IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CR for MU EDCA parameters – 27.2.3 | | | | | | Date: 2017-01-16 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Laurent Cariou | Intel |  |  | Laurent.cariou@intel.com | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs ():

* 3193, 3194, 4747, 4748, 5032, 5172, 5684, 5853, 5854, 5906, 5908, 6159, 6160, 7138, 7178, 7185, 7186, 7795, 8212, 8213, 8214, 8264, 8295, 8296, 8297, 9403, 9491, 9521, 9586 , 9702, 10248, 10249, 10327, 3244, 3389, 3499, 3830, 3919, 4270, 4454, 4483, 4742, 4744, 5843, 5911, 5912, 6462, 6463, 6464, 7562, 8201, 8262, 8263, 8265, 8290, 8291, 8519, 4745

Revision 1: added resolutions to CIDs 5172, 8295, 9586, 8265, 8291

Revision 2: included modifications proposed during the presentation in TGax conf call on 2/16/2017

* 8262: revised the introduction sentence.
* 8297: Update resolution text
* Modify sentence related to AIFSN value set to 0 in MU EDCA parameter set element
* 5853 on hold before hearing alternative proposal
* 8290: change resolution text from rejected to revised

Revision 3:

* Modify sentence related to AIFSN value set to 0 in MU EDCA parameter set element

