IEEE P802.11
Wireless LANs

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| Comment Resolution for CID 991 |
| Date: 2016-11-07 |
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Abstract

This is the proposal for resolution of comment CID 991.

**CID**

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| 991 | 9.3.3.1 | 23 | 27 | Beacon should be also allowed in HE PPDU format  | Revised, see discussion and proposed change in the following. TGax Editor to make the changes as in 11-16-1503-00-00ax-HE Beacon frame .doc |

**Discussion:**

The current 802.11ax draft specifies the new PHY format to provide more reliable transmissions in various deployment scenario using:

* HE SU PPDU
* HE EXT SU PPDU
* HE MU PPDU
* HE triggered based PPDU

The new HE PHY improves spectrum efficiency and robustness via

* Increase FFT size from 64 to 256 in 20MHz BW
* Guard Interval: 0.8 us, 1.6 us, 3.2us
* RL-SIG in HE frame format.

**Proposed Resolution:**

REVISED.

In the current 802.11ax draft specification, the beacon frame is transmitted in single non-HT format to allow all the STAs to be able to receive and decode it. However, this non-HT frame format for the beacon transmission may not be reliable in the outdoor environment. To improve the transmission robustness, the HE AP should be allowed to transmit a beacon frame in HE format.

However, as the beacon frame is a broadcast management frame, not all the HE PPDU formats are applicable to the HE beacon. We suggest using HE\_EXT\_SU PPDU for HE beacon transmission.

When the beacon frame is carried in HE format, the legacy STAs will not be able to decode it. Therefore it needs to consider supporting transmission of legacy beacon when the HE AP transmits a Beacon in HE\_EXT\_SU format so as to allow legacy STAs to understand the beacon frame of BSS. We suggest leveraging the similar rule of existing dual beacon transmission mechanism of 802.11 specification to alternate beacon transmission in HE format and non-HT format.

TGax Editor, please make the changes as in 11-16-1503-00-00ax-HE Beacon frame.doc

**Proposed Text Changes:**

------------- Begin Text Changes ---------------

**3.2 Definitions specific to IEEE 802.11**

***Insert the following new paragraph***

**High efficient (HE) dual beacon**: A BSS transmits beacons in two PHY modes, in non-HT format and in HE extended range PHY format. The beacons transmitted in HE\_EXT\_SU PHY format enables BSS discoverability and BSS operating parameters distribution in the whole BSS coverage.

**9.4.2.219 HE Operation element**

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***TGax Editor: Modify the subclause as follows***



Figure 9-589cr—HE Operation Parameters field format

The Dual Beacon subfield indicates whether the HE AP transmits beacons by using two PHY formats, one in a non-HE format and other in an HE\_EXT\_SU PHY format. The Dual Beacon subfield also indicates the TBTT offset of Beacon in HE\_EXT\_SU format in the 11.1.3.x. .

The subfield is set to 0, if HE AP transmits Beacons in one PHY format.

The subfield is set to 1, if HE AP transmits Beacons in a HE\_EXT\_SU PPDU format and non-HE PPDU format.

***Insert the following new paragraph***

**25.x.3 Rate selection for HE Beacom frames**

An HE AP may transmit a Beacon in a 242-tone HE\_EXT\_SU PPDU format, using the MCS0 in HE-MCS set specified in the Table 26-16 of 26.3.10.7.2 Content. The MCS rate set is specified in the Table 26-68 242-tone RU, non-OFDMA 20 MHz, DCM = 0, NSS = 1 of Subclaus 26.5.

4X HE-LTF and 3.2us may be used in the Beacon in HE\_EXT\_SU PPDU format.

***Insert the following new paragraph***

**11.1.3.x Beacon generation in HE infrastructure networks**

An HE AP may transmit beacon frames in two PHY formats to ensure the BSS discoverability and BSS operating parameter distribution for the whole BSS coverage.

The HE AP that transmits Beacon frames in two PHY formats shall set the Dual Beacon subfield to non-zero value in the HE Operation elements it transmits. Otherwise the AP shall set the field to 0. When Beacon frames are transmitted in two PHY formats, the HE AP shall transmit Beacon frames in non-HT format and in HE\_EXT\_SU format. The Beacon frame transmitted in non-HT PPDU format has TBTT at the TSF value 0. The TBTT repeats every Beacon interval as indicated in the Beacon frame transmitted in non-HT PPDU format.

The Beacon frame transmitted in HE EXT\_SU PPDU format has TBTT at the TSF value 0 plus the TBTT offset which value is a half of the value of the Beacon Interval field of the Beacon frame sent in non-HT format.The TBTT of the beacon frame transmitted in HE\_EXT\_SU PPDU format repeats every Beacon interval as indicated in the Beacon frame transmitted in HE\_EXT\_SU PPDU format. The beacon frame transmitted in HE\_EXT\_SU format shall be transmitted using a MCS rate specified in 25.x.3 (Rate selection for HE Beacon frames).

The non-HT format and HE EXT\_SU PPDU format Beacon frames may contain different set of elements. An element shall have the same value, if the element is transmitted in a non-HT PPDU format Beacon frame and in a HE\_EXT\_SU PPDU format Beacon frame, except the Timestamp field, and the TIM element may have different values.

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