IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Comment Resolution SA1 – LTF Vector | | | | |
| Date: 2022-03-02 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Christian Berger | NXP | 350 Holger Way, San Jose, CA |  | [christian.berger@nxp.com](mailto:christian.berger@nxp.com) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes the comment resolution of CIDs 7095; as part of SA1, changes are relative to Draft 4.1.

Revisions:

1. Include feedback during presentation
2. Incorporating more feedback

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 TGax 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.***

**The text preceded by “Discussion” is not part of the adopted changes.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| **7095** | 232.0 | 27.2.2 | Why is LTF\_KEY optional in TXVECTOR? Does this mean that one can transmit a secure LTF ranging NDP without using LTF\_KEY? | Change "O" to "Y" in the TXVECTOR column in the LTF\_KEY row. | **Revised**  The change to P802.11az draft already incorporated as part of D4.1, hence no further change needed. Refer to submission [https://mentor.ieee.org/802.11/dcn/21/11-21-1875-01-00az-comment-resolution-sa1-txvector.docx](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fmentor.ieee.org%2F802.11%2Fdcn%2F21%2F11-21-1875-01-00az-comment-resolution-sa1-txvector.docx&data=04%7C01%7Cchristian.berger%40nxp.com%7C6a8a0b0877874200485d08d9fc75f12f%7C686ea1d3bc2b4c6fa92cd99c5c301635%7C0%7C1%7C637818405925560356%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000&sdata=NkYwxQdmhWMha%2BT0v4f47Co5nfeb%2BuFW8fF3kADYyaM%3D&reserved=0)  TGaz editor add 7095 to list of CIDs updated in table 27-1 in P.231L.2.  TGaz editor change D4.1 P.170L.25 LTFVECOR to LTFVECTOR. |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Discussion:**

The PHY-RXLTFSEQUENCE.request is a PHY SAP service primitive that basically passes the LTFVECTOR to the PHY which carries similar information as in the TXVECTOR that the PHY needs to receive/process the HE Ranging NDP and HE TB Ranging NDP.

In some parts of the document, it seems that the PHY-RXLTFSEQUENCE.request is only used with Secure HE-LTF, when in fact for regular HE-LTF we still need to communicate the number of HE-LTF repetitions that is not part of the HE SIG-A.

Changes:

* Clarify in several places that the PHY-RXLTFSEQUENCE.request is not only used for Secure HE-LTF
* Change that most parameters in the LTFVECTOR are only present when used for Secure HE-LTF
* Add text in the TB and Non-TB Ranging Measurement Exchange that states what parameters are passed to the PHY
* Change the sections on Secure HE-LTF to state more explicitly what parameters are passed
* Remove part of the Secure HE-LTF section how to set PHY-RXLTFSEQUENCE.request when the SAC is wrong; since this is purely for reception, no security risk is caused by sending the true values to our PHY

8.3.4.3 PHY SAP service primitives parameters

TGaz Editor: Change text on page 40 starting at line 2 as follows and update Table 8-3

***Modify Table 8-3 of REVme\_D0.0 by adding a new row for the “LTFVECTOR” parameter and the related text and change to “RXERROR” parameter. The proposed modifications are in reference to the text in REVme\_D0.0, and are indicated by the change marks as follows: (#1058, #7095)***

Table [8-3](#T08o3) (PHY SAP service primitive parameters) shows the parameters used by one or more of the PHY SAP service primitives.

1. Table 8-3—PHY SAP service primitive parameters

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Associated primitive** | **Value** |
| RXERROR | PHY-RXEND.indication | NoError, FormatViolation,  CarrierLost, UnsupportedRate,  Filtered, IntegrityCheckError (#**3844**) |
| IPI-STATE | PHY-CCARESET.request  PHY-CCARESET.confirm | IPI-ON, IPI-OFF |
| IPI-REPORT | PHY-CCA.indication  PHY-CCARESET.confirm | A set of IPI values for the preceding  time interval |
| PHYCONFIG\_VECTOR | PHY-CONFIG | A set of parameters |
| TXSTATUS | PHY-TXSTART.confirm | A set of parameters |
| USER\_INDEX | PHY-DATA.request | 0 to TXVECTOR parameter  NUM\_USERS - 1 |
| LTFVECTOR | PHY-RXLTFSEQUENCE.request | A set of parameters needed to receive and process the HE Ranging NDP and HE TB Ranging NDP (see Table [27-2a](#T27o2a) (LTFVECTOR parameters)). (#**2289**,#**3761, #7095**) |

