IEEE P802.11
Wireless LANs

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| Proposed Draft Text: Packet Extension |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yan Zhang | NXP |  |  |  |
| Yujin Noh | Newracom |  |  |  |
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Abstract

This submission shows

* Packet Extension

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Fixed typos in Equations
* Rev 2: Highlighted TBD text
* Rev 3: Remove some TBD text in D0.2 based on the latest motions, Motion 137, SP268
* Rev 4: Made some editorial changes according to the comments made in the meeting.
* Rev 5: Made minor editorial changes in response to a comment.
* Rev 7: Changed UL TB PPDU PE requirements

**36.3.13 Packet extension**

A PE field of duration 0 µs, 4 µs, 8 µs, 12 µs, 16 µs or 20 µs is present in an EHT PPDU. A PE field of duration 20 µs is only allowed in an EHT MU PPDU with at least one participating STA being modulated with 4096-QAM, or in an EHT MU PPDU with more than 8 spatial streams transmitted on at least one RU/MRU, or in a 320 MHz EHT MU PPDU if the size of the one of the allocated RU or MRU is greater than 2x996, or in an EHT TB PPDU. A non-AP EHT STA shall support transmit an EHT TB PPDU with a PE field of duration up to 20 µs, and receive an EHT MU PPDU with a PE field of duration up to 20 µs. The PE field provides additional receive processing time at the end of the EHT PPDU. The PE field, if present, shall be transmitted with the same average power as the Data field and shall not cause significant power leakage outside of the spectrum used by the Data field. Other than that, its content is arbitrary. In an OFDMA EHT PPDU or punctured non-OFDMA EHT PPDU, the spectrum used by PE field is commensurate with the locations and sizes of the occupied RUs or MRUs in the Data field. For example, for an 20MHz OFDMA EHT PPDU, if the occupied RU in the Data field is 106-tone RU, the PE would have a spectrum that is approximately 10 MHz wide.

The duration of the PE field for an EHT MU PPDU is determined by both the pre-FEC padding factor value in the last OFDM symbol of the Data field, and the TXVECTOR parameter NOMINAL\_PACKET\_PADDING.

For an EHT MU PPDU, the nominal value () is given by Equation (36-77).

 (36-77)

where

 is the nominal value for user *u* and is also given by Table 36-44 (Nominal values).

 is the maximum value of over all values of *u*.

In this case, *a* in Table 36-44 (Nominal values) is given by either Equation (36-50) or Equation (36-51).

**Table 36-42 ⎯Nominal values**

|  |  |
| --- | --- |
| **a** | **TXVECTOR parameter NOMINAL\_PACKET\_PADDING[*u*] (EHT MU PPDU)** |
| **0 µs** | **8 µs** | **16 µs** | **20 µs** |
| 1 | 0 µs | 0 µs | 4 µs | 8 **µs** |
| 2 | 0 µs | 0 µs | 8 µs | 12 **µs** |
| 3 | 0 µs | 4 µs | 12 µs | 16 **µs** |
| 4 | 0 µs | 8 µs | 16 µs | 20 **µs** |

The duration of the PE field, , may take values of 0 µs, 4 µs, 8 µs, 12 µs, 16 µs, or 20 µs. for an EHT MU PPDU shall not be less than . for an EHT MU PPDU should be equal to to minimize the packet extension overhead. Figure 36-46 (PE field duration of an EHT MU PPDU if maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 8 µs and ), Figure 36-47 (PE field duration of an EHT MU PPDU if the maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 16 µs and ), and Figure 36-48 (PE field duration of an EHT MU PPDU if the maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 20 µs and ), show examples of the PE field duration in an EHT MU PPDU if the maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 8 µs, 16 µs, and 20 µs, respectively, and .

for an EHT sounding NDP is 4 µs if the PPDU bandwidth is less than or equal to 160 MHz and the number of spatial streams of the EHT sounding NDP is less than or equal to 8. Otherwise, for an EHT sounding NDP is 8 µs.



**Figure 36-46 ⎯ PE field duration of an EHT MU PPDU without midambles if the maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 8 µs and**



**Figure 36-47 ⎯ PE field duration of an EHT MU PPDU without midambles if the maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 16 µs and**

 F**igure 36-48 ⎯ PE field duration of an EHT MU PPDU if the maximum value of TXVECTOR parameters NOMINAL\_PACKET\_PADDING[*u*] is 20 µs and**

If transmitting an EHT TB PPDU for which the TXVECTOR parameter TRIGGER\_METHOD is TRIGGER\_FRAME (TBD), each transmitter of an EHT TB PPDU shall append a PE field with a duration *TPE* calculated using Equation (36-78) except for an EHT TB feedback NDP, which has *TPE* = 0 (TBD).

 (36-78)

where

LENGTH is the value indicated by UL Length subfield of the Common Info field in the Trigger frame (TBD).

*T*EHT-PREAMBLE is the value for an EHT TB PPDU in Equation (36-85)

*T*EHT-LTF-SYM is defined in Table 36-9 (Timing-related constants)

 (36-79)

*b*PE-Disambiguityis the value of the TXVECTOR parameter EHT\_TB\_PE\_DISAMBIGUITY.

If transmitting an EHT TB PPDU for which the TXVECTOR parameter TRIGGER\_METHOD is TRS(TBD), each transmitter of the EHT TB PPDU shall append a PE field with the duration *TPE* equal to the value specified in the TXVECTOR parameter DEFAULT\_PE\_DURATION.

The PE Disambiguity field of the EHT-SIG field for an EHT MU PPDU (see Reference TBD) shall be set to 1 if the condition in Equation (36-82) is met, otherwise it shall be set to 0.

The PE Disambiguity subfield in the Common Info field (TBD) of the Trigger frame shall be set to 1 if the condition in Equation (36-82) is met for the EHT TB PPDU solicited by the Trigger frame. Otherwise, it shall be set to 0.

 (36-82)

where

*TPE* is the PE field duration

*TSYM* is the symbol duration of the Data field as defined in Table 36-9 (Timing-related constants).

TXTIME (in µs) is defined in 36.4.3 (TXTIME and PSDU\_LENGTH calculation) .

*SignalExtension* is 0 µs if TXVECTOR parameter NO\_SIG\_EXTN is true and is aSignalExtension as defined in Table 36-51 (EHT PHY characteristics) if TXVECTOR parameter NO\_SIG\_EXTN is false.

The receiver computes *NSYM*, and *TPE* of the received EHT MU PPDU using Equation (36-83), and Equation (36-84).

  (36-83)

 (36-84) where

L\_LENGTH is the value indicated by the LENGTH field of the L-SIG field

(36-85)

*T*RL-SIG, *T*EHT-STF-T, *T*EHT-STF-NT, *T*EHT-LTF-SYM, *T*U-SIG, *T*EHT-SIG are defined in Table 36-9 (Timing-related constants)

*N*EHT-SIG, *N*EHT-LTF are defined in Table 36-14 (Frequently used parameters)

*b*PE-Disambiguity is the value indicated by the PE Disambiguity subfield of the EHT-SIG field for an EHT MU PPDU, or the value indicated by the PE Disambiguity subfield in the Common Info field (TBD) in the Trigger frame for an EHT TB PPDU.