IEEE P802.11
Wireless LANs

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| CR for Location |
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**Abstract**

This submission proposes resolutions of comments received from LB240.

* CIDs: 1559, 1892, 2148, 2289

The comments are based on TGaz Draft 1.0 and the proposed changes are relative to TGaz Draft 1.2

Revision 0: initial draft

Revision 1: included resolution for CID 2289

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| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 1559 | 11.22.6.4.1 | 93 | There is also a Passive Location Ranging FTM measurement scheduling mechanism. The description of this is missing. | Change to 'five basic scheduling mechanisms' and add a bullet for the 'Passive Location Ranging scheuling mode' with the relavent section reference. | **Rejected**: Draft 1.2 mentions four scheduling sheme including ‘Passive Location Ranging’. |

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| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 1892 | 11.22.6.3 | 83 | Make it clear that the negotiated BW of the associated STA and AP can be wider than the BSS operation BW. |  | **Accepted:**Following text is adopted in submission 11-19/1062r6The initiating STA shall indicate, in the Format and Bandwidth field, a format and bandwidth that it supports, and this may be different from the BSS operation BW |

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| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 2148 | 11.22.6.4.1 | 53 | [Re-raising this comment from the comment collection, as it is not possible to determine from 18/1544r8 whether/how it was addressed. References are to the CC draft and hence may be wrong against D1.0.]"RSTA centric EDCA based" is confusing -- is there any EDCA-based mode that is not RSTA-centric? |  |  |

**Comments from 11-19/1277r3**

Also, there is some confusion/inconsistency on how best to interpret RSTA Centric versus ISTA Centric. The value of qualifying the protocol as ISTA Centric and RSTA Centric is not clear (and seems irrelevant to the protocol). Hence the proposal is to name the three variants as follows:

1. EDCA based FTM Session Negotiation and EDCA based FTM Measurement Exchange: applies to ‘legacy’ FTM, PDMG and PEDMG.
2. Trigger based FTM Session Negotiation and Trigger based Measurement Exchange: applies to the Cl. 11.22.6.3.3 and 11.22.6.4.3
3. Non-Trigger based FTM Session Negotiation and non-Trigger based Measurement Exchange: applies to Cl. 11.22.6.3.3 and 11.22.6.4.4.

Proposal: Rename the baseline Fine Timing Measurement protocol as EDCA based FTM Session. The corresponding negotiation is EDCA based FTM Session Negotiation. The corresponding Measurement Exchange is EDCA based FTM Measurement Exchange.

*Modify the following paragraphs of Clause 11.22 as shown below:*

11.22 Wireless network management procedures

11.22.6 Fine timing measurement (FTM) procedure

11.22.6.1 Overview

The FTM procedure allows a STA to determine its range, relative range and its direction to or from another STA. In order for a STA to obtain its location, the STA may perform this procedure with multiple STAs whose locations are known.

An FTM session is an instance of an FTM procedure between an initiating STA and a responding STA along with the associated scheduling and operational parameters (see 9.4.2.167 (Fine Timing Measurement Parameters element)) and 9.4.2.279 (Ranging Parameters element)). An FTM session is composed of a negotiation, measurement exchange and termination.

A responding STA (RSTA) might be required to establish overlapping FTM sessions with a large number of initiating STAs (e.g., an AP providing measurements to STAs at a mall or a store). On the other hand, an initiating STA (ISTA) might have multiple ongoing FTM sessions on the same or different channels with different responding STAs, while being associated with an AP for the exchange of data or signaling.

Since some of the initiating STA’s activities may be nondeterministic and might have higher precedence than the FTM session (e.g., data transfer interaction with an associated AP), the FTM procedure provide scheduling mechanisms to avoid and handle such conflicts. Based on schedulding scheme the mechanisms are

* RSTA centrics cheduling and
* ISTA centric scheduling

In RSTA centric scheduling the RSTA assigns the ISTA a set of known availability time windows during which measurements occur, and the RSTA has full control of the measurement timing.

RSTA centric scheduling is supported by EDCA FTM (including PDMG and PEDMG), TB and TB passive ranging.

In ISTA centric scheduling the ISTA chooses the start of measurement phase. ISTA centric scheduling is less controlled from the prespective of RSTA as ISTA can come to channel at any time and use contention based access to start measurement phase.

ISTA centric scheduling is supported by non-TB ranging.