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. This introduction is 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** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 3193 | Ahmadreza Hedayat | 152.14 | The spec does not require an HE AP to send the MU EDCA Parameter set, hence an HE STA may have not received such set at all. | "An UL MU capable non-AP HE STA that receives a Basic Trigger frame that contains a Per User Info field with the AID of the STA, and that receives an immediate response from the AP for the transmitted Triggerbased PPDU, shall update its CWmin[AC], CWmax[AC], AIFSN[AC] and HEMUEDCATimer[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, if any, for all the ACs from which QoS Data frames were transmitted in the HE trigger-based PPDU." | Revised – agree in principle with the comment. Add a sentence to clarify the behaviour of the STA if the MU EDCA parameter element is not present as described in the proposed modification in doc 204r2. |
| 3194 | Ahmadreza Hedayat | 152.19 | "Each HEMUEDCATimer[AC] shall uniformly count down to 0 when its value is nonzero." | "In an HE STA, each HEMUEDCATimer[AC] shall uniformly count down to 0 when its value is nonzero." | Revised – agree in principle with the comment. Add  “In an HE non-AP STA,” to the sentence as described in the proposed changes in doc 204r2. |
| 4747 | Alfred Asterjadhi | 152.17 | Time references when to update these state variables are missing, especially for the timer. | Add the following at the end of the paragraph: "The backoff counter maintenance corresponding to the updated state variables shall follow the rules in 10.22.2.2 (EDCA backoff procedure), and the updated HEMUEDCATimer[AC] shall start at the end of the immediate response (if any is sent by the AP). | Revised – agree in principle with the comment. Add  The proposed sentence as described in the proposed changes in doc 204r2 |
| 4748 | Alfred Asterjadhi | 152.18 | Perhaps it is already clear but better to add a note that only the Basic Trigger frame causes a switch to the MU EDCA parameters, and only when QoS Data are sent. | Add the following note: "The non-AP STA is not required to update its state variables to the values contained in the MU EDCA Parameter Set element if it the Trigger frame addressed to it is not a Basic Trigger frame or if it transmits frames that are not QoS Data frames in the HE TB PPDU response." | Revised – agree in principle with the comment. Add  the proposed note as described in the proposed changes in doc 204r2 |
| 5032 | Chittabrata Ghosh | 6.18 | It is specified that a STA that receives a Basic Trigger frame with its AID in Per User Info field shall update MU EDCA parameters. However, there is no STA behavior mentioned with respect to MU EDCA parameter update when a STA accesses a random access RU with AID 0 assigned in Basic Trigger frame; | Suggest to provide STA behavior when a STA accesses an RU assigned for random access indicated by AID 0 in Basic Trigger frame; | Revised – agree in principle with the comment. Add  a note as described in the proposed changes in doc 204r2 |
| 5172 | Dorothy Stanley | 152.21 | what's an "OMI A-Control field"? | Change to "Operating Mode subfield in A-Control subfield" in all locations where "OMI A-Control field" is used, or define "OMI A-Control field" | Rejected - the OMI A-control field will be defined as part of other CR. |
| 5684 | Guoqing Li | 152.25 | what does "updating its EDCA access" mean when UL MU is disabled? What happens to the counters in this case? Regenerate according to new EDCA parameters? Or count down to zero then start using the new EDCA parameters? | Clarify | Revised – Clarify NOTE1 so that when UL MU is disabled, the STA is exempt from updating its EDCA access parameters. |
| 5853 | Hyunhee Park | 152.20 | Basically, the HE STA enters the doze state outside trigger-enabled TWT SPs. In this case, HEMUEDCATimer doesn't need to countdown. | Add below sentence in P152P20 for clarification of HEMUEDCATimer. "The HEMUEDCATimer[AC] should not countdown outside trigger-enabled TWT SPs." | Rejected – Trigger-enabled TWT SPs is not the only period where UL MU operation is possible, so there are no reasons to define such rules. Plus, this MU EDCA parameters mechanism is defined so that it is orthogonal to other mechanisms, including TWT. That means that the MU EDCA rules apply the same way with and without TWT. |
| 5854 | Hyunhee Park | 152.11 | When the STA receives the Trigger frame from the AP, it shall update its CW, AIFSN, EDCA Timer in the most recently received MU EDCA Parameter Set element. In addition, when the STA sends the OMI A-Confrol field to change UL MU enable mode, in this case, it may update it CW, AIFSN, EDCA Timer in most recently received MU EDCA parameter set element. Because the UL MU enable means that it will be scheduled from the Trigger frame by the AP. Right now the change of MU EDCA parameter is quite restricted. If the STA sends the OMI A-Control field with UL MU enable, it means the STA wants to operate MU operation mode with MU EDCA parameter. Furthermore, in order to relieve of fairness between the legacy STA and MU operated STA, the MU operated STA should use MU EDCA parameter even though it requests UL MU enable mode by OMI A-Control field. | Add an update rule of CW, AIFSN and HEMUEDCATimer when an UL MU capable non-AP HE STA sends the OMI A-Confrol field to enable UL MU operation. | Rejected – When a STA sends the OMI A-Confrol field to change UL MU enable mode, it only means that it allows UL MU operation and possibly would like to operate in this mode. But it is the AP decision to trigger that STA or not. If the STA switches directly to MU EDCA parameters, it will be disfavoured if the AP does not trigger it. For that reason, the switch to using MU EDCA parameters is when receiving a trigger frame from the AP, which is a clear indication that the AP now will schedule the STA with UL MU. |
