IEEE P802.11
Wireless LANs

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| LB225 CR Sub-clause 27.11.4 |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yongho Seok | NEWRACOM | 9008 Research Drive, Irvine, CA, 92618  |  | yongho.seok@newracom.com  |

Abstract

This submission proposes resolutions of comments received from TGax LB225.

(The proposed change is based on TGax Draft 1.0.)

* CIDs: 5475, 5388, 5734, 5213, 5477, 8240, 5214, 6779, 7604, 10291, 5479, 9953, 7168 (13 CID)

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** |
| --- | --- | --- | --- | --- | --- |
| 5475 | 196.42 | 27.11.4 | "An HE STA transmitting an HE Operation element shall select a value in the range 1 to 63 to include in the BSS Color subfield of the HE Operation element that it transmits..." So color is mandatory. Why? The three uses, OBSS\_PD, inter-PPDU PS and two NAVs all can be done without color. Also the seperate treatment of the inter and intra packets is dangerous in the cases where the OBSS is close by. | Make color optional at the least. "An HE STA transmitting an HE Operation element may select a value in the range 1 to 63 to include in the BSS Color subfield of the HE Operation element that it transmits..." | Rejected- The BSS Color selection and including the BSS Color in a transmitted HE PPDU is mandatory on an HE AP side. But, the use of the BSS Color for the OBSS\_PD and the Intra-PPDU power save is already optional on an HE non-AP STA side. What the commenter is asking is that an HE AP can enable or disable an optional feature.But, it is better to leave that as an implementation issue.  |
| 5388 | 196.49 | 27.11.4 | An HE STA may not receive the HE Operation element at the BSS Color change TBTT. In this case, the HE STA shall set the TXVECTOR parameter BSS\_COLOR of an HE PPDU to the value indicated in the BSS Color Change Annoucement element, not in the HE Operation element. | As per comment | Revised- Agree in principal. The BSS Color information can be provided from the BSS Color Change Annoucement element. TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 5734 | 196.52 | 27.11.4 | "from the HE STA with which...", should this HE STA be HE AP? | Change to "from the HE AP with which..." | Revised- Agree in principal. TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 5213 | 196.54 | 27.11.4 | "may ignore the HE PPDU" - its not about ignoring the PPDU, its about following modified CCA rules | change sentence to "...and 63 may follow the spatial reuse rules as described in 27.9 (Spatial reuse operation). | Accepted- Agree in principal.  |
| 5477 | 196.54 | 27.11.4 | "An HE STA that received an HE PPDU with RXVECTOR parameter BSS\_COLOR with a value between 1 and 63 may ignore the HE PPDU subject to the rules as described in 27.9 (Spatial reuse operation)." This is a seperate rule that is not required here. | Delete cited sentence | Revised- Because the corresponding sentence is not precisely described, it is changed as the blelow according to CID 5213. “An HE STA that received an HE PPDU with RXVECTOR parameter BSS\_COLOR with a value between 1 and 63 may follow the spatial reuse rules as described in 27.9 (Spatial reuse operation).”TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 8240 | 196.54 | 27.11.4 | the rule starting at line 54 doesn't seem be precise. Ignoring the HE PPDU is only for Inter-BSS PPDU, not for all the BSS color values | clarify | Revised- Because the corresponding sentence is not precisely described, it is changed as the blelow according to CID 5213. “An HE STA that received an HE PPDU with RXVECTOR parameter BSS\_COLOR with a value between 1 and 63 may follow the spatial reuse rules as described in 27.9 (Spatial reuse operation).”TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 5214 | 196.63 | 27.11.4 | Regarding "BSS\_COLOR equal to 0 shall not discard the HE PPDU", there is nothing restricting APs from setting the BSS Color to 0. In 9.4.2.219, the value 0 is defined as "indicates that there is no BSS color for this BSS". Is the intention of this requirement to really not discard any SU PPDUs from APs with BSS Color set to 0? Or is the intention more limited to the previous paragraph where a SU PDDU is sent to a non-member and we set BSS\_COLOR to 0. | clarify | Revised- A delete of the cited sentence for the BSS Color value 0 was approved in a previous motion of CC23. But, in a mistake of TGax editor, two conflicted sentences are existed.For your clarification, the intention of this sentence is limited to the previous paragraph, where an HE SU PDDU is sent to a non-member.The following sentence from 9.4.2.219 shall be removed. “The BSS Color field is an unsigned integer whose value is the BSS color of the BSS corresponding to the AP which transmitted this element, except that a value of 0 in this field indicates that there is no BSS color for this BSS.”TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 6779 | 197.19 | 27.11.4 | An "HE non-AP STA should use [...] instead of the BSS\_COLOR". Wait a moment, didn't we read just on the preceding page that an HE STA "shall maintain that single value of the BSS Color subfield for the lifetime of the BSS" (P196 LL43-44)? So already the text is contradicting itself. This needs to be resolved. | Reconcile the two statements at issue. For example, add some "Except when ..." qualifier to the earlier statement. | Revised-The following statement is not precisely described.