IEEE P802.11  
Wireless LANs

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| LB240 CID Resolutions – Fine timing measurement parameters element - Amendment text | | | | |
| Date: 2019-06-28 | | | | |
| Author(s): | | | | |
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|  |  |  |  |  |

Abstract

This document proposes resolutions to comments related to the Fine timing measurement parameters element.

TGaz LB240 CIDs addressed: 1121, 1629, 1630, 1066, 1508, 1509, 1516, 2246, 1208, 2265, 1062, 2247, 1210, 1064, 1211, 1065, 1635, 1791, 1383, 1708, 1096, and 1089.

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** | **X** |
| 1121 | 38.32 | 9.4.2.167 | Figure 9-618 includes a new field "Secure ToF Measurement" which should only be used for DMG/eDMG and NOT for the existing FTM sequence for <7GHz. | Add a text describing this field is only used for DMG/eDMG and perhaps a note that the field is not applicable to the existing EDCA FTM ranging (page 39, lines 8-13). |  | Y |
| 1629 | 39.00 | 9.4.2.167 | Fields are contained within an element. Fields contain subfields. The Fine Timing Measurement Parameters field cannot contain Secure ToF Measurement field but can contain a Secure ToF Measurement subfield. | Refer to the attributes of the FTM Parameters field as subfield(s) instead of field(s). This may be a REVmd issue as well (Status Indication subfield, Value subfield, etc., are referred as Status Indication field and Value field in the baseline). |  | Y |
| 1630 | 39.00 | 9.4.2.167 | Secure ToF Supported [sub?]field is not depicted in Figure 9-618 but is described in P40L10-13. | Delete lines 10-13 in page 39. If Secure ToF Measurement subfield is set to 1, it implies that the ISTA supports Secure ToF. |  | Y |
| 1508 | 39.01 | 9.4.2.167 | The 802.11az draft is using reserved bit 7 in the Fine Timing Measurement Parameters Field for 'Secure ToF Measurement' negotiation'. It seems to me we should be able to move this bit to one of the new elements as only with 802.11az can we do secure ranging. That way we are keeping this bit free for other purposes for which we may not be able to add new elements so easily. | Free up the reserved bit 7 in the Fine Timing Measurement Parameters here used for 'Secure ToF Measurement' negotiation'. Move this bit to one of the new elements that deals with secure ranging. |  | Y |
| 1509 | 39.01 | 9.4.2.167 | The 802.11az draft is using reserved bits 48 and 49 in the Fine Timing Measurement Parameters Field for 'EDMG Ranging Priority'. It seems to me that we should be able to move these bits to one of the new elements as EDMG Rangiung Priority is an 802.11az feature. That way we are keeping these bit free for other purposes for which we may not be able to add new elements for so easily. | Free up the reserved bit 48 and 49 in the Fine Timing Measurement Parameters here used for 'EDMG Ranging Priority'. Move these bits to one of the new elements. |  | Y |
| 1516 | 39.01 | 9.4.2.167 | The ACK to a Fine Timing Measurement frame should according to the current standard be sent in a non-HT duplicate PPDU, i.e. with the 20 MHz  legacy part of PPDU duplicated to the bandwidth of the ACK, e.g. 40 or 80 MHz. The phase relations between these 20 MHz segments are  specified in the standard but these specified phase relations may not be adhered to and there appear currently not to be any tests that ensure  that these phase relations are correct in released products. For regular communication these phase relations don't matter much but to for FTM  TOA estimation on, say, the L-LTF part of the PPDU they are crucial. By adding a way for an ISTA and an RSTA to negotiate how the TOA should be measured, the problem with TOA measurements on the non-HT duplicate PPDU can be solved. | Make use of one of the reserved bits in the 'Fine Timing Measurement Parameters field' to be used by an FTM initiator to request that the responder computes a TOA estimate for the FTM ACK based on the assumption that the 20 MHz segments in the L-LTF part of the FTM ACK in non-HT PPDU format have standards compliant phase relations between its 20 MHz segments. If the responder can fulfill this requirement it replies with the same bit set in the 'Fine Timing Measurement Parameters field'. |  | Y |
