IEEE P802.11  
Wireless LANs

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| Proposed Draft Text: Transmit requirements for PPDUs sent in response to a triggering frame | | | | |
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Abstract

This submission proposes the draft text on **transmit requirements for PPDUs sent in response to a triggering frame** for 802.11be D0.4.

This draft text is for 36.3.15. The revised contents in this draft indicate the changes compared with the text in 27.3.15.

* + 1. Transmit requirements for PPDUs sent in response to a triggering frame

36.3.15.1 Introduction

An AP may solicit simultaneous EHT TB PPDU transmissions, or simultaneous non-HT or non-HT duplicate PPDU transmissions from multiple non-AP STAs using a triggering frame. Since there are multiple transmitters, transmission time, frequency, sampling symbol clock, and power pre-correction (in the case of an EHT TB PPDU) by the non-AP STAs are necessary to mitigate synchronization and interference issues at the AP. Frequency and sampling clock pre-corrections are needed to prevent inter-carrier interference. Power pre-correction is necessary to control interference between EHT TB PPDU transmissions from the non-AP STAs. An AP may solicit simultaneous EHT TB PPDU transmissions from both Class A and Class B devices (see 35.4.1.x1 (General)). A non-AP STA that supports EHT TB PPDU transmission shall support power pre-correction as described in 36.3.15.2 (Power pre-correction) and shall meet the pre-correction accuracy requirements described in 36.3.15.3 (Pre-correction accuracy requirements).

36.3.15.2 Power pre-correction

(#24417)A STA transmits an EHT TB PPDU at the STA's maximum transmit power for the assigned EHT-MCS if the UL Target Receive Power subfield of the User Info field in the Trigger frame that solicits the EHT TB PPDU or the UL Target Receive Power subfield of the TRS Control field of the frame that solicits a response in an EHT TB PPDU indicates that the maximum transmit power is used.

Otherwise, the STA calculates the transmit power, , of the EHT TB PPDU for the assigned EHT-MCS using Equation (36-xx1).

(36-xx1)

where

*PLDL* is the DL pathloss

*TargetRxpwr* is the expected receive signal power indicated in the UL Target Receive Power subfield in the User Info field in the Trigger frame or the UL Target Receive Power subfield in the TRS control field.

The STA computes *PLDL* using Equation (36-xx2).

(36-xx2)

where(#24414)

 is the AP’s transmit power, in units of dBm / 20 MHz, as indicated by the AP Tx Power subfield of the Common Info field in the Trigger frame, the encoding of which is specified in 9.3.1.22 (Trigger frame format), or the AP Tx Power subfield of the TRS Control field, the encoding of which is specified in 9.2.4.6a.1 (TRS Control).

*Rxpwr* is the receive signal power, in units of dBm / 20 MHz, at the antenna connector of the STA of the triggering PPDU. *Rxpwr* is an average of the receive signal power over the antennas on which the average *PLDL* is being computed. If the triggering PPDU is a HT-mixed, VHT, HE or EHT PPDU, then the receive signal power is measured from the fields prior to the HT-STF, VHT-STF, HE-STF or EHT-STF, respectively.

NOTE— and *Rxpwr* are in units of dBm / 20 MHz, while  and *TargetRxpwr* are in units of dBm.(#24414)

A STA that applies beamforming (BF) in the UL should take the BF gain into account when calculating the transmit power needed to meet the target RSSI.

NOTE—An AP could account for its beamforming gain in  or *TargetRSSI* if the triggering PPDU used beamforming.

The transmit power of the EHT TB PPDU is further subject to a STA’s minimum and maximum transmit power limit due to hardware capability, regulatory requirements and local maximum transmit power levels (see 11.7.5 (Specification of regulatory and local maximum transmit power levels)) as well as non-802.11 in-device coexistence requirements.

A STA (#24291)includes its UL power headroom in the EHT TB PPDU following the rules defined in 35.4.1.x2 (Non-AP STA behavior for UL MU operation).

