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: 22186 22285 22324 22325 22376 22377 22432 22433 22497 22545

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 | Author | Page/line | Clause | Comment | Proposed Change | Resolution |
| 22186 | Mark RISON |  | 26.2.7 | There's nothing in Clause 26 to say that if AIFSN=0 in the MU EDCA params you don't use EDCA | In 26.2.7 EDCA operation using MU EDCA parameters at 316.18 add a para "If AIFSN[AC] is 0 then the corresponding EDCAF shall not transmit." | Revised – agree with the commenter. Apply the changes marked as #22186 as proposed in this document. |
| 22285 | Mark RISON |  |  | It isn't possible to have different params for TDLS compared with MU EDCA, because the reference model for EDCA only allows one set of EDCA params per AC. Need to have wording about temporarily changing EDCA params when MPDU for TDLS peer hits front of EDCAF queue, and then restoring afterwards | As it says in the comment | Reject – the sentence currently says that the non-AP STA may use regular EDCA parameters for frames not addressed to its associated AP. Without changing EDCA architecture, the non-AP STA can either not transmit frames from that AC in response to a trigger frame if frames from that AC are also for TDLS in order to use EDCA parameters, or can use MU EDCA parameters for TDLS. No EDCA architecture changes are needed. |
| 22324 | Mark RISON | 127.46 | 9.3.3.6 | The behaviour for existing devices cannot be changed | Do not insert "optionally" in the EDCA Parameter Set row of Table 9-37--Association Response frame body and Table 9-39--Reassociation Response frame body | Reject – the behaviour for existing devices is not changed as the current rules explicitly define the behaviour for the cases where this element is present and not present. |
| 22325 | Mark RISON | 316.58 | 26.2.7 | 19/1204r1 asserts that:baseline has contradicting statements. It is sometimes said that the EDCA parameter set element shall be always present in association frames, while it is said in other places that if it is not present, the default EDCA parameters apply.However, it is clear that the intent of the baseline is that the EDCA Parameter Set element is included in association responses. There are a couple of locations that are ambiguous because they are trying to cover the situation prior to association (or for mesh or OCB), but the fact that the EDCA parameters are always known after association is otherwise clear.Furthermore, note that the analogue of this in the Wi-Fi Alliance WMM specification (see https://www.wi-fi.org/file/wmm-specification-v12 ) says:An association response frame shall contain a WMM Parameter Element [the equivalent of an EDCA Parameter Set element] in addition to the information specified elements in [IEEE Std 802.11] if the corresponding association request contained a WMM Information element [indicating that the non-AP STA is a QoS STA] | In the referenced subclause, change "When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, either by counting down or due to areset following the reception of an MU EDCA Control frame, then the STA shall update CWmin[AC],CWmax[AC] and AIFSN[AC] either to the values that are contained in the most recently received EDCAParameter Set element sent by the AP with which the STA is associated, or to the default EDCA parametervalues (see Table 9-137 (Default EDCA Parameter Set element parameter values if dot11OCBActivated isfalse)) if an EDCA Parameter Set element has not been received." to "When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, either by counting down or due to areset following the reception of an MU EDCA Control frame, the STA shall update CWmin[AC],CWmax[AC] and AIFSN[AC] to the values that are contained in the most recently received EDCAParameter Set element sent by the AP with which the STA is associated."Revert the changes made under CID 20624 in 19/1204r1.Make the changes to 10.2.3.2 HCF contention based channel access (EDCA) shown under Proposed changes for CID 20624 in 19/1667r1. | Reject – as indicated in the proposed change of this CID, a discussion occurred already in this group regarding this issue and the group decided to accept the changes made with CID 20624 in 19/1204r1.  |
| 22376 | Mark RISON |  | 26.2.7 | CID 20676. The resolution refers to a note 3, but NOTE 3 is "NOTE 3--The TXOP limits are not updated by the procedure defined in this subclause, but by that in 10.22.2.8 (TXOPlimits)." which doesn't seem relevant to the comment. The problem remains that it is not clear enough that a QoS Null does not count, even if acked | After the para starting "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" in 26.2.7 EDCA operation using MU EDCA parameters add a "NOTE---The successful transmission of a QoS Null frame does not cause an update of the state variables." | Reject – In resolution for CID20676, the referred note is note 2 and not note 3 (one note got removed in between). The normative text is very clear that the update of parameters are only when transmitting QoS Data frames in response to a trigger frame. This thefore excludes QoS Null frames, which have a different Subtype value as defined in table 9-1 (Valid type and subtype combination). There is not need to clarify that the update is not made for transmission of all the other frame types and subtypes. |