For EDMG STAs that have set to one the First Path Beamforming Training Supported field in the Beamforming Capability subelement, an FTM session shall be preceded by a first path beamforming training as described in 10.43.10.6 First Path Beamforming Training.

For DMG and EDMG, an FTM session shall be preceded by a first path beamforming training as described in 10.43.10.6 First Path Beamforming Training.

11.22.6.1.1 RSTA scheduled operation overview

To support the constraints of both the initiating and responding STAs, during the negotiation phase the initiating STA initially requests a preferred periodic time window allocation. The responding STA subsequently responds by accepting or overriding the allocation request based on its resource availability and capability.

The initiating STA in Figure 11-33 (Concurrent FTM sessions) establishes sessions with responding STA 1 and responding STA 2 on different channels. The sessions’ availability window instance periodicity might be different as well as the RSTAs’ clock offsets and thus, over time, some temporal conflicts may occur. To overcome this, during each availability window the initiating STA indicates its availability.

The method to indicate availability depends on the channel access method. u In EDCA FTM based channel access the availability indication is performed by sending of an FTM Request frame, in TB (TB) Ranging Measurement Exchange the RSTA poll the ISTA to indicate their need for measurement resources and allocated medium for Range measurement based on the ISTAs’ responses.

EDCA based channel access is used by EDCA FTM inlcuding DMGz and EDMGz STAs. TB Ranging Measurement Exchange is used by HE STAs capable of TB Ranging Measurement Exchange.

11.22.6.1.2 ISTA centric operation overview

ISTA centric scheduling FTM operation is referred to as Non-TB Range Measurement operation. In Non-TB operation the ISTA determines the measurement timing, based on its scheduling conflicts with other activities and the parameters of the availability window which is a time window referenced to the previous measurement instance. During this measurement time window the ISTA may come to the channel at any time and use contention based access to initiate a new measurement round. Because of conflict arising due to other activities, measurement phase may not start at the periodicity indicated during negotiation phase and RSTA needs to wait for the start of measurement phase. Dotted region in Figure 11-35a indicates that RSTA may not see start of measurement phase as ISTA is occupied with activities.

*Modify the figure Figure 11-35a ISTA Scheduled Concurrent FTM Sessions as follows:*



The initiating STA in Figure 11-35a (ISTA Scheduled Concurrent FTM Sessions), establishes sessions with responding STA 1 and responding STA 2. Scheduling of new measurement instance is determined by the timing of the previous measurement instance with that RSTA. The timing constraint may be different among RSTAs. ISTA initiate a measurement instance subjected to availability of RSTA.

11.22.6.1.3 RSTA centric for passive ranging operation overview

Passive Ranging allows a locating STA to measure a differential range by receiving the ranging exchanges of a pair/set of STAs engaged in Passive Ranging. In order for such a STA to obtain its location, the STA may listen in to Passive Location Exchanges between multiple STAs whose locations are known.

The RSTA centric Scheduling for Passive Location Ranging operation operates as the RSTA centric Scheduling for TB Ranging operation described in subclause 11.22.6.1.1. The availability window is here referred to as a Passive Location Ranging Availability window. The RSTA announces the schedule for the Passive Location Ranging Availability window, if present, in every beacon frame using Passive Location Ranging Availability Window element. Arbitary STA performing ranging using passive location ranging listen to ranging exchange and associated measurement reporting to estimate differential distance to pairs or sets consisting of the RSTA and one or more ISTAs. Arbitrary STA doesn’t participate in ranging frame exchange.

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| **CID** | **Clause Number** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 2289 | 9.4.2.280 | 54 | "LTF Sequence Generation Information" seems to be synonymous with "secure LTF counter" in the spec. "Secure LTF counter" is a more descriptive name to use than the field name of "LTF sequence generation information". | Replace "LTF sequence generation information" with "secure LTF counter" throughout the spec. |  **Accepted.**TGaz Editor: Please replace “LTF sequence generation information” with “Secure LTF Counter” in the amendment text. Note in many cases LTF is followed by two spaces. |

*Update below figure in section 9.4.2.280 Secure LTF Parameters element*

*Note: this change is missed in Draft 1.2*

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|  | Element ID  | Length | Element ID Extension | Secure LTF Counter | LTF Generation SAC  | Measurement result SAC | Measurement Result LTF Offset |
| Octets |  1 |  1 |  1 |  6 |  2  |  2  |  1 |

Figure 9-1012 Secure LTF Parameters element format (#1580, #2283, #1163)