| 5906 | James Yee | 152.13 | By when should the non-HE STA update its QoS state variables based on the most recent MU EDCA Parameter Set element values? It seems open ended to just require "shall update". | Change "shall update" to "shall, before it transmits the nex PPDU of an affected AC, update" | Rejected – the spec currently says that it shall update, when all conditions are met (it has received the immediate response). |
| 5908 | James Yee | 152.30 | The 2nd sentence of the paragraph describing the EDCA Parameter Set Update Count is a repeat of the description in 9.4.2.29 (802.11-2016) and is unnecessary. | Delete the sentence. | Rejected – it is not exctly a repeat because we are talking here about MU EDCA parameters and not the EDCA parameters. This is therefore a normative behaviour defined explicitly for MU operation (not present in baseline). |
| 6159 | Jinjing Jiang | 152.19 | The HEMUEDCATimer[AC] should be reset/restarted upon each triggered event including the AC | As in the comments | Revised – agree in principle with the comment. The spec already says this. |
| 6160 | Jinjing Jiang | 152.18 | There should be recommended guideline for HEMUEDCATimer setting to ensure channel access fairness between SU and MU | Please provide the details |  |
| 7138 | kaiying Lv | 152.13 | When the HEMUEDCATimer[AC] is not 0, is the TXOPLimit[AC] still used as defined by EDCA Parameter Set element? | Please clarify it. | Revised – add a note to indicate that the TxOPlimit is not updated, as proposed in the proposed texrt changes in doc 204r2. |
| 7178 | kaiying Lv | 152.11 | According to 9.3.1.23,there is "User Info field" in trigger frame,not "Per User Info field".There are many places use the incorrect name of this field. | Change as comment. | Revised – agree with the comment. Change per user info to user info as in the proposed changes in doc 204r2. |
| 7185 | kaiying Lv | 152.22 | UL MU disable operation shall be independent from switching MU/SU EDCA parameters. Otherwise, a non-AP STA may cheat to be exempt from updating its EDCA access parameters to the values contained in the MU EDCA Parameter Set element by sending the trigger-based PPDU with an OMI A-Control field containing a value of 1 in the UL MU Disable field. | Delete note 1 | Rejected – A STA that sets the UL MU disable bit in the UL TB PPDU will not be further scheduled by the AP in UL MU. So it can not get both higher EDCA access and still be scheduled by the AP. There are therefore no ways to cheat here. |
| 7186 | kaiying Lv | 152.29 | change"HE non-AP UL MU capable STA" to" UL MU capable non-AP | Please unify it | Revised – modify to HE non-AP STA as UL MU capable STA only refers to STAs supporting UL MU MIMO operation. Update the spec with the proposed changes in doc 204r2. |
| 7795 | Mark Hamilton | 152.11 | Trigger frame User Info fields only have AID12, not full AIDs. | Change "with the AID of the STA" to "with AID12 matching the least significant 12 bits of the AID of the STA" | Revised – agree in principle with the comment. Update the spec with the proposed changes in doc 204r2. |
| 8212 | Osama Aboulmagd | 152.14 | MU-EDCA needs to be defined | as in comment | Revised – definition is included as in the proposed changes in doc 204r2 |
| 8213 | Osama Aboulmagd | 152.13 | The parameter HEMUEDCATimer[AC] seems to appear for the first time in the draft on page 152. No proper definition was given and its role in channel acces wasn't explained. | Introduce definition and describe its use including how to set its value | Revised – add a sentence to clarify that it is set to the value in the MU EDCA Timer subfield in MU EDCA parameter set element |
| 8214 | Osama Aboulmagd | 152.08 | Clause 27.2.3 doesn specify clearly when an EDCA for UL MU Capable STAs is obtained. It focuses on the different parameter settings. | explain which counters are involved in obtaining the TXOP. Does HEMUEDCATimer[AC] only used to contrl the values of Cwmin, Cwmax, etc as implied in the last paragarph of this clause. Need to be clear | Revised – agree in principle with the comment. Clarify the spec by changing the spec text as in the proposed changes in doc 204r2. |
| 8264 | Pascal VIGER | 152.19 | HEMUEDCATimer[AC] shall uniformly count down to 0. Is this countdown continuously performed along time, or is the countdown suspended in between each medium access (that means only counting down during contention procedure periods) ? | Please clarify when countdown is executed. | Revised – Clarify that there can not be any suspensions. Modify the sentence as defined in the proposed changes in fdoc 204r2. |
| 8295 | Patrice Nezou | 152.10 | When a STA is in MU EDCA mode, how the QoS data are selected from the ACs ? | Proposal: "The HE trigger-based PPDU is built based on the current backoff values of ACs. The backoff values must be updated after the transmission". | Rejected – this comment does not refer to this section, but to subclause 27.10.4 A-MPDU with multiple TIDs where these rules are already defined. |
| 8296 | Patrice Nezou | 152.29 | When a STA switches from MU EDCA to EDCA, how the backoff are restored ? | Proposal: "The backoff values must be resetted and CW is set to CWmin when switching from MU EDCA to EDCA." | Rejected – the spec currently says that only the CWmin,max and AIFSN values are updated, not the backoff nor the CW. The backoff and CW are updated based on legacy procedures, using the updated parameters. The intent is not to reset CW and backoff values. |
