IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Comment resolutions for HE SU beacon and miscellaneous rules for 6 GHz | | | | |
| Date: 2019-01-11 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| Abhishek Patil | Qualcomm Inc. |  |  |  |
| George Cherian | Qualcomm Inc. |  |  |  |
| Liwen Chu | Marvell |  |  |  |
| Matthew Fischer | Broadcom Limited |  |  |  |

Abstract

This submission proposes resolutions for multiple comments related to TGax D3.0 with the following CIDs (2 CIDs):

* 16588, 15650

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Added timer for the transmit power control and the other rate selection rules for pre-association. Changes in green.
* Rev 2: Incorporated some feedback received during the presentation (changes in blue).

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 TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 16588 | Po-Kai Huang | 209.02 | 6 GHz band is enabled for 11ax AP and non-AP STA. In 6 GHz band, there is no non-HE STA, and transmission of beacon frame with non-HT format is then not a requriement, and enabling beacon transmission with HE SU PPDU format is then possible. HE SU PPDU maybe transmitted with larger MPDU content and higher data rate. These features are beneficial because when multiple BSSID concept is used larger MPDU content is reuqired for carrying all nontransmitted BSSID profiles, and higher data rate can redcue the transmission overhead. | Enable beacon frame to be transmitted with HE SU PPDU format in 6 GHz band. Add rate selection for the beacon frame with HE SU PPDU. | Revised –  Agree in principle with the comment. Proposed resolution is to enable an AP to send Beacons in HE SU PPDUs, for which case rate selectiona and other PHY transmit parameter settings are explicitly defined. For completeness also the ER beacon rules were reviewed to ensure consistency on the subclauses, adding rules that had been missing. Furthermore, resolution additionally adds the rules that STAs follow when transmitting frames, prior to associating to the AP, in terms of rate selection, bandwidth selection, and number of spatial streams, depending on reception of FILS Discovery frames, or HE Operation elements from that AP.  TGax editor to make the changes shown in 11-18/0097r2 under all headings that include CID 16588. |
| 15650 | GEORGE CHERIAN |  | Add the ability for AP to control the power of STAs operating in 6GHz, whether it is transmitting HE SU PPDU or HE TB PPDU. | As in the comment | Revised –  Agree in principle with the comment. Proposed resolution is to specify that the STAs follow the mandatory rules defined in 11.7.5 (Specification of regulatory and local maximum transmit power levels) if the STA has received Transmit Power Envelope elements and combinations of Country and Power Constraint elements received on that channel from that AP or is received from a neighboring AP from the same SSID to which the STA is currently associated.  TGax editor to make the changes shown in 11-18/0097r2 under all headings that include CID 15650. |

**Discussion: *None.***

**10.6.5.1 Rate selection for non-STBC Beacon and non-STBC PSMP frames**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16588):***

If the BSSBasicRateSet parameter is not empty, a non-STBC PSMP frame, or a non-STBCBeacon, ER beacon or HE beacon frame shall be transmitted in a non-HT PPDU using one of the rates included in the BSSBasicRateSet parameter. An ER beacon is transmitted as defined 27.15.4a and an HE beacon is transmitted as defined in 27.15.4b.*(#16588)*

If the BSSBasicRateSet parameter is empty, the frame shall be transmitted in a non-HT PPDU using one of the mandatory PHY rates.

**27.17.5 ER beacon generation in an ER BSS**

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 16588):***

An ER beacon is a Beacon frame carried in HE ER SU PPDU (242-tone RU or high frequency 106- tone RU in P20), which provides additional link budget for downlink transmissions to compensate the link budget imbalance between downlink and uplink due to introduction of UL OFDMA transmission.*(#16588)*

An HE AP may operate an ER BSS in addition to a non-ER BSS operated by another co-located AP. An ER BSS, if present, shall operate independently of the co-located non-ER BSS and the AP operating the ER BSS shall have a BSSID different from the AP operating the non-ER BSS.

NOTE—An ER BSS is expected to have a larger coverage area than a non-ER BSS.

An HE AP that sets up an ER BSS shall not set the ER SU Disable subfield to 1 in HE Operation elements it transmits.*(#16588)*An HE AP that operates an ER BSS shall transmit Beacon frames and group addressed frames in ER SU PPDUs and following the rules defined in 27.15.4a(Additional rules for ER beacons and group addressed frames).*(#16588)*

An HE AP may use larger CP length of HE ER SU PPDU to further improve the transmission reliability of ER Beacon frames. The protection of transmissions in an ER BSS is out of scope of this specification.

**TGax Editor: *Insert a new subclause as follows (#CID 16588):***

27.16.1a.2.5a HE beacon generation in the 6 GHz band

An HE beacon is a Beacon frame carried in HE SU PPDU format.