| 2246 | 39.08 | 9.4.2.167 | Are there one or two bits in FTM parameters field format. Line 8 talks about Secure ToF Measurement field and line 10 talks about Secure ToF Supported. There seems to be only a single bit in the figure | Clarify if it is the same bit |  | Y |
| 1208 | 39.10 | 9.4.2.167 | The text about the secure ToF supported is out of place because the field was moved to the EMDG Capabilities element | remove lines 10-13 |  | Y |
| 2265 | 39.10 | 9.4.2.167 | Secure ToF Supported field is not present in FTM parameters field format |  |  | Y |
| 1062 | 40.01 | 9.4.2.167 | "Table 9-281 doesn't include CB3 (6480MHz) for SC and OFDM. | 1062 |  |  |
| 2247 | 40.01 | 9.4.2.167 | Table 9-281 includes HE format w/ 20, 40, 80, and 160 MHz bandwidth. Does this mean legacy FTM that does not use TB/non-TB exchanges can be used with HE? Ideally it would be good to have just one way to measure with HE | Clarify - perhaps some of the BW/Format values are applicable to HE ranging only, as these values are referenced also by ranging parameters element | Revised. Specify that legacy FTM cannot use HE PPDUs. | Y |
| 1210 | 40.10 | 9.4.2.167 | PDMG specifc parameters - this subelement does not exist - the line should be removed from the table | Remove line from table |  | Y |
| 1064 | 42.05 | 9.4.2.167 | Inconsistent naming regarding PDMG.  - Table 9-281a uses PDMG.  - Text description on page 42 line 5 uses PDMGz  - Text references it to 9.6.7.32 where there are some definitions which look different.  Text should be much more coherent | Make the text and names coherent |  | Y |
| 1211 | 42.05 | 9.4.2.167 | "PDMGz" should be PEMDG | replace PDMGZ with PEDMG |  | Y |
| 1065 | 42.11 | 9.4.2.167 | Inconsistent naming: "The format of the PEDMG Specific Parameters subelement is shown in 9-619c (PDMGz Specific 11 Parameters subelement format)." ?!?! | Make the text and names coherent |  | Y |
| 1635 | 43.00 | 9.4.2.167 | Does the Ranging Priority subfield in Fine Timing Parameters field apply only to DMG/EDMG ranging (and not for RSTA Centric EDCA based FTM ranging over 2.4/5 GHz)? Lines 15-16 seem to imply so. Note that Ranging over DMG/EDMG without the use of Direction Measurement capabilities is also RSTA Centric EDCA based FTM Ranging. So Lines 15-16 seem contradictory. | "it would be better (less confusing) to move these bits to a new optional subelement or to the DMG Direction Measurement Parameters (possibly rename this subelement to DMG Ranging and Direction Measurement Parameters subelement); or replace |  | Y |
| 1791 | 43.15 | 9.4.2.167 | The concept of urgency makes perfect sense. However, it is unlikely that STAs would only need emergency ranging when supporting DMG, and never with other methods. Emergency should eb a feature of FTM, not band-dependent. | Allow Ranging Priority value for EDCA-based FTM ranging, except in old-FTM compatibility mode. | Reject. For non-TB and TB ranging the Ranging Priority is signalled in the Ranging Parameters field in the Ranging Parameters element. | Y |
| 1383 | 43.16 | 9.4.2.167 | We should leave at least 1 Reserved bit in the FTM Parameters field. A good example is L-SIG (17.3.4.1 in 802.11-2016). Can we simplify Ranging Priority to have 1 bit: urgent or not urgent? | Change Table 9-281c to have 2 values : No priority, High |  | Y |
| 1708 | 47.00 | 9.4.2.167 | "Clarify ""The Secure ToF Supported field is set to 1 in the initial Fine Timing Measurement Request frame to indicate that an ISTA supports a secure ToF measurement exchange."". | 1708 |  | Y |
| 1096 | 50.15 | 9.4.2.167 | "The use of PEDMG in section 9.4.2.167 is a mixup. PEDMG is EDMG and not ONLY secured. It should be named Secured EDMG or SEDMG. | 1096 |  | Y |
| 1089 | 51.01 | 9.4.2.167 | It is not clear how the Secret Key is derivated on both sides of the link | Add text to explain |  |  |

