IEEE P802.11  
Wireless LANs

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| LB249-Clause-9-4-CIDs | | | | |
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|  |  |  |  |  |

Abstract

This document proposes resolutions to LB249 comments on subclause 9.4. The base is TGaz D2.0. The CIDs are 3648, 3026, 3027, 3262, 3573, 3574, 3575, 3028, 3029, 3638, 3916, 3918, 4002, 3042, 4003.

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| --- | --- | --- | --- | --- | --- | --- |
| 3648 | 61.00 | 8 | 9.4.2.127.9 | "The LOS Assessment TX subfield is set to 1 to indicate that the STA can participate in a LOS 8 Assessment exchange by transmitting a LOS Assessment FTM PPDU (see 11.22.6.4.7.3 LOS 9 assessment FTM exchange). 10  11 The LOS Assessment RX subfield is set to 1 to indicate that the STA can participate in a LOS 12 Assessment exchange as an RSTA by switching polarization at receiving an Ack with TRN field 13 and responding with channel measurement feedback by transmitting a LOS Assessment FTM 14 PPDU. " -- first para should be about ISTA, and second para should be about Ack PPDU, presumably (see 132.1) | Change to "The LOS Assessment TX subfield is set to 1 to indicate that the STA can participate in a LOS Assessment exchange as an ISTA by transmitting a LOS Assessment FTM PPDU (see 11.22.6.4.7.3 LOS assessment FTM exchange).  The LOS Assessment RX subfield is set to 1 to indicate that the STA can participate in a LOS Assessment exchange as an RSTA by switching polarization at receiving an Ack with TRN field and responding with channel measurement feedback by transmitting a LOS Assessment Ack PPDU. " | Revise |

Discussion: There are two capabilities: LOS Assessment TX, and LOS Assessment RX. This first one is an RSTA capability to send an FTM frame as part of an FTM burst with TRN fields in which it is switching polarization. The second capability is an RSTA capability to measure the TRN field of an ACK frame in which the initiator is switching polarizations. Both the capabilities are RSTA capabilities. The ISTA capability is not necessary as the ISTA is the one requesting this exchange. The text should be clarified to say that. The text in 11.22.6.4.7.2.1.4 can be improved to mention the first capability as it is not referenced.

***TGaz Editor: Modify the text in P61L8-10 (9.4.2.127.9) as follows:***

The LOS Assessment TX subfield is set to 1 to indicate that the STA can participate as an RSTA in a LOS Assessment exchange by transmitting a LOS Assessment FTM PPDU (see 11.22.6.4.2.1.4 LOS assessment FTM exchange).

***TGaz Editor: Modify the text in P131L29-31 (11.22.6.4.2.1.4) as follows:***

PPDU. A LOS assessment FTM burst over the regular AWV is identified by the ISTA setting the FTM trigger to 3 at the FTM request. A LOS assessment FTM burst over the first path AWV is identified by setting the FTM trigger to 4. An ISTA shall not initiate an FTM burst by an FTM request with the trigger set to 3 or 4 unless the RSTA has indicated it can participate in such exchange by setting to 1 the LOS Assessment TX subfield in the DMG Direction Measurement Capabilities field of the DMG Capabilities element.

***TGaz Editor: Modify the text in P131L33-35 (11.22.6.4.2.1.4) as follows:***

A LOS assessment FTM PPDU is defined as a PPDU that contains an FTM frame has the DUAL\_POLARIZATION\_TRNS TXVECTOR parameter set to 1, the EDMG\_TRN\_LEN set to a value greater than 0 and the EDMG\_PACKET\_TYPE set to EDMG-TRN-R-PACKET.

***TGaz Editor: Modify the text in P132L6 (11.22.6.4.2.1.4) as follows:***

and the EDMG\_PACKET\_TYPE set to EDMG-TRN-R-PACKET. The ISTA and the RSTA shall switch