TGaz Editor: Change text on page 42 starting at line 1 as follows

***Insert the following new clauses:***

8.3.5.18 PHY-RXLTFSEQUENCE.request

8.3.5.18.1 Function

This primitive is a request by the MAC sublayer to the local PHY entity to provide the **(#2289)** parameters shown in Table [27-2a](#T27o2a) (LTFVECTOR parameters) for the receipt of an HE Ranging NDP or HE TB Ranging NDP (**#2415**, #**3099).**

8.3.5.18.2 Semantics of the service primitive

This primitive provides the following parameter:

PHY-RXLTFSEQUENCE.request(

LTFVECTOR

)

The LTFVECTOR represents a list of parameters needed to receive an HE Ranging NDP or HE TB Ranging NDP, including the HE-LTF configuration and information on how to generate the Secure HE-LTF symbols as described in [27.3.18d](#H27o3o18d) (Construction of Secure HE-LTF).

8.3.5.18.3 When generated

This primitive is issued by the MAC sublayer to the PHY entity before receiving HE Ranging NDP and HE TB Ranging NDP.

8.3.5.18.4 Effect of receipt

The effect of receipt of this primitive by the PHY entity is to be aware of the number of spatial streams and HE-LTF repetitions that are not signalled in the HE SIG-A of the HE Ranging NDP and HE TB Ranging NDP, as well as to be able to generate the Secure HE-LTF symbols based on the parameters in LTFVECTOR as described in [27.3.18](#H27o3o18d)a.4 (Construction of Secure HE-LTF), if Secure LTF is used.

11.21.6.4.3.3 Measurement sounding phase of TB ranging

TGaz Editor: Add the following paragraphs on page 153 at line 20 as follows

After transmission of the TF Ranging Sounding, the RSTA’s MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with an LTFVECTOR containing the following parameters :

* the SECURE\_LTF\_FLAG parameter set to 0, and
* the LTF\_N\_STS and LTF\_REP parameter vectors set to the same values as indicated, respectively, by the SS Allocation and I2R Rep subfields of all the User Info fields.

TGaz Editor: Add the following paragraphs on page 153 at line 33 as follows

After reception of the Ranging NDP Announcement frame, the ISTAs’ MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with an LTFVECTOR containing the following parameters :

* the SECURE\_LTF\_FLAG parameter set to 0, and
* the LTF\_N\_STS and LTF\_REP parameters set to the same values as indicated, respectively, by the R2I N\_STS and R2I Rep subfields of the STA Info field addressed to it.

11.21.6.4.4.2 Measurement sounding phase of non-TB ranging

TGaz Editor: Add the following paragraphs on page 162 at line 6 as follows

After transmission of the Ranging NDP Announcement frame, the ISTA’s MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with a LTFVECTOR containing the following parameters :

* the SECURE\_LTF\_FLAG parameter set to 0, and
* the LTF\_N\_STS and LTF\_REP parameters set to the same values as indicated, respectively, by the R2I N\_STS and R2I Rep subfields in the STA Info field with the AID11 subfield less than 2008.

After reception of the Ranging NDP Announcement frame, the RSTA’s MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with a LTFVECTOR containing the following parameters:

* the SECURE\_LTF\_FLAG parameter set to 0, and
* the LTF\_N\_STS and LTF\_REP parameters set to the same values as indicated, respectively, by the I2R N\_STS and I2R Rep subfields in the STA Info field with the AID11 subfield less than 2008.

11.21.6.4.5.2 TB ranging measurement exchange with secure LTF

TGaz Editor: Change the following paragraphs on page 168 at line 21 as follows

After transmission of the Secure Sounding Ranging Trigger frame to the ISTA, the RSTA’s MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with a LTFVECTOR containing the following parameters:

* the SECURE\_LTF\_FLAG parameter set to 1,
* the LTF\_N\_STS and LTF\_REP parameters set to the same values, respectively, as indicated by the SS Allocation and I2R Rep subfields of the User Info field,
* the LTF\_KEY and LTF\_IV parameters that are set to ista-ltf-key and ltf-iv for generating the secure HE-LTF based on the value of (#1830, #1832, #3124, #3754) the Secure LTF Counter subfield (#2289) in the Secure LTF Parameters element in the last transmitted protected IFTM frame or last transmitted protected LMR frame to the ISTA; see 11.21.6.4.5.4 (Secure LTF octet stream generation),
* the TX\_WINDOW\_FLAG set to 1 if the RSTA and ISTA have negotiated to use the optional frequency domain Tx window for I2R NDP; it is set to 0 otherwise,
* the LTF\_OFFSET set to 0.