**Acronyms**

EDMG - Enhanced directional multi-gigabit (802.11ay)

DMG - Enhanced directional multi-gigabit (802.11ad)

**Secure ToF Measurement field**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1121 | 38.32 | 9.4.2.167 | Figure 9-618 includes a new field "Secure ToF Measurement" which should only be used for DMG/eDMG and NOT for the existing FTM sequence for <7GHz. | Add a text describing this field is only used for DMG/eDMG and perhaps a note that the field is not applicable to the existing EDCA FTM ranging (page 39, lines 8-13). | Rejected.  Move the 'Secure ToF Measurement' subfield to relevant ‘elements’ for below and above 6 GHz. |
| 1508 | 39.01 | 9.4.2.167 | The 802.11az draft is using reserved bit 7 in the Fine Timing Measurement Parameters Field for 'Secure ToF Measurement' negotiation'. It seems to me we should be able to move this bit to one of the new elements as only with 802.11az can we do secure ranging. That way we are keeping this bit free for other purposes for which we may not be able to add new elements so easily. | Free up the reserved bit 7 in the Fine Timing Measurement Parameters here used for 'Secure ToF Measurement' negotiation'. Move this bit to one of the new elements that deals with secure ranging. | Revised.  Move the 'Secure ToF Measurement' subfield to relevant ‘elements’ for below and above 6 GHz. |
| 1383 | 43.16 | 9.4.2.167 | We should leave at least 1 Reserved bit in the FTM Parameters field. A good example is L-SIG (17.3.4.1 in 802.11-2016). Can we simplify Ranging Priority to have 1 bit: urgent or not urgent? | Change Table 9-281c to have 2 values : No priority, High | Revised. Move the 'Secure ToF Measurement' subfield to relevant ‘elements’ for below and above 6 GHz. The ‘EDMG Ranging Priority’ subfield is already reserved for the |
| 1383 | 43.16 | 9.4.2.167 | We should leave at least 1 Reserved bit in the FTM Parameters field. A good example is L-SIG (17.3.4.1 in 802.11-2016). Can we simplify Ranging Priority to have 1 bit: urgent or not urgent? | Change Table 9-281c to have 2 values : No priority, High | Revised. Move the ‘Secure ToF Measurement’ field to respective subelelements for the EMDG, TB and non-TB ranging cases. |

**Discussion**

Discussion:

**Moving the Secure ToF Measurement bit:**

* **For the EDMG case:**
  + Move bit to the ‘Secure Ranging Parameters field’ in the ‘PEDMG Specific Parameters subelement’
    - Add a subfield containing the ‘Secure ToF Measurement’ bit
* **For the TB Ranging case:** 
  + Move bit to the TB-specific Ranging Parameters subelement of the Ranging Parameters Element
    - Add field containing the ‘Secure ToF Measurement’ bit
* **For the non-TB Ranging case:** 
  + Move bit to the non-TB-specific Ranging Parameters subelement of the Ranging Parameters Element
    - Add field containing the ‘Secure ToF Measurement’ bit