| 8297 | Patrice Nezou | 152.10 | A STA, exchanging QoS data frame with another in DLS mode and setting in MU EDCA mode, cannot transmit any QoS data frame related to the DLS transmission because the scheduled RU allocated by the AP are dedicated to transmit QoS data frame to the AP. | Disable MU transmission mode when direct link transmissions are initiated by sending a frame containing an OMI A-Control field, and reset EDCA parameters. | Revised – add the sentence: “A non-AP STA should only send QoS data frames in HE trigger-based PPDU with ACs for which the STA’s buffer queues contain frames that are only addressed to its associated AP”, as described in the proposed text in doc 204r2204r2 |
| 9403 | Woojin Ahn | 152.20 | If an EDCAF reported that its buffer is empty during a UL MU procedure, that EDCAF cannot expect to be scheduled by AP for the following UL MU transmissions. The EDCAF should be exempted from entering MU mode | As per comment |  |
| 9491 | Yanchun Li | 152.10 | When AP has acknowledged STA's uplink buffer status report (BSR), AP will allocate trigger based transmission resource to this STA soon. Similar to the current case that STA slow down its EDCA contention after being provided trigger-based UL transmission opportunity, STA shall also slow down its EDCA contention and use MU EDCA Parameter Set after uplink BSR. Otherwise, there will be too many legacy SU transmissions. And the whole system performance just degrades to legacy SU system. It will be hard for AP to organize MU transmission. Actually, 11ax shall take advantage from MU transmission as much as possible. | Insert condition "that receives an immediate response from the AP for the transmitted BSR" to the paragraph. The paragraph is changed to: An UL MU capable non-AP HE STA that receives a Basic Trigger frame that contains a Per User Info field with the AID of the STA, and that receives an immediate response from the AP for the transmitted Trigger based PPDU, or that receives an immediate response from the AP for the transmitted BSR, shall update its CWmin[AC], CWmax[AC], AIFSN[AC] and HEMUEDCATimer[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 were transmitted in the HE trigger-based PPDU. | Rejected – When a STA sends a BSR, it only means that it would like to operate with UL MU mode. But it is the AP decision to trigger that STA or not. If the STA switches directly to MU EDCA parameters, it will be disfavoured if the AP does not trigger it. For that reason, the switch to using MU EDCA parameters is when receiving a trigger frame from the AP, which is a clear indication that the AP now will schedule the STA with UL MU. |
| 9521 | Yasuhiko Inoue | 152.13 | HEMUEDCATimer[AC] not defined. | Define HEMUEDCATimer[AC]. | Revised – Add a clarification sentence as in the proposed changes in doc 204r2 |
| 9586 | Yongho Kim | 152.19 | For some applications using 802.11ax, some value of HEMUEDCATimer in EDCA Parameter Set element need to provide some special feature. | Define it. | Rejected – the comment fails to identify a technical issue |
| 9702 | Yongho Seok | 152.08 | The definition of an UL MU capable STA is as the following (see 27.5.2.1): "A non-AP STA with dot11ULMUMIMOOptionImplemented equal to true is referred to as an UL MU capable STA." So, an UL MU capable STA represents a non-AP STA supporting an UL MU-MIMO. See the title of 27.2.3: "Obtaining an EDCA TXOP for UL MU capable STAs" When a non-AP STA does not support an UL MU-MIMO, it is not an UL MU capable STA. So, an EDCA TXOP rule defined in 27.2.3 is not appilied to that STA. Probably, it is not an intention of the proposed EDCA TXOP rule. Replace "UL MU capable STA(s)" with "HE non-AP STA(s)" throughout the TGax draft 1.0 | As per commnet. | Revised – agree in principle with the comment. Include in the specification the proposed changes in doc 204r2. |
| 10248 | Yusuke Tanaka | 152.29 | The operation when the HEMUEDCATimer[AC] reaches zero should consider the retry counters (SSRC/SLRC). The retry counters should be reset to 0 at updating of EDCA parameters, otherwise the STA would give up retransmission after only one transmission with CWmin. | Add the following texts at the end. "When the STA update the CWmin[AC], CWmax[AC] and AIFSN[AC] either, The SSRC and the SLRC shall be reset to 0. | Rejected – only the EDCA parameters are updated, but the backoff and retry counter are kept unchanged. |
| 10249 | Yusuke Tanaka | 152.29 | To ensure that the STA receives EDCA Parameter Set element, the trigger frame may contain EDCA Parameter Set element. | Add "in the Trigger frame" after "EDCA Parameter Set element".  Define EDCA Parameter Set element in Common Infor field of Trigger frame format in P42L6 | Rejected – This would make the trigger frame way too big. There is no need to update the parameters on a trigger-frame basis, so inclusion of MU EDCA parameter set element in beacons is sufficient, same as for the EDCA parameter set element. |
| 10327 | Zhou Lan | 152.00 | Section 27.5.2.1 says "A non-AP STA with dot11ULMUMIMOOptionImplemented equal to true is referred to as an UL MU capable STA.", so an UL MU capable STA is a STA that is capable of supporting UL MU MIMO. However, here in this section, it refers to UL MU MIMO, UL OFDMA, UL OFDMA+MU MIMO. UL OFDMA is a mandatory feature which doesnt need capability indication. So the language should be fixed. | fix the language per comment | Revised – agree in principle with the comment. Include in the specification the proposed changes in doc 204r2. |

