IEEE P802.11
Wireless LANs

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| LMR timestamp clock and reporting |
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Abstract

This document proposes resolutions to TGaz LB249 comments related to the definition of the clock from which the FTM timestamps are reported.

The TGaz LB249 CIDs addressed in this document are CIDs:

3279 and 3280.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 3279 | 108.17 | 11.22.6 | It may not be entirely clear in the current standards and draft standard what the requirements are on the clock that the FTM time stamps are derived from. We should review this and if missing add specifications for how the clock that the FTM time stamps are derived from is related to the Tx carrier frequency and over what time intervals the clock is required to be continuous. | Review as per the comment and if missing, add specifications for how the clock that the FTM time stamps are derived from is related to the Tx carrier frequency and over what time intervals the clock is required to be continuous. Add this text in a new section where it is easy to find. In this section also refer to all other rules that relates to this and affects the FTM time stamps. | Revised. TGaz editor, make the changes as shown in document https://mentor.ieee.org/802.11/dcn/20/11-20-1556-04-00az-lmr-timestamp-clock-and-reporting.docx. |
| 3280 | 111.06 | 11.22.6.1.3 | For TB ranging, and especially for Passive TB Ranging, to work well, it is desirable that the FTM clocks are continuous during each availability window used for FTM ranging. | Add requirement that the FTM clocks always need to be continuous during each availability window used for FTM ranging. | Revised. TGaz editor, make the changes as shown in document https://mentor.ieee.org/802.11/dcn/20/11-20-1556-04-00az-lmr-timestamp-clock-and-reporting.docx. |

**Discussion for CIDs 3279 and 3280:** For ranging we always need the clock to run continuously between the TOD time and the TOA time. For Passive TB Ranging, as an ISTA can receive and measure the TOA of an NDP both before and after it transmits its own NDP, we need to expand on the requirement what is needed for TB Ranging. Either way we don’t have this specified also for TB Ranging. We here propose to solve this problem for both TB Ranging and Passive TB Ranging by specifying that the time stamps reported within each availability window shall be derived from a clock that runs continuously during the availability window and runs at a rate that is locked relative to the clock generating the carrier frequency. This also solves the problem that we need the FTM time-stamping clock to run at the rate as the clock that generates the carrier.

**Resolution**

***TGaz Editor: Change the text in Subclause 11.21.6.1 (Overview – In 11.21.6 Fine timing measurement (FTM) procedure) as follows):***

**11.21.6.1 General**

… <Scroll to P113L21>

Since some of the ISTA’s activities may be nondeterministic and might have higher precedence than the FTM session (e.g., data transfer interaction with an associated AP), a conflict might prevent the ISTA from being available at the scheduled time window(s) for executing the ranging measurement exchange(s). The FTM procedure provides mechanisms as described in 11.21.6.1.1 (EDCA based ranging and TB Ranging overview) and 11.21.6.1.2 (Non-TB Ranging overview) to ensure that the ISTA is available to execute the ranging measurement exchange as scheduled.

The frequency of the clock for the FTM timestamps shall be derived from the same reference oscillator as the transmit center frequency and the symbol clock frequency. **(#3279)**

NOTE – The transmit center frequency and symbol clock frequency are in derived from the same reference oscillator, as per the specifications for the different PHYs. **(#3279)**

***TGaz Editor: Change the text in Subclause 11.21.6.4.3.1 (General – In 11.21.6.4.3 TB Ranging measurement exchange) as follows):***

**11.21.6.4.3.1 General**

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During the availability window, measurement resources and results are made available to each ISTA whose poll response was received at the RSTA; see 11.22.6.4.3.3 (Measurement Sounding Phase of TB Ranging) and 11.22.6.4.3.4 (Reporting Phase of TB Ranging Measurement) (#**2156**). This may also lead to extra instances of polling/sounding/reporting triplets, even if all ISTAs assigned to this availability window were polled in the first polling phase instance (e.g., if the RSTA is not able to accommodate all ISTAs that responded in a single measurement sounding phase instance; see 11.22.6.4.3.3 (Measurement sounding phase of TB Ranging).

The timestamps reported within each availability window shall be derived from a clock that runs continuously during the availability window. **(#3279, #3280)**

If there is a discontinuity in the clock for the FTM timestamping between two reported TOD timestamps, then the subfield ‘TOD Not Continuous’ in the TOD Error field of Location Measurement Report frame shall be set to one. Otherwise it shall be set to 0. **(#3279, #3280)**

NOTE - In some use cases it is of interest to have a clock that runs continuously across subsequent ranging availability windows. For this reason it is desirable for the clock for the FTM timestamping to run continuously. **(#3279, #3280)**

Within each availability window, an RSTA shall use an AID or Ranging Session ID (RSID) to identify an associated or unassociated ISTA respectively. The AID and RSID assignment shall be non-conflicting and shall have the same size and valid address space (as defined in 9.4.1.8 and 26.17.4). The RSID usage shall follow the same rules as that of AIDs for HE operations. The RSIDs are assigned to unassociated ISTAs during the FTM negotiation; see 11.22.6.3 (Fine timing measurement procedure negotiation).

***TGaz Editor: Change the text in Subclause 11.21.6.4.8.1 (General – In 11.21.6.4.8 Measurement exchange in Passive TB Ranging mode) as follows):***

**11.21.6.4.8.1 General**

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The Passive TB Ranging exchanges occur in an availability window used for passive location.

If there is a discontinuity in the clock for the FTM timestamping between two reported TOD timestamps, then the subfield ‘TOD Not Continuous’ in the Timestamp Error subfield of the Time Stamp Measurement Report subfield in the ISTA Passive TB Ranging Measurement Report element shall be set to 1. Otherwise it shall be set to 0. **(#3279, #3280)**

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**References:**

**[1] Draft P802.11az\_D2.5**