IEEE P802.11
Wireless LANs

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| Some 11mc comment resolutions related to Locationing – Part 2 |
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Abstract

This document contains the proposed resolutions to CIDs 5049, 5179, 5185, 6244, 6283, 6316, 6354, 6356, 5182, 5339, 6243, and 6417.

It uses REVmcDraft 4.0 as baseline.

**CIDs 5179, 5185, and 6283**

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
| 5179 | 1741.41 | 10.24.6.4 | There is no shall statement regarding the Dialog Token of the last FTM frame in an FTM session. Please add " The Dialog Token of the last FTM frame and its retransmissions in a session shall be set to 0." | As in comment |
| 5185 |  |  | Dialog Token of 0 frames should be allowed to be retried (in the 802.11 sense, not FTM retransmission) when the Ack is not received. | As in comment |
| 6283 | 1741.00 | 10.24.6.4 | The setting of the Dialog Token in the last FTM frame is not clear | Add "or in the last Fine Timing Measurement frame in an FTM session" after "Dialog Tokens field values of consecutive Fine Timing Measurement frames shall be consecutive, except when the value wraps around to 1" at 1740.62 and add "The Dialog Token in the final Fine Timing measurement frame shall be set to 0." after "The Follow Up Dialog Token in the initial Fine Timing Measurement frame shall be set to 0." at 1741.14 |

**Discussion:**

In 8.6.8.33, we have:

The Dialog Token field is a nonzero value chosen by the responding STA to identify the Fine Timing

Measurement frame as the first of a pair, with the second or follow-up Fine Timing Measurement frame to

be sent later. The Dialog Token field is set to 0 to indicate that the Fine Timing Measurement frame will not

be followed by a subsequent follow-up Fine Timing Measurement frame.

In 10.24.6.6 we have :

There are four ways an FTM session is terminated:

— The responding STA sends a Fine Timing Measurement frame with the Dialog Token field set to 0.

— The initiating STA sends a Fine Timing Measurement Request frame with the Trigger field set to 0.

— The initiating STA terminates the current session and requests a new session with modified Fine

Timing Measurement parameters (see 10.24.6.5 (Fine timing measurement parameter

modification)).

— After the number of burst instances indicated in the Number of Bursts Exponent field in the initial

Fine Timing Measurement frame has been reached.

**Proposed Resolution: Revised.**

***EDITOR :***

**Please make the following change to Section 8.6.8.33:**

The Dialog Token field is set to 0 to indicate the end of the FTM session (see **10.24.6.6 Fine timing measurement termination and 10.24.6.4 Measurement exchange)**. ~~that the Fine Timing Measurement frame will not~~

~~be followed by a subsequent follow-up Fine Timing Measurement frame.~~

**Section 10.24.6.4**

A responding STA transmits Fine Timing Measurement frames in overlapping pairs of consecutive frames. For example, in Figure 10-35 (Example negotiation and measurement exchange sequence, ASAP=1), FTM\_1 and FTM\_2, FTM\_2 and FTM\_3, and FTM\_3 and FTM\_4 are overlapping pairs of consecutive frames. The first Fine Timing Measurement frame of a pair of consecutive Fine Timing Measurement frames contains a nonzero value in the Dialog Token field. The follow up Fine Timing Measurement frame contains a Follow Up Dialog Token field set to the value of the Dialog Token field in the first frame of the consecutive pair. Dialog Tokens field values of consecutive Fine Timing Measurement frames shall be consecutive, except when the value wraps around to 1 or in the last Fine Timing Measurement frame in an FTM session.

~~The Follow Up Dialog Token in the initial Fine Timing Measurement frame shall be set to 0~~

When the ASAP field is set to 0 by a responding STA, the Follow Up Dialog Token, TOD, TOA, TOD Error, and TOA Error fields in the Fine Timing Measurement frame following the initial Fine Timing Measurement frame shall be reserved.

