IEEE P802.11
Wireless LANs

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| Spec Text Proposal for Pre-FEC Padding Factor Parameter  |
| Date: 2020-09-17 |
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Abstract

This contribution provisions with proposal to add a TXVECTOR parameter PRE\_FEC\_PADDING\_FACTOR for MAC to transfer the Pre-FEC Padding Factor parameter to PHY and for PHY to complete the Pre-FEC Padding process. This contribution also provides spec text modification for IEEE P802.11ax accordingly.

Revisions:

* R0, comment resolutions initial draft.
* R1, add PSDU\_LENGTH[] issue description.
* R2, added updates to 26.5.2.3.3 and updated Table 27-1

**Issue Description:**

In current IEEE P802.11ax D6.1, a Pre-FEC Padding process is introduced which contains both MAC and PHY operation sequentially, as defined in sub-clause 27.3.12.2 (Pre-FEC padding process).

“*A two-step padding process is applied to an HE PPDU. A pre-FEC padding process including both pre-FEC MAC and pre-FEC PHY padding is applied before conducting FEC coding, and a post-FEC PHY padding process is applied on the FEC encoded bits.*”

For PHY to proceed the Pre-FEC PHY padding process, a parameter “Pre-FEC Padding Factor” will be used to decide the specific padding bits, as defined in sub-clause 27.3.12.2 (Pre-FEC padding process). For HE SU PPDU, HE ER SU PPDU and HE MU PPDU, the parameter Pre-FEC Padding Factor, *ainit*is calculated from TXVECTOR parameter “APEP\_LENGTH” together with other PHY parameters. But for HE TB PPDU, as defined in sub-clause 27.3.12.5.5 (Encoding process for an HE TB PPDU), when TRIGGER\_METHOD is TRIGGER\_FRAME, *ainit* is decided by the value of Pre-FEC Padding Factor subfield in the Trigger Frame. When TRIGGER\_METHOD is TRS, *ainit* =4.

While in current IEEE P802.11ax D6.1, there’s no such a TXVECTOR to pass the value of Pre-FEC Padding Factor subfield in the Trigger Frame from MAC to PHY. Therefore a TXVECTOR parameter is needed in HE TB PPDU case, for MAC to inform PHY the value of Pre-FEC Padding Factor subfield.

Another issue is the description for PSDU\_LENGTH[] in sub-clause 6.5.6.2 needs to be updated for HE PPDUs. In 11ac, the array size of PSDU\_LENGTH[] is determined by TXVECTOR parameter NUM\_USERs. While for HE MU PPDU, the size of PSDU\_LENGTH[] array is determined by TXVECTOR parameter RU\_ALLOCATION and STA\_ID.

**Proposed spec text modification:**

***TGax Editor: please implement following modification to sub-clause 6.5.6.2 (Semantics of the service primitive) in IEEE P802.11ax D7.0.***

6.5 PLME SAP interface

6.5.6 PLME-TXTIME.confirm

6.5.6.2 Semantics of the service primitive

***Change the 2nd and 3rd paragraph as follows:***

The TXTIME represents the time, in microseconds, required to transmit the PPDU described in the corresponding PLME-TXTIME.request primitive. If the calculated time includes a fractional microsecond and the TXVECTOR parameter FORMAT in the corresponding PLME-TXTIME.request primitive is not HE\_SU, HE\_MU, HE\_TB or HE\_ER\_SU, a non-DMG STA rounds the TXTIME value to the next higher integer. A non-DMG STA does not round the TXTIME value up or down if the TXVECTOR parameter FORMAT in the corresponding PLME-TXTIME.request primitive is HE\_SU, HE\_MU, HE\_TB or HE\_ER\_SU. A DMG STA does not round the TXTIME value up or down (see 20.11.3 (TXTIME calculation)).

The PSDU\_LENGTH[] parameter is an array of size TXVECTOR parameter NUM\_USERS if the TXVECTOR FORMAT parameter is VHT. If the TXVECTOR FORMAT parameter is HE\_SU, HE\_ER and HE\_TB, the size of the parameter PSDU\_LENGTH[] array is always 1. If the TXVECTOR FORMAT parameter is HE\_MU, the size of the parameter PSDU\_LENGTH[] array is determined by TXVECTOR parameter RU\_ALLOCATION and STA\_ID. Each value in the array indicates the number of octets required to fill the PPDU for the user represented by that array index. The parameter is present only when the TXVECTOR FORMAT parameter is VHT, HE\_SU, HE\_ER\_SU, HE\_MU or HE\_TB.

***TGax Editor: Please add the following at IEEE P802.11ax D7.0 P378L8:***

26.5.2.3.3 TXVECTOR parameters for HE TB PPDU response to Trigger frame

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* The HE\_TB\_PE\_DISAMBIGUITY parameter is set to the value indicated by the PE Disambiguity subfield in the Common Info field in the Trigger frame.
* PRE\_FEC\_PADDING\_FACTOR parameter is set to the value indicated by the Pre-FEC Padding Factor subfield in the Common Info field in the Trigger frame

***TGax Editor: please add following entry into Table 27-1 (TXVECTOR and RXVECTOR parameters) in IEEE P802.11ax D7.0:***

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
|  | … |  |  |  |
| PRE\_FEC\_PADDING\_FACTOR | FORMAT is HE\_TB and TRIGGER\_METHOD is TRIGGER\_FRAME | Indicates the pre-FEC padding factor used by the HE TB PPDU transmission. | Y | N |
| Otherwise | Not present | N | N |
| … | … |  |  |  |

***TGax Editor: please update the spec text at pg643/ln61 in sub-clause 27.3.12.5.5 (Encoding process for an HE TB PPDU) in IEEE P802.11ax D7.0 as proposed below****:*

For an HE TB PPDU with BCC encoding, follow the HE SU PPDU padding and encoding process as introduced in 27.3.12.2 (Pre-FEC padding process), 27.3.12.5.1 (BCC coding and puncturing), and 27.3.12.5.3 (Post-FEC padding) with initial parameters as follows:

— If the TXVECTOR parameter TRIGGER\_METHOD is TRIGGER\_FRAME, the initial parameters are *NSYM,init* = *NSYM*, and *ainit* = *a*, where *a* is the TXVECTOR parameter PRE\_FEC\_PADDING\_FACTOR~~pre-FEC padding factor indicated in the Pre-FEC Padding Factor subfield of the Common Info field in the Trigger frame~~ and *NSYM* is the common number of data OFDM symbols derived from the UL Length, Number Of HE-LTF Symbols And Midamble Periodicity, and Doppler subfields of the Common Info field in the Trigger frame.

— If the TXVECTOR parameter TRIGGER\_METHOD is TRS, the initial parameters are *NSYM,init* = *FVAL* + 1, and *ainit* = 4, where *FVAL* is the value of the UL Data Symbols subfield of the TRS Control subfield.

**References:**

1. **IEEE P802.11ax/D6.1, May 2020.**