IEEE P802.11
Wireless LANs

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| LB233 CR for Subclause 26.17.6 |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yonggang Fang | ZTE (TX) |  |  | yfang@ztetx.com  |
| Bo Sun  | ZTE |  |  |  |
| Zhiqiang Han | ZTE  |  |  |  |
| Nan Li  | ZTE  |  |  |  |

Abstract

This submission proposes resolutions of comments received from TGax LB238.

(The proposed change is based on TGax Draft 4.3.)

* CIDs: 20738, 20744, 20745, 21457, 21566 (5 CIDs)

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** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 20738 | 438.24 | 26.17.6 | Re CID 16091: the rejection did not address the comment. ER beacons don't work for the same reason they didn't work with STBC (and got obsoleted): the AP typically has higher tx power so the AP can reach STAs but STAs can't reach the AP. The slight advantage conferred by the ability of the STA to use 10 MHz transmissions is not sufficient to overcome this. The submissions referenced in the rejection are about longer CPs, but they do not address the link budget issue | Delete this subclause | Revised- Agree in principle. 802.11ax introduces the trigger based UL transmission. The parameters for trigger frame transmission are carried in the IE (e.g. UORA Parameter Set) of Beacon frame. As a STA could be scheduled for UL transmission over 26-tones RU, it may have higher link budget on UL than the non-ER PPDU on DL. The ER Beacon can provide additional link budget on DL. Without ER Beacon, the STA may not be able to receive the parameters of the trigger frames carried in the Beacon frame and perfom the trigger based UL transmissions. Therefore the ER Beacon should be supported in the spec. TGax editor makes the changes as shown in 11-19/1458-02 under (#20738) |
| 20744 |  |  | Re CID 16123: the comment was not addressed by the resolution. Non-ER BSSes need to be protected against ER BSSes, just in the same way that earlier PHYs have had protection mechanisms (see 10.28 Protection mechanisms) | Add to 10.28 a description of the mechanisms by which non-ER BSSes are protected from ER BSSes | Revised- Agree in principle. The subclause 10.28 describes the protection mechanism of using RTS/CTS or CTS to self prior to the HT transmission for the shared media cases: ERP (11g), HT (11n) and VHT (11ac).The ER BSS formed by ER Beacon is to provide the extended coverage for HE STAs to receive the Beacon frame more robustly. As the ER Beacon is carried in HE ER SU PPDU format, any HE STA that has not disabled ER SU should be able to understand the ER Beacon, HE STAs that have disabled ER SU can get the TXOP Duration from the PHY header, if specified, and non-HE STAs should be able to decode the legacy preamble of ER Beacon to set protection, but only for the PPDU duration, not for the TXOP. ER BSS does not introduce other PPDU format than HE PPDU. The ER BSS protection should follow the protection of HE PPDU transmission, as specified in subclause 10.28.6. For the protection of HE PPDU transmission, the MU-RTS/CTS introduced by 11ax can be used to protect the MU transmissions in either HE BSS or ER BSS. In addition, the RTS/CTS or CTS to Self can also be used for the protection of transmissions in either HE BSS or ER BSS or non ER BSS.TGax editor makes the changes as shown in 11-19/1458-02 under (#20744). |
| 20745 | 438.24 | 26.17.6 | Re CID 16123: the comment was not addressed by the resolution. Non-ER BSSes need to be protected against ER BSSes, just in the same way that earlier PHYs have had protection mechanisms (see 10.28 Protection mechanisms) | Delete the referenced subclause. | Rejected- The subclause 10.28 describes the protection mechanism of using RTS/CTS or CTS to self prior to the HT transmission for the shared media cases: ERP (11g), HT (11n) and VHT (11ac).The ER BSS formed by ER Beacon is to provide the extended coverage for HE STAs to receive the Beacon frame more robustly. As the ER Beacon is carried in HE ER SU PPDU format, any HE STA that has not disabled ER SU should be able to understand the ER Beacon, HE STAs that have disabled ER can get the TXOP Duration from the PHY header, if specified, and non-HE STAs should be able to decode the legacy preamble of ER Beacon to set protection but only for the PPDU duration, not for the TXOP. ER BSS does not introduce other PPDU format than HE PPDU. The ER BSS protection should follow the protection of HE PPDU transmission.For the protection of HE PPDU transmission, the MU-RTS/CTS can be used to protect the MU transmissions in either HE BSS or ER BSS. In addition, the RTS/CTS or CTS to self can also be used for the protection of transmissions in HE BSS or ER BSS or non ER BSS. |
| 21457 | 438.00 | 26.17.6 | Dual-beacon (STBC beacon) was removed from the IEEE-2016 specification. Now 11ax is adding back dual-beacon (HE ER). I think we know that the industry won't build this feature due to the fact that sending this kind of beacon will encourage devices to use slow data rates thus lowering efficiency, both in-BSS efficiency and multi-BSS efficiency. This comment was rejected based on the need for outdoor (longer GI) operation. HE beacons have some usefulness. HE ER beacons will never be used. | Remove 26.17.6 | Revised- Agree in principle.802.11ax PAR requires to address the use case of outdoor deployment and improve robustness of transmission in outdoor propagation environments.The ER Beacon does not only support longer GI for the outdoor operation for improving the robustness, but also supports 106-tones RU to carry the Beacon frame which is not supported in HE Beacon.Therefore an ER Beacon could provide larger coverage with more robustness for receiption than the HE Beacon. As an HE AP can operate a non-ER BSS in addition to an ER BSS operated by another collocated AP, an HE STA can transition to the non-ER BSS if in the coverage of non-ER BSS where the data rates being served by the AP are much higher.TGax editor makes the changes as shown in 11-19/1458-02 under (#21457) |
| 21566 | 438.43 | 26.17.6 | "An HE AP may use larger CP length of HE ER SU PPDU to further improve the transmission reliability of ER Beacon frames." This sentence does not seem to provide any information. There is no restriction on choosing between various CP lengths, as long as they are supported by the receivers. Adding a 'may' sentence here does not provide any more flexiblity or clarity. | Delete "An HE AP may use larger CP length of HE ER SU PPDU to further improve the transmission reliability of ER Beacon frames." | Accepted.  TGax editor makes the changes as shown in 11-19/1458-02 under (#21566) |