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| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 3244 | Albert Petrick | 94.56 | MUEDCATimer not defined | Add definition for MUEDCATimer in clause 3.4 Definitions, acronyms, and abbreviations | Revised – include the proposed changes defined in doc 204r2 |
| 3389 | Albert Petrick | 94.56 | MUEDCATimer not defined | Add definition for MUEDCATimer in clause 3.4 Definitions, acronyms, and abbreviations | Revised – include the proposed changes defined in doc 204r2 |
| 3499 | Albert Petrick | 94.56 | MUEDCATimer not defined | Add definition for MUEDCATimer in clause 3.4 Definitions, acronyms, and abbreviations | Revised – include the proposed changes defined in doc 204r2 |
| 3830 | Albert Petrick | 94.56 | MUEDCATimer not defined | Add definition for MUEDCATimer in clause 3.4 Definitions, acronyms, and abbreviations | Revised – include the proposed changes defined in doc 204r2 |
| 3919 | Albert Petrick | 94.56 | MUEDCATimer not defined | Add definition for MUEDCATimer in clause 3.4 Definitions, acronyms, and abbreviations | Revised – include the proposed changes defined in doc 204r2 |
| 4270 | Albert Petrick | 94.04 | MU EDCA not defined, nor in IEEE 802.11-2016 | Change text "MU EDCA" to "Multi-user (MU) EDCA" | Rejected – this term is only used to name the element. |
| 4454 | Albert Petrick | 94.56 | MUEDCATimer not defined | Add definition for MUEDCATimer in clause 3.4 Definitions, acronyms, and abbreviations | Revised – include the proposed changes defined in doc 204r2 |
| 4483 | Albert Petrick | 94.04 | MU EDCA not defined, nor in IEEE 802.11-2016 | Change text "MU EDCA" to "Multi-user (MU) EDCA" | Rejected – this term is only used to name the element. |
| 4742 | Alfred Asterjadhi | 94.27 | Only UL MU Capable STAs update their MIBs. And they do so when certain conditions occure as defined in10.2.4.2. Change to something like this: The most recent MU EDCA Parameter Set element is used by an "UL MU Capable STA" to update the appropriate MIB variables, "as defined in 10.2.4.2 (HCF contention based channel access (EDCA))." | Add quoted text as in comment. | Revised – agree in principle with the comment. Modify the sentence to limit it to HE non-AP STAs and to reference section 27.2.3, as in the proposed text in doc 204r2. |
| 4744 | Alfred Asterjadhi | 94.63 | This sentence is unclear. Rephrase it so that it is clear that this is the time during which the STA is supposed to use the MU EDCA parames. | Replace with "The MU EDCA Timer field indicates the duration of time, in units of 8 TUs, during which the HE STA uses the provided MU EDCA parameters for the corresponding AC, as defined in 27.2.3 (Obtaining an EDCA TXOP for UL MU capable STAs). | Revised – Agree in principle with the comment. Modify the sentence by including the proposed changes in doc 204r2. |
| 5843 | Huizhao Wang | 94.62 | MU EDCA timer field description is not clear | Change the sentence: "The MU EDCA Timer field indicates the duration of time, in units of 8 TUs, for which the provided MU EDCA parameters are used by an HE STA after reception of a Basic variant Trigger frame for the corresponding AC." To: "The MU EDCA Timer field indicates the duration of time, in units of 8 TUs, is used by an HE non-AP STA to disable EDCA function after reception of a Basic variant Trigger frame which contains User Info field AID matching its AID for the corresponding AC." | Revised – agree in principle with the comment.  Modify the sentence by including the changes defined in the proposed changes in doc 204r2. |
| 5911 | James Yee | 94.31 | The 2nd sentence of the paragraph describing the EDCA Parameter Set Update Count is a repeat of the description in 9.4.2.29 (802.11-2016) and is unnecessary. | Delete the sentence. | Rejected – the sentence clarifies that it is for MU EDCA parameters and not for EDCA parameters. |
| 5912 | James Yee | 94.30 | "same as the field defined in 9.4.1.17 (QoS Info field)" should more specifically refer to "same as the QoS Info field defined in 9.4.1.17 (QoS Info field) when sent by the AP" | As suggested. | Revised – agree in principle with the comment. Include the proposed changes in doc 204r2. |