TGaz Editor: Change the following paragraphs on page 169 at line 33 as follows

When an ISTA receives a Secure Sounding Ranging Trigger frame from an RSTA in which the value of the SAC subfield in the Trigger Dependent User Info field is equal to the value of the Validation SAC subfield in the Secure LTF Parameters element in the last protected IFTM frame, or last protected LMR frame, received from the RSTA, the ISTA shall send an HE TB Ranging NDP with the TXVECTOR parameters LTF\_KEY and LTF\_IV that are set to *ista-ltf-key* and *ltf-iv* for generating the secure HE-LTF based on (#**1830**, #**1832**) the value of the Secure LTF Counter subfield (#**2289**) and the corresponding Validation SAC (#**3123**) subfield, in the Secure LTF Parameters element in the last protected IFTM frame, or last protected LMR frame, received from the RSTA; see [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF octet stream generation).

When an ISTA receives a Secure Sounding Ranging Trigger frame from an RSTA in which the value of the SAC subfield in the Trigger Dependent User Info field is not equal to the value of the Validation SAC subfield in the Secure LTF Parameters element in the last protected IFTM frame or last protected LMR frame received from the RSTA, the ISTA shall send an HE TB Ranging NDP with the TXVECTOR parameters LTF\_KEY and LTF\_IV that are set to (#**2289**) the *ista-ltf-key* and *ltf-iv* for generating any secure HE-LTF (#**3124**, #**1828**, #**1831**).

When an ISTA receives a Ranging NDP Announcement frame from an RSTA in which the AID11/RSID11 subfield in the STA Info field contains the 11 least significant bits of the AID or RSID of the ISTA, the ISTA shall issue a PHY-RXLTFSEQUENCE.request primitive with the following LTFVECOR parameters:

* the SECURE\_LTF\_FLAG parameter set to 1,
* the LTF\_N\_STS, LTF\_REP, and LTF\_OFFSET parameters set to the same values, respectively, as indicated by the R2I N\_STS, R2I Rep and LTF Offset subfields of the STA Info field addressed to it,
* the LTF\_KEY and LTF\_IV parameters that are set to the *rsta-ltf-key* and *ltf-iv* for generating the secure HE-LTFbased on (#**1830**, #**1832)** the value of the Secure LTF Counter subfield (#**2289**)in the Secure LTF Parameters element in the last protected IFTM frame, or last protected LMR frame received from the RSTA; see [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF octet stream generation), and
* the TX\_WINDOW\_FLAG set to 1 if the ISTA and RSTA have negotiated to use the optional frequency domain Tx window for R2I NDP; it is set to 0 otherwise,

11.21.6.4.5.3 Non-TB ranging measurement exchange with secure LTF

TGaz Editor: Change the following paragraphs on page 174 at line 13 as follows

An ISTA that sends an I2R NDP a SIFS after transmission of the Ranging NDP Announcement frame shall set the TXVECTOR parameters LTF\_KEY and LTF\_IV these are set as follows:

* Either (#**3754**) to the value of Null-SAC-HE-LTF, (#**1828**, #**1831**) if the SAC subfield in the STA Info field with AID equal to 2043 in the Ranging NDP Announcement frame, is equal to 0 (#**3124**);
* Or the *ista-ltf-key* and *ltf-iv* for generating secure HE-LTF based on (#**1830**, #**1832**) the values of the Secure LTF Counter (#**2289**) and the corresponding Validation SAC subfields in the Secure LTF Parameters element in the last protected IFTM frame or last protected LMR frame, received from the RSTA; see [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF octet stream generation). (#**3123**)

After transmission of the Ranging NDP Announcement frame to the RSTA, the ISTA’s MAC sublayer shall issue a PHY-RXLTFSEQUENCE.request primitive with an LTFVECTOR containing the following parameters (#**2289**):

* the SECURE\_LTF\_FLAG parameter set to 1,
* the LTF\_N\_STS and LTF\_REP parameters set to the same values as indicated, respectively, by the R2I N\_STS and R2I Rep subfields in the STA Info field with the AID11 subfield less than 2008,
* the LTF\_KEY and LTF\_IV parameters that are set to either (#**3754**) the values based on the Null-SAC-HE-LTF, (#**1828**, #**1831**) if the SAC subfield in the STA Info field with AID equal to 2043 in the Ranging NDP Announcement frame is equal to 0; or the *rsta-ltf-key* and *ltf-iv* for generating the secure HE-LTF based on (#**1830**, #**1832**) the values of the Secure LTF Counter subfield in the Secure LTF Parameters element in the last protected IFTM frame, or last protected LMR frame received, from the RSTA; see [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF octet stream generation). (#**3123**)
* the TX\_WINDOW\_FLAG set to 1 if the ISTA and RSTA have negotiated to use the optional frequency domain Tx window for R2I NDP; it is set to 0 otherwise, and
* the LTF\_OFFSET set to 0.