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| 3026 | 63.00 | 3 | 9.4.2.167 | Reorder EDMG cases. The SC CB3 (BW of 6480 MHz) should be between 4320 and 8640. | Reorder as described. | Accept |
| 3027 | 63.00 | 3 | 9.4.2.167 | Case of OFDM CB3 (BW of 6480 MHz) should be between 4320 and 8640. and have a unique Field value. | Reorder and fix as described. | Accept |
| 3262 | 63.00 | 2 | 9.4.2.167 | There is an addition of HE formats to transmit FTM frames (in 6 GHz), but it fails to mention which exact HE format (SU/MU/TB?) and what LTFs (1x/2x/4x), please specify. | As per comment, a possible solution would be to use SU with 2x LTFs. | Accept |
| 3573 | 63.00 | 3 | 9.4.2.167 | Table 9-281--Format And Bandwidth field has two 42s and has broken change tracking | As it says in the comment | Revise as in 11-20-0388 |
| 3574 | 63.00 | 3 | 9.4.2.167 | There is no such thing as "EDCA-based HE" format | Delete "EDCA-based " throughout the table | Revise as in 11-20-0388 |
| 3575 | 63.00 | 3 | 9.4.2.167 | So what is used for "TB-based HE" format (sic)? | Change "EDCA-based HE" throughout the table to "HE SU" and then add rows for the same bandwidths for "HE TB", and add a table "NOTE---The bandwidth for HE TB format refers to the smallest bandwidth that covers the RU size." |  |

***TGaz Editor: Modify Table 9-281 (Format And Bandwidth field) and its editing instructions as follows:***

***Modify lines 17-63 of table 9-280 (Format and Bandwidth subfield) as follows: (#3575)***

|  |  |  |
| --- | --- | --- |
| **Field value** | **Format** | **Bandwidth (MHz)** |
| 17~~-30~~ | EDCA Based HE ~~Reserved~~ | 20~~Reserved~~ |
| 18 | EDCA-Based HE | 40 |
| 19 | EDCA-Based HE | 80 |
| 20 | EDCA-Based HE | 80+80 |
| 21 | EDCA-Based HE (two separate RF LOs) | 160 |
| 22 | EDCA-Based HE (single RF LO) | 160 |
| 23-30 | Reserved | Reserved |
| 31 | DMG | 2160 |
| 32 | EDMG (Single Carrier Mode) | 2160 |
| 33 | EDMG (Single Carrier Mode) | 4320 |
| 34 | EDMG (Single Carrier Mode) | 6480 |
| 35 | EDMG (Single Carrier Mode) | 8640 |
| 36 | EDMG (Single Carrier Mode) | 2160+2160 |
| 37 | EDMG (Single Carrier Mode) | 4320+4320 |
| 38 | EDMG (OFDM) | 2160 |
| 39 | EDMG (OFDM) | 4320 |
| 40 | EDMG (OFDM) | 6480 |
| 41 | EDMG (OFDM) | 8640 |
| 42 | EDMG (OFDM) | 2160+2160 |
| 43 | EDMG (OFDM) | 4320+4320 |
| ~~32~~44-63 | Reserved | Reserved |
|  | | |

***TGaz Editor: Add the following text at the end of clause 26.17.2.1 (P197L16)***

HE SU PPDU format shall use 2x HE-LTF and 1.6 usec GI for both the Fine Timing Measurement frame and the corresponding acknowledgement frame.

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| 3028 | 65.00 | 23 | 9.4.2.167 | The Secure fields are optional in EDMG mode and therefor the text should state that the fields are reserved when in non Secure mode. Figure 9-619d and related text. | Fix as described | Revise as in 11-20-0388 |
| 3029 | 66.00 | 4 | 9.4.2.167 | The Secure fields are optional in EDMG mode and therefor the text should state that the fields are reserved when in non Secure mode. Figure 9-619e and related text. | Fix as described | Revise as in 11-20-0388 |

Discussion: The whole EDMG specific element should not be included if the Secure ToF field is not set to 1.

***TGaz Editor: Modify the text in P64L7-10 (9.4.2.167) as follows***:

the requested or allocated operation configurations from one EDMG STA to another. The EDMG Specific Parameters subelement is included in the initial Fine Timing Measurement Request frame, as described in 9.6.7.32 (Fine Timing Measurement frame format), and the initial Fine Timing Measurement frame, as described in 9.6.7.33 (Fine Timing Measurement frame format) if the Secure ToF Measurement subfield of the Fine Timing Measurement Parameters field of these frames is set to 1. (#3028)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3638 | 68.00 | 8 | 9.4.2.250.2 | "A STA sets the Secure ToF Supported field to 1 if it supports Secure Time of Flight (ToF) 8 Measurement exchange as defined in 11.22.6.4.8 (Secure EDMG Measurement Exchange 9 Protocol). " -- this is behaviour not format | Change to "The Secure ToF Supported field is set to 1 to indicate that the EDMG STA supports Secure Time of Flight (ToF) Measurement exchange (see 11.22.6.4.8 (Secure EDMG Measurement Exchange Protocol)). " | Accept |