| 6462 | John Coffey | 94.39 | Here format is "illustrated" in the Figure, whereas in most other places in the draft, format is "defined" in a figure. Is the present statement normative or is it an explanatory restatement of an explicit definition somewhere else? | If this is intended to be the definition, change "illusrated" to "defined". | Revised – Agree in principle with the comment. Change “illustrated” to “defined” as in the proposed changes in doc 204r2. |
| 6463 | John Coffey | 94.52 | Here format is "illustrated" in the Figure, whereas in most other places in the draft, format is "defined" in a figure. Is the present statement normative or is it an explanatory restatement of an explicit definition somewhere else? | If this is intended to be the definition, change "illusrated" to "defined". | Revised – Agree in principle with the comment. Change “illustrated” to “defined” as in the proposed changes in doc 204r2. |
| 6464 | John Coffey | 94.59 | Here format is "illustrated" in the Figure, whereas in most other places in the draft, format is "defined" in a figure. Is the present statement normative or is it an explanatory restatement of an explicit definition somewhere else? | If this is intended to be the definition, change "illusrated" to "defined". | Revised – Agree in principle with the comment. Change “illustrated” to “defined” as in the proposed changes in doc 204r2. |
| 7562 | Liwen Chu | 94.53 | "except that a value 0 of the AIFSN field indicates that the AIFS is equal to the value of the MU EDCA Timer "  This is ok for the first backoff per MU EDCA parameters after being triggered. The normative text doesn't say for the following backoff after schedueld by Trigger MU EDCA timer is set to the value of MU EDCA Timer. | Clarify the text and harmonize the normative behavior with the text here. | Revised – agree in principle with the comment.  Modify the sentence to reference 27.3.2 as defined in the proposed changes in doc 204r2. |
| 8201 | Osama Aboulmagd | 94.01 | what MU EDCA parameter set is used for. It seems tat the only new parameter is the MUEDCA Timer. The rest of the parameters are the same as in EDCA Parameter set. | Needs clarification to see how useful this nes IE is | Revised – Include a sentence:”The MU EDCA parameter Set element is used to control the EDCA from HE non-AP STAs as defined in 27.2.3 (Obtaining an EDCA TXOP for UL MU capable STAs).” As defined in the proposed changes in doc 204r2. |
| 8262 | Pascal VIGER | 94.04 | The MU EDCA Parameter Set element is used for proper operation of the QoS facility during the CP. The sentence is unclear, and particularly the CP term is not defined. If CP refers to contention period, is it useful to be used as this kind of period is the only allowed type (as according to 27.1, the use of HCCA is banned at HE STAs and thus there is no more CFP period). | Please clarify the sentence. | Revised – Clarify the sentence by including the proposed changes in doc 204r2. |
| 8263 | Pascal VIGER | 94.52 | For value 0 of the AIFSN field, the sentence is unclear : "the AIFS is equal to the value of the MU EDCA Timer, i.e. EDCA is disabled for the duration specified by the MUEDCATimer for the corresponding AC". This lets think that the EDCA medium access will be enabled once the AIFS will expire. BUT this will not be possible, as AIFS timer is large (8\*1024-┴s) and re-scheduled at each start of EDCA contention phase (see 10.3.2.3.6 AIFS). | Please clarify the sentence, in order to clearly know under which conditions the EDCA medium access will be re-enabled. | Revised – The EDCA will be re-enabled when the MU EDCA Timer reaches zero and the STA moves back to EDCA parameter set element. |
| 8265 | Pascal VIGER | 94.62 | MU EDCA Timer field indicates a duration expressed in time unit (TU) (a TU equals to 1024 ++s). No exemplary value is provided for MU EDCA Timer field. By the way, is value 0 allowed (and so what is the consequence)? | According to 10.22.2.4 (Obtaining an EDCA TXOP), the value of AIFSN[AC] shall be greater than or equal to 2 for non-AP STAs. That results in having a AIFS timer value never null. Thus, the MU EDCA Parameter Set must provide a correct value, preventing the null case. | Rejected – there are no issues related to having MU EDCA timer equal to zero, so the spec does not need to define it. |