| 22377 | Mark RISON |  | 26.2.7 | CID 20676. The resolution refers to a note 3, but NOTE 3 is "NOTE 3--The TXOP limits are not updated by the procedure defined in this subclause, but by that in 10.22.2.8 (TXOPlimits)." which doesn't seem relevant to the comment. The problem remains that it is not clear enough that a QoS Null does not count, even if acked. Also, the wording is too verbose | Change the sentence starting "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" in 26.2.7 EDCA operation using MU EDCA parameters to "A non-AP HE STA that transmits an HE TB PPDU shall update itsCWmin[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 – In resolution for CID20676, the referred note is note 2 and not note 3 (one note got removed in between). The normative text is very clear that the update of parameters are only when transmitting QoS Data frames in response to a trigger frame. This thefore excludes QoS Null frames, which have a different Subtype value as defined in table 9-1 (Valid type and subtype combination). There is not need to clarify that the update is not made for transmission of all the other frame types and subtypes. |
| 22432 | Pascal VIGER | 316.09 | 26.2.7 | A non-AP HE STA ... shall update its CW/AIFSN/MU\_EDCA\_Timer state variables ... for all the ACs from which at least one QoS Data frame was transmitted successfully in an HE TB PPDU in response to the Trigger frame.Please confirm if this behavior is also to be executed for ACs where at least one management frame (like Action Frames) was transmitted successfully. | As per comment. | Reject - The normative text is very clear that the update of parameters are only when transmitting QoS Data frames in response to a trigger frame. This thefore excludes management frames, which have a different type value as defined in table 9-1 (Valid type and subtype combination). There is not need to clarify that the update is not made for transmission of all the other frame types and subtypes. |
| 22433 | Patrice Nezou | 317.01 | 26.2.7 | In this following sentence, "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 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 from the OMI responder.", there is no instruction to update CWmin[AC],CWmax[AC] and AIFSN[AC]. | Replace the cited sentence by "Upon the reception of an immediate acknowledgment from the OMI responder, 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 as defined in 26.9.3 (Transmit operating mode (TOM) indication) may set the MUEDCATimer[AC] for all ACs to 0 and may set 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. | Revised – the normative text describing the non-AP STA behaviour when the EDCA timer is zero is already defined. The proposed resolution is to clarify in that sentence that it covers also this case of OM control exchange. Apply the changes marked as #22433 in this document. |
| 22497 | Tomoko Adachi | 127.46 | 9.3.3.6 | EDCA Parameter Set element was changed to be optional in Association Response (subclause 9.3.3.6, Table 9-37), Reassociation Response (subclause 9.3.3.8, Table 9-39), and Probe Response (subclause 9.3.3.10, Table 9-41) frames. And corresponding changes, i.e., to only mandate the element when it is different from the default EDCA parameters in those frames, were made in the 4th para in subclause 10.2.3.2 and in the 2nd para in subclause 26.2.7.However, the baseline mandates the element in those frames and it should be kept as is. The ambiguity parts that the baseline only had were in the 2nd para and 4th para in 10.2.3.2. But these parts are just trying to cover the situation prior to association. Even if the EDCA parameters are the same with the default, (Re)Association Response and Probe Response frames shall include the EDCA Parameters Set element. The policy aligns with the WMM spec. | Delete "optionally" in the Notes column for the EDCA Parameter Set element in Table 9-37 (Association Response frame body), Table 9-39 (Reassociation Response frame body), and Table 9-41 (Probe Response frame body).Change the 2nd paragraph in 10.2.3.2 as follows: "For each AC ... When communicating within a non-mesh QoS BSS, the EDCA parameters used are from the EDCA Parameter Set element or (for a non-AP STA prior to association in an infrastructure BSS, a mesh STA, or a STA that operates OCB) from the default values for the parameters. The parameters used by the ..."Change the 4th paragraph in 10.2.3.2 as follows: "The QoS AP shall announce the EDCA parameters in selected Beacon frames and in all Probe Response and (Re)Association Response frames by the inclusion of the EDCA Parameter Set element using the information from the MIB entries in dot11EDCATable. If no such element has been received (e.g., prior to association in an infrastructure BSS), a non-AP QoS STA shall use the default values for the parameters. The fields following ..."Note that the typo "dot11ECDATable" in the baseline is also fixed in the above.Change the 2nd paragraph in 26.2.7 as follows: "An HE AP that has dot11MUEDCAParametersActivated equal to true includes the MU EDCA Parameter Set element in the Management frames it transmits that include the EDCA Parameter Set element. An HE AP shall set ..."Note that space is added between the 1st and the 2nd sentences. | Reject - a discussion occurred already in this group regarding this issue and the group decided to accept the changes made with CID 20624 in 19/1204r1. |
| 22545 | Yongho Seok | 317.13 | 26.2.7 | "A non-AP HE STA that receives an individually addressed MU EDCA Control frame from its associated AP may reset the MUEDCATimer[AC] to 0 for an AC if the bit corresponding to that AC in the Affected ACs subfield is equal to 1. The STA may invoke a new EDCA backoff procedure after the MUEDCATimer[AC] is reset for that AC and after CWmin[AC], CWmax[AC] and AIFSN[AC] are updated for that AC, as per this subclause, in response to the MUEDCATimer[AC] reset."The STA that is already using the regular EDCA paramter does not invoke a new EDCA backoff procedure when it receives a MU EDCA Control frame. | Change to:"When the MUEDCATimer[AC] for an AC of a non-AP has non-zero value, the non-AP HE STA that receives an individually addressed MU EDCA Control frame from its associated AP may reset the MUEDCATimer[AC] to 0 for that AC..." | Revised – agree with the commenter. Apply the changes marked as #22545 in this document. |

