IEEE P802.11  
Wireless LANs

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| 802.11  IEEE P802.11az D3.0 Mandatory Draft Review (MDR) Report | | | | |
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**Abstract**

This document contains the report of the TGaz Mandatory Draft Review.

r0: section headings, initial assignements.

r1: includes findings from Jonathan, Edward, Mark and Peter

r2: added Emily’s findings

r3: added ANA findings

r4: edits during the editors meeting review on March 8, 2021. Added Yonho’s MIB findings.

r5: added MEC report

r6: intermediate questions on report to editors committee

r7: updates resulting from discussion during July 12 editors meeting

# Introduction

## Purpose of this document

This document is the report from the group of volunteers that participated in the P802.11az/D3.0 mandatory draft review.

This document contains recommendations for changes to the P802.11az draft to bring it into improved compliance to IEEE-SA and WG11 style.

The recommended changes need to be reviewed by TGaz and approved, or ownership of the issues taken by TGaz.

## Process / references

The MDR process is described in:

* 11-11/615r5 – WG802.11 MEC Process

And references:

* 11-09/1034r17 – 802.11 Editorial Style Guide

A setup meeting was held, and review topics identified and assigned to volunteers. The volunteers provided their review comments, which have been compiled into this document, with some editorial changes.

## Acknowledgements

The 802.11 technical editors (Robert Stacey and Peter Ecclesine) gratefully acknowledge the work and contribution of:

* Roy Want
* ChaoChun Wang
* Yongho Seok
* Mark Hamilton
* Emily Qi
* Edward Au
* Jonathan Segev

# Findings

## Style

### Style Gude 2.1 – Frames

Emily Qi

57.9, use Repeating field format defined in section 2.1.1.2 in 11-09-1034r17 to define the Antenna Placement and Calibration field.

68.12, what is the length of the Wrapped Data field? Why variable is removed?

70.25, “Varaible” should be “variable”.

70.5, use Repeating field format defined in section 2.1.1.2 in 11-09-1034r17 to define the Availability Information field.

77.9, the color for B60 and B61 is not correct.

81.27, remove the underline for B0, B5, B6 and B7.

83.14, use Repeating field format defined in section 2.1.1.2 in 11-09-1034r17 to define the AOD Feedback field.

98.26, The color for the insert fields are incorrect. It should black.

101.14, “Variable” should be low case.

### Style Guide 2.2 – Naming Frames

Emily Qi

47.19 and 47.6, add “format” after “…Common Info subfield”.

47.22, add “subfield” or “field” after “ The value of the Ranging Trigger Subtype”.   
**[11azED: (clarification & note) we’ll use subfield – global check for this everywhere]**

48.24,49.14, add “format” after “field”

56.1, add “format” after “Field” and change “Field” to “field”.

57.9, use Repeating field format defined in section 2.1.1.2 in 11-09-1034r17 to define the Antenna Placement and Calibration field.

61.7, add “format” after “field”.

68.12, what is the length of the Wrapped Data field? Why variable is removed**?   
[11azED: (resolution) we’ll restore variable]**

70.25, “Varaible” should be “variable”.

70.5, use Repeating field format defined in section 2.1.1.2 in 11-09-1034r17 to define the Availability Information field.

72.6, add “format” after “subfield”.

77.9, the color for B60 and B61 is not correct.

81.27, remove the underline for B0, B5, B6 and B7.

82.4, 83.3, 83.15, 84.38, 85.20, 86.10, 86.24, 87.7, 88.1, 89.7, 90.2, 90.21, 91.20, 99.16, 99.20, 102.13, add “format” after “field”, “subfield” or “element”.

83.14, use Repeating field format defined in section 2.1.1.2 in 11-09-1034r17 to define the AOD Feedback field.

83.24, change “field structure” to “field format”.

97.29, add “field” before “format”.

### Style Guide 2.2 – true/false

Emily Qi

None.

### Style Guide 2.3 – “is set to”

Emily Qi

44.17, change “if the AID is set to 2043” to “if the AID is 2043”. **[11azED: (resolution) replace ‘is set’ to ‘is equal’ – move if to the beginning, check other places]**

44.24, delet “set to”.

66.8, change “set” to “equal”. Also, at 66.7, change “. if” to “, if”.

127.12, 127.20, 127.25, 128.15, 128.21, 128.22, 128.29, 130.42, 137.25, 139.7, 154.8, 160.19, 207.35, 209.28, change “set” to “equal”

### Information Elements/Subelements

Jonathan Segev

#### Style Guide 2.4.1 – Information Elements/subelements – Naming

MDR 1 P.54L.3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Passive TB Ranging LCI Table element (see 9.4.2.306)* | *255* | *97* | *Yes* | *No* |

Element is part of the name.

**Suggested remedy**: Remove element from Passive TB Ranging LCI Table.

MDR 2 [JS] P.97L.48 not an 11az per se but heritage from REVmd, FTM Synchronization element single apearence, REVmd has an additional 15 occurances.

**Proposed remedy:** Leave for REVme to fix.

MDR 3 P.56 L.1 The Relative Compact LCI field is missing Subelement ID and Length fields.

**Proposed remedy**: add the missing fields and consider byte alignment over bit alignment.

[Jonathan to look at separate submission for this problem. It would seem that Relative Compact LCI field should be a subelement not a field. Roy is comfortable making the change as editor.]

MDR 4 P.61 L.1 the DMG cap. element format modification is shown as partial part of it; it does specify where the new fields are going.

**Suggested remedy**: include the complete element and show the changes over that.

[Clarify by modifying the editing instruction to “Change…” and quoting the full figure.]

MDR 5 P.62 L.10 use of ‘information’ in field’s name “DMG Fine Timing and Range Measurement Capability Information field”, not an element or subelement name but use of information does not make the name more descriptive.