***EDITOR : Please add the following text to the end of Section 10.24.6.4:***

The initial Fine Timing Measurement frame in an FTM session shall have the Follow Up Dialog Token field set to 0, including retransmissions of the initial Fine Timing Measurement frame in the FTM session.

The last Fine Timing Measurement frame in an FTM session shall have the Dialog Token field set to 0, including retransmissions of the last Fine Timing Measurement frame in the FTM session.

**CID 6244**

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| 6244 | 1740.33 | 10.24.6.4 | Should MCS 32 be allowed for FTM | Add "MCS 32 format," before "or HT-greenfield format" at 1740.35 |
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**Discussion:**

MCS 32 has tones populated from -58 to +58. The HT-LTF portion uses 114 tones whereas the data portion uses 104 tones. Non-HT duplicate formats also have 104 data tones populated from -58 to +58, so there is really not much more bandwidth information in MCS 32. Thus, we should disallow Fine Timing Measurement frames from using it.

**Proposed Resolution : Accepted.**

***EDITOR : Please make the following change in Section 10.24.6.4:***

The responding STA shall not transmit Fine Timing Measurement frames using Clause 16 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications) or Clause 17 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification) formats, MCS 32 format, or HT-greenfield format.

**CID 6316**

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| 6316 | 1741.08 | 10.24.6.4 | What does "(i.e., without correcting the clock offset)" mean? | Delete the cited text |

**Discussion**

The relevant text from Section 10.24.6.4 is shown below:



**Proposed Resolution: Revised**

***EDITOR : Please make the following change in Section 10.24.6.4:***

Change "without correcting the clock offset" to “without applying any frequency offset correction to the time bases”.

**CID 5049**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5049 | 1740.31 | 10.24.5 | "initiating STA shall transmit using a single RF chain." -- there is no definition of what comprises an RF chain. Likewise at 1733.45. | Add a definition of an RF chain. |

**Discussion:** CID 6330 was already accepted. Here is the text associated with it:

**CID 6330**

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| 6330 | 1740.31 | 10.24.6.4 | "both the responding STA and initiating STA shall transmit using a single RF chain." seems rather restrictive | Add "Fine Timing Measurement frames and the corresponding Ack frames" after "transmit" in the cited text |

We have the following text in 10.24.5 (**Timing measurement procedure)**

*For non-DMG STAs, both the Timing Measurement frame and the corresponding Ack frame shall be transmitted using a single RF chain.*

Here is the definition of receive chain in the spec



Note that Clause 21 (DMG) does not make any reference to “chain”. The concept of “antenna” is used instead. So the changes proposed here have no effect on DMG.

**Proposed Resolution : Revised**

***EDITOR : Please add the following definitions to Section 3.1 (Definitions):***

RF chain: A receive chain or a transmit chain.

transmit chain: The physical entity that implements any necessary signal processing to generate the transmit signal from the digital baseband. Such signal processing includes digital to analog conversion, filtering, amplification and up-conversion.

In Section 10.24.6, change the following sentence:

For non-DMG STAs, both the responding STA and initiating STA shall transmit using a single RF chain.

to the following

For non-DMG STAs, both the Fine Timing Measurement frame and the corresponding Ack frame shall be transmitted using a single transmit chain.

In Section 9.32.2.4.1, please make the following change

NOTE—STAs with two or more transmit ~~RF~~ chains should be calibrated in order to engage in implicit transmit

beamforming. STAs with any number of RF chains, including those with a single RF chain, can participate in a

calibration exchange as a calibration responder.

Similarly, in Section 10.24.5, change the following text:

For non-DMG STAs, both the Timing Measurement frame and the corresponding Ack frame shall be

transmitted using a single transmit ~~RF~~ chain.