When an RSTA receives a Ranging NDP Announcement frame from an ISTA in which the SAC subfield in the STA Info field with AID equal to 2043 is not equal to the value of the Validation SAC subfield in the Secure LTF Parameters element in the last transmitted protected IFTM frame or last transmitted protected LMR frame to the ISTA, the RSTA shall:

* Send an HE Ranging NDP to the ISTA with the TXVECTOR parameters r*sta-ltf-key* and *ltf-iv* for generating any secure HE-LTF (#**1828**, #**1831**) to the ISTA, only if the RSTA receives an HE Ranging NDP from the ISTA a SIFS after the ranging NDP Announcement frame;
* Send a protected LMR frame with a Secure LTF Parameters element containing the SEC\_LTF\_CTR and the corresponding LTF\_VALID\_SAC parameters to the ISTA, only if the RSTA receives an HE Ranging NDP from the ISTA a SIFS after the ranging NDP Announcement frame.
* When an RSTA receives a Ranging NDP Announcement frame from an ISTA in which the value of the SAC subfield in the STA Info field with AID equal to 2043 is equal to the value of the Validation SAC subfield in the Secure LTF Parameters element in the last transmitted protected IFTM frame or last transmitted protected LMR frame to the ISTA, the RSTA shall:
* Send an HE Ranging NDP with the TXVECTOR parameters *rsta-ltf-key* and *ltf-iv* for generating a secure HE-LTF based on the values of the (#**1830,** #**1832**) Secure LTF Counter (#**2289**) in the Secure LTF Parameters element in the last transmitted protected IFTM frame, or last transmitted protected LMR frame to the ISTA, only if the RSTA receives an HE Ranging NDP from the ISTA a SIFS after the ranging NDP Announcement frame; see [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF octet stream generation);
* Send a protected LMR frame that includes the Secure LTF Parameters element to the ISTA, only if the RSTA receives an HE Ranging NDP from the ISTA a SIFS after the ranging NDP Announcement frame.

When an RSTA receives a Ranging NDP Announcement frame from an ISTA, the RSTA shall also inwith the following :

* the SECURE\_LTF\_FLAG parameter set to 1,
* the LTF\_N\_STS and LTF\_REP parameters set to the same values as indicated, respectively, by the I2R N\_STS and I2R Rep subfields in the STA Info field with the AID11 subfield less than 2008,
* the LTF\_KEY and LTF\_IV parameters that are set to the
* the TX\_WINDOW\_FLAG set to 1 if the ISTA and RSTA have negotiated to use the optional frequency domain Tx window for R2I NDP; it is set to 0 otherwise, and
* the LTF\_OFFSET set to 0.

27.2.3a LTFVECTOR parameters

TGaz Editor: Change Table 27-2a on page 235 as follows

|  |  |
| --- | --- |
| Table 27-2a—LTFVECTOR parameters | |
| Parameter | Value |
| LTF\_KEY | Included when SECURE\_LTF\_FLAG is set to one.  Contains the *rsta-ltf-key* or *ista-ltf-key* (See [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF octet stream generation)) when receiving the secure HE-LTFs  (#**2289**, #**1828**, #**1831**). |
| LTF\_IV | Included when SECURE\_LTF\_FLAG is set to one.  Contains the *ltf-iv* (See [11.21.6.4.5.4](#H11o21o6o4o5o4) (Secure LTF 0ctet stream generation)) for secure HE-LTFs or null otherwise. |
| LTF\_OFFSET | Included when SECURE\_LTF\_FLAG is set to one.  Indicates the number of HE-LTF to skip to receive in the following HE Ranging NDP. |
| LTF\_N\_STS | Indicate the number of space-time streams to receive in the following HE Ranging NDP or the following HE TB Ranging NDP. |
| LTF\_REP | Indicate the number of repetitions of the HE-LTF repetitions to receive in the following HE Ranging NDP or the following HE TB Ranging NDP. (#**5435**, #**5452**, #**5476**) |
| SECURE\_LTF\_FLAG | Set to one when the HE Ranging NDP or HE TB Ranging NDP will use Secure HE-LTF. |
| TX\_WINDOW\_FLAG | Included when SECURE\_LTF\_FLAG is set to one.  Set to one when the secure HE-LTF of an HE Ranging NDP or HE TB Ranging NDP will use the optional frequency domain Tx Window. (#**5215**) |