**Suggested remedy**: remove information from field name.

MDR 7 P.63 L.8 proper use of reserved. The field Secure RTT Measurement is only valid for EDMG and for non EDMG it is reserved, however the text is confusing as when this is reserved: “In cases other than Secure EDMG ranging, the Secure RTT 12 Measurement subfield is reserved.” It actually meant to say in cases other than EDMG ranging, because the only way to tell if this is Secure DMG Ranging yes or no is by evaluating this bit itself so its not Reserved for secure DMG ranging (AKA Secure RTT exchange).

Proposed remedy: identify the field as Secure RTT/Reserved, and clarify its reserved when the FTM session is non-DMG one. Note: bring the issue of whether management frames are self contained, if they should be then its not reserved.

[Jonathan to check if this is a style issue or problem with the draft.]

MDR 8 P.63 L.8 same functionality appears in different terminology Secure DMG (3), Secure RTT (22)

Proposed remedy: use same terminology probably Secure DMG.

[Jonathan to check if this is a style issue or raise as technical issue with task group.]

#### Style Guide 2.4.2 – Definition Conventions

Style Guide 2.4.3 - 2.4.3 Element Inclusion Conventions

MDR 9 P.64 L.12 The DMG Direction Measurement Parameters subelement optionally is included in the IFTMR

**Proposed remedy**: delete sentence.

MDR 10 P.66 L5 The EDMG Specific Parameters 5 subelement is included in frame format), and the initial Fine Timing Measurement frame

**Proposed remedy**: delete sentence.

[Jonathan: perhaps add description of purpose rather than identify the frame]

MDR 11P.72 L.18 The Ranging Parameters element is optionally included in the IFTMR frame, as described 18 in 9.6.7.32

**Proposed remedy:** replace sentence with *“The Ranging Parameters element provides the request or assignment of an FTM TB or NTB measurement exchange.”*

MDR 12 P.77 L.3 The non-TB specific subelement is included in the IFTMR frame

**Proposed remedy**: delete sentence.

MDR 13 P. 78 L.4 The TB Specific subelement is included in the IFTMR frame

**Proposed remedy: delete sentence.**

MDR 14 P.78 L.23 Figure 9-788edk (Example of a bitmap with 200 TU periodicity 23 signaled in the ISTA Availability Window element), shows the bitmap in the ISTA Availability 24 Information field of the ISTA Availability Window element **included with an IFTMR frame**.

Proposed remedy: remove included with an IFTMR frame.

MDR 15 P.80 L.13 The Secure LTF Parameters element is optionally included in the initial Fine Timing Measurement 13 frame, as described in 9.6.7.33 (Fine Timing Measurement frame format), and the Location 14 Measurement Report frame, as described in 9.6.7.49 (Location Measurement Report frame format) 15 for a secure LTF measurement exchange mode of the Non-TB Ranging and TB Ranging 16 measurement exchange (see 11.21.6.4.6 (Secure LTF Measurement Exchange Protocol)).

Proposed remedy: delete sentences.

MDR 17 It is transmitted as part of the (#**1223**) Fine Timing Measurement frame.

Proposed remedy: delete sentence.

MDR 18 P.77 L.9 Figure 9-788edi bits B0-B7 reads Subelement ID (0) not sure what (0) means but not needed.

Proposed remedy: delete (0)

MDR 19 P.78 L.9 Figure 9-788edj bits B0-B7 reads Subelement ID (1), not sure what (1) means but not needed.

Proped remedy: delete (1)

MDR 20 P. 56 L.2 redundant includsion specifying, in effect it is normative text in clause 9: “The Relative Compact LCI field is only used in the Passive TB Ranging LCI Table Report element 2 (see 9.4.2.304 (Passive TB Ranging LCI Table element) that contains an RSTA LCI report field.”

**Proposed remedy:** should be moved to clause 11 under passive TB Ranging possibly P.184 L.28.

[Specifying behavior; move to behavioral clause]

MDR 21 P.48 L.18 misuse of ‘Only’, refers to a verb rather to a condition: The TA field for the Ranging Trigger frame set to the address of the RSTA transmitting the Trigger 17 frame if the Trigger frame is addressed only to ISTAs with which that RSTA has a TB Ranging 18 measurement exchange (11.21.6.4.3).

MDR 22 use of “Of subvariant” similar to the inappropriate form “shall transmit a Management frame of subtype Association Request”: An RSTA that transmits a Ranging Trigger frame shall set the CS Required subfield to 1 unless 20 one of the following conditions is met:

– The **Ranging Trigger frame is of subvariant Poll**, Sounding, Secure Sounding or Passive 22 TB Measurement Exchange. 23 – **The Ranging Trigger frame is of subvariant Report** and the UL Length subfield in the 24 Common Info field of the Trigger frame is less than or equal to 418 (#**1366**, #**4019**).

Proposed remedy: for discussion, 11ax includes many similar occurrences.

[Robert: as a suggestion – use “Ranging Trigger frame” as the generic term for any subvariant and then name the specific subvariants: Poll Ranging Trigger frame, Report Ranging Trigger frame, etc.]

MDR 23 [JS] P.43 L.6 strikethrough is used for new text that was modified by one of the drafts.

~~In the case of the non-TB ranging protocol, 7 there is always only one intended receiver and accordingly only one STA Info field (#2418), see 8 11.22.6.4.4 (Non-TB Ranging measurement exchange), but the Ranging NDP Announcement 9 frame also (#1192. #1706) has the optional STA Info SAC field present when operating in secure 10 mode; see 11.22.6.4.6.1 (Secure Non-TB ranging mode)(#3222, #3011)~~

**Proposed Remedy:** Remove strikethrough text.

### Style Guide 2.5 – Removal of functions and features

Edward Au

No issues identified.

