IEEE P802.11
Wireless LANs

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| EDCA-FTM Negotiations |
| Date: 2019-06-28 |
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Abstract

This document proposes resolutions to comments related to EDCA-FTM.

TGaz LB240 CIDs addressed: 1516.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1516 | 39.01 | 9.4.2.167 | The ACK to a Fine Timing Measurement frame should according to the current standard be sent in a non-HT duplicate PPDU, i.e. with the 20 MHzlegacy part of PPDU duplicated to the bandwidth of the ACK, e.g. 40 or 80 MHz. The phase relations between these 20 MHz segments arespecified in the standard but these specified phase relations may not be adhered to and there appear currently not to be any tests that ensurethat these phase relations are correct in released products. For regular communication these phase relations don't matter much but to for FTMTOA estimation on, say, the L-LTF part of the PPDU they are crucial. By adding a way for an ISTA and an RSTA to negotiate how the TOA should be measured, the problem with TOA measurements on the non-HT duplicate PPDU can be solved. | Make use of one of the reserved bits in the 'Fine Timing Measurement Parameters field' to be used by an FTM initiator to request that the responder computes a TOA estimate for the FTM ACK based on the assumption that the 20 MHz segments in the L-LTF part of the FTM ACK in non-HT PPDU format have standards compliant phase relations between its 20 MHz segments. If the responder can fulfill this requirement it replies with the same bit set in the 'Fine Timing Measurement Parameters field'. | Revised. See changes to amendment text in this submission. |

Proposed Resolution: **Revise**

**Discussion:**

It is already specified in [3]:

“The initiating STA shall indicate, in the Format and Bandwidth field, a format and bandwidth that it

supports(#1015).”

Thus an initiator shall not request FTM ranging with a bandwidth and format that it does not support.

For example, if it does not use the correct phase relations between 20 MHz segments in an ‘FTM ACK’ (an Ack of an FTM frame) sent in a non-HT duplicate PPDU, and is not able to respond with ‘FTM ACKs’ in HT or VHT PPDU’s, then it shall not request FTM ranging with a bandwidth of more than 20 MHz.

 To clarify this the changes to the amendment text below is proposed.

***TGaz Editor: Change the text in Section 11.22.6.3 as follows:***

***Change the text in Section 11.22.6.3 as follows:***

* Fine timing measurement procedure negotiation

In order to initiate an FTM(#1022) procedure, a STA that supports the FTM procedure as an initiator (referred to as an *initiating* *STA*) shall transmit a Fine Timing Measurement Request frame. This frame is called the *initial* Fine Timing Measurement Request frame. After transmission of this frame, the initiating STA shall be ready to receive a Fine Timing Measurement frame.

A STA that supports the FTM procedure as a responder (referred to as a *responding* *STA*) shall not transmit Fine Timing Measurement frames addressed to a peer STA unless the responding STA has received an initial Fine Timing Measurement Request frame from the peer STA.

The initial Fine Timing Measurement Request frame shall have:

* the Trigger field set to 1,
* a set of scheduling parameters in a Fine Timing Measurement Parameters element that describe the initiating STA’s availability for measurement exchange.

The first Fine Timing Measurement frame in the FTM session is called the *initial* Fine Timing Measurement frame. The responding STA should transmit an initial Fine Timing Measurement frame within 10 ms in response to the initial Fine Timing Measurement Request frame. This initial Fine Timing Measurement frame shall include the Fine Timing Measurement Parameters element. The Status Indication field indicates the outcome of the request.(MDR2)

NOTE—In an initial Fine Timing Measurement frame, the responding STA might indicate that the request for an FTM session is successful, even if the initial Fine Timing Measurement frame includes at least one of

* A Measurement Report element that indicates an unknown LCI or
* A Measurement Report element that indicates an unknown civic location.

In the case of requests for 160 MHz bandwidth, the initiating STA shall indicate in the Format And Bandwidth field whether it uses a single or two separate RF LOs. In the cases when the responding STA indicates use of 160 MHz bandwidth, the responding STA shall indicate in the Format And Bandwidth field whether it uses a single or two separate RF LOs.

The initiating STA shall indicate, in the Format and Bandwidth field, a format and bandwidth that it supports(#1015).

The initiating STA shall not indicate ‘No preference’ in the Format And Bandwidth field, unless it supports FTM for all Formats and Bandwidths that the Responder may select for the FTM session.

