IEEE P802.11
Wireless LANs

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| 802.11[Resolutions to a few LB240 comments(relative to IEEE 802.11 REVmd D2.0 and P802.11az D1.2) |
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**Abstract**

This submission proposes resolutions to the following LB240 CIDs 2227, 2322, 1761, 1902 and 2448.

History:

R0: Initial Version

R1: Incorporated some early feedback – typos, remove details (Clause 4, is a high level overview)

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| 2227 | Minyoung Park | 4.3.19.19 | 6.23 | Probably a short paragraph is needed to describe how the positioning is enhanced by this amendment. | As shown in the comment. | REVISE. Incorporate the editor instructions in submission 11-19-1277. |
| 2322 | Song-Haur An | 4.3.19.19 | 6.20 | What is the technical enabler for the "enhancements" being amended in this version? It's not clear that the added paragraph illustrates any "new" idea for amendment since the fine timing measurement is not a new feature. | Please provide a summary of new (FTM) features in this amendment project. | REVISE. . Incorporate the editor instructions in submission 11-19-1277. |
| 1761 | Jarkko Kneckt | 4.3.19.19 | 6.21 | Unclear text:"An HE STA may poll other HE STAs using the TB ranging sequence, whether they request range measurement and then schedule times for concurrent range measurements to several HE STAs" | Please change to: "An HE STA may range other HE STAs using the TB ranging sequence and schedule times for concurrent range measurements to several HE STAs." | REVISE.The corresponding statement has been deleted. |
| 1902 | Mark Hamilton | 4.3.19.19 | 6.21 | The second sentence of 4.3.19.19 seems to be completely separate concept from the first sentence. This second sentence seems to be discussing how to get a scheduled window in which FTM can be done, right? If that's correct, then this seems like a detail of how to do FTM when combined with HE scheduling, not a new high level concept of what FTM does (which is what clause 4 is intended for). | Delete the second sentence of the paragraph | ACCEPT |
| 2488 | Xiaofei Wang | 4.3.19.19 | 14.22 | Not sure what it is means "whether they request range", is that word supposed to be "in which"? Also "they" is a grammer mistake. | change "whether they request range measurement and then schedule times for concurrent range measurements to several HE STAs." into "in which it requests range measurement and then schedules times for concurrent range measurements to several HE STAs." | REVISE. Incorporate the editor instructions in submission 11-19-1277. |

Discussion: Clause 4 needs to be updated highlighting the enhancements that TGaz brings to 802.11. Enabling Management Frame protection using PASN, PHY layer security with LTF repetitions, optimized measurement exchange(s) based on (i) the .11ax Sounding Protocol, (ii) completing measurement exchanges within a TXOP, (iii) allowing for the use of multiple Tx/Rx chains for better LoS estimation and (iv) Passive Ranging.

Resolution: REVISE

**4.3.19.19 Fine timing measurement**

***TGaz Editor: 11-19-704r5 modifies the new paragraph added to Cl. 4.3.19.19. The text shown below is part of the new paragraph. Delete the text (in D1.0) and add the new paragraphs as shown below:***

The Pre-association Security Negotiation protocol enables setting up the required security context to protect the frames exchanged in order to establish a FTM session between two peers and on successful establishmnent of a FTM session to perform the measurement exchanges.

A FTM session is negotiated to determine range estimates by executing one of the measurement exchanges listed below:

* EDCA based exchange of Fine Timing Measurement frames where location estimates are based on Time of Departure and Time of Arrival of the exchanged FTM frames and their corresponding acknowledgements. When the negotiated FTM session is over DMG/EDMG, security parameters can be negotiated to ensure that the measurement exchange is exectuted with the intended peer.
* Trigger based measurement where location estimates are based on the execution of the the trigger based measurement exchange, This mode of operation allows for the execution of the measurement exchange between a RSTA and multiple ISTAs at the same time. Optionally, the FTM session can be negotiated to enable security parameters enabling mechanisms to ensure that the measurement exchange is executed with the intended peer.
* Non-Trigger based measurement where location estimates are based on the execution of the non-trigger based measurement exchange. Optionally, the FTM session can be negotiated to enable security parameters enabling mechanisms to ensure that the measurement exchange is executed with the intended peer.

A Passive Ranging mesurement exchange is defined where a STA can determine its location based on periodic measurement reports from other STAs that execute the Passive Ranging measurement exchange amongst themselves.