposed in doc 19/0413r2 |
| 20603 | Mark RISON | 26.2.7 | 303.45 | "the MU EDCA Parameter Set element shall be included in all Beacon frames that contain an EDCA Parameter Set element" is not clearly compatible with Clause 9 | At 119.47 rightmost cell add "NOTE---The MU EDCA Parameter Set is present if the EDCA Parameter Set is present and the AP announces MU EDCA parameters." | Revised – agree with the commenter. Modify table 9-37 as suggested by the commenter. Apply the changes as proposed in doc 19/0413r2. |
| 20604 | Mark RISON | 26.2.7 | 303.45 | The EDCA Parameter Set and the MU EDCA Parameter Set should both be included, or neither, at least if the update count changes. Otherwise the STA has to probe just in case the non-transmitted one has changed | At 303.45 change "If an HE AP announces both EDCA parameters and MU EDCA Parameters, the MU EDCA Parameter Set element shall be included in all Beacon frames that contain an EDCA Parameter Set element." to "If an HE AP announces both EDCA parameters and MU EDCA Parameters, either both the EDCA Parameter Set element and the MU EDCA Parameter Set element shall be included in all Beacon frames, or neither shall." | Revised – agree with the commenter. Modify the sentence as suggested by the commenter to make it clear that either both elements are present or none of the elements are present. Makes the changes as proposed in doc 19/0413r2. |
| 20622 | Mark RISON | 26.2.7 | 304.28 | "NOTE 2---A non-AP STA that sends a QoS Data frame with Ack policy set to No Ack updates its state variables to the values contained in the MU EDCA Parameter Set element irrespective of receiving immediate response from the AP. The updated MUEDCATimer starts at the end of the HE TB PPDU." -- there will obviously be no immediate response from the AP. Also poor grammar. Also seems normative. Also what if there are other ack-requiring frames in the PPDU? | Change to (non-NOTE) "A non-AP STA that sends a HE TB PPDU that does not contain any frames that require immediate acknowledgment updates its state variables to the values contained in the MU EDCA Parameter Set element. The updated MUEDCATimer[AC] starts at the end of the HE TB PPDU." | Revised – agree with the comment. Remove the NOTE and modify the normative text to separate the behavior for HE TB PPDUs that carry frames that require immediate acknowledgment and that don’t require immediate acknowledgment. Make the changes as proposed in doc 19/0413r2 marked with CID #20622. |
| 20623 | Mark RISON | 26.2.7 | 303.56 | "An HE STA shall update its MIB attributes that correspond to fields in an MU EDCA Parameter Set element" -- no such MIB variables | Add suitable MIB variables to C.3. Then at 304.28 refer to those rather than to the MU EDCA Parameter Set element | Revised – agree with the comment. Apply the changes marked as CID20623 in doc 19/0413r2. |
| 20624 | Mark RISON | 26.2.7 | 304.51 | "When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, then the STA may update CWmin[AC], CWmax[AC] and AIFSN[AC] either 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, or to the default EDCA parameter values (see Table 9-137 (Default EDCA Parameter Set element parameter values if dot11OCBActivated is false)) if an EDCA Parameter Set element has not been received." -- this can't happen because an MU EDCA Params is always associated with an EDCA Params (and EDCA Params is sent in assoc rsp anyway) | Change to "When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, the STA shall 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." | 0413r2Accept |
| 20625 | Mark RISON | 26.2.7 | 304.08 | "A non-AP HE STA that receives a Basic Trigger frame that contains a User Info field addressed to the STA, and that receives an immediate response from the AP for the transmitted HE TB PPDU, shall 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" -- this seems to suggest that if the STA uses something like Block Ack ack policy, it could avoid having to use the MU EDCA parameters | Change to "A non-AP HE STA that receives a Basic Trigger frame that contains a User Info field addressed to the STA, and that receives an acknowledgment from the AP for a frame in the HE TB PPDU, shall 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" | Revised – agree in principle with the commenter. CID 20622 already modifies this sentence to have different behaviors if there is immediate acknowledgment or not. That means that if the policy is No Ack, the STA still switches to MU EDCA parameters without waiting for the acknowledgment. Apply the changes marked as #20625) as proposed in doc 19/0413r2. |
| 20661 | Mark RISON | 26.2.7 | 304.00 | NOTEs 1-3 on this page seem normative to me | Delete the "NOTE <n>---" in NOTEs 1-3 | Revised – agree with the commenter regarding NOTE 2. Modify the normative text above to list the conditions for updating the EDCA parameters to MU EDCA parameters to include the new normative text from note2. NOTE 1 and 3 are however already covered by the normative text above. Apply the changes marked with CID 20661 as proposed in doc 19/0413r2. |
| 20662 | Mark RISON | 26.2.7 | 304.41 | "The TxOPLimit[AC] state variables are not updated by the procedure defined in this subclause, but in 10.22.2.8 (TXOP limits)." -- there are no TxOPLimit[AC] state variables | Change the cited text at the referenced location to ""The TXOP limits are not updated by the procedure defined in this subclause, but by that in 10.22.2.8 (TXOP limits)." | 0413r2Accept |