### Style Guide 2.6 – Capitalization

Edward Au

Whenever the description is not dedicated to a frame, an element, a subelement, a field, or a subfield, globally replace “Ranging” with “ranging”.   
**[11azED: (clarification & note) be careful to check for nouns and first word of a sentence**]

Globally replace “Secure TRN Sequences” with “secure TRN sequences”.   
**[11azED: (clarification & note) it’s a mix, be careful, check with Edward Au (definitions see 190.21 is this a field name (then needs a ‘field’ after) or description. (resolution) Use “EDMG secure ranging” and don’t capitalize tech terms, only field, subfield and element names fully]**

Page 92, Line 6: Replace “Neighbouring DMG Aps” with “neighbouring DMG APs”.

Page 245: Replace “FTM Passive TB Ranging ISTA.” with “FTM passive TB ranging ISTA”

Page 245: Replace “FTM Passive TB Ranging RSTA.” with “FTM passive TB ranging RSTA”

Page 246: Replace “FTM Passive STA.” with “FTM passive STA”   
**[11azED:** (**resolution**) **don’t capitalize (note) see p118 11.21.6.1.3., also use the form PSTA -> (PSTA) at bottom of page**]

Page 246: Replace all instances of “support” with “Support”Page 251: Replace “Passive TB Ranging Operation” with “Passive TB ranging operation**”**

**[11azED:**  **(editorial note) also change the text where it was introduced p118.5** ]

Page 251: Replace “Passive TB Ranging sequence” with “Passive TB ranging sequence**”**

**[11azED**:  **(resolution) ditto – see above**]

Page 251: Replace “NGP capability Signaling” with “NGP capability signalling”

Page 251: Replace “TB Ranging Operation” with “TB ranging operation”.

Page 251: Replace “Protected LMR exchange in TB Ranging exchange” with “Protected LMR exchange in TB ranging exchange”.

Page 252: Replace “Sequence Authentication Code exchange for TB operation” with “Sequence authentication code exchange for TB operation”.

**[11azED: (resolution) SAC is the acronym – replace with SAC**]

Page 252: Replace “NON-TB Ranging Operation” with “Non-TB ranging operation”.

Page 252: Replace “Non-TB Ranging exchange” with “Non-TB ranging exchange**”.**

[**11azED:** **(editorial note)** **modify p 117 line 5 11.21.6.1.2 reword sentence to start with “Non-TB ranging is …”]**

Page 252: Replace “Protected LMR exchange in Non-TB Ranging exchange” with “Protected LMR exchange in non-TB ranging exchange”.

Page 252: Replace “Sequence Authentication Code exchange for Non-TB Ranging operation” with “Sequence authentication code exchange for non-TB ranging operation”.

**[11azED: (resolution): use the SAC acronyn]**

Page 252: Replace “EDMG/DMG Direction Measurement as ISTA” with “EDMG/DMG direction measurement as ISTA”.

Page 253: Replace “EDMG/DMG Direction Measurement as RSTA” with “EDMG/DMG direction measurement as RSTA”.

Page 253: Replace “EDMG FTM measurement with First Arrival Path as ISTA” with “EDMG FTM measurement with first arrival path as ISTA”.

Page 253: Replace “EDMG FTM measurement with First Arrival Path as RSTA” with “EDMG FTM measurement with first arrival path as RSTA”.

Page 253: Replace “EDMG Direction measurement with First Arrival Path as ISTA” with “EDMG direction measurement with first arrival path as ISTA”.

Page 253: Replace “EDMG Direction Measurement with First Arrival Path as RSTA” with “EDMG direction measurement with first arrival path as RSTA”.

Page 253: Replace “EDMG LOS Assessment as ISTA” with “EDMG LOS assessment as ISTA”.

Page 253: Replace “EDMG LOS Assessment as RSTA” with “EDMG LOS assessment as RSTA”.

Page 254: Replace “NGP TB and Non-TB Measurement Exchange waveforms” with “NGP TB and non-TB measurement exchange waveform”.

Page 254: Replace “HE Ranging NDP” with “HE ranging NDP**”.**

Page 254: Replace “HE Ranging NDP with Secure HE-LTFs” with “HE ranging NDP with secure HE-LTFs”.

Page 254: Replace “HEz TB Ranging NDP” with “HEz TB ranging NDP”.

Page 254: Replace “HEz TB Ranging NDP with Secure HE-LTFs” with “HEz TB ranging NDP with secure HE-LTFs”.

Page 104, Line 13 (inside the table): Replace “a Protected Fine Timing Frame” with “a Protected Fine Timing frame”.

Page 104, Line 13 (inside the table): Replace “A STA Transmitting Protected Fine Timing Frames or” with “a STA transmitting Protected Fine Timing frames”.

Page 105, Line 7 (inside the table): Replace “a Protected Fine Timing Frame” with “a Protected Fine Timing frame”.

Page 105, Line 7 (inside the table): Replace “A STA receiving Protected Fine Timing Frames or” with “a STA receiving Protected Fine Timing frames”.

Page 134, Line 17: Replace “FTM request frame” with “Fine Timing Measurement Request frame”.

**[11azED: (resolution) use FTMR acronym - see p20.21]**

Page 139, Line 6: Replace “FTM requests frame” with “Fine Timing Measurement Request frame”.

**[11azED: (resolution) use FTMR acronym– see p20.21]**

Page 98, Line 10: Replace “LOS likelihood element” with “LOS Likelihood element”.

Page 102, Line 18: Replace “Passive TB Ranging LCI table element” with “Passive TB Ranging LCI Table element”.

Page 207, Line 23: Replace “PASN parameters element” with “PASN Parameters element”.

Page 56, Line 3: Replace “RSTA LCI report field” with “RSTA LCI Report field”.

Page 60, Line 1 (inside the figure): Replace “DMG positioning” with “DMG Positioning”.