1. **Proposed changes**

***TGax editor: Modify the following subclause 26.2.7 EDCA operation using MU EDCA parameters as follows for the following CIDs #22186, #22433, #22545. The sentences changes corresponding to a CID are marked with #CID\_number:***

* EDCA operation using MU EDCA parameters

A non-AP STA that receives an MU EDCA Parameter Set element from the AP with which(#22340) it is associated follows the procedure defined in this subclause.

An HE AP that has dot11MUEDCAParametersActivated equal to true includes the MU EDCA Parameter Set element in the Management frames it transmits that include the EDCA Parameter Set element, if the AP announces non-default EDCA parameters following the rules defined in 10.2.3.2 (HCF contention based channel access (EDCA)). 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 and MU EDCA Parameter Set element is incremented every time any of the EDCA parameters or the MU EDCA parameters change.

An HE STA shall update the dot11EDCATable and dot11MUEDCATable 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.

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 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.

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.

A non-AP HE STA that receives a Basic Trigger frame that contains a User Info field addressed to the STA 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 with which the STA is associated, for all the ACs from which at least one QoS Data frame was transmitted successfully 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 acknowledgment for that frame, or if the QoS Data frame does not require immediate acknowledgment.

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 10.23.2.2 (EDCA backoff procedure), except that if AIFSN[AC] is 0 then the EDCAF corresponding to that AC shall not be used (#22186). 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.

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. 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.

NOTE 2—A non-AP STA does not update its state variables to the values contained in the MU EDCA Parameter Set element if any of the following apply:(#22218, #Ed)

* 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 26.5.4 (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 10.23.2.9 (TXOP limits).

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 in 10.2.3.2 (HCF contention based channel access (EDCA)).

When the MUEDCATimer[AC] of a non-AP HE STA reaches zero, either by counting down or due to a reset following the reception of an MU EDCA Control frame or the transmission of 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 (#22433), then the STA shall 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 9-155 (Default EDCA Parameter Set element parameter values if dot11OCBActivated is false) or the STA is a non-sensor STA) if an EDCA Parameter Set element has not been received.

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 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 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] has reached zero, until the STA invokes a new EDCA backoff procedure. The STA follows the rules defined in 10.23.2.2 (EDCA backoff procedure) for updating CW[AC].

A non-AP HE STA that receives an individually addressed MU EDCA Control frame from its associated AP when the MUEDCATimer[AC] for an AC of the STA has a non-zero value, may reset the MUEDCATimer[AC] to 0 for that AC if the bit corresponding to that AC in the Affected ACs subfield is equal to 1. (#22545) The STA may invoke a new EDCA backoff procedure after the MUEDCATimer[AC] is reset for that AC and after CWmin[AC], CWmax[AC] and AIFSN[AC] are updated for that AC, as per this subclause, in response to the MUEDCATimer[AC] reset.