| 8290 | Pascal VIGER | 94.62 | MU EDCA Parameters Set is not compatible with STA2STA (or also called P2P) traffics, like DLS or TDLS protocols. The penalty scheme as envisaged by MU EDCA Parameter Set penalizes the uplink traffic to the AP, but also blocks any legacy EDCA access for P2P communications. | The MU EDCA Parameter Set has to be modified (and as a result will be simplified) to support P2P traffics. The MU EDCA Timer is the only parameter kept, and indicates the duration of time during which the restricted UL MU mode is used. Principle consists in to let EDCA backoff counters count down as usual (that is to say with no penalty as currently envisaged by former MU EDCA Parameters set), and to condition the transmission of data (when one EDCA backoff is down to zero) according to the MU EDCA Timer activity and the data to be sent. - if MU EDCA Timer is not active (or timeout), then the transmission is allowed on the given queue - if MU EDCA Timer is not active, then only transmission of P2P data inside the expired queue is allowed. Next the backoff counter is redrawn as usual. | Revised – it is true that MU EDCA parameter should not apply to P2P traffic. STAs behaviour should not send UL traffic in UL MU for the AC that is used for the P2P traffic. Make the changes as proposed in 204r2. |
| 8291 | Pascal VIGER | 94.62 | The specification of MU EDCA parameter Set prevent any EDCA backoff counter (e.g. by MU EDCA Timer, i.e. EDCA is disabled for the duration specified by the MUEDCATimer). Thus, this mechanism makes the EDCA backoff counters no longer mirror which AC queue should have the highest priority of transmission in the meaning of conventional EDCA (e.g. with oldest data stored in it). For instance, when the STA receives a trigger frame with a scheduled RU dedicated to it, the STA having its backoff counters frozen, cannot anymore use them to handle its QoS and send the data with the highest priority (not only regarding its Access Category, but also regarding the respective ages of the data in the AC[] queues). Therefore, MU EDCA Parameter Set has broken the classical QoS handling. | The MU EDCA Parameter Set can be modified to keep the EDCA penalty and allow keeping the backoff count down. Among the set of parameters used in 9.4.2.221, the MU EDCA Timer is the only parameter kept, and indicates the duration of time during which the restricted UL MU mode is used. Principle consists in to let EDCA backoff counters count down as usual (that is to say with no penalty as currently envisaged by former MU EDCA Parameters set), and to condition the transmission of data (when one EDCA backoff is down to zero) according to the MU EDCA Timer activity and the data to be sent. - if MU EDCA Timer is not active (or timeout), then the EDCA transmission is allowed on the given queue - if MU EDCA Timer is not active, then transmission through EDCA is dis-allowed. Next the backoff counter is redrawn as usual. This ensures the penalty scheme envisioned in the 802.11ax standard to be kept: EDCA scheme still operates, while no medium access is allowed to a AC queue in MU EDCA mode, even if its associated backoff counter, with restored dynamicity, expires. | Rejected – the issue described is an implementation issue and is left to the implementer. The spec does not need to describe it. |
| 8519 | Robert Stacey | 94.65 | Default MU EDCA Parameters set for non-AP STA operation are missing (compared to default EDCA parameter set in 802.11-2016 Table 9-137 & Table 9-138) | Add defaults: AC\_BK: AIFSN = 7/ ECWmin = 15 / ECWmax = 15 / MU EDCA Timer = 13\*8TUs AC\_BE: AIFSN = 13/ ECWmin = 15 / ECWmax = 15 / MU EDCA Timer = 13\*8TUs AC\_VI: AIFSN = 2/ ECWmin = 15 / ECWmax = 15 / MU EDCA Timer = 13\*8TUs AC\_VO: AIFSN = 2/ ECWmin = 15 / ECWmax = 15 / MU EDCA Timer = 13\*8TUs |  |
| 4745 | Alfred Asterjadhi | 114.13 | What is the expectation when the AP wants to not use MU EDCA Parameters anymore? Does it decide to not include the MU EDCA Parameter Set in the Beacon, or does it continue including it and always specify the same values in the MU and normal EDCA Parameter Set elements? Clarify (noting that the second option requires to keep 16 redundant octets in the Beacon). | As in comment | Revised – agree with the comment. Clarification is added that if the MU EDCA parameter element was not received, the procedure does not apply, as described in the proposed changes in doc 204r2. |

