IEEE P802.11
Wireless LANs

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| LB225 CR on Intra-PPDU Power saving (27.14.1) |
| Date: 2017-02-06 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs:

* CIDs: 3091,5216, 5506, 5938,6052,6055,6782,6783,6784,6785,7602,8241,8242,9602

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.***

# Intra-PPDU PS (27.14.1)

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 8241 | 199.14 | 27.14.1 | Intra PPDU power save needs to be defined | as in comment | Revised –Agree in principal.TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 3091 | 199.22 | 27.14.1 | Change broadcast to group-addressed | Change broadcast to group-addressed to cover the case of GCR, FMS etc where a sub-set of STAs are addressed by the AP | RejectedThe commenter fails to indentify the technical issue. The STA ID list contains an identifier of the STA which is not related to either GCR or FMS. |
| 5216 | 199.11 | 27.14.1 | If the APs set BSS Color to zero, then the determinition of intra-PPDU based on matching BSS Color is not going to be correct quite often. I believe we need some exceptions for the BSS Color equal 0 situation. | as in comment | Rejected –As described in 27.11.4 (BSS\_COLOR), a value of BSS Color of an AP is selected in range 1 to 63. And, BSS Color of HE SU/ER\_SU PPDU is set to 0 only when the HE PPDU is sent to a intended recipient STA which is not a member of a transmitting STA’s BSS (e.g., public action frame). Therefore, STA does not enter the doze state for PPDU with BSS color set to 0. |
| 6055 | 199.20 | 27.14.1 | BSS Color can be disabled by BSS Color Disabled subfield set to 1. In BSS Color Disabled case, Intra-PPDU PS based on BSS Color is disabled. In subclause 27.14.1, the related text needs to be updated as follows. | Change the related text as follows.-- The PPDU is an HE MU PPDU where the RXVECTOR parameter BSS\_COLOR is the BSS colorof the BSS with which the STA is associated, the RXVECTOR parameter UL\_FLAG is 0, and theRXVECTOR parameter STA\_ID\_LIST does not include the identifier of the STA or the broadcastidentifier(s) intended for the STA and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield.-- The PPDU is an HE MU PPDU, HE SU PPDU or HE extended range SU PPDU and one of thefollowing conditions are true:\* The RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA isassociated and the RXVECTOR parameter UL\_FLAG is 1, and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield\* The RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA isassociated, the RXVECTOR parameter UL\_FLAG is 0, and a PHY-RXEND.indication(UnsupportedRate)primitive was received , and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield-- The PPDU is an HE trigger-based PPDU where the RXVECTOR parameter BSS\_COLOR is theBSS color of the BSS with which the STA is associated, and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield | Revised- Agree in principal. To prevent the Intra-PPDU PS in the BSS Color disabled case, the following text should be included in the indicated sentences as the below suggested text - *“the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield*”TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 6052 | 199.21 | 27.14.1 | Intra-BSS PPDU Power saving is a micro sleep PS method based on the PPDU duration in order to minimize the STA's power consumption. In DL MU PPDU, if there is no its STA ID in STA list of SIG-B of Intra-PPDU, the STA can enter the Doze state. However, in DL MU PPDU, an A-MPDU for a STA can carry longer padding frames rather than other A-MPDUs. When the padding is very long, it's efficient for the STA to enter the Doze state during padding frames. | Add the operation mentioned in the comment into subclause 27.14.1 | Rejected- The commenter fails to indentify the technical issue. What the STA does the padding is out of the scope of the standard.. |
| 7602 | 199.11 | 27.14.1 | Add the following intra-PPDU power save rules: if a PPDU is from OBSS, the STA can desicard the frame until the end of the PPDU. | As in comment | Revised- Agree in principal with the comment. A non-AP STA does not need to decode the frame identified as an inter-BSS frame to reduce the unnecessary power consumption and to receive the intended frame sent by its associated AP. Because the ppdu filtering rule is STA’s internal process, the operation should be optional (may). In somecase, STA may try to decode a frame identified as Inter-BSS frame for NAV update.TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 5506 | 199.11 | 27.14.1 | Yet another power save scheme. In this case it is stating that a STA can go into power save if it is not interested in the received packet. Hmm...it can do that now withut the need to define what packets the STA is not interested in. In general if the packet is not for the STA, having checked the NAV/duration a STA could doze if it wants. There is no need to go through all this text which, as I said, merely defines a packet that the STA need not decode. I can't see the need for this at all and furthermore it involves no interoperablity at all and is at the discretion of the STA - if it wants to doze then let it. | Delete the scheme it adds nothing new. | Revised –When the received packet is not for the STA, if the STA enters the doze state for NAV/PPDU duration, the STA may miss the PPDU sent from the STA’s associated AP because the AP might not know whether the STA enters the doze state or not. But, during Intra-PPDU TX times, AP will never send the STA any packet. Therefore, we need to list the correct conditions for the STA to enter the doze state without its packet loss. Intra-PPDU PS is defined for the purpose.Instead of entering the doze state during Inter-BSS PPDU, STA may discard the PPDU as the resolution of CID 7602.TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 5938 | 199.12 | 27.14.1 | Besides intra-PPDU power save for HE non-AP STAs, allowing them to enter doze mode till the end of an inter-BSS PPDU TXOP with received power > OBSS\_PDmax may further save some power. | As suggested | Revised –Power saving for inter-BSS frames may create the problem of failing the intended packet reception. For example, if a STA enters the doze state during the inter-BSS PPDU duration, the STA may not receive a frame sent from its associated AP.Instead of entering the doze state during Inter-BSS PPDU, STA may discard the PPDU as the resolution of CID 7602.TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 8242 | 199.19 | 27.14.1 | shouldn't there be a condition where the STA goes to the doze state if the BSS-color is not the same as the AP color to which the STA is associated? Does the STA stays awake all the time for receiving an inetr-BSS PPDU | as in comment | Revised –Power saving for inter-BSS frames may create the problem of failing the intended packet reception. For example, if a STA enters the doze state during the inter-BSS PPDU duration, the STA may not receive a frame sent from its associated AP.Instead of entering the doze state during Inter-BSS PPDU, STA may discard the PPDU as the resolution of CID 7602.TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 9602 | 199.28 | 27.14.1 | When the RXVECTOR parameter BSS\_COLOR is not the BSS color of the BSS with which the STA is associated and the RXVECTOR parameters SPATIAL\_REUSE is SR\_Delay Entry, An HE non-AP STA that is in intra-PPDU power save mode can be enter the doze state. | Insert the following condition:"The RXVECTOR parameter BSS\_COLOR is not the BSS color of the BSS with which the STA is associated and the RXVECTOR parameters SPATIAL\_REUSE is SR\_Delay Entry." | Revised –Power saving for inter-BSS frames may create the problem of failing the intended packet reception. For example, if a STA enters the doze state during the inter-BSS PPDU duration, the STA may not receive a frame sent from its associated AP.Instead of entering the doze state during Inter-BSS PPDU, STA may discard the PPDU as the resolution of CID 7602.TGax editor makes changes as shown in the as specified in 11-17/0347r0. |
| 6782 | 199.20 | 27.14.1 | Unnecessary variant used for defined term: "BSS color". The term is "BSS Color". | Change to "BSS Color". | RejectedBecause ‘BSS color’ is general term, need to keep the current text. |
| 6783 | 199.28 | 27.14.1 | Unnecessary variant used for defined term: "BSS color". The term is "BSS Color". | Change to "BSS Color". | RejectedBecause BSS color is general term, need to keep the current text. |
| 6784 | 199.30 | 27.14.1 | Unnecessary variant used for defined term: "BSS color". The term is "BSS Color". | Change to "BSS Color". | RejectedBecause BSS color is general term, need to keep the current text. |
| 6785 | 199.36 | 27.14.1 | Unnecessary variant used for defined term: "BSS color". The term is "BSS Color". | Change to "BSS Color". | RejectedBecause BSS color is general term, need to keep the current text. |