Page 60, Line 5: Replace “DMG positioning field” with “DMG Positioning field”

Page 72, Line 2: Replace “Passive TB Ranging parameters subfield” with “Passive TB Ranging Parameters subfield”.

Page 72, Line 6: Replace “Passive TB Ranging parameters subfield” with “Passive TB Ranging Parameters subfield”.

Page 85, Line 34: Replace “Ephemeral public key length field” with “Ephemeral Public Key Length field”.

Page 86, Line 1: Replace “Ephemeral public key field” with “Ephemeral Public Key field”.

Page 104, Line 1: Replace “A protected Fine Timing Measurement Request” with “A protected fine timing measurement request”. **[11azED: (resolution)** **replace with the FTMR acronym**]

Page 104, Line 1: Replace “A protected Fine Timing Measurement” with “A protected fine timing measurement”.   
**[11azED: (resolution) this is a frame name and needs to be capitalized**]

Page 104, Line 1: Replace “A protected Location Measurement Report” with “A protected location measurement report”.

**[11azED: (resolution) this is a frame name and needs to be capitalized and add frame**]

Page 104, Line 1: Replace all instances of “action frame” with “Action frame”.

Page 114, Line 19: Replace “DMG location supporting APs information field” with “DMG Location Supporting APs Information field”.

Page 119, Line 16: Replace “Passive TB Ranging parameters subfield” with “Passive TB Ranging Parameters subfield”.

Page 130, Line 33: Replace “Ranging parameters field” with “Ranging Parameters field”.

Page 130, Line 35: Replace “Ranging parameters field” with “Ranging Parameters field”.

Page 135, Line 12: Replace “LOS Assessment TX capability subfield” with “LOS Assessment TX Capability subfield”.

Page 135, Line 16: Replace “LOS assessment TX capability subfields” with “LOS Assessment TX capability subfields”. **[11azED: (resolution) should be ‘Capability’ – part of field name**]

Page 135, Line 21: Replace “LOS Assessment RX capability subfields” with “LOS Assessment RX Capability subfields”.

Page 138, Line 40: Replace “Best AWV Id field” with “Best AWV ID field”.

Page 147, Line 17: Replace “STA INFO fields” with “STA Info fields”.

Page 151, Line 8: Replace “of the the trigger dependent common info subfield” with “of the Trigger Dependent Common Info subfield”.

Page 158, Line 16: Replace “Immediate R2I or I2R feedback subfield” with “Immediate R2I Or I2R Feedback subfield”.

Page 205, Line 19: Replace “Status code field” with “Status Code field”.

Page 206, Line 22: Replace “RSN capabilities field” with “RSN Capabilities field”.

Page 208, Line 23: Replace “RSN capabilities field” with “RSN Capabilities field”.

Page 225, Line 26: Replace “packet extension field” with “Packet Extension field”.

### Style Guide 2.7 – Terminology: frame vs packet vs PPDU vs MPDU

Edward Au

No issues identified.

### Style Guide 2.8 – Use of verbs & problematic words

Mark Hamilton

#### normative, non-normative, ensure

MDR 24 P.48L.7: The RA field and the CS Required, UL BW subfields in the Common Info field of the Ranging Trigger frame are identical to the Basic Trigger frame described in 26.5.2 (UL MU operation) and 9.3.1.22 (Trigger frame format), except that the RA field in Ranging Trigger frames with only one User Info field can be either unicast or broadcast. Use of can in normative behavior, conflicting with 2.8 of style guide can is non-normative.

**Suggested remedy**: replace ‘can’ with a ‘may’ as there are only two possible options.

**[11azED: – Needs discussion]**

**[Robert Stacey: change can to may]**

MDR 25 P.139L.34 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.* (#**3648**)

Use of can in normative behavior, conflicting with 2.8 of style guide can is non-normative.

**Suggested remedy**: replace ‘can’ with ‘may’.

[Suggest wording along the following lines… “…unless the RSTA is capable of participiating in such an exchange as indicated by the LOS field”]

MDR 26 P.143L.15 Each availability window by default consists of a single TXOP and can be extended to multiple TXOPs by announcement, if a single TXOP is insufficient to accommodate all ISTAs that responded to the poll;

[Inappropriate can. Replace with may.]

#### which/that

#### articles

#### missing nouns

#### unnecessary nouns

#### unicast and multicast

### Style Guide 2.9 – Numbers

Edward Au

Page 56, Line 6: Replace “two’s complement” with “2s complement”.

Page 56, Line 9: Replace “two’s complement” with “2s complement”.

Page 56, Line 12: Replace “two’s complement” with “2s complement”.

Page 82, Line 8: Replace “two’s complement” with “2s complement”.

Page 82, Line 14: Replace “two’s complement” with “2s complement”.

Page 84, Line 3: Replace “two’s complement” with “2s complement”.

Page 84, Line 10: Replace “two’s complement” with “2s complement”.

Page 86, Line 19: Replace “two’s-complement” with “2s complement”.

Page 91, Line 21: Replace “two’s complement” with “2s complement”.

Page 228, Line 1: Replace “20-MHz secure” with “20 MHz secure”.

Page 228, Line 2: Replace “20-MHz secure” with “20 MHz secure”.

Page 228, Line 3: Replace “20-MHz secure” with “20 MHz secure”.

Page 228, Line 7: Replace “20-MHz secure” with “20 MHz secure”.

Page 228, Line 15: Replace “20-MHz secure” with “20 MHz secure”.

Page 228, Line 19: Replace 20-MHz secure” with “20 MHz secure”.

Page 228, Line 21: Replace “20-MHz secure” with “20 MHz secure”.

Page 228, Line 26: Replace “40-MHz secure” with “40 MHz secure”.

Page 229, Line 1: Replace “40-MHz secure” with “40 MHz secure”.

Page 229, Line 2: Replace “40-MHz secure” with “40 MHz secure”.

Page 229, Line 6: Replace “40-MHz secure” with “40 MHz secure”.