***TGax Editor: Change the subclause 26.17.6 as follows: (#21566,*** #20738, #21457***)***

**26.17.6 ER beacon generation in an ER BSS**

An ER beacon is a Beacon frame carried in HE ER SU PPDU using a 242-tone RU and transmitted in the primary 20 MHz channel.(#21163) An ER beacon provides additional link budget for downlink transmissions to compensate for the link budget imbalance between downlink and uplink due to introduction of UL OFDMA transmission. An HE AP shall(#21457) operate an ER BSS in addition to a non-ER BSS operated by another collocated AP. An ER BSS, if present, shall operate independently of the collocated 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 AP that uses ER Beacon frames can balance the link budget by allocating narrow RUs to STAs.(#20738) An ER BSS is expected to have a larger coverage area than a non-ER BSS.

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The HE AP of an ER BSS shall transmit Beacon frames and group addressed frames in HE ER SU PPDUs following the rules in 26.15.5 (Additional rules for ER beacons and group addressed frames). ~~An HE AP may use larger CP length of HE ER SU PPDU to further improve the transmission reliability of ER Beacon frames~~. (#21566)

(#20744)

***TGax Editor: Add the subclause 10.28.6 after 10.28.5 as follows: (#20744)***

**10.28.5 Protection rules for VHT STAs**

A VHT STA is subject to all of the rules for HT STAs that apply to its operating band, except that a PPDU

with the TXECTOR FORMAT parameter set to VHT may be substituted for a PPDU with the TXVECTOR

FORMAT parameter set to HT\_MF.

**10.28.6 Protection rules for HE STAs (#20744)**

An HE STA operating in the 2.4 GHz band is subject to all of the rules for HT STAs that apply to that band, except that a PPDU with the TXVECTOR FORMAT parameter set to HE\_SU, HE\_ER\_SU, HE\_MU or HE\_TB may be substituted for a PPDU with the TXVECTOR FORMAT parameter set to HT\_MF.

An HE STA operating in the 5 GHz band is subject to all of the rules for VHT STAs that apply to that band, except that a PPDU with the TXVECTOR FORMAT parameter set to HE\_SU, HE\_ER\_SU, HE\_MU or HE\_TB may be substituted for a PPDU with the TXVECTOR FORMAT parameter set to VHT.

Additionally, an HE STA can use the MU-RTS/CTS frame exchange procedure.