**TGax Editor: Modify the subclause 27.15.1 (27.14.1 Intra-PPDU power save for HE non-AP STAs ) as follows:**

**27.14.1 Intra-PPDU power save for HE non-AP STAs**

Intra-PPDU power save is the power save mechanisms for an HE STA to enter the doze state until the end of a received PPDU which is identified as an Intra-BSS frame by the below conditions listed in this subclause. (#8241)

An HE non-AP STA has dot11IntraPPDUPowerSaveOptionActivated equal to true operates in intra-PPDU power save mode.

An HE non-AP STA that is in intra-PPDU power save mode may enter the doze state until the end of a PPDU currently being received when one of the following conditions is met:

— The PPDU is an HE MU PPDU where the RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UL\_FLAG is 0 and the RXVECTOR parameter STA\_ID\_LIST does not include the identifier of the STA or the broadcast identifier(s) intended for theSTA and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield.(#6055)

— The PPDU is an HE MU PPDU, HE SU PPDU or HE extended range SU PPDU and one of the following conditions are true:

• The RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated, ~~and~~ the RXVECTOR parameter UL\_FLAG is 1 and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield.(#6055)

• The RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UL\_FLAG is 0, ~~and~~ a PHY-RXEND.indication(UnsupportedRate) primitive was received and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield.(#6055)

— The PPDU is an HE trigger-based PPDU where the RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield.(#6055)

— The PPDU is a VHT PPDU where the RXVECTOR parameter PARTIAL\_AID is the BSSID[39:47] of the BSS with which the STA is associated and the RXVECTOR parameter GROUP\_ID is 0.

— The PPDU is a PPDU with:

• An A-MPDU including TA or RA equal to either the BSSID of the BSS with which the STA is associated or the BSSID of any BSS of a multiple BSSID set that the STA's associated BSS belongs to and,

• The RA is not the individual MAC address of the STA or the group address(es) of the STA

An HE STA that is in intra-PPDU power save mode and has entered doze state shall continue to operate its

NAV timers and consider the medium busy during doze state and shall transition into awake state at the end

of the PPDU.

An HE non-AP STA that is in intra-PPDU power save mode may discard a PPDU identified as an inter-BSS frame as defined in 27.2.1 (Intra-BSS and inter-BSS frame detection) until the end of the PPDU. (# 7602, 5506, 5938, 8242, 9602)

NOTE—The STA can contend for access to the medium immediately on the expiry of the NAV timers.