| 20676 | Mark RISON | 26.2.7 | 304.08 | "A non-AP HE STA that receives a Basic Trigger frame that contains a User Info field addressed to the STA, and that receives an immediate response from the AP for the transmitted HE TB PPDU, shall 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 associ- ated, for all the ACs from which QoS Data frames were transmitted successfully in the HE TB PPDU." -- should reword to make clearer only applies to QoS Data frames, not QoS Null or Action or Control | Change the cited text to "A non-AP HE STA that transmits an HE TB PPDU shall 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 QoS Data frames (i.e. not including QoS Null frames or Management or Control frames) are acknowledged by the AP." | Reject – the normative text already mentions that the STA updates its parameters only for the ACs for which QoS data frames are transmitted, and the note 3 further clarifies that it is only for QoS data frames. |
| 20811 | Mark RISON | 9.4.2.245 | 191.29 | Since the MU EDCA Parameter Set is always accompanied by an EDCA Parameter Set, there is no point carrying the update count in it, just a risk of confusion/inconsistency | In 9.2.4.1.8 delete "The QoS Info field is pres- ent in the QoS Capability, EDCA Parameter Set, and MU EDCA Parameter Set elements transmitted by an HE AP." In Figure 9-772o change "QoS Info" to "Reserved". In 9.4.2.245 delete "The format of the QoS Info field is defined in 9.4.1.17 (QoS Info field) when sent by the AP. The QoS Info field contains the EDCA Parameter Set Update Count subfield, which is initially set to 0 and is incremented each time any of the MU AC parameters in the MU EDCA Parameter Set element changes. This subfield is used by a non-AP HE STA to determine whether the MU EDCA Parameter Set has changed and requires updating the appropriate MIB attributes." | Reject – There is no risk of inconsistency as there is already a shall statement to have the same value in the QoS Info fields of the EDCA Parameter set element and the MU EDCA Parameter Set element: “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).” |
| 21128 | Pascal VIGER | 26.2.7 | 304.52 | When the MUEDCATimer[AC] reaches zero, the classical EDCA parameters are re-applied. Nevertheless, nothing is indicated for the backoff: the backoff needs to be redrawn as it may become completly out-of-range of the updated OCW range. | Please add a sentence that mandates to redraw the backoff value. Example: "The backoff counter maintenance corresponding to the updated state variables shall be redrawn according to the rules in 10.22.2.2 (EDCA backoff procedure)." | Reject – we interpret that OCW range in this context refers to CW range. The MU EDCA parameter procedure has been designed so that it is orthogonal from backoff generation, basically it only focuses on updating the CWmin/max and AIFSN values. The out-of-range problem is just temporary and is solved after the next backoff re-draw. |
| 21143 | Patrice Nezou | 26.2.7 | 304.52 | It is written: "When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, then the STA may update CWmin[AC],CWmax[AC] and AIFSN[AC] ..." When a STA enters in MU EDCA mode, it shall update its EDCA parameters based on the MU EDCA parameter set. When it goes out from the MU EDCA mode, the STA only MAY update its EDCA parameters. If the AIFSN is set to 0 and the STA decides not to update its AIFSN, it creates a big inconsistency. In that case, the STA can not transmit data packets anymore. | Resolve this inconsistency. One solution is to replace "may" by "shall" when updating the EDCA parameters. | Revised – agree with the commenter that AIFSN value 0 is a special case. Propose to replace the may by a shall as proposed by the commenter as being the simplest solution. Apply the changes marked as CID21143 in doc 19/0413r2. |
| 21414 | stephane baron | 26.2.7 | 304.44 | then sentence is not clear. A frames doen't use EDCA parameters. Does it mean that a new backoff value is selected according to the EDCA parameters ? What if the AC already contains data and a backoff has been selected according to the MUEDCA paramters ? Pleas clarify the settings of the EDCA parameters (OCWmin, OCWmax, AIFS), and if the dynamic values (OCW, and backoff counter are modified). | as in comment. | Revised – agree in principle with the commenter. Modify the sentence to clarify that it is the STA that uses EDCA parameters and not the frames, and that the recipient of the frames is also associated with the AP, otherwise other rules apply. Add also a clarification that when communicating not within the BSS, default values are used. Apply the changes marked as CID21414 in doc 19/0413r2. |
| 21443 | Thomas Derham | 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 | Reject – similar to EDCA parameters, MU EDCA parameters are designed to be for the entire BSS for fairness reasons between STAs. |
| 21586 | Zhou Lan | 26.2.7 | 303.37 | The MU EDCA procedure is lack of an explicit or implicit signaling mechanism that allows AP or non-AP STAs to exit current MU EDCA backoff period when AP stops triggering. The lack of the mechanism can cause non-AP STAs' UL traffic being delayed significantly. | Define an explicit or implicit signaling mechanism to solve this problem. |  |
| 21617 | Zhou Lan | 26.2.7 | 304.28 | "NOTE 2--A non-AP STA that sends a QoS Data frame with Ack policy set to No Ack updates its state variables to the values contained in the MU EDCA Parameter Set element irrespective of receiving immediate response from the AP. The updated MUEDCATimer starts at the end of the HE TB PPDU." If a QoS Data set the Ack policy to No ACk, then whether this frame is correctly received by AP or not can not be determined. Thefore it should not be a trigger condition for MU EDCA parameter updates. Remove this note. | As stated in the comment. | Revised – In such case, the current specification intended that the STA uses MU EDCA parameters. Remove the NOTE and add normative text to better explain these different cases. Apply the Changes marked as CID21617 as in this document. |