***Include the following in section 3.4 Abbreviations and acronyms***

MUEDCATimer Multi-user EDCA timer

***Modify 9.4.2.221 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 9-589cv (MU EDCA Parameter Set element).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
|  | Element ID | Length | Element ID Extension | MU 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 the AP to control the EDCA from HE non-AP STAs as defined in 27.2.3 (Obtaining an EDCA TXOP for UL MU capable STAs). The most recent MU EDCA Parameter Set element received by a HE non-AP STA is used to update the appropriate MIB values, following the rules defined in 27.2.3 (Obtaining an EDCA TXOP for UL MU capable STAs).

The format of the MU QoS Info field is the same as the QoS Info field defined in 9.4.1.17 (QoS Info field) when sent by the AP. The MU 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 changes. This subfield is used by non-AP STAs to determine whether the MU EDCA parameter set has changed and requires updating the appropriate MIB attributes.

The formats of MU AC\_BE, MU AC\_BK, MU AC\_VI, and MU AC\_VO Parameters fields are identical and are defined in Figure 9-589cw (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 as defined in 9.4.2.29 (EDCA Parameter Set element), except that a value 0 of the AIFSN field indicates that the AIFSN is equal to the value of the MU EDCA Timer field, i.e. EDCAF is disabled for the duration specified by the MUEDCATimer for the corresponding AC (see 27.2.3 (Obtaining an EDCA TXOP for UL MU capable STAs)).

The format of the ECWmin/ECWmax field is defined in Figure 9-263 (ECWmin and ECWmax fields) and the encoding of its subfields is as 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 27.2.3 (Obtaining an EDCA TXOP for UL MU capable STAs).

***Modify 27.2.3 Obtaining an EDCA TXOP for UL MU capable STAs as follows:***

* Obtaining an EDCA TXOP for HE non-AP STAs using MU EDCA parameters

A STA that has not received an MU EDCA Parameter Set element from the AP to which it is associated is exempt from following the procedure described in this subclause.

An HE non-AP STA that receives a Basic Trigger frame that contains a User Info field with the AID12 subfield equal to the 12 LSBs of the AID of the STA, and that receives an immediate response from the AP for the transmitted HE Trigger-based PPDU, shall update its CWmin[AC], CWmax[AC], AIFSN[AC] and HEMUEDCATimer[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 were transmitted in the HE trigger-based PPDU. The HEMUEDCATimer[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), and the updated HEMUEDCATimer[AC] shall start at the end of the immediate response.

In an HE non-AP STA, each HEMUEDCATimer[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 OMI A-Control field containing a value of 1 in the UL MU Disable field 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 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 HEMUEDCATimer starts at the end of the HE trigger-based PPDU.

NOTE 3—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 Trigger-Based PPDU response sent in response to the Basic Trigger frame
* The STA transmits the HE Trigger-based PPDU in response to a Basic Trigger frame following the rules defined in 27.5.2.6 (OFDMA-based random access).

NOTE 4- The TxOPLimit[AC] state variables are not updated by the procedure defined in this subclause, but in 10.22.2.8 TxOP limit.

A non-AP STA should only send QoS data frames in HE trigger-based PPDU with ACs for which the STA’s buffer queues contain frames that are only addressed to its associated AP.

When the HEMUEDCATimer[AC] of an HE non-AP STA reaches zero, then the STA may update the 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 to which the STA is associated, or to the values contained in the default dot11EDCATable if an EDCA Parameter Set element has not been received. An HE non-AP STA that sends a frame with OMI A-Control field containing an UL MU Disable subfield equal to 1 as defined in 27.8.3 (Rules for transmit operation mode (TOM) indication) may set the HEMUEDCATimer[AC] for all its ACs to 0, when it successfully receives the immediate acknowledegment from the OMI responder.