Note: -- The use of transmitted phase relations between the 20 MHz segments in non-HT duplicate PPDUs according to sections 19.3.11.11.4 Transmission of 40 MHz HT format; and 21.3.7.5 Definition of tone rotation, are required to enable peer TOA estimations on FTM exchanges (and thus support it) using non-HT duplicate PPDUs.

If the request was successful

* (#1015)The responding STA shall indicate, in the Format and Bandwidth field, a format and bandwidth that it supports. The responding STA should indicate the same format and bandwidth in the Format and Bandwidth field as that requested by the initiating STA, if the responding STA supports this. The responding STA shall not indicate a bandwidth wider than requested. The responding STA shall not indicate a VHT format if DMG, HT-mixed or non-HT format was requested. (#1015)The responding STA shall not indicate an HT format if DMG or non-HT format was requested. The responding STA shall not indicate a DMG format if VHT, HT-mixed or non-HT format was requested.
* An initiating STA performing an FTM(#1022) procedure with a responding STA that is an AP shall support non-ASAP operation.
* A responding STA that is an AP shall support and select non-ASAP operation when so requested by an initiating STA.
* An initiating STA performing an FTM(#1022) procedure with a responding STA that is not an AP shall support ASAP operation.
* A responding STA that is not an AP shall support and select ASAP operation when so requested by an initiating STA.
* If the responding STA is ASAP capable, the responding STA’s selection of ASAP should be the same as that requested by the initiating STA.
* The responding STA’s selection of the Min Delta FTM field value shall be greater than or equal to the value requested by the initiating STA.
* The responding STA’s selection of the Number of Bursts Exponent field value shall be 0 if the initiating STA requested it to be 0.
* The responding STA’s selection of the Burst Duration field value should be less than or equal to the one requested by the initiating STA if the requested (#1426)FTMs Per Burst field value is set to a value indicating no preference, (#2344)subject to the recommendations below and the responding STA’s policy on the maximum and minimum Burst Duration field values.
* If the Number of Bursts Exponent field is set to 0 and the ASAP field is set to 1, the Burst Duration field value should be set to indicate the value *BD*1, defined as follows:

where

*NFTMPB* is the value of the (#1426)FTMs Per Burst field

*K* is the maximum number of Fine Timing Measurement frame retransmissions the responding STA might attempt

*TMDFTM* is the duration indicated by the Min Delta FTM field of the Fine Timing Measurement Parameters field of the initial Fine Timing Measurement frame (FTM\_1)

*TFTM* is the duration of the initial Fine Timing Measurement frame if the (#1426)FTMs Per Burst field of the Fine Timing Measurement Parameters field of FTM\_1 is set to 1, and the duration of the non initial Fine Timing Measurement frame otherwise

*TAck* is the duration of the Ack frame expected as a response

* Otherwise, the Burst Duration field value should be set to indicate a value greater than or equal to the following value:



where

*TFTMR* is the duration of a Fine Timing Measurement Request frame without a Measurement Request element and without a Fine Timing Measurement Parameters element

*TACCESS\_FTM* is the estimated medium access time for the first Fine Timing Measurement frame(#1353) in a burst

* The responding STA’s selection of the (#1426)FTMs Per Burst field should be the same as the one requested by the initiating STA if the requested the Burst Duration field indicates no preference (see Table 9-280 (Burst Duration field encoding)), subject to the responding STA’s policy on the maximum value of the (#1426)FTMs Per Burst field.(MDR2)
* The responding STA’s selection of Burst Period shall be greater than or equal the responding STA’s selection of Burst Duration.

NOTE—Apart from the Status Indication, Value, ASAP, Number of Bursts Exponent, Min Delta FTM, and Burst Period fields, the other fields in the Fine Timing Measurement Parameters element in the initial Fine Timing Measurement frame have no constraints.

When the responding STA cannot support the initiator’s Min Delta FTM or Number of Bursts Exponent constraints, the responding STA shall set the Status Indication field to Request incapable and the FTM session ends. When the responding STA is unable to fulfill the request by the initiating STA, the responding STA shall set the Status Indication field to Request failed and the FTM session ends.

***TGaz Editor: Change the text in P38L32 as follows:***

**References:**

**[1] Draft P802.11az\_D1.0**

**[2] Draft P802.11ay\_D3.0**

**[3] Draft P802.11REVmd\_D2.2**