***TGaz Editor: Change the text in (@11/714r0 P39L15) (@D1.0 P38L32) as follows:***

***Change figure 9-618 as shown below***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 B6 | B7 | B8 B11 | B12 B15 | B16 B23 | B24 B39 | B40 |
|  | Status  Indication | Value | Reserved | Number of Bursts Exponent | Burst Duration | Min Delta FTM | Partial TSF Timer | Partial TSF Timer No Preference |
| Bits: | 2 | 5 | 1 | 4 | 4 | 8 | 16 | 1 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B41 | B42 | B43 B47 | B48 B49 | B50 B55 | B56 B71 |
|  | ASAP Capable | ASAP | FTMs per Burst | EMDG Ranging Priority | Format and Bandwidth | Burst Period |
| Bits: | 1 | 1 | 5 | 2 | 7 | 16 |

**Figure 9-618 - Fine Timing Measurement Parameters field format**

***TGaz Editor: Change the text in P39L8 as follows:***

**EDMG Ranging Priority field**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1509 | 39.01 | 9.4.2.167 | The 802.11az draft is using reserved bits 48 and 49 in the Fine Timing Measurement Parameters Field for 'EDMG Ranging Priority'. It seems to me that we should be able to move these bits to one of the new elements as EDMG Rangiung Priority is an 802.11az feature. That way we are keeping these bit free for other purposes for which we may not be able to add new elements for so easily. | Free up the reserved bit 48 and 49 in the Fine Timing Measurement Parameters here used for 'EDMG Ranging Priority'. Move these bits to one of the new elements. | Reject. These bits are still reserved for the RSTA centric EDCA-based FTM ranging. For EDMG Ranging we have new subfields with reserved bits. |
| 1635 | 43.00 | 9.4.2.167 | Does the Ranging Priority subfield in Fine Timing Parameters field apply only to DMG/EDMG ranging (and not for RSTA Centric EDCA based FTM ranging over 2.4/5 GHz)? Lines 15-16 seem to imply so. Note that Ranging over DMG/EDMG without the use of Direction Measurement capabilities is also RSTA Centric EDCA based FTM Ranging. So Lines 15-16 seem contradictory. | "it would be better (less confusing) to move these bits to a new optional subelement or to the DMG Direction Measurement Parameters (possibly rename this subelement to DMG Ranging and Direction Measurement Parameters subelement); or replace | Reject. The ‘EDMG Ranging Priority’ field applies only to DMG/EDMG ranging. Not proposing to move them though. (But maybe we should…) |

**Discussion**

These bits are only used for the EDMG case and not for an RSTA centric EDCA-based FTM ranging session. In this case these bits are still reserved.

**Secure ToF Supported field**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1630 | 39.00 | 9.4.2.167 | Secure ToF Supported [sub?]field is not depicted in Figure 9-618 but is described in P40L10-13. | delete lines 10-13 in page 39. If Secure ToF Measurement subfield is set to 1, it implies that the ISTA supports Secure ToF. |  |
| 2246 | 39.08 | 9.4.2.167 | Are there one or two bits in FTM parameters field format. Line 8 talks about Secure ToF Measurement field and line 10 talks about Secure ToF Supported. There seems to be only a single bit in the figure | Clarify if it is the same bit |  |
| 1208 | 39.10 | 9.4.2.167 | The text about the secure ToF supported is out of place because the field was moved to the EMDG Capabilities element | remove lines 10-13 |  |
| 2265 | 39.10 | 9.4.2.167 | Secure ToF Supported field is not present in FTM parameters field format |  |  |
| 1708 | 47.00 | 9.4.2.167 | "Clarify ""The Secure ToF Supported field is set to 1 in the initial Fine Timing Measurement Request frame to indicate that an ISTA supports a secure ToF measurement exchange."". | 1708 |  |

**Discussion**

These…

**Frames-Elements-Subelement-Fields-Subfields – Editorial changes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1629 | 39.00 | 9.4.2.167 | Fields are contained within an element. Fields contain subfields. The Fine Timing Measurement Parameters field cannot contain Secure ToF Measurement field but can contain a Secure ToF Measurement subfield. | Refer to the attributes of the FTM Parameters field as subfield(s) instead of field(s). This may be a REVmd issue as well (Status Indication subfield, Value subfield, etc., are referred as Status Indication field and Value field in the baseline). | Accept. (Really editorial.) |