Page 229, Line 15: Replace “40-MHz secure” with “40 MHz secure”.

Page 229, Line 18: Replace “40-MHz secure” with “40 MHz secure”.

Page 229, Line 20: Replace “40-MHz secure” with “40 MHz secure”.

Page 230, Line 3: Replace “80-MHz secure” with “80 MHz secure”.

Page 230, Line 5: Replace “80-MHz secure” with “80 MHz secure”.

Page 230, Line 6: Replace “80-MHz secure” with “80 MHz secure”.

Page 230, Line 10: Replace “80-MHz secure” with “80 MHz secure”.

Page 230, Line 18: Replace “80-MHz secure” with “80 MHz secure”.

Page 231, Line 2: Replace “80-MHz secure” with “80 MHz secure”.

Page 231, Line 5: Replace “80-MHz secure” with “80 MHz secure”.

Page 231, Line 8: Replace “80-MHz secure” with “80 MHz secure”.

Page 231, Line 13: Replace “160-MHz secure” with “160 MHz secure”.

Page 231, Line 16: Replace “160-MHz secure” with “160 MHz secure”.

Page 231, Line 19: Replace “160-MHz secure” with “160 MHz secure”.

Page 231, Line 22: Replace “160-MHz secure” with “160 MHz secure”.

Page 232, Line 3: Replace “160-MHz secure” with “160 MHz secure”.

Page 232, Line 9: Replace “80-MHz” with “80 MHz”.

Page 232, Line 10: Replace “80-MHz” with “80 MHz”.

Page 232, Line 13: Replace “80-MHz” with “80 MHz”.

Page 232, Line 14 (the first row of the table): Replace “80-MHz” with “80 MHz”.

Page 233, Line 3: Replace “160-MHz secure” with “160 MHz secure”.

Page 44, Line 21: Replace “16bit” with “16 bit”.

Page 53, Line 6: Long numbers have embedded spaces to group digits into threes. Please replace “65535” with “65 535”.

Page 91, Line 23: Replace “A value of 255in” with “A value of 255 in”.

### Style Guide 2.10 – Maths operators and relations

Edward Au

Page 125, Line 27: What is “TFTM<”? It seems that the math operator “<” is redundant.  
 **[11azED: (resolution) remove <]**

Page 181, Line 16: Please replace “\*” with “×” for the equation.

Page 186, Line 19: Please replace “\*” with “×” for the equation.

### Style Guide 2.11 – Hyphenation

Edward Au

Globally replace “non-zero” with “nonzero”. There are about 25 instances.

Globally replace “Non-Zero” with “Nonzero”. There are about 6 instances.

Globally replace “pre-association” with “preassociation”.

Globally replace “Pre-association” with “Preassociation”.

Globally replace “Pre-Association” with “Preassociation”.

Page 126, Line 36: Replace “For TB andNon-TB” with “For TB and Non-TB”.

Page 127, Line 21: Replace “non-conflicting” with “nonconflicting”.

Page 144, Line 23: Replace “non-conflicting” with “nonconflicting”.

Page 145, Line 5: Replace “non-transmitted” with “nontransmitted”.

Page 217, Line 9: Replace “non-transmitted” with “nontransmitted”.

Page 217, Line 14: Replace “non-transmitted” with “nontransmitted”.

Page 217, Line 17: Replace “non-transmitted” with “nontransmitted”.

Page 150, Line 10: Replace “pre-correction” with “precorrection”.

Page 165, Line 11: Replace “pre-determined” with “predetermined”.

Page 191, Line 36: Replace “pre-generating” with “pregenerating”.

Page 113, Line 33: Replace “re-associate” with “reassociate”.

Page 185, Line 16: Replace “re-broadcast” with “rebroadcast”.

Page 185, Line 30: Replace “re-broadcasted” with “rebroadcasted”.

Page 191, Line 25: Replace “re-use” with “reuse”.

Page 216, Line 1: Replace “re-initiate” with “reinitiate”.

Page 8, Line 8: Replace “high-accuracy” with “high accuracy”.

Page 21, Line 20: Replace “Zero-power” with “Zero power”.

Page 227, Line 23 (inside the figure): Replace “zero-power” with “zero power”.

Page 227, Line 24 (inside the figure): Replace “zero-power” with “zero power”.

Page 233, Line 12: Replace “zero-power” with “zero power”.

Page 234, Line 26: Replace “zero-power” with “zero power”.

Page 22, Line 5: Replace “round-trip time” with “round trip time”.

Page 149, Line 22: Replace “Round-Trip” with “Round Trip”.

Page 157, Line 4: Replace “Round-Trip” with “Round Trip”.

Page 157, Line 15: Replace “Round-Trip” with “Round Trip”.

Page 22, Line 17: Replace “geo-spatial” with “geospatial”.

Page 169, Line 6: Replace “per-stream” with “per stream”.

Page 173, Line 7: Replace “pseudo-random” with “pseudorandom”.

Page 191, Line 10: Replace “pseudo-random” with “pseudorandom”.

Page 191, Line 22: Replace “pseudo-random” with “pseudorandom”.

Page 191, Line 28: Replace “Pseudo-random” with “Pseudorandom”.

Page 191, Line 30: Replace “pseudo-random” with “pseudorandom”.

Page 243, Line 16: Replace “pseudo-random” with “pseudorandom”.

Page 180, Line 29: Replace “time-stamps” with “timestamps”.

Page 183, Line 13: Replace “Passive TB Ranging Polling-Sounding-Reporting triplet” with “passive TB ranging polling sounding reporting triplet”

Page 183, Line 21: Replace “Passive TB Ranging Polling-Sounding-Reporting triplet” with “passive TB ranging polling sounding reporting triplet”.

Page 191, Line 30: Replace “One-time” with “One time”.

Page 191, Line 31: Replace “set-up” with “setup”.