An HE AP may transmit HE beacons only in the 6 GHz band. The AP shall not transmit HE beacons in the 2.4 GHz or 5 GHz band. The AP shall transmit HE beacons following the rules defined in 27.15.4b (Rate selection rules for HE beacons in the 6 GHz band).*(#16588)*

**TGax Editor: *Change heading and the paragraphs below of this subclause as follows (#CID 16588):***

**27.15.4a Additional rules ER eacons and group addressed frames**

If the basic HE-MCS and NSS set of the AP that starts an ER BSS is not empty, then the HE AP shall transmit Beacon frames and group-addressed frames in HE ER SU PPDUs using one of the <HE-MCS, 1> tuples included in the basic HE-MCS and NSS set. Otherwise the HE AP shall transmit Beacon frames and group addressed frames in HE ER SU PPDUs using one of the mandatory <HE-MCS, 1> tuples.

ER beacons shall be carried in an S-MPDU (see Table 9-532 (A-MPDU contents in the S-MPDU) context).

The HE AP transmitting the ER SU PPDU shall set the TXVECTOR parameters HE\_LTF\_TYPE to 2xHE-LTF, GI\_TYPE to 0\_8\_US or 1\_6\_US, and FEC\_CODING to BCC\_CODING. The AP shall set all other TXVECTOR parameters to values that are mandatory in reception for HE non-AP STAs.*(#16588)*

**TGax Editor: *Insert new subclauses as follows (#CID 16588, 15650):***

**27.15.4b Additional rules for HE beacons in the 6 GHz band**

If the basic HE-MCS and NSS set of the HE AP that starts an HE BSS is not empty, then the HE AP transmitting Beacon frames in HE SU PPDUs shall use one of the <HE-MCS, 1> tuples included in the basic HE-MCS and NSS set; otherwise the AP transmitting the Beacon frame in HE SU PPDUs(#14156) shall use one of the(#Ed) mandatory <HE-MCS, 1> tuples.(#16588)

HE beacons shall be carried in an S-MPDU (see Table 9-532 (A-MPDU contents in the S-MPDU) context).

The HE AP transmitting the HE SU PPDU shall set the TXVECTOR parameters CH\_BANDWIDTH to 20 MHz, HE\_LTF\_TYPE to 2xHE-LTF or 4xHE-LTF, GI\_TYPE to any value, and FEC\_CODING to BCC\_CODING. The AP shall set all other TXVECTOR parameters to values that are mandatory in reception for HE non-AP STAs.

**27.15.4b Additional rules for pre-association in the 6 GHz band**

An HE AP may transmit a FILS Discovery, or a broadcast Probe Response frame in a broadcast RU of the HE MU PPDU identified by STA\_ID\_LIST of 2045, which does not exceed 242-tone RU, is in the primary 20 MHz channel and is subject to the rules defined in 28.3.2.8, The HE AP transmitting the HE MU PPDU shall set the TXVECTOR parameter HE\_LTF\_TYPE to 2xHE-LTF or 4xHE-LTF and FEC\_CODING to BCC\_CODING for the broadcast RU. FILS Discovery and broadcast Probe Responses shall be carried in an S-MPDU (see Table 9-532 (A-MPDU contents in the S-MPDU) context).

An HE STA that transmits, in the 6 GHz band, a frame contained in a non-HE TB PPDU with Address 1 field or Address 3 field to the MAC address of an HE AP with which it is not associated from which it has received, a FILS Discovery frame or an HE Operation element, shall ensure that:

* The bandwidth of the PPDU is less than or equal to the operating bandwidth of the HE BSS, which is indicated in the BSS Operating Channel Width subfield of the FILS Discovery frame or in the Channel Width subfield of the HE Operation element sent by the AP,
* The number of spatial streams of the PPDU is less than or equal to the maximum number of spatial streams of the HE BSS, which is indicated in the Maximum Number of Spatial Stream subfield of the FILS Discovery frame or in the Basic HE-MCS and NSS Set field of the HE Operation element sent by the AP,
* The rate of the PPDU is greater than or equal to the minimum rate indicated in the FILS Minimum Rate field (if present) of the FILS Discovery frame or in the Minimum Rate field of the HE Operation element.

An HE STA that transmits, in the 6 GHz band, a frame contained in non-HE TB PPDU with an individual MAC address in the Address 1 field or in the Address 3 to an AP with which it is not associated shall determine a local maximum transmit power for that transmission following the rules in 11.7.5 (Specification of regulatory and local maximum transmit power levels), if the local maximum transmit power is received in Transmit Power Envelope elements and combinations of Country elements and Power Constraint elements in the most recently received Beacon or Probe Response frame, on the channel from that AP.*(#16588, 15650)*