IEEE P802.11
Wireless LANs

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| LB240 comment and resolution for Service interface and PPDU format |
| Date: 2019-11-07 |
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Abstract

This document proposes comment resolutions to the following CIDs (22 CIDs) for TGaz D1.0:

1172 1298 1299 1302 1319 1322 1340 1371 1731 2324 2353 2356 2357

2359 2360 2477 2502 2503 2504 2510 2516 2518

Revisions:

* Rev 0: Initial version of the document. Use 11az D1.4 as baseline spec text.
* Rev 1: Change to use 11az D1.5 as baseline spec text. Revised several comments.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGaz Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGaz Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGaz Editor: Editing instructions preceded by “TGaz Editor” are instructions to the TGaz editor to modify existing material in the TGaz draft. As a result of adopting the changes, the TGaz editor will execute the instructions rather than copy them to the TGaz Draft.***

**CID 1172, 1731, 2477**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1172 | 146.08 | Adding to a Chapter that is still in flux, because it is a draft itself, is dangerous and can break 11ax. | Move the 11az PHY to its own clause, to not break the 11ax draft. | Reject. It is important to make sure 11az PHY spec not break 11ax PHY. But there could be options such as make 11az a subclause in clause 27, or carefully merge the 11az PHY into clause 27 without breaking it. Carefully merge 11az PHY into clause 27 is currently the preferred option.   |
| 1731 | 146.08 | It is not convenient to write up PHY by revising on top of an on-going amendment (11ax). | Start a new PHY clause, similar to 11af (TVHT) | Reject. See resolution for CID 1172.  |
| 2477 | 146.08 | The 11az draft is making many changes to the PHY section of 11ax. Create a new section which describes the 11az PHY and do not modify Section 28. This will prevent the industry from 11ax interoperabiilty problems. | Create a new section which describes the 11az PHY and do not modify Section 28. | Reject. See resolution for CID 1172. |

**CID 2502, 2503, 2504**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2502 | 146.08 | 11az PHY is substantially different from that of 11ax. For example, GI has zero energy instead of cyclic prefix. LTF sequences are randomized, and LTF uses 8-PSK. LTF has repetition. Introduces a yet another new HE TB PPDU mode with no data symbols. 11ax PE has no GI. But 11az PE has GI. Etc. And a lot of the related text changes are breaking 11ax operation. Furthermore, 11ax draft is still under development, thus is a moving target. Making these substantial changes on top of a moving target will create issues to both 11ax and 11az. For example, P147L1 redefines APEP\_LENGTH=0 for HE TB PPDU, which ends up disallowing a valid mode used in 11ax (respond to Trigger frame with EOF MPDU delimiters). | Do not modify 11ax Clause 28. Rather, create a new PHY clause for 11az. See, for example, how 11af took 11ac Clause 21 as a baseline, but spelled out changes separately in Clause 22. | Revised. Agree in principle. Merging 11az PHY with 11ax PHY should avoid affect 11ax. See resolution for CID 1172. For TXVECTOR/RXVECTOR:In 11ax, FORMAT = HE\_TB and APEP\_LENGTH = 0 is already a valid mode and shall not be redefined to signal HE TB Ranging NDP PPDU. Also, FORMAT = HE\_SU and APEP\_LENGTH = 0 indicates HE Sounding NDP PPDU and shall not be redefined for HE Ranging NDP. Propose to define a new parameter in TXVECTOR as a flag for HE Ranging NDP PPDU and HE TB Ranging NDP PPDU. **TGaz Editor:** Please make changes to IEEE P802.11az D1.5 according to the proposed text changes as resolution to CID 2502 in 11-19/1677r1 |
| 2503 | 147.01 | In 11ax, APEP\_LENGTH=0 for HE TB PPDU means that the STA has no MPDUs to transmit. But now, 11az is redefining APEP\_LENGHT=0 in HE TBPPPDU to mean randomizing the LTF sequence. This breaks 11ax UL OFDMA/MU-MIMO operation. | Do not break 11ax. Move 11az to a new PHY clause. | Revised. See resolution for CID 2502. |
| 2504 | 148.01 | In 11ax, APEP\_LENGTH=0 for HE TB PPDU means that the STA has no MPDUs to transmit. With this change on P148, 11az has removed ability of 11ax STAs to respond to Trigger frames w/ EOF MPDU delimiters. | Do not break 11ax. Move 11az to a new PHY clause. | Revised. See resolution for CID 2502. |