Page 265, Line 7: Replace “well-known” with “well known”.

### Style Guide 2.12 – References to SAP primitives

Peter Eccelsine

No issues noted.

### Style Guide 2.13 – References to the contents of a field/subfield

Emily Qi

69.23: Missing editor instruction at 69.23: “Insert the following subclauses at the end of 9.4.2.”.

74.19, change “The ISTA sets the I2R LMR Feedback subfield in the Ranging Parameters field of the Ranging 19 Parameters element in the IFTMR frame:” to “The I2R LMR Feedback subfield in the Ranging Parameters field of the Ranging Parameters element in the IFTMR frame is set:”

[How the field is set, not who sets it]

76.16, font is incorrect.

85.34, change “Ephemeral public key length field is the length in octets of the ephemeral public key.” To

“The Ephemeral Public Key Length field is the length of the Ephemeral Public Key field.”

[remove ‘in octets’, use descriptive phrasing] **[11azED:** (**resolution**) the **capitalization is good, but is it okay to lose octet?**]

[Robert Stacey: leave “in octets” for clarity]

91.9, The size of the font of NOTE should be 9.

92.21, change “Optional” to “optional” , two instances.

93.22 to 93.28, this paragraph should be moved to clause 11.

[Limit behavioral text in frame format section]

96.38 – 96.46, this paragraph should be rewritten. Clause 9 decribes the structure of frames and fields. Also, this paragraph exists in IEEE 802.11-2020. Please show the changes.

Change “If the initiator requested negotiation of parameters with the responder in order to perform Fine Timing Measurement as the ranging protocol as defined in 11.21.6.4.2 (EDCA based ranging scheduling measurement exchange), the Fine Timing Measurement Parameters field is present in the initial Fine Timing Measurement Frame, see 11.21.6.3 (Fine timing measurement procedure negotiation)) and its retransmissions; and is not present in subsequent Fine Timing Measurement frames except for the conditions described in subclauses 11.21.6.5 (Fine Timing Measurement parameter modification) and 11.21.6.6 (Fine Timing Measurement session termination). If present, it contains a Fine Timing Measurement Parameters element as defined in 9.4.2.298 (Ranging Parameters element.) (#2091)”

To

“The format of the Fine Timing Measurement Parameters element is defined in 9.4.2.167 (Fine Timing Measurement Parameters element). ... ... ”.

[A bit of work here. Check against baseline and identify changes. Limit behavioral text in clause 9.]

97.25, change “This field has the structure shown in Figure 9-881a (Channel Measurement Feedback Type format). The interpretation of each of the subfields is described in Table 9-257 (FBCK-TYPE field description)” to

“The format of the Channel Measurement Feedback Type field is shown in Figure 25 9-881a (Channel Measurement Feedback Type format). Each of the subfields is described in Table 9-257 (FBCK-TYPE field description).”

[Use consistent style for format description]

99.18, change “The TOA Error field is structured as shown in Figure 9-909ac (Format of the TOA Error field).” To

“The format of the TOA Error field is shown in Figure 9-909ac (Format of the TOA Error field).”

[Use consistent style for format description]

99.18, remove the underline for the TOA Type subfield as all subfields are newly inserted.

100.11, change “field” to “subfield”, 2 instances.

100.26, 100.34, remove underlines for this paragraph as the whole subclause is inserted.

101.6, change “; see” to “as defined in”.

102.1, remove underlines as the whole subclause is inserted.

102.7, add “field” after “Counter”.

102.15, add “field” after “LCI Table”.  
**[11azED:**  **(rsolution): first reference move subfield after Table, but the 2nd and 3rd reference should be referred to as values we think - discussion**]

[Robert Stacey: change sentence so that it reads: “The New LCI Table subfield is set to 0 if the current LCI table and LCI table to be transmitted at the end of the countdown are the same; otherwise it is set to 1”.

See additional items in 2.1.19.3.

### Style Guide 2.14 – References to MIB variables/attributes

Mark Hamilton

### Style Guide 2.15 – Hanging Paragraphs

Emily Qi

None.

### Style Guide 2.16 – Abbreviations

Edward Au

PASN is widely used. Please insert it in subclause 3.4.   
**[11azED**:  **(resolution): see p21 line 9 and 10 where it is defined]**

Page 21, Line 33: DMG has been defined in IEEE 802.11-2020. You do not need to add it in subclause 3.4.

Page 21, Line 34: EDMG has been defined in IEEE 802.11ay-2021. You do not need to add it in subclause 3.4.

Page 22, Line 5: round trip time has been defined in subclause 3.4 of IEEE 802.11-2020. You do not need to add it in your local subclause 3.4.

### Style Guide 2.17 – Format for code/pseudocode

Not applicable

### Style guide 3 – Style applicable to specific Clauses

#### Definitions (Clause 3)

Peter Eccelsine

P21 Ll Null-SAC-HE-LTF. HE, I2R, ISTA, LTF, NDP, R2I and SAC should be spelled out in full on first use. Final sentence is missing closing period. HE-LTF should be added to 3.4 Acronyms and abbreviations as 802.11ax did not. Because the amendment is extensively using the term Ranging NDP, there should be a definition of Ranging null data PPDU (NDP). announcement.

P21 L14 is missing closing period.

P21 L16 is missing closing period.

P21 L18 is missing closing period.

P21 L20 is missing closing period.

#### General Description (Clause 4)

Peter Eccelsine

**[11azED: (resolution) the entire paragraph needs updating to the latest in 11md p270 para 3**]

P23 Ll3 changebars missing in final paragraph “- A Passive triggered …”

P23 L21 Replace “IEEE std” with “IEEE Std”

**[11azED (resolution): ok, and remove duplicate std]**

**[Robert Stacey: delete “std” so that it reads “IEEE Std 802.11 defines…”]**

P23 L34 changebars missing from final words “, or any combination of these authentication methods”

#### Frame formats (Clause 9) – shall or may?

Emily Qi

#### SAP interfaces (Clause 6)

Edward Au

No issues identified.

