

IEEE P802.11
Wireless LANs

Proposed spec text for MU EDCA parameters

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Abstract

This document provides proposals for spec changes for adding MU EDCA parameters.

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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.

2. Explanation of the proposed changes

Propose to define 2 sets of EDCA parameters (one being the current legacy EDCA parameters, one new set called MU EDCA parameters) for non-AP HE-STA.

- MU EDCA parameters are signaled with a new IE called MU EDCA Parameter Set element:
- This IE includes for each AC the following parameters:
 - o CWmin/Cwmax, AIFSN
- A specific value of AIFSN defines no EDCA access

The STA operating with MU EDCA parameters can switch back to the legacy EDCA parameters:

- if the STA has not been scheduled after a pre-defined TimeOut after the last time the STA was scheduled by Basic variant Trigger frame in UL MU.
- timeout starts from end of basic variant Trigger

3. Proposed changes

TGax editor: Add a new line for spatial reuse parameter set element in Table 9-76—Element IDs.

TGax editor: Insert a new subclause (Spatial reuse parameter set element) in 9.4.2

9.4.2.216 MU EDCA parameter set element

The MU EDCA Parameter Set element provides information needed by non-AP STAs that are in MU mode (see 25.5.2 (UL MU operation) for proper operation of the QoS facility during the CP. The format of the MU EDCA Parameter Set element is defined in Figure 9-ax6 (MU EDCA Parameter Set element).

Element ID	Length	Element ID Extension	MU QoS Info	MU EDCA Timer	MU AC_BE Parameter Record	MU AC_BK Parameter Record	MU AC_VI Parameter Record	MU AC_VO Parameter Record
1	1	1	1	1	2	2	2	2

Octets:

Figure 9-ax6- 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 establish policy (by changing default MIB attribute values), to change policies when accepting new STAs or new traffic, or to adapt to changes in offered load. The most recent MU EDCA Parameter Set element received by a STA is used to update the appropriate MIB values.

The format of the MU QoS Info field is the same as the field defined in 9.4.1.17 (QoS Info field). 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 MU EDCA Timer indicates the duration of time, in units of 8TUs, for which the provided MU EDCA parameters are used by an HE STA after reception of a basic variant Trigger frame.

The formats of MU AC_BE, MU AC_BK, MU AC_VI, and MU AC_VO Parameters fields are identical and are illustrated in Figure 9-ax7 (MU AC_BE, MU AC_BK, MU AC_VI, and MU AC_VO Parameter Record field format).

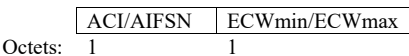


Figure 9-ax7 – MU AC_BE, MU AC_BK, MU AC_VI, and MU AC_VO Parameter Record field format

The format of the ACI/AIFSN field is illustrated in Figure 9-262 (~~Error! Reference source not found.~~~~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 AIFS is equal to the value of the MU EDCA Timer.

The format of the ECWmin/ECWmax field is illustrated in ~~Error! Reference source not found.~~~~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).

10.2.4.2 HCF contention based channel access (EDCA)

TGax editor: Change the paragraph below 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 dot11ECDATable. If no such element is received, a STA(#1289) shall use the default values for the parameters. The fields following the QoS Info field in the EDCA Parameter Set element shall be included in all Beacon frames occurring within two (optionally more) delivery traffic indication map (DTIM) periods following a change in AC parameters, which provides all STAs an opportunity to receive the updated EDCA parameters. If any associated STAs are in WNM sleep(#5381) mode(#3369) or using FMS, these fields should be included by the AP for as many DTIM periods as needed to exceed the longest interval any STA is expected to not receive Beacon frames.(#2461) A QoS STA shall update its MIB attributes that correspond to fields in an EDCA Parameter Set element(#5411) within an

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interval of time equal to one beacon interval after receiving an updated EDCA parameter set. QoS STAs update the MIB attributes and store the EDCA Parameter Set update count value in the QoS Info field.

An AP may change the EDCA access parameters by changing the EDCA Parameter Set element in the Beacon frame, Probe Response frame, and (Re-)Association Response frame. However, the AP should change them only rarely. A QoS STA shall use the EDCA Parameter Set Update Count Value subfield in the QoS Capability element of all Beacon frames to determine whether the STA is using the current EDCA Parameter Values. If the EDCA Parameter Set update count value in the QoS Capability element is different from the value that has been stored, the QoS STA shall query the updated EDCA parameter values by sending a Probe Request frame to the AP.

In addition, an HE AP may temporarily change the EDCA access parameters for HE non-AP STAs that are UL MU capable, by including an MU EDCA Parameter Set element in the Beacon frame, Probe Response frame, and (Re-) Association Response frame. An HE non-AP STA that receives an MU EDCA Parameter Set element from its associated AP follows the rules defined in 25.5.2.3 (STA behavior).

TGax editor: Add a new section 25.2.2

25.2.2 Obtaining an EDCA TxOP for UL MU capable STAs

An HE non-AP UL MU capable STA that receives a Basic variant 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, shall:

- update its CWmin[AC], CWmax[AC], AIFSN[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 trigger-based PPDU.
- Update its HEMUEDCATimer state variable to the values contained in the most recently received MU EDCA Parameter Set element sent by the AP to which the STA is associated.

The HEMUEDCATimer shall uniformly count down to 0 when its value is nonzero.

NOTE—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.

An HE non-AP UL MU capable STA may update its CWmin[AC], CWmax[AC], and AIFSN[AC] for all ACs to the values contained in the most recently received EDCA Parameter Set element sent by the AP to which the STA is associated or to the default dot11EDCATable when an EDCA Parameter Set element has not been received when the HEMUEDCATimer reaches 0.

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