1. **Proposed changes**

***TGax editor: Modify Table 9-37 – Association Response frame body as follows:***

|  |  |  |
| --- | --- | --- |
| * Association Response frame body | | |
| **Order** | **Information** | **Notes** |
| **58** | **MU EDCA Parameter Set** | **The MU EDCA Parameter Set element is present if dot11HEOptionImplemented is true and if dot11MUEDCAParametersActivated is true; otherwise, it is not present. (#20603)** |

***TGax editor: Modify Table 9-39 – Reassociation Response frame body as follows:***

|  |  |  |
| --- | --- | --- |
| Table 9-39 - Reassociation Response frame body | | |
| **Order** | **Information** | **Notes** |
| **63** | **MU EDCA Parameter Set** | **The MU EDCA Parameter Set element is present if dot11HEOptionImplemented is true and if dot11MUEDCAParametersActivated is true; otherwise, it is not present. (#20603)** |

***TGax editor: Modify Table 9-34 – Beacon frame body as follows:***

|  |  |  |
| --- | --- | --- |
| Table 9-34 - Beacon frame body | | |
| **Order** | **Information** | **Notes** |
| **82** | **MU EDCA Parameter Set** | **The MU EDCA Parameter Set element is present if dot11HEOptionImplemented is true and dot11MUEDCAParametersActivated is true and the QoS Capability element is not**  **Present; otherwise, it is not present. (#20603)** |

***TGax editor: Modify 9.4.2.245 MU EDCA Parameter Set element as follows:***

* MU EDCA Parameter Set element

The format of the MU EDCA Parameter Set element is defined in Figure 9-772o (MU EDCA Parameter Set element).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
|  | Element ID | Length | Element ID Extension | QoS Info | MU AC\_BE Parameter Record | MU AC\_BK Parameter Record | MU AC\_VI Parameter Record | MU AC\_VO Parameter Record |
| Octets: | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| * MU EDCA Parameter Set element | | | | | | | | |

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

For an infrastructure BSS, the MU EDCA Parameter Set element is used by an AP to control the EDCA from non-AP HE STAs as defined in 26.2.7 (EDCA operation using MU EDCA parameters). The most recent MU EDCA Parameter Set element received by a non-AP HE STA is used to update the appropriate MIB values.

The format of the QoS Info field is defined in 9.4.1.17 (QoS Info field) when sent by the AP. The QoS Info field contains the EDCA Parameter Set Update Count subfield, which is initially set to 0 and is incremented each time any of the MU EDCA parameters in the MU EDCA Parameter Set element changes. This subfield is used by a non-AP HE STA to determine whether the MU EDCA Parameter Set has changed and requires updating the appropriate MIB attributes. (#20596)

The format of the MU AC\_BE, MU AC\_BK, MU AC\_VI, and MU AC\_VO Parameter Record fields are identical and defined in Figure 9-772p (MU AC Parameter Record field format).

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | ACI/AIFSN | ECWmin/ECWmax | MU EDCA Timer |
| Octets: | 1 | 1 | 1 |
| * MU AC Parameter Record field format | | | |

The format of the ACI/AIFSN field is defined in Figure 9-262 (ACI/AIFSN field) and the encoding of its subfields is defined in 9.4.2.29 (EDCA Parameter Set element), except that the value 0 in the AIFSN field indicates that EDCA is disabled for the duration specified by the MUEDCATimer for the corresponding AC.