#### New top level clauses

Peter Eccelsine

P269 Annex AD. No issues noted.

#### Annex A – Bibliography

Not applicable. There are neither normative nor informative references.

#### Annex B – PICS

Edward Au

Page 247: Since you add 4 new entries to B.4.4.1 that follows the enumeration PC, you should replace FSTB, FSNTB, FSPASN, and FSPTB with PC48, PC49, PC50, and PC51, respectively.

**[11azED: (resolution)**  **ok, but will remove FSPASN, and renumber**]

[RS: look at moving to B.4.4.3 instead of changing name.] **[11azED (resolution): plan not to move it**]

[Robert Stacey: Move FSTB, FSNTB and FSPTB to B.4.4.3 (and number FSxx). Remove FSPASN (duplicated by PC47.]

Page 249.2: Replace “Insert a new Subclause B.4.33 as follows:” with “Insert a new subclause B.4.37 as follows:”.

Page 251: Missing entry in reference column for NGP7.1.

**[11azED: use ref 11.21.6.4.8 (Measurement Exchange in Passive TB Ranging mode**)]

#### Annex G – Frame exchange sequences

## ANA

Check for correct use of numbers against database.   
**[11azED:** **(clarification):** **ok, most are in Table 9-92**, …, **9-329**]

Check names against database (update database if names have changed).

Robert Stacey

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource** | **Value** | **Name** | **Status** |
| AuthenticationAlgorithmNumbers | 7 | PASN authentication | OK |
| Categories | 34 | Protected Fine Timing Frame | An allocation was made 2020-10-26, but does not seem to be used in the draft. Table 9-51 in the draft shows “<34-protected-finetiming-actionframe>” |
| Element ID Extension 1 | 94 | Secure LTF Parameters | OK |
|  | 95 | ISTA Passive TB  Ranging Measurement  Report | OK |
|  | 96 | RSTA Passive TB  Ranging Measurement  Report | OK |
|  | 97 | Passive TB Ranging LCI  Table | OK |
|  | 98 | ISTA Availability  Window | OK |
|  | 99 | RSTA Availability  Window | OK |
|  | 100 | PASN Parameters | OK |
|  | 101 | Ranging Parameters | OK |
|  | 102 | Direction Measurement  Results | OK |
|  | 103 | Multiple AOD Feedback | OK |
|  | 104 | Multiple Best AWV ID | OK |
|  | 105 | LOS Likelihood | OK |
| AKMSuiteSelectors | 21 | PASN | OK |
| ExtendedCapabilities | 90 | non-TB Ranging Responder | OK |
|  | 91 | TB Ranging Responder | OK |
|  | 92 | Passive TB Ranging  Responder Measurement  Support | OK |
|  | 93 | Passive TB Ranging  Initiator Measurement  Support | OK |
|  | 94 | AOA Measurements  Available | OK |
|  | 95 | Phase Shift Feedback  Support | OK |
|  | 96 | DMG/location supporting  APs in the area | OK |
|  | 97 | I2R LMR Feedback Policy | OK |
| Extended RSN Capabilities | 9 | Secure LTF Support | OK |
|  | 10 | Secure RTT Supported | OK |
| PublicActionFrames | 47 | Location Measurement Report | OK |
|  | 48 | ISTA Passive TB Ranging Measurement Report |  |
|  | 49 | Primary RSTA Broadcast Passive TB Ranging Measurement Report | OK |
|  | 50 | Secondary RSTA Broadcast Passive TB Ranging Measurement Report | OK |
| dot11StationConfigEntry | 201 | dot11PASNActivated | Object not correctly numbered in draft |
|  | 202 | dot11NoAuthPASNActivated | Object not correctly numbered in draft |

Additional Actions:

For the table in 9.6.7.1, identify as “Table 9-364—Public Action field values”.

The value 45 in the table is existing and the row should be deleted. If context is required (and I don’t think it is necessary) it can be provided in the editing instruction (“Insert the following after row 45 in Table 9-364” – but note that 11ay adds row 46)

## MIB

Conformance to 09/533r1 and 15/355r13 – Mark Hamilton

P93L44 – Wording preference for clarity: change “set to 1” to “equal to true”, and at P94L1, change “set to 0” to “equal to false”. Alterntively, could say “when dot11PassiveTBRangingAoDImplemented is true on the ISTA” (likewise, “is false” at the second location). Same changes at P184L25, P184L26, P184L31, and P184L32.

P256L12 – dot11RMCivicConfigured is not being added (already in the baseline). This appears to be trying to show context for the adds here and at P257L14, but it is just confusing. The instructions already say to add “at the end”, that is sufficient. Delete the row/entry for dot11RMCivicConfigured here, and the (partial) definition of dot11RMCivicConfigured at P257L14. Change the instructions at P257.12, to say “Insert new objects as shown, after the definition of dot11RMCivicConfigured:”.

P256L29 – An attribute name of “dot11…Policy” is not one of the recommended names, for a TruthValue. I commented on this during the balloting process, and the resolution indicated that this is a two-valued attribute, indicating which type of policy is in effect. If that is correct/agreed, then this would be better as a two-valued enumeration, and not a SYNTAX “TruthValue”. There are also numerous misspellings of this attribute, which make it true use/type difficult to find in the text**.**

**[11azED:**  **Proposal[J. Segev]: dot11I2RSTALMRFeedbackPolicy enumarted INTEGER (0 | 1) ]**

[Robert Stacey: No change from MDR, but resolve through the comment process]

P256L35 – There is no definition or use of dot11SecureLTFActivated. Delete row/entry to dot11SecureLTFActivated, here.

