IEEE P802.11
Wireless LANs

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| CR for Some PHY Related CIDs in LB249 |
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Abstract

This submission addresses the following CIDs in LB249: 3128, 3129, 3892, 3629, 3271

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| CID | Page | Clause  | Comment | Proposed Change | Resolution |
| 3128 | 205 | 27.3.17c | It is not clear if spec should indicate the Ntx in Secure R2I NDP to be the same for all users even if Nsts between users are different. | Add as a NOTE that Ntx can stay the same during secure R2I NDP transmissions while Qmatrix is used to de-select Nsts i.e., hence Ntx | Revised TGaz editor makes changes as specified in 11-20/0759r1 for CID 3128 |

**Discussions:**

There are two options for the mapping of the Ntx and Nsts.

**Option 1**: The transmitter can use spatial expansion matrix Qmatrix to mapp the Ntx antennas to Nsts spatial streams. The definition of spatial expansion matrix is in 19.3.11.11.2 Spatial mapping. For this case Nsts<=Ntx. This option aligns with the NDP design in 11ax.

When there is AWGN channel beween the transmitter and receiver, the signals from two antennas sending the same spatial stream may coherently add togher or cancel each other. But in the real scenario, this situation should rarely happen due to the multi-path effect.

**Option 2**: The transmitter always uses Nsts antennas for NDP transmission and for this case Nsts=Ntx and Q matrix is identity matrix. This option needs some change compared with 11ax spec.

In the secured TB ranging, for R2I secured NDP with LTF field with different Nsts, the RSTA’s Tx antennas will need to swith between on and off states across different LTF fields. For example, first user’s LTF field use Nsts=Ntx=2 and the second user’s LTF field uses Nsts=Ntx=4. This may add additional complexity at RSTA’s RF design.

**Proposed Changes**

*TGaz Editor: please change the lines 8-13 on page 202 of 11az D2.0 as below:*

The HE Ranging NDP has the following properties:

— Uses the HE SU PPDU format but without the Data field. 7

— No beamforming steering matrix is applied to the waveform, the Beamformed field in HE-SIG-A of a Ranging NDP is always set to zero. The Q matrix is a sptial expansion matrix to map the Nsts spatial streams to Ntx antennas. For transmission of Passive TB Ranging with dot11PassiveTBRangingAoDImplemented set to 1, when NSTS = NTx, Q matrix is an Identity matrix, and when NSTS < NTx, Q matrix is antenna selection matrix with no antenna swapping. Q matrix becomes an Identity matrix when all 0 rows are 12 removed. (#**2302**)

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| 3129 | 205 | 27.3.17c | Specify that TX power would need to stay the same throughout the SU HE NDP transmission when some of the chains will not be in use in the case when Ntx>Nsts as controlled by Qmatrix. | As per comment | RevisedTGaz editor makes changes as specified in 11-20/0759r1 for CID 3128  |

**Discussions:**

In the secured TB ranging, when the RSTA sends R2I NDP to more than one ISTA, the sum Tx power across Nsts for each HE-LTF field shall be kept the same to avoid the ISTA’s AGC setting issue.

**Proposed Changes**

*TGaz Editor: please change the last paragraph of section 27.3.17a HE Ranging NDP on page 203 of 11az D2.0 as below:*

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.

The Secure HE-LTF for each user are concatenated one after another to a maximum of 64 Secure HE-LTF. The sum Tx power across all the Nsts in each user’s secure HE-LTF field shall stay the same.

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| 3892 | 202 | 27.3.17a | For NTB ranging consider including NDPA parameters like I2R/R2I N\_rep, Nsts, ltf-offset in HE-SIGA too. This will simplify receiver implementation. Receiver can look at HESIGA instead of NDPA (no need to buffer parameters) | As per comment | RejectedRefer to submission 11-20-0759-02. The TGaz group discussed the topic and no concensus was achieved.  |

**Discussions:**

In the 11az, NTB ranging, the user info field in NDPA includes Nsts for I2R NDP and Nsts for R2I NDP and R2I Rep and I2R Rep, and the Offset is always set to 0. For the HE-SIG-A of the R2I NDP or I2R NDP, the NSTS And Midamble Periodicity should be set accord to the values indicated in NDPA and the receiver only needs to buffer the single parameter I2R Rep or the parameter R2I Rep.

If the HE-SIG-A is used to indicate I2R Rep or R2I Rep, this will not work for the secured TB ranging mode, since in secured TB ranging, the ISTA still needs to buffer the R2I Rep based on the NDPA frame. This will create NTB mode and TB mode for the ISTA and complicate the hardware design at ISTA side.

A similar proposal was discussed in TGaz ad hoc meeting June, 2019 (802.11-19/1046r0), and the straw poll was not passed.

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| 3629 | 199 | 27.2.2 | LTF\_OFFSET - not needed in RxVector nor TxVector | Remove from Table 27-1--TXVECTOR and RXVECTOR parameters | Accepted TGaz editor makes changes as specified in 11-20/0759r1 for CID 3629 |

*TGaz Editor: please remove the first rows on page 199 of Table 27-1 TXVECTOR and RXVECTOR parameters of 11az D2.0 as below:*

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

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| **Parameter**  | **Condition** | **Value**  | **TXVECTOR**  | **RXVECTOR**  |
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| 3271 | 202 | 27.3.17a | "... and TXVECTOR parameter LTF\_OFFSET that indicates the number of HE-LTF to skip to receive" there is no TXVECTOR parameter LTF\_OFFSET, since it is not used in transmission. Also this statement should appear later after LTF\_REP and the secure HE-LTF structure have been described. | Remove this whole bullet point, instead add a paragraph at the end of the subclause "For decoding the HE-LTF fields, a PHY-RXLTFSEQUENCE.request primitive issued from the MAC provides the LTF\_REP parameter and LTF\_OFFSET parameter, which are not encoded in the HE-SIG-A, but included in the preceeding Ranging NDP Announcement frame. The LTF\_OFFSET parameter indicates the number of secure HE-LTF to skip to receive for each user, e.g., in Figure 27-52d the LTF\_OFFSET for the first and second user would be 0 and 4 respectively." | RevisedAgree in principle with the commentor.TGaz editor makes changes as specified in 11-20/0759r1 for CID 3271 |

*TGaz Editor: please remove the lines 22-26 on page 202 of 11az D2.0 as below:*

— The TXVECTOR parameter LTF\_REP that indicates the number of repetitions of the HE-LTF symbols . For decoding the HE-LTF fields, a PHY-RXLTFSEQUENCE.request primitive issued from the MAC provides the LTF\_REP parameter and LTF\_OFFSET parameter, which are not encoded in the HE-SIG-A, but included in the preceeding Ranging NDP Announcement frame. The LTF\_OFFSET parameter indicates the number of secure HE-LTF symbols to skip for receiving the corresponding user’s HE-LTF field, e.g., in Figure 27-52d the LTF\_OFFSET for the first and second user would be 0 and 4 respectively.