**CID 6354**

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| --- | --- | --- | --- | --- |
| 6354 | 1740.38 | 10.24.6.4 | "The initiating STA may request the Fine Timing Measurement to have a certain format and bandwidth using the FTM Format And Bandwidth field of the Fine Timing Measurement Parameters element in the initial Fine Timing Measurement Request frame. The responding STA should transmit Fine Timing Measurement frames with the requested format and bandwidth. In the case of contiguous 160 MHz requests, the initiating STA can indicate whether it uses a single or two separate RF LOs. In the cases when the responding STA advertises transmission of Fine Timing Measurement frames with contiguous 160 MHz transmissions, the responding STA chooses the appropriate entry in the FTM Format and Bandwidth field depending on the number of RF LOs used by the responding STA. The responding STA shall not use a bandwidth wider than requested. The responding STA shall not use a VHT format if HT-mixed or non-HT format was requested. The responding STA shall not use an HT format if non-HT format was requested." is not clear. Is it referring to the "negotiation" phase or the actual FTM frame transmission | Make it clear that (1) the rSTA can choose what it wants in the iFTM as long as both STAs are capable of it and (2) the rSTA shall not transmit wider or more complicated than what it indicated in the iFTM |

**Proposed Resolution: Revised.**

***NOTE TO EDITOR: Please add the following paragraph to Section 10.24.6.3:***

The responding STA's selection of the format and bandwidth in the FTM Format and Bandwidth field should be the same as that requested by the initiating STA. The responding STA shall not choose a bandwidth wider than requested. The responding STA shall not choose a VHT format if HT-mixed or non-HT format was requested. The responding STA shall not choose an HT format if non-HT format was requested.

In the case of requests for contiguous 160 MHz bandwidth, the initiating STA can indicate whether it uses a single or two separate RF LOs. In the cases when the responding STA advertises transmission of Fine Timing Measurement frames with contiguous 160 MHz transmissions, the responding STA chooses the appropriate entry in the FTM Format and Bandwidth field depending on the number of RF LOs used by the responding STA.

If the request was successful

— 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 value shall be greater than or equal to the corresponding value requested by the initiating STA.

— The responding STA's selection of the Number of Bursts Exponent value shall be 0 when the

initiating STA requests it to be 0.

***EDITOR : Please make the following change in Section 10.24.6.4:***

~~If the initiating STA requested The initiating STA may request the Fine Timing Measurement to have a certain format and bandwidth using the FTM Format And Bandwidth field of the Fine Timing Measurement Parameters element in the initial Fine Timing Measurement Request frame, then .~~ The responding STA should transmit Fine Timing Measurement frames with the format and bandwidth it indicated. ~~transmit Fine Timing Measurement frames with the requested format and bandwidth.~~ ~~In the case of contiguous 160 MHz requests, the initiating STA can indicate whether it uses a single or two separate RF LOs. In the cases when the responding STA advertises transmission of Fine Timing Measurement frames with contiguous 160 MHz transmissions, the responding STA chooses the appropriate entry in the FTM Format and Bandwidth field depending on the number of RF LOs used by the responding STA.~~

For the Fine Timing Measurement frames transmitted during the FTM session,

* + The responding STA shall not use a bandwidth wider than it indicated.
	+ The responding STA shall not use a VHT format if HT-mixed or non-HT format was indicated.
	+ The responding STA shall not use an HT format if non-HT format was indicated.

~~The responding STA shall not use a bandwidth wider than requested. The responding STA shall not use a VHT format if HT-mixed or non-HT format was requested. The responding STA shall not use an HT format if non-HT format was requested.~~

**CID 6356**

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| 6356 | 1736.49 | 10.24.6.3 | If an iSTA does not request ASAP it should not be forced to do it | Add "The responding STA's selection of the ASAP value shall be 0 when the initiating STA requests it to be 0." to the list of rules |

**Discussion:** The relevant text is below:



**Proposed Resolution: Rejected.**

Resolution: While some responding STAs might not be able to do ASAP=1, some responding STAs might not be able to do ASAP=0 either. The present language in the spec of “should” is sufficient to account for both ASAP=0 and ASAP=1 cases. If the initiating STA does not like the choice made by the responding STA, the initiating STA can send an FTM Request frame with the value of the Trigger field set to 0 to end the FTM session. In addition, if the responding STA accepts the ASAP=0 request, the responding STA can choose any PTSF value that is allowed by its current resource scheduling. The responding STA may not be able to accommodate the ASAP=0 request at the requested PTSF value. If the initating STA’s PTSF value is not met when ASAP=0, the initiating STA might likely end the FTM session anyways.