**Discussion**

These…

**Non-HT Duplicate ACKs to FTM Frames – Measurement BW negtiation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1516 | 39.01 | 9.4.2.167 | The ACK to a Fine Timing Measurement frame should according to the current standard be sent in a non-HT duplicate PPDU, i.e. with the 20 MHz  legacy part of PPDU duplicated to the bandwidth of the ACK, e.g. 40 or 80 MHz. The phase relations between these 20 MHz segments are  specified in the standard but these specified phase relations may not be adhered to and there appear currently not to be any tests that ensure  that these phase relations are correct in released products. For regular communication these phase relations don't matter much but to for FTM  TOA estimation on, say, the L-LTF part of the PPDU they are crucial. By adding a way for an ISTA and an RSTA to negotiate how the TOA should be measured, the problem with TOA measurements on the non-HT duplicate PPDU can be solved. | Make use of one of the reserved bits in the 'Fine Timing Measurement Parameters field' to be used by an FTM initiator to request that the responder computes a TOA estimate for the FTM ACK based on the assumption that the 20 MHz segments in the L-LTF part of the FTM ACK in non-HT PPDU format have standards compliant phase relations between its 20 MHz segments. If the responder can fulfill this requirement it replies with the same bit set in the 'Fine Timing Measurement Parameters field'. | Rejected. An ISTA shall not request to do ranging with a bandwidth that it does not support. |

**Discussion**

These…

**Ranging Priority for non-TB and TB Ranging**

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| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1791 | 43.15 | 9.4.2.167 | The concept of urgency makes perfect sense. However, it is unlikely that STAs would only need emergency ranging when supporting DMG, and never with other methods. Emergency should eb a feature of FTM, not band-dependent. | Allow Ranging Priority value for EDCA-based FTM ranging, except in old-FTM compatibility mode. | Reject. For non-TB and TB ranging the Ranging Priority is signalled in the Ranging Parameters field in the Ranging Parameters element. |

**Discussion**

These…

**Use of HE PPDU in Legacy FTM Ranging**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 2247 | 40.01 | 9.4.2.167 | Table 9-281 includes HE format w/ 20, 40, 80, and 160 MHz bandwidth. Does this mean legacy FTM that does not use TB/non-TB exchanges can be used with HE? Ideally it would be good to have just one way to measure with HE | Clarify - perhaps some of the BW/Format values are applicable to HE ranging only, as these values are referenced also by ranging parameters element | Revised. Specify that legacy FTM cannot use HE PPDUs. |

**Discussion**

These…

**PDMG/PEDMG naming**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1210 | 40.10 | 9.4.2.167 | PDMG specifc parameters - this subelement does not exist - the line should be removed from the table | Remove line from table |  |
| 1064 | 42.05 | 9.4.2.167 | Inconsistent naming regarding PDMG. | 1064 |  |
| 1211 | 42.05 | 9.4.2.167 | "PDMGz" should be PEMDG | replace PDMGZ with PEDMG |  |
| 1065 | 42.11 | 9.4.2.167 | Inconsistent naming: "The format of the PEDMG Specific Parameters subelement is shown in 9-619c (PDMGz Specific 11 Parameters subelement format)." ?!?! | Make the text and names coherent |  |
| 1096 | 50.15 | 9.4.2.167 | "The use of PEDMG in section 9.4.2.167 is a mixup. PEDMG is EDMG and not ONLY secured. It should be named Secured EDMG or SEDMG. | 1096 |  |

**Discussion**

These…

**Secret Key Derivation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed change** | **Proposed resolution** |
| 1089 | 51.01 | 9.4.2.167 | It is not clear how the is derivated on both sides of the link | Add text to explain | Reject. |

**Discussion**

Reject. Should be explained…

**References:**

**[1] 11/713r0 draft-specification-1-0-with-editorial-changes-r1-clean-version**