“An HE STA transmitting an HE Operation element shall select a value in the range 1 to 63 to include in the BSS Color subfield of the HE Operation element that it transmits and shall maintain that single value of the BSS Color subfield for the lifetime of the BSS.”And, above sentence has changed according to CID 3086, 5387 and 7166. TGax editor makes no changes for this CID, because the proposed changes for CID 3086, 5387 and 7166 are already resolving.  |
| 7604 | 197.25 | 27.11.4 | Add the following text:"an non-AP STA should use A1, A2, A3 fields for SR decision" | As in comment | Rejected- “If a HE non-AP STA receives from associated AP a BSS Color Disabled subfield value equal to 1 in the HE Operation element the HE non-AP STA should not exclusively use BSS Color parameter in making decision related to Intra-PPDU power save and for setting Intra BSS NAV.”When the BSS Color is disabled, there is no restriction on the SR operation.Also, sub-clause 27.2.1 (Intra-BSS and inter-BSS frame detection) already indicates the following: “If the received frame satisfies both intra-BSS and inter-BSS conditions, the decision made by using the MAC address takes precedence over the decision made by using the RXVECTOR parameter BSS\_COLOR .” |
| 10291 | 197.26 | 27.11.4 | This rule contradict the rule described in P196L49. | Delete this sentence. | Revised-This rule is not clear. It implies that the BSS Color may be used to determine whether the STA updates the intra-BSS NAV or goes to power save mode.TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 5479 | 197.27 | 27.11.4 | "The HE non-AP STA may use the BSS color if 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." So this is optional. Hence color should be optional | Make Color optional | Revised- It is unclear which features of the BSS Color are optional. This implies that the BSS Color may be used to determine whether the STA updates the intra-BSS NAV or goes to power save mode.TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 9953 | 197.27 | 27.11.4 | Not clear what "The HE non-AP STA may use the BSS color" means. Does this imply that the HE non-AP STA may include the BSS color in its own HE PPDU transmission? Or, does this imply the STA may update intra-BSS NAV or go to power save mode when the STA receives a PPDU with the BSS color? More clarification is needed. | As in the comment. | Revised- Agree in principal. This implies that the BSS Color may be used to determine whether the STA updates the intra-BSS NAV or goes to power save mode.TGax editor makes changes as shown in the as specified in 11-17/0045r1. |
| 7168 | 197.29 | 27.11.4 | When the BSS color changes, the the Partial BSS Color field in the HE Operation element shall be set to 0. Otherwise the value of RXVECTOR parameter PARTIAL\_AID [5:8] in the received VHT PPDU with the RXVECTOR parameter GROUP\_ID equal to 63 will cause confusion on detection of inter-BSS frame | Please add the following text at the end the subclause "When an HE AP changes the BSS color for the BSS that it serves, it shall set the Partial BSS Color field in the HE Operation element 0.Note: The HE AP may continue applying an AID assignment rule using the partial BSS color bits. | Rejected- “If a HE non-AP STA receives from associated AP a BSS Color Disabled subfield value equal to 1 in the HE Operation element the HE non-AP STA should not exclusively use BSS Color parameter in making decision related to Intra-PPDU power save and for setting Intra BSS NAV.”When the BSS Color is disabled, there is no restriction on the SR operation.By continuously using the BSS Color, the STA can achieve the benefit of the SR operation. Because the partial BSS Color is used only for the SR operation, the proposed restriction constraint is not needed. |

**27.11.4 BSS\_COLOR**

***TGax editor: change the sub-clause 27.11.4 as the following:***

The BSS Color is an identifier of the BSS and is used to assist a receiving STA in identifying the BSS from which a PPDU originates so that the STA can use the channel access rules as described in 27.9 (Spatial reuse operation) or reduce power consumption as described in 27.14.1 (Intra-PPDU power save for HE non-AP STAs).