***TGay Editor: Modify the text in P68L8-10 (9.4.2.250.2) as follows:***

The Secure ToF Supported field is set to 1 to indicate that the EDMG STA (#3638) supports Secure Time of Flight (ToF) Measurement exchange as defined in 11.22.6.4.8 (Secure EDMG Measurement Exchange Protocol).

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| --- | --- | --- | --- | --- | --- |
| 3870 | 66.00 | 9.4.2.167 | Figure 9-169e Secure Ranging Operation Parameters field format includes salt which is not used in the construction of TRN sequences. It should be removed | Remove it from the field and adjust the description accordingly | Revise (Accept in principle) |

***TGaz Editor: Modify the text in P66L4-9 as follows:***

|  |  |  |
| --- | --- | --- |
|  | Secret Key |  |
| Octets | 32 |  |

Figure 9-619e - Secure Ranging Operation Parameters field format

(#**1454**, #**1455**, #**1456**, #**1450**, #**1089**)

The Secret Key subfield is used to carry the secret key which is used to generate the random sequence(s) as described in subclause 12.2.11 (PEDMG Secure Ranging Sequences).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3916 | 68.00 | 9.4.2.250.2 | "The EDMG OFDM Ranging Supported subfield is set to 1 to indicate that the EDMG STA is capable of performing range measurement based on FTM using EDMG OFDM PPDUs. This subfield is set to 0 otherwise." The EDMG OFDM is optional and, when OFDM is supported then the EDMG OFDM Ranging subfield can be set to 1 | Add the condition that the subfield can only be set when EDMG OFDM is supported. | Revise as in 11-20-0388 |

***TGaz Editor: Modify the text in P68L15-17***

The EDMG OFDM Ranging Supported subfield is set to 1 to indicate that the EDMG STA is capable of performing range measurement based on FTM using EDMG OFDM PPDUs. This subfield is set to 0 otherwise. This field is reserved if the Maximum OFDM MCS subfield of the Supported MCS field is set to 0. (#3916)

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| --- | --- | --- | --- | --- | --- |
| 3918 | 68.00 | 9.4.2.250.2 | No description of First Path Beamforming Training Supported field.  The description is somehow defined in 11ay Section 9.4.2.263.2 Beamforming Capability subelement (see same Figure 9.787ap in 11az D2.0 and 11ay D5.0).  "The First Path Training Supported subfield indicates if the STA supports the first path beamforming training procedure defined in 10.42.10.6. This subfield is set to 1 if dot11FirstPathTrainingImplemented is true, and is set to 0 otherwise." | change the text  "The First Path Training Supported subfield indicates if the STA supports the first path beamforming training procedure defined in 10.42.10.6. This subfield is set to 1 if dot11FirstPathTrainingImplemented is true, and is set to 0 otherwise." to  "The First Path Beamforming Training Supported subfield indicates if the STA supports the First Path Beamforming Training procedure defined in 10.42.10.6. This subfield is set to 1 if dot11FirstPathTrainingImplemented is true, and is set to 0 otherwise." | Revise as in 11-20-0388 |

Discussion:

The field name was changed in 11az, while not actually marking it as a change. It is possible to change the text in 11ay, as long as it is marked correctly.

***TGaz Editor: Modify Figure 9-*** ***787ap (Data field of the Beamforming Capability subelement format) as follows (add underline under beamforming)***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B10 | B11 B14 | | B15 | | B16 | | B17 B18 | B19 | B20 |
|  | First Path Beamforming  Training Supported | Dual Polarization TRN Capability | | Hybrid Beamforming and MU-MIMO Supported | | Hybrid Beamforming and MU-MIMO Supported | | Largest Ng Supported | Dynamic Grouping Supported | Secure ToF Supported |
| bits: | 1 | 4 | | 1 | | 1 | | 2 | 1 | 1 |
| B21 | | | 22 | | B23 B31 | |
| EDMG SC Ranging Supported | | | EDMG OFDM Ranging Supported | | Reserved | |
| 1 | | | 1 | | 9 | |

