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: 2148

The comments are based on TGaz Draft 1.0 and the proposed changes are relative to TGaz Draft 1.4

This submission includes the resolutions accepted in following submissions

 1483r2: Changes to D1.2 for consistent use of terminology

1559r1: Resolutions to a few LB240 Comments (Part-5)

1659r2: Resolutions to a few LB240 Comments (Part-6)

Revision 0: initial draft

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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? |  | Revised:RSTA centric and ISTA centric term is omitted from draft 1.5 onwards. Section updated based on newly adopted terms. |

*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 (#1699), 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 provides scheduling mechanisms to avoid and handle such conflicts. Based on the scheduling mechanism used to avoid conflict the Ranging measurement exchange is classified as:

* EDCA based ranging
* Trigger Based ranging
* Non-Trigger Based ranging

For EDMG STAs that have set to 1 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.

11.22.6.1.1EDCA based ranging and Trigger Based ranging overview

In EDCA Based Ranging and TB Ranging the RSTA assigns the ISTA a set of known periodic time windows during which measurements occur, and the RSTA has full control of the measurement timing. For EDCA Based Ranging, ISTA performs EDCA based medium access to initiate ranging frame exchange in allocated periodic time window. For TB Ranging, RSTA polls ISTA using trigger frame to initiate ranging frame exchange in availability window.

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’ burst 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 used by FTM; EDCA and TB channel access. In FTM using EDCA 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.

11.22.6.1.2 Non-TB Ranging overview

In non-TB ranging the ISTA chooses the start of measurement phase. Non-TB ranging 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. In non-TB ranging the ISTA initiates a measurement based on loose scheduling limitations provided by the RSTA.

Non-TB ranging is supported by exchanging Ranging NDPA and Ranging NDP frames using EDCA based medium access.

. In Non-TB Ranging Measurement Exchange the ISTA determines the measurement timing, based on its scheduling conflicts with other activities and the parameters agreed during negotiation phase . During this measurement time window the ISTA may come to the channel at any time and use contention based access to initiate a new measurementexchange. Because of conflict arising due to other activities, ISTA may not start measurement exchange at the periodicity indicated during negotiation phase while RSTA waits for the start of measurement phase. Dotted region in Figure 11-35a indicates that of non-TB measurement exchange phase may not start at the beginning of the time window since the ISTA is occupied with activities.

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



Figure 11-35a— non-TB ranging concurrent FTM Sessions

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. The RSTAs remain ready within the complete availability window instance for the ISTA to initiate a measurement instance.