IEEE P802.11
Wireless LANs

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| LB240 comment and resolution for Service interface and PPDU format |
| Date: 2019-09-12 |
| Author(s): |
| Name | Affiliation | Address | Phone | Email |
| Tianyu Wu | Apple |  |  | tianyu@apple.com |

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.

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. See resolution for CID 1172. Merging 11az TXVECTOR/RXVECTOR with 11ax should avoid conflict with 11ax. 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. Example: After merge into 11ax TXVECTOR/RXVECTOR, non-az 11ax devices will be confused on defining LTF\_SEQUENCE and LTF\_OFFSET etc for FORMAT = HE\_SU and APEP\_LENGTH = 0 which is HE Sounding NDP as defined in 11ax D4.3 pp382ln8:“The TXVECTOR parameters for an HE sounding NDP shall be set as follows: — FORMAT is set to HE\_SU— APEP\_LENGTH is set to 0”Propose to define new FORMAT value to indicate HE Ranging NDP and HE TB Ranging NDP PPDU. **TGaz Editor:** Please make changes to IEEE P802.11az D1.4 according to the proposed text changes as resolution to CID 2502 in 11-19/1677r0 |
| 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 D1.4 P178L1 as follows:***

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| FORMAT |  | Determines the format of the PPDU. Enumerated type: NON\_HT indicates Clause 15, Clause 16, Clause 17, Clause 18 or non-HT duplicate PPDU format. In this case, the modulation is determined by the NON\_HT\_MODULA- TION parameter.HT\_MF indicates HT-mixed format.HT\_GF indicates HT-greenfield format.VHT indicates VHT format.HE\_SU indicates HE SU PPDU format.HE\_MU indicates HE MU PPDU format.HE\_ER\_SU indicates HE ER SU PPDU format.HE\_TB indicates HE TB PPDU format. HE\_RANGING indicates HE Ranging NDP PPDU format.HE\_TB\_RANGING indicates HE TB Ranging NDP PPDU format. | Y | Y |
|  | (...existing fields...) |
| LTF\_SEQUENCE | ~~FORMAT is either HE\_SU or HE\_TB and APEP\_LENGTH is 0~~ FORMAT is either HE\_RANGING or HE\_TB\_RANGING |  |  |  |

 ***TGaz Editor: Please replace***

***“HE\_SU and APEP\_LENGTH is 0” by “HE\_RANGING”***

***“HE\_TB and APEP\_LENGTH is 0” by “HE\_TB\_RANGING”***

***“HE\_SU or HE\_TB and APEP\_LENGTH is 0” by “HE\_RANGING or HE\_TB\_RANGING”***

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. LTF\_N\_STS field is needed in TXVECTOR but existing description is not accurate. Tx MAC use this field to indicate the number of space-time steams in each HE-LTF repetition to the PHY. For secured Ranging NDP, one LTF\_N\_STS is needed for each user. Also, this field does not exist in table 21-1. Change the “otherwise” part to not present. **TGaz Editor:** Please make changes to IEEE P802.11az D1.4 according to the proposed text changes as resolution to CID 1298 in 11-19/1677r0 |
| 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 HE-LTF segments 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 D1.4 according to the proposed text changes as resolution to CID 1299 in 11-19/1677r0 |

***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 D1.4 P178L1 as follows***

 **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~~FORMAT is HE\_RANGING or HE\_TB\_RANGING | ~~Indicate the number of space-time streams to receive in the following HE Ranging NDP or the following HE TB Ranging NDP .~~ Indicate the number of space-time streams. (#1298)Set to the number of space-time streams minus 1.  | O | N |
| Otherwise  | ~~See corresponding entry in Table 21-1 (TXVECTOR and RXVECTOR parameters).~~ Not present. | N | N |
| LTF\_REP  | ~~FORMAT is either HE\_SU or HE\_TB and APEP\_LENGTH is 0~~FORMAT is HE\_RANGING or HE\_TB\_RANGING | ~~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 | Rejected.Already fixed in D1.4.  |
| 1322 | 150.07 | "HEz TB sounding " -> "TB sounding" | as in comment | Rejected.Already fixed in D1.4.  |
| 2324 | 147.00 | How to use LTF\_SEQUENCE appearing twice in the same table? | Please clarify or consolidate them. | Revised. There is a redundant LTF\_SEQUENCE field in the table. Removed the 2nd LTF\_SEQUENCE field in the table. 11-19/1624 also proposed similar change to the spec. **TGaz Editor:** Please make changes to IEEE P802.11az D1.4 according to the proposed text changes as resolution to CID 2324 in 11-19/1677r0 |
| 2353 | 147.01 | There are duplicate fields of LTF\_SEQUENCE in TXVECTOR and RXVECTOR parameters table. | Remove the first field of LTF\_SEQUENCE. | Revised.See resolution for CID 2324. |
| 2510 | 147.01 | LTF\_SEQUENCE is defined twice in TXVECTOR. | Fix it. | Revised. See resolution for CID 2324.  |
| 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. | Rejected.“HEz” is an old acronym for 11az Ranging NDP. In D1.4, this problem is already fixed.  |

***TGaz Editor: Change the text in az D1.4 P179L1 as follows***

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| ~~LTF\_SEQUENCE~~ | ~~FORMAT is either HE\_SU or HE\_TB and APEP\_LENGTH is 0~~  | ~~Indicates the Secure LTF Counter (#2289) to generate the randomized LTF sequence used in the HE Ranging NDP and HE TB Ranging NDP.~~ ~~The Secure LTF Counter (#2289) is defined in 9.4.2.280 (Secure LTF Parameters).~~  | ~~O~~ | ~~N~~ |
| ~~Otherwise~~ | ~~Not present~~  | ~~N~~ | ~~N~~ |

**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 and HE\_TB\_RANGING. **TGaz Editor:** Please make changes to IEEE P802.11az D1.4 according to the proposed text changes as resolution to CID 2356 in 11-19/1677r0 |
| 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 D1.4 according to the proposed text changes as resolution to CID 2357 in 11-19/1677r0 |
| 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 D1.4 according to the proposed text changes as resolution to CID 2359 in 11-19/1677r0 |
| 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 D1.4 P179L1 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\_N\_STS”, “LTF\_REP”***

***TGaz Editor: Change the text in az D1.4 P184L22 as follows***

When the TXVECTOR parameter LTF\_SEQUENCE is present and the NUM\_USERS parameter is larger than 1, the TXVECTOR parameters LTF\_SEQUENCE, N\_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 segments. The randomized HE-LTF sequences are different for HE-LTF repetitions. (#2357)

***TGaz Editor: Change the text in az D1.4 P185L23 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 segments. The randomized HE-LTF sequences are different for HE-LTF repetitions. (#2357)

***TGaz Editor: Change the text in az D1.4 P180L1 as follows***

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| NUM\_USERS | FORMAT is HE\_RANGING 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.  |
| 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 is used for consistent 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. | Rejected. LTF sequence generation information is already clarified in D1.4.  |

**References:**