***TGaz Editor: Move the Editor instruction (Insert the following at the end of 9.4.2.250.2 (Beamforming Capability subelement) (#1215): ) from line 18 to line 7 (before the inserted text).***

***TGaz Editor: Add the following text immediately following the caption of figure 9-787ap***

*Modify the text in the 7th paragraph of 9.4.2.263.2 as follows*

The First Path Beamforming (#3918) Training Supported subfield indicates if the STA supports the first path beamforming training procedure defined in 10.42.10.6. This subfield is set to 1 if dot11FirstPathTrainingImplemented is true, and is set to 0 otherwise.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3940 | 68.00 | 9.4.2.250.2 | The Secure Time of Flight is part of the management frame protection that any part of the related frame exchanges shall be protected. However, the capability "Secure ToF Supported" is defined as part of the EDMG Capabilities element that can be delivered in unprotected frame exchanges exposed to the "man in the middle" attack. The capability shall be moved to the RSN extension element to be protected. | Move the Secure ToF capability to the RSN extension - 9.4.2.241 RSN Extension element (RSNXE) | OPEN |

Discussion: The issue is that the capability field is transmitted before a secure connection is established. The bit can be modified by a “man in the middle” thus preventing the secure process from being use.

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| --- | --- | --- | --- | --- | --- |
| 4000 | 81.00 | 9.4.2.299 | Figure 9-1015 has a blank field. What is it? Assume there are multiple Best AWV ID fields. Then, add "..." as in Figure 9-1003. Set the length under "Best AWV ID 1" and "Best AWV ID N", delete "variable", and set "..." therebetween. | As in comment. | Revise (accepted but another change is also performed). |
| 4001 | 81.00 | 9.4.2.299 | "Each Best AWV ID field is 11bits long." What happens if the total length of the Best AWV ID fields won't be octet length? Add padding? It is better to have each length 2-octet length. | Change the field to 2-octet length. Add a rule how to set the 11-bit ID into the field, for instance B0-4 can be reserved. | Revise (near Accept) |

***TGaz Editor: Modify figure 9-1015 (Multiple Best AWV ID element) as follows:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element Id | Element Length | Element ID Extension | Number of Best AWV ID | Best AWV ID1 | … | Best AWV IDN |
| Octets: | 1 | 1 | 1 | 1 | 2 | … | 2 (#4000) |

***TGaz Editor Modify the Text in P81L20-21 as follows:***

The number of Best AWV ID field indicates the number of attached Best AWV ID fields. Each Best AWV ID field is 16bits long, taking values between 1 and 2047. (#4001) It indicates the index of either the TRN subfield index or the

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| --- | --- | --- | --- | --- | --- |
| 4002 | 81.00 | 9.4.2.300 | Figure 9-1016 has a blank field. What is it? Assume there are multiple AOD Feedback fields. Then, add "..." as in Figure 9-1003. Set the length under "AOD Feedback 1" and "AOD Feedback N", delete "variable", and set "..." therebetween. | As in comment. | Accept |
| 3042 | 82.00 | 9.4.2.299 | The value -5120 should be -512. | Fix as described | Accept |
| 4003 | 82.00 | 9.4.2.300 | The length of the AID field is 35 bits and it isn't in octet length. The Length field of an element is in octet length. Add a reserved field with 5 bits somewhere (at the end?) and make it 4-octet length. | As in comment. | Accept |

***TGaz Editor: Modify figure 9-1016 (Multiple AOD feedback element) as follows (note that the last column (Reserved) is deleted:***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Element Length | Element ID Extension | Number of AOD Feedbacks | AOD Reference | AOD Feedback 1 | … | AOD Feedback N |
| Octets: | 1 | 1 | 1 | 1 | 1 | 5 | … | 5 (#4002) |

***TGaz Editor: Modify figure 1017 (AOD field structure) as follows:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B10 | B11 B17 | B18 B27 | B28 B34 | B35 B39 |
|  | AOD Azimuth | AOD Azimuth Accuracy | AOD Elevation | AOD Elevation Accuracy | Reserved (#4003) |
| Bits: | 11 | 7 | 10 | 7 | 6 |

***TGaz Editor: Modify the text in P82L17 as follows:***

subfield is a signed two’s complement number taking values between -512 (#3042) and 511.

**References:**

**P802.11az D2.0**