***TGaz Editor: Change the text in az D1.5 P186L1 as follows:***

 **Table 27-1—TXVECTOR and RXVECTOR parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
|  | (...existing fields...) |
| RANGING\_FLAG(#2502) | FORMAT is either HE\_SU or HE\_TB | Indicate whether the PPDU is a HE Ranging NDP PPDU or HE TB Ranging NDP PPDU.Set to 1 when the PPDU is HE Ranging NDP PPDU or HE TB Ranging NDP PPDU. Set to 0 otherwise.  | Y | N |
| Otherwise | Not Present |  |  |
|  | (...existing fields...) |
| LTF\_SEQUENCE | ~~FORMAT is either HE\_SU or HE\_TB and APEP\_LENGTH is 0~~ FORMAT is either HE\_SU or HE\_TB and RANGING\_FLAG is 1 | … |  |  |

 ***TGaz Editor: (#2502, #2503, #2504) Please replace***

***“HE\_SU and APEP\_LENGTH is 0” by “HE\_SU and RANGING\_FLAG is 1”***

***“HE\_TB and APEP\_LENGTH is 0” by “HE\_TB and RANGING\_FLAG is 1”***

***“HE\_SU or HE\_TB and APEP\_LENGTH is 0” by “HE\_SU or HE\_TB and RANGING\_FLAG is 1”***

in Table 27-1.

**CID 1298, 1299**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1298 | 147.01 | "Indicate the number of space-time streams to receive in the following HE Ranging NDP or the following HE TB Ranging NDP.": TXVECTOR control the transmission of the PPDU and things that go in the header. If this field controls the reception of the next PPDU, it should go into the PHY-CONFIG interface, not the PHY-SERVICE interface | Remove the LTF\_N\_STS line from the PHY-SERVICE interface. | Revised. The number of space-time stream is indicated by NUM\_STS in TXVECTOR. LTF\_N\_STS is a redundant parameter in TXVECTOR and shall be removed. At transmitter, MAC use NUM\_STS to indicate the number of space-time steams in each HE-LTF repetition to the PHY. For secured Ranging NDP with multiple users, one NUM\_STS parameter is needed for each user. But similar to LTF\_REP and LTF\_SEQUENCE, this case is clarified in NUM\_USERS parameter and also clarified in D1.5 P191Ln29. **TGaz Editor:** Please make changes to IEEE P802.11az D1.5 according to the proposed text changes as resolution to CID 1298 in 11-19/1677r1 |
| 1299 | 147.01 | "Indicate the number of repetitions of the HE-LTF symbols to receive in the following HE Ranging": TXVECTOR control the transmission of the PPDU and things that go in the header. If this field controls the reception of the next PPDU, it should go into the PHY-CONFIG interface, not the PHY-SERVICE interface | Remove the LTF\_REP line from the PHY-SERVICE interface or show how it contorl the transmission of the current PPDU. Same for LTF-OFFSET | Revised. LTF\_REP is needed for MAC to indicate the number of repetitions of HE-LTF fields to PHY in TXVECTOR. But the existing description is not accurate. This field is not for the reception of following Ranging NDP but for the transmission of the current Ranging NDP. **TGaz Editor:** Please make changes to IEEE P802.11az D1.5 according to the proposed text changes as resolution to CID 1299 in 11-19/1677r1 |

***Discussion:***

*Understanding of TXVECTOR and LTFVECTOR:*

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In TXVECTOR, all the parameters are defined for transmitting the immediate PPDU.