An HE STA transmitting an HE Operation element or a BSS Color Change Announcement element except when the HE STA is a non-AP STA associated with an HE AP (#5388) shall select a value in the range 1 to 63 to include in either the BSS Color subfield of the HE Operation element or the New BSS Color subfield of the BSS Color Change Announcement element respectively (#5388) that it transmits and shall maintain that single value of the BSS Color subfield for the lifetime of the BSS. An HE STA associated with an HE AP that is transmitting an HE PPDU in a direct path to a DLS or TDLS peer STA shall set the BSS Color subfield of the HE Operation element in its transmitting an HE Operation element to the value of the value indicated in the BSS Color subfield of the HE Operation element received from the HE AP.

An HE STA that transmitted an HE Operation element shall set the TXVECTOR parameter BSS\_COLOR of an HE PPDU to the value indicated in the BSS Color subfield of its HE Operation element.

An active BSS Color is the BSS Color value received by an HE STA from a peer HE STA in the most recent HE Operation element or when the BSS Color change TBTT has passed, it the BSS Color value received in the most recent BSS Color Change Announcement (see 27.16.2 (Selecting and advertising new BSS Color)) transmitted by a peer HE STA.

An HE STA receiving an HE Operation element from a peer HE STA shall set the TXVECTOR parameter of BSS\_COLOR of an HE PPDU which is destined to the peer STA to the active BSS Color value ~~to the value indicated in the BSS Color subfield of the HE Operation element received from the HE STA with which it is associated or intends to transmit.~~, if the HE STA has established any of the following with the peer HE STA or none of the following with the other HE STAs: (#5734)

— An association

— A TDLS link

— A DLS link

— A Mesh Peer relationship

— An IBSS membership

An HE STA that received an HE PPDU with RXVECTOR parameter BSS\_COLOR with a value between 1 and 63 may ~~ignore~~ follow the spatial reuse rules ~~the HE PPDU subject to the rules~~ (#5213) as described in 27.9 (Spatial reuse operation).

An HE STA transmitting an HE SU PPDU or an HE extended range SU PPDU for which one or more intended recipient STAs is not a member of a transmitting STA's HE (#5734) BSS shall set the TXVECTOR parameter BSS\_COLOR of the HE PPDU to 0.

An HE STA that received an HE SU PPDU or an HE extended range SU PPDU with RXVECTOR parameter BSS\_COLOR equal to 0 shall not discard the HE PPDU.

~~An HE STA associated with an HE AP that is transmitting an HE PPDU in a direct path to a DLS or TDLS peer STA shall set the TXVECTOR parameter BSS\_COLOR to the value of the value indicated in the BSS Color subfield of the HE Operation element received from the HE AP.~~

All APs that are members of a Multiple BSSID Set element shall use the same BSS Color.

An HE AP that decides to discontinue the use of the BSS color for the BSS that it serves, for example, after detecting a BSS Color overlap with an OBSS shall set the value of BSS Color Disabled subfield in the HE Operation element to 1 to inform associated STAs that the BSS Color is disabled; otherwise the AP shall set the BSS Color Disabled subfield to 0.

If the most recently received HE Operation element from the AP to which it is associated contained a value of 1 in the BSS Color Disabled subfield then:

— A HE non-AP STA should use the A1, A2 and Duration/ID fields of the MPDUs contained in the received PPDUs instead of the BSS\_COLOR and TXOP\_Duration field in the HE-SIG-A field to determine whether the STA should update the ~~I~~intra-BSS NAV.

— A HE non-AP STA should use the A1, A2 of the MPDUs contained in the received PPDUs instead of the BSS\_COLOR and STA\_ID\_LIST field in the HE-SIG-A field to determine whether the STA may go to doze state for the duration of that PPDU (see 27.14.1 (Intra-PPDU power save for HE non-AP STAs)).

The HE non-AP STA may use the BSS\_color in the HE-SIG-A field to determine whether the STA should update the intra-BSS NAV or the STA may go to doze state for the duration of that PPDU (#10291, 5479, 9953) if 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: delete the following sentence from the sub-clause 9.4.2.219:***

~~The BSS Color field is an unsigned integer whose value is the BSS color of the BSS corresponding to the AP which transmitted this element, except that a value of 0 in this field indicates that there is no BSS color for this BSS.~~ (#5214)