P257L10 – There is what appears to be a random/lost xref to 11.21 here. Delete the “11.21” text/xref.

MIB compiling – Yongho Seok   
**[11azED: (clarification) – the description below shows changes as a Diff to make the MIB compile correctly]**





Comparing files TGazD3\_0\_An\_C\_error.txt and TGAZD3\_0\_AN\_C\_FIXED.TXT

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

DEFVAL {false}

::= { dot11StationConfigEntry <201-MIB-1> **} [11azED: (clarification): Just 201 – no angle brackets either]**

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

DEFVAL {false}

::= { dot11StationConfigEntry 195 }

Comment: Please change to <ANA> and request a value for dot11StationConfigEntry to ANA.

[Robert: Verify that dot11StationConfigEntry number have been ANA assigned]

**[11azED: (clarification): 201 is ok]**

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

DEFVAL {false}

::= { dot11StationConfigEntry <202-MIB-2> }**[11azED: Clarification: Just 202]**

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

DEFVAL {false}

::= { dot11StationConfigEntry 196 }

Comment: Please change to <ANA> and request a value for dot11StationConfigEntry to ANA.

**[11azED: (clarification): 202 is ok]**

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

The time for which the derived PTKSA derived from PASN authentication is valid”

DEFVAL { 3600 }

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

The time for which the derived PTKSA derived from PASN authentication is valid"   
**[11azED: clarification: use this “]**

DEFVAL { 3600 }

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

dot11AOAMeasurementImplemented TruthValue,

dot11 ISTA2RSTALMRFeedbackPolicy TruthValue**,   
[11azED: clarification: remove space, change to I2R]**

dot11LOSAssessmentTXImplemented TruthValue,

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

dot11AOAMeasurementImplemented TruthValue,

dot11I2RLMRFeedbackPolicy TruthValue,

dot11LOSAssessmentTXImplemented TruthValue,

\*\*\*\*\*

**[11azED: p259L42 dot11II2R… use a single I, p122L12, p262L3, 256L29 use the I2R version rather than ISTA2RSTA**]

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

dot11LOSAssessmentRXImplemented TruthValue,

dot11PassiveTBRangingAODImplemented TruthValue,

dot11SecureLTFActivated TruthValue,

dot11PhaseShiftFeedbackImplemented Truthvalue

}

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

dot11LOSAssessmentRXImplemented TruthValue,

dot11PassiveTBRangingAODImplemented TruthValue,

dot11PhaseShiftFeedbackImplemented TruthValue

}

Comment: Delete dot11SecureLTFActivated. **[11azED: discussed and agree OK**]

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

dot11PassiveTBRangingInitiatorImplementedOBJECT-TYPE

SYNTAX TruthValue

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

dot11PassiveTBRangingInitiatorImplemented OBJECT-TYPE

SYNTAX TruthValue

Comment: Add a space “Implemented OJECT-TYPE”.

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

dot11II2RLMRFeedbackPolicy OBJECT-TYPE

SYNTAX TruthValue

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

dot11I2RLMRFeedbackPolicy OBJECT-TYPE

SYNTAX TruthValue

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

ge by transmitting a Loss Assessment PPDU. It is set to false otherwise."

::= { dot11WirelessMgmtOptionsEntry 55 }

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

ge by transmitting a Loss Assessment PPDU. It is set to false otherwise."

::= { dot11WirelessMgmtOptionsEntry 62 **} [11azED: (clarification) see p260L27]**

Comment: Entry value is used in other MIB variable.

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

ge by switching polarization on the TRN field when a Loss Assessment PPDU is received. It is set to false otherwise."

::= { dot11WirelessMgmtOptionsEntry 56 }

dot11PassiveTBRangingAODEnablementImplemented OBJECT-TYPE

SYNTAX TruthValue

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

ge by switching polarization on the TRN field when a Loss Assessment PPDU is received. It is set to false otherwise."

::= { dot11WirelessMgmtOptionsEntry 63 } **[11azED: (clarification) see p260L41]**

Comment: Entry value is used in other MIB variable.

dot11PassiveTBRangingAODImplemented OBJECT-TYPE

SYNTAX TruthValue

Comment: dot11PassiveTBRangingAODEnablementImplemented does not exist.

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

Ranging)."

::= { dot11WirelessMgmtOptionsEntry 57 }

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

Ranging)."

::= { dot11WirelessMgmtOptionsEntry 64 }}} **[11azED: (clarification)** **see p261L12]**

Comment: Entry value is used in other MIB variable.

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

ates Reported in the LMR frame are not based on the Phase Shift feedback method."

::= { dot11WirelessMgmtOptionsEntry 58 }

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

ates Reported in the LMR frame are not based on the Phase Shift feedback method."

::= { dot11WirelessMgmtOptionsEntry 65 **}} [11azED: (clarification) see p261L27]**

Comment: Entry value is used in other MIB variable.

\*\*\*\*\*

\*\*\*\*\* TGazD3\_0\_An\_C\_error.txt

dot11RSNAConfigPASNPTKSATimeout,

dot11LOSAssessmentRxImplemented,

dot11LOSAssessmentTxImplemented,

dot11PhaseShiftFeedbackImplemented,

dot11PassiveTBRangingAODImplemented

}

\*\*\*\*\* TGAZD3\_0\_AN\_C\_FIXED.TXT

dot11RSNAConfigPASNPTKSATimeout,

dot11LOSAssessmentRXImplemented**, [11azED: (clarification) change case]**

dot11LOSAssessmentTXImplemented,

dot11PhaseShiftFeedbackImplemented,

dot11PassiveTBRangingAODImplemented

}

\*\*\*\*\*

### Detailed proposed changes

## Use of verbs

# Collateral findings

# IEEE-SA MEC

The MEC report is in the following attachment.

No specific findings but there is a general request to review aspects of the draft.

|  |
| --- |
|  |