***TGaz Editor: Change the text in az D1.5 P187L1 as follows for CID 1298 and 1299***

 **Table 27-1—TXVECTOR and RXVECTOR parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| ~~LTF\_N\_STS~~  | ~~FORMAT is either HE\_SU or HE\_TB and APEP\_LENGTH is 0~~ | ~~Indicate the number of space-time streams to receive in the following HE Ranging NDP or the following HE TB Ranging NDP .~~ ~~Set to the number of space-time streams minus 1.~~  | ~~O~~ | ~~N~~ |
| ~~Otherwise~~  | ~~See corresponding entry in Table 21-1 (TXVECTOR and RXVECTOR parameters).~~  |
| LTF\_REP  | ~~FORMAT is either HE\_SU or HE\_TB and APEP\_LENGTH is 0~~FORMAT is either HE\_SU or HE\_TB and RANGING\_FLAG is 1 | ~~Indicate the number of repetitions of the HE-LTF symbols to receive in the following HE Ranging NDP or the following HE TB Ranging NDP.~~ Indicate the number of repetitions of the HE-LTF symbols. Set to the number of repetitions minus 1.  | O | N |
| Otherwise  | ~~See corresponding entry in Table 21-1 (TXVECTOR and RXVECTOR parameters).~~ Not present.  | N | N |

**CID 1319, 1322, 2324, 2353, 2510, 2518**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1319 | 147.01 | "HEz sounding" - replace with "TB sounding" | as in comment | RevisedAgree with the commenter. Already fixed in D1.5 for similar comments.  |
| 1322 | 150.07 | "HEz TB sounding " -> "TB sounding" | as in comment | Revised.Agree with the commenter. Already fixed in D1.5 for similar comments.  |
| 2324 | 147.00 | How to use LTF\_SEQUENCE appearing twice in the same table? | Please clarify or consolidate them. | Revised. Agree with the commenter. Already fixed in D1.5 for similar comments.  |
| 2353 | 147.01 | There are duplicate fields of LTF\_SEQUENCE in TXVECTOR and RXVECTOR parameters table. | Remove the first field of LTF\_SEQUENCE. | Revised.Agree with the commenter. Already fixed in D1.5 for similar comments. |
| 2510 | 147.01 | LTF\_SEQUENCE is defined twice in TXVECTOR. | Fix it. | Revised. Agree with the commenter. Already fixed in D1.5 for similar comments. |
| 2518 | 147.01 | What does HEz stand for? | All other PHY acronyms have a meaning. E.g. High Efficiency, Very High Throughput, High Throughput, High Rate, Extended Rate, Directional Multi-Gigabit, etc. Move out edits from Clause 28 to a different Clause, and come up with a more meaningful acronym than HEz for that clause. | Revised.Agree with the commenter. Already fixed in D1.5 for similar comments.  |

**CID 2356, 2357, 2359, 2360**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2356 | 147.01 | For all the "Otherwise" conditions, it's not clear what is the meaning of "See corresponding entry in Table 21-1 (TXVECTOR and RXVECTOR parameters).". There are no corresponding entry in Table 21-1 for many parameters in this table. | For the parameters not exist in table 21-1, change the value to "Not present". | Revised. Agree in principle. The value for some of the “Otherwise” conditions should be changed to “Not present”. For example LTF\_SEQUENCE is not present for all the conditions other than HE Ranging NDP and HE TB Ranging NDP. **TGaz Editor:** Please make changes to IEEE P802.11az D1.5 according to the proposed text changes as resolution to CID 2356 in 11-19/1677r1 |
| 2357 | 147.01 | Terms of LTF\_REP and "repetitions of the HE-LTF" are misleading. In secure HE-LTF, HE-LTFs are not repeated. | Change to more precise terms such as LTF\_SEC and sections of the HE-LTF. Clarify that for normal HE-LTF mode, the LTF sections are repeating but for secure HE-LTF mode, the LTF sections are defined with different randomized sequences. | Revised. Agree in principle. Although for regular HE-LTFs, multiple segments of HE-LTF field for one user are repeating, this is not the case for secure HE-LTF. To be more precise, we should change all LTF\_REP to LTF\_SEG and do a global search to update the related part. Change “DL Rep” and “UL Rep” to “DL Seg” and “UL Seg” , change “repetition” to “segment” etc. To avoid excessive work on the spec text change, alternative solution is to add some spec text to clarify that the HE-LTFs are not repetition for secure HE-LTF. **TGaz Editor:** Please make changes to IEEE P802.11az D1.5 according to the proposed text changes as resolution to CID 2357 in 11-19/1677r1 |
| 2359 | 148.01 | "NUM\_USERS" field definition is not correct.The value of this field should be defined as indicating the number of users in HE Ranging NDP with randomized LTF sequence. | Correct the definition of this field. | Revised.Agree in principle. This field is indicating number of users not “Indicating an HE Ranging NDP ” **TGaz Editor:** Please make changes to IEEE P802.11az D1.5 according to the proposed text changes as resolution to CID 2359 in 11-19/1677r1 |
| 2360 | 149.07 | All the parameters in LTFVECTOR are also defined in TXVECTOR and RXVECTOR, why need these duplicate parameters to be defined in TXVECTOR and RXVECTOR? The parameters in LTFVECTOR will not pass from MAC to PHY in Tx and not pass from PHY to MAC in Rx. They donot need to be defined in TXVECTOR and RXVECTOR. | Remove the redundant parameters from TXVECTOR/RXVECTOR table. | Reject. Purpose of LTFVECTOR and TXVECTOR is different and these parameters are needed in both.  |

