IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CR for Location | | | | |
| Date: 2019-09-15 | | | | |
| Author(s): | | | | |
| Name | Company | Address | Phone | Email |
| Girish Madpuwar | Broadcom | Electronic City, Bangalore India |  | [Girish.madpuwar@broadcom.com](mailto:Girish.madpuwar@broadcom.com) |
| Nehru Bhandaru | Broadcom | San Jose  CA, USA |  | [Nehru.bhandaru@broadcom.com](mailto:Nehru.bhandaru@broadcom.com) |

**Abstract**

This submission proposes resolutions of comments received from LB240.

* CIDs: 1559, 1892, 2148

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

Revision 0: initial draft

Revision 1: included resolution for CID 2289

Revision 2: updates based on 1062/r5 for CID 1892

: updates based on 1483/r2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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**:  Refer comment below |

Three types of ranging mechanism supported

1. EDCA based ranging
2. TB ranging
3. Non-TB ranging

Rejecting this comment based on categorization of scheduling mechanism on 1483/r2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 11-19/1062r5  The 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 |

*Following text is adopted as part of 1062/r5 resolution. No further change is suggested in this resolution.*

**11.22.6.3.2 EDCA-based ranging session negotiation**

**…**

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, and this may be different from the BSS operation BW. **(#1015)** **(#1516).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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:  TB ranging in RSTA centric realy on trigger to start measurement phase.  But RSTA centric term is used to indicate that Range measurement is fully controlled RSTA. |

*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 schedulding scheme the Ranging mechanisms are classified as:

* EDCA based ranging
* TB ranging
* Non-TB 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 availability 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 availability window. For TB Ranging, RSTA polls ISTA using trigger frame to initiate ranging frame exchange in availability window.

EDCA Based Ranging is supported by exchanging Fine Timing Meaurement frame using EDCA based medium access mechanism. TB Ranging is supported by exchanging Ranging Trigger and response frames using trigger based medium access.

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 session’s 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. In EDCA based Ranging Measurement Exchange 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 Min time Between Measurement and Max Time Between Measurement 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 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 windos winc 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.