**CID 5182**

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| 5182 | 10.24.6.3 | 1737 | If the Ack to FTM\_1 is lost and the responding STA does an FTM retransmission of FTM\_1, the initiating STA might not be there. | Please clarify what the behavior should be in this case. |

**Discussion:**

Fo ASAP=0, we have this text in the 171 submission :

 *If the time indicated by the Partial TSF Timer field is reached and neither an Ack frame to FTM\_1 nor an FTM trigger frame has been received by the responding STA, it shall send a Fine Timing Measurement frame with Dialog Token field set to 0. This terminates the FTM session with the initiating STA.*

**Proposed Resolution : Revised**

***EDITOR : Please replace the paragraph in the 171 submission above with the following text:***

When neither an Ack to the initial Fine Timing Measurement frame nor an FTM trigger frame has been received by the responding STA, the responding STA shall not terminate the FTM session before the time indicated by the Partial TSF timer plus the Burst Duration.

**CID 5339**

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| 5339 | 8.4.2.20.14 | 759 | The reference given in Clause 2 is "IETF RFC 4776", not "-2006" (which is redundant anyway, as that is the ony version of RFC 4776 listed in Clause 2). | Replace "RFC 4776-2006" with "RFC 4776" throughout the draft. |

**Discussion :**

RFCs do not have year numbers in them.

**Proposed Resolution : Accept**

**CID 6243**

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| 6243 |  |  | We don't normally adorn field names with the technology they pertain to | Delete the "FTM" in "FTM Format and Bandwidth" throughout |

**Proposed Resolution : Rejected.**

Resolution : Format and Bandwidth is too genertic. In addition, theVHT Operation element has “VHT Operation Information” field. Similarly, the HT Operation element has “HT Operation Information” field.

**CID 6417**

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| 6417 | 10.24.6.4 | 1737 | "Fine Timing Measurements frames are sent during time windows called burst instances" is too vague. May FTM frames be sent outside burst instances? | Clarify that any frames sent outside burst instances might not be acknowledged |

**Discussion:**

In 171-04 (which has already been approved by IEEE), we have the following text which may need further clarification.

*NOTE- If the initiating STA successfully transmits a non-initial Fine Timing Measurement Request frame (i.e. FTM trigger frame) late in a burst instance, fewer than FTMs Per Burst might be successfully transmitted by the responding STA in the burst instance.*

**Proposed Resolution: Revised.**

***EDITOR :*** *Please change as follows*

NOTE- If the initiating STA successfully transmits a non-initial Fine Timing Measurement Request frame (i.e. FTM trigger frame) late in a burst instance, fewer than FTMs ~~P~~per Burst might be successfully transmitted by the responding STA in the burst instance. If a Fine Timing Measurement frame, except for the initial Fine Timing Measurement frame in the ASAP=0 case, is sent outside a burst instance, it might not be acknowledged.

**References:**

[**https://mentor.ieee.org/802.11/dcn/15/11-15-0532-06-000m-revmc-sponsor-ballot-comments.xls**](https://mentor.ieee.org/802.11/dcn/15/11-15-0532-06-000m-revmc-sponsor-ballot-comments.xls)

[**https://mentor.ieee.org/802.11/dcn/15/11-15-0565-05-000m-revmc-sb-mac-comments.xls**](https://mentor.ieee.org/802.11/dcn/15/11-15-0565-05-000m-revmc-sb-mac-comments.xls)