***TGaz Editor: Change the text in az D1.5 P186L1 to P187L1 as follows***

***In table 27-1, change the value of “Otherwise” condition to “Not present” for the following parameters: (#2356)***

 ***“LTF\_SEQUENCE”, “LTF\_OFFSET”, “LTF\_REP”***

***TGaz Editor: Change the text in az D1.5 P191L28 as follows***

When the TXVECTOR parameter LTF\_SEQUENCE is present and the NUM\_USERS parameter is larger than 1, the TXVECTOR parameters LTF\_SEQUENCE, NUM\_STS and LTF\_REP will be in array form with NUM\_USERS entries. The number of Secure HE-LTF will depend on the sum of: N\_HE-LTF times LTF\_REP, across all users. In this case, the repetitions of the HE-LTF symbols are repetition of the structure for HE-LTF fields. The randomized HE-LTF sequences are different for HE-LTF repetitions. (#2357)

***TGaz Editor: Change the text in az D1.5 P192L25 as follows***

When the TXVECTOR parameter LTF\_SEQUENCE is present, Secure HE-LTFs as defined in subclause 27.3.17d are used and the Packet Extension field will be partially replaced by a zero power GI in its first 1.6 μs, see Figure 27-52f (HE TB Ranging NDP format with Secure HE LTFs). The repetitions of the HE-LTF symbols are repetition of the structure for HE-LTF fields. The randomized HE-LTF sequences are different for HE-LTF repetitions. (#2357)

***TGaz Editor: Change the text in az D1.5 P188L1 as follows***

 **Table 27-1—TXVECTOR and RXVECTOR parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| NUM\_USERS | ~~FORMAT is HE\_SU, APEP\_LENGTH is 0, and LTF\_SEQUENCE is present~~FORMAT is HE\_SU, RANGING\_FLAG is 1, and LTF\_SEQUENCE is present | Indicating the number of users of an HE Ranging NDP with randomized LTF sequence. (#2359)If NUM\_USERS is larger than 1, NUM\_STS, LTF\_REP, and LTF\_SEQUENCE will be MU  | O | N |
| … | …  | … | … |

**CID 1302, 1340, 1371, 2516**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1302 | 511.01 | Missing a formula describing how the Secure LTF is modulated. Especially missing is the 0 GI. Formula should be similar to eq-28-58 in TGax D3.0 | add the missing formula | Rejected.The HE-LTF waveform equation (eq 27-58) can be reused for each repetition of secure LTF with new input parameters of spatial mapping matrix, zero cyclic shift value and randomized HE-LTF sequence etc. New equation is not needed. (Eq 27-58) is a super set for all HE-LTF and secure HE-LTFs.  |
| 1340 | 158.05 | HE Ranging NDP is NOT a variant of SU PPDU since in the following texts mulitiple user support is discussed | as in the comment | Rejected. See resolution for CID 2363 in 11-19/1479r3. |
| 1371 | 150.01 | Using Repetitions of HE-LTF via "LTF\_REP" adds too much overhead and could increase the error due to clock drift. This feature should be removed. | Remove the entry "LTF\_REP" from Table 28-2a and all text associated with LTF\_REP. | Reject.HE-LTF repetition can improve the accuracy and can be used for consistency check for secure HE-LTFs. |
| 2516 | 150.01 | LTF sequence gneration information is not defined in 9.4.2.251 or 9.4.2.280. | Define it. | Revised.Agree in principle. LTF sequence generation information is already clarified in D1.5. Refer to 27.3.17c and 27.3.17d. |

**References:**