The format of the ECWmin/ECWmax field is defined in Figure 9-263 (ECWmin and ECWmax fields) and the encoding of its subfields is defined in 9.4.2.29 (EDCA Parameter Set element).

The MU EDCA Timer field indicates the duration of time, in units of 8 TUs, during which the HE STA uses the MU EDCA parameters for the corresponding AC, as defined in 26.2.7 (EDCA operation using MU EDCA parameters), except that the value 0 is reserved.

***TGax editor: Modify the following subclause 26.2.7 EDCA operation using MU EDCA parameters:***

* 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. 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 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. 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)

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].

***TGax editor: Add the following text in section C-3 MIB detail after the “End of SMT AP EDCA Config TABLE”:***

(#20623)

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* SMT MU EDCA Config TABLE

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

dot11MUEDCATable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot11MUEDCAEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Conceptual table for MU EDCA parameter values at a non-AP STA. This table contains the four entries of the MU EDCA parameters corresponding to four possible ACs. Index 1 corresponds to AC\_BK, index 2 to AC\_BE, index 3 to AC\_VI, and index 4 to AC\_VO."

::= { dot11mac ANA }

dot11MUEDCAEntry OBJECT-TYPE

SYNTAX Dot11MUEDCAEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An Entry (conceptual row) in the MU EDCA Table.

ifIndex - Each IEEE 802.11 interface is represented by an ifEntry. Interface tables in this MIB module are indexed by ifIndex."

INDEX { ifIndex, dot11MUEDCATableIndex }

::= { dot11MUEDCATable 1 }

Dot11MUEDCAEntry ::=

SEQUENCE {

dot11MUEDCATableIndex Unsigned32,

dot11MUEDCATableCWmin Unsigned32,

dot11MUEDCATableCWmax Unsigned32,

dot11MUEDCATableAIFSN Unsigned32,

}

dot11MUEDCATableIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The auxiliary variable used to identify instances of the columnar objects in the MU EDCA Table. The value of this variable is

1, if the value of the AC is AC\_BK.

2, if the value of the AC is AC\_BE.

3, if the value of the AC is AC\_VI.

4, if the value of the AC is AC\_VO."

::= { dot11MUEDCAEntry 1 }

dot11MUEDCATableCWmin OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the MAC upon receiving an MU EDCA Parameter Set.

Changes take effect as soon as practical in the implementation.

This attribute specifies the value of the minimum size of the window that is used by a STA for a particular AC for generating a random number for the backoff. The value of this attribute is such that it could always be expressed in the form of 2\*\*X - 1, where X is an integer. "

::= { dot11MUEDCAEntry 2 }

dot11MUEDCATableCWmax OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the MAC upon receiving an MU EDCA Parameter Set.

Changes take effect as soon as practical in the implementation.

This attribute specifies the value of the maximum size of the window that is used by a STA for a particular AC for generating a random number for the backoff. The value of this attribute is such that it could always be expressed in the form of 2\*\*X - 1, where X is an integer. "

::= { dot11MUEDCAEntry 3 }

dot11MUEDCATableAIFSN OBJECT-TYPE

SYNTAX Unsigned32 (0..15)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the MAC upon receiving an MU EDCA Parameter Set element.

Changes take effect as soon as practical in the implementation.

This attribute specifies the number of slots, after a SIFS, that the STA, for a particular AC, senses the medium idle either before transmitting or executing a backoff. "

::= { dot11MUEDCAEntry 4 }

dot11MUEDCATableTimer OBJECT-TYPE

SYNTAX Unsigned32 (0..256)

UNITS "8192 microseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity.

Changes take effect as soon as practical in the implementation.

This attribute specifies the duration of time, in units of 8 TUs, during which the HE STA uses the MU EDCA parameters for the corresponding AC, as defined in 26.2.7 (EDCA operation using MU EDCA parameters), except that the value 0 is reserved."

::= { dot11QAPMUEDCAEntry 5 }

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \* End of SMT MU EDCA Config TABLE

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

***TGax editor: Add a new entry at the end of the list of dot11HEStation ConfigEntry: “dot11MUEDCAParametersActived TruthValue” (#20596)***

***TGax editor: Add the following text in section C-3 MIB detail before the “End of dot11HEStationConfigTable TABLE”: (#20596)***

dot11MUEDCAParametersActived OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a variable used only if the STA is an AP. It is set to true to indicate that the AP intends to advertise MU EDCA parameters so that its associated STAs follow the procedure defined in subclause 26.2.7 (EDCA operation uing MU EDCA parameters).

"

DEFVAL { true }

::= { dot11HEStationConfigEntry xx}