36.3.15.3 Pre-correction accuracy requirements

A STA that transmits an EHT TB PPDU shall support per chain max(*P*–32, –10) dBm as the minimum transmit power, where *P* is the maximum power, in dBm, that the STA can transmit at the antenna connector of that chain using EHT-MCS 0 while meeting the transmit EVM and spectral mask requirements. A STA transmitting at and above the minimum power, but below *P*max,MCS7, shall support the EVM requirements for EHT-MCS 7 even if the EHT-MCS used for the transmission is lower than EHT-MCS 7, where *P*max,MCS7 is the maximum transmit power supported by the STA for EHT-MCS 7 in an EHT TB PPDU.(#24205)

A STA that transmits an EHT TB PPDU shall support the absolute and relative transmit power requirements and the RSSI measurement accuracy requirements defined in Table 36-xx3 (Transmit power and RSSI measurement accuracy).

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| Table 36-xx3 Transmit power and RSSI measurement accuracy | | | |
| Parameter | Minimum Requirement | | Comments |
| Class A | Class B |
| Absolute transmit power accuracy | ±3 dB | ±9 dB | Accuracy of achieving a specified transmit power. |
| RSSI measurement accuracy | ±3 dB | ±5 dB | The difference between the RSSI and the received power.  Requirements are valid from minimum receive to maximum receive input power. |
| Relative transmit power accuracy | N/A | ±3 dB | Accuracy of achieving a change in transmit power for consecutive EHT TB PPDU.  The relative transmit power accuracy is applicable only to Class B devices. |

The absolute transmit power accuracy is applicable for the entire range of transmit power that the STA is intending to use for the current band of operation. The RSSI accuracy requirements shall be applied to receive signal level range from –82 dBm to –20 dBm in the 2.4 GHz band and –82 dBm to –30 dBm in the 5 GHz and 6 GHz bands. The requirements are for nominal (room) temperature conditions. The RSSI shall be measured during the reception of the non-EHT portion of the EHT PPDU preamble.

A STA compensates for carrier frequency offset (CFO) error and symbol clock error with respect to the corresponding triggering PPDU when transmitting the following types of PPDUs:

* EHT TB PPDU
* Non-HT or non-HT duplicate PPDU with the TXVECTOR parameter TRIGGER\_RESPONDING set to true

NOTE—The MU-RTS Trigger frame solicits transmission of a non-HT or non-HT duplicate PPDU and not an EHT TB PPDU(#24296). The non-HT or non-HT duplicate PPDU transmitted as a response to an MU-RTS Trigger frame carries a CTS frame.

After compensation, the absolute value of residual CFO error with respect to the corresponding triggering PPDU shall not exceed the following levels when measured at the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN at a received power of –60 dBm in the primary 20 MHz:

* 350 Hz for the data subcarriers of an EHT TB PPDU
* 2 kHz for a non-HT PPDU or non-HT duplicate PPDU

The residual CFO error measurement on an EHT TB PPDU shall be made after the U-SIG field. The residual CFO error measurement on the non-HT or non-HT duplicate PPDU shall be made after the L-STF field. The symbol clock error shall be compensated by the same ppm amount as the CFO error.

A STA that transmits an EHT TB PPDU, non-HT PPDU, or non-HT duplicate PPDU in response to a triggering PPDU shall ensure that the transmission start time of the EHT TB PPDU, non-HT PPDU, or non-HT duplicate PPDU is within ±0.4 µs + 16 µs from the end, at the STA’s transmit antenna connector(#24371), of the last OFDM symbol of the triggering PPDU (if it contains no PE field) or of the PE field of the triggering PPDU (if the PE field is present).

NOTE—This end instant is before any signal extension, so this is equivalent to EHT TB PPDU transmission within 0.4 µs of SIFS after the end of the triggering PPDU including signal extension.