IEEE P802.11  
Wireless LANs

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| Resolution for CIDs related to BSS Color – Part 2 | | | | |
| Date: May 2, 2019 | | | | |
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Abstract

This submission proposes resolutions for comments received for TGax LB238 (6):

21463, 20928, 20924, 20929, 20927, 20062

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revised resolution to CID 20062 based on offline feedback
* Rev 2: Edits made when the doc was presented on 5/16/19 PM1
  + Fixed missing ‘BSSID’ in the context of co-hosted BSSID set in the definition BSS color
  + Resolution for CID 20062 is updated based on feedback from Liwen and other members to exempt an MU PPDU from setting the color to 0 when it carries RU for unassociated STA.

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.***

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 21463 | Wookbong Lee |  |  | "BSS color" is used in many places, e.g. BSS Color Collision, BSS color value, BSS Color In Use, BSS Color Change Announcement, BSS Color Information, BSS Color Bitmap, etc. Add definition of BSS color in Clause 3. | As suggested in the comment | **Revised**  Agree with the comment. Added a definition for BSS color in clause 3.2  **TGax editor, please make changes as shown in doc 11-19/505r2 tagged as 21463** |

**3.2 Definitions specific to IEEE 802.11**

***TGax Editor: Please add a new definition to this subclause as shown below (while maintaining the alphabetical order)***

**Basic service set (BSS) color:** An identifier for a BSS or for a set of BSSs belonging to a multiple BSSID set or a Co-hosted BSSID set.[21463]

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20928 | Mark RISON | 194.46 | 9.4.2.248 | "The BSS Color Change Announcement element is carried in the HE BSS Color Change Announcement frame and is optionally included in Beacon, Probe Response, and (Re)Association Response frames. The use of the BSS Color Change Announcement element and HE BSS Color Change Announcement frame is described in 26.17.3.1 (Selecting and advertising a new BSS color)." -- first bit is duplication, second is not relevant to Clause 9 | Delete the cited text at the referenced location. Also delete ", which may be carried in the Beacon, Probe Response and (Re)Association Response frames transmit- ted by the AP" at 434.44 (whose "may" is even confusing). At 194.4 change " BSS Color change" to " BSS color change" | **Revised**  Agree with the comment. Deleted the cited text in clause 9.4.2.248. Further the cited sentence in clause 26.17.3.4 is split into two sentences to remove any ambiguity. Minor editorial changes to provide additional clarity. Changed color to lower case c in the 1st sentence of 9.4.2.248 as pointed by the comment.  **TGax editor, please make changes as shown in doc 11-19/505r2 tagged as 20928** |

* **BSS Color Change Announcement element**

***TGax Editor: Please make changes to the 1st paragraph in this subclause as shown below***

The BSS Color Change Announcement element is used by an AP to advertise an upcoming BSS [20928]color change event and the value of the new BSS color that will take effect after the color change (see 26.17.3.4). The format of the BSS Color Change Announcement element is shown in Figure 9-772t (BSS Color Change Announcement element format).

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|  |  |  |  |  |  |
|  | Element ID | Length | Element ID Extension | Color Switch Countdown | New BSS Color Information |
| Octets: | 1 | 1 | 1 | 1 | 1 |
| * **BSS Color Change Announcement element format** | | | | | |

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

The Color Switch Countdown field is set to the number of TBTTs that remain until the HE AP sending the BSS Color Change Announcement element switches to the new BSS color. A value of 0 indicates that the switch occurs at the current TBTT if the element is carried in a Beacon frame or at the next TBTT following the frame that carried the element if the frame is not a Beacon frame.

The format of the New BSS Color Information field is defined in Figure 9-772u (New BSS Color Information field format). The New BSS Color subfield is set to the new BSS color value that the HE AP intends to use starting from the TBTT at which the color switch countdown reaches 0.

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|  | B0           B5 | B6            B7 |
|  | New BSS Color | Reserved |
| Bits: | 6 | 2 |
| * **New BSS Color Information field format** | | |

***TGax Editor: Please delete the last paragraph in this subclause as shown below***

[20928]

* Selecting and advertising a new BSS color

***TGax Editor: Please make changes to the 2nd paragraph in this subclause as shown below***

[20928]An HE AP shall announce an upcoming BSS color change using the BSS Color Change Announcement element. The BSS Color Change Announcement element may be carried in the Beacon, Probe Response, (Re)Association Response, and HE BSS Color Change Announcement frames transmitted by the AP. An HE AP should announce an upcoming BSS color change for a period of time that is sufficiently long for all STAs in the BSS, including STAs in PS mode, to have an opportunity to receive at least one frame carrying a BSS Color Change Announcement element before the BSS color change.

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20924 | Mark RISON | 213.03 | 9.6.32.2 | "Action No ACK" -- no need to shout! | Change to "Action No Ack" | **Accept**  **TGax editor, please make changes as suggested by the commenter** |
| 20929 | Mark RISON | 213.00 | 9.6.32.2 | "The BSS Color Change Announcement element as defined in 9.4.2.248 (BSS Color Change Announcement element) is always present in the frame. No Vendor-Specific elements are present in the HE BSS Color Change Announcement frame." -- typo, duplication and lack of justification of constraint | Change the cited text at the referenced location to "The BSS Color Change Announcement element is defined in 9.4.2.248 (BSS Color Change Announcement element)." | **Revised**  The purpose of this frame to carry information about an upcoming BSS color change event. It doesn’t need to carry vendor specific information. There is precedence in the baseline spec to limiting the amount of information carried in a frame (as an example, please see VHT Compressed Beamforming frame format). Removed duplicate reference to clause 9.4.2.248 and self-reference to the frame.  **TGax editor, please make changes as shown in doc 11-19/505r2 tagged as 20929** |
| 20927 | Mark RISON | 213.03 | 9.6.32.2 | "The HE BSS Color Change Announcement frame is an Action or Action No ACK frame" -- can't be both | Delete "or Action No ACK" in the cited text at the referenced location | **Reject**  The spec allows an AP to transmit this frame to a broadcast address or directed to a particular STA. In case of broadcast, the frame will not be acknowledged. In such cases where the frame is individually addressed, an acknowledgement is expected. |

* **HE BSS Color Change Announcement frame format**

***TGax Editor: Please make changes to the paragraphs in this subclause as shown below***

The HE BSS Color Change Announcement frame is an Action or Action No [20924]Ack frame of category Protected HE. The Action field of an HE BSS Color Change Announcement frame contains the information shown in Table 9-524f (HE BSS Color Change Announcement frame Action field format).

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| * **HE BSS Color Change Announcement frame Action field format** | |
| **Order** | **Information** |
| 1 | Category |
| 2 | Protected HE Action |
| 3 | BSS Color Change Announcement element (see 9.4.2.248 (BSS Color Change Announcement element)) |

The Category field is defined in Table 9-53 (Category values).

The Protected HE Action field is defined in Table 9-524e (Protected HE Action field values).

[20929]The BSS Color Change Announcement element is always present in the frame.

[20929]Vendor-Specific element is not present in this frame.

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20062 | Abhishek Patil | 405.61 | 26.11.4 | An AP operating in 6GHz is allowed to send broadcast Probe Response frame or a FILS Discovery frame in a DL MU PPDU carried in an RU with STAID set to 2045 along with other RUs (directed or broadcast) for associated STAs. In such cases, what should be the BSS Color parameter in the TXVECTOR set to?. | Please clarify | **Revised**  Revised the paragraph so that each case is covered as a separate bullets. The revised text covers the DL MU PPDU case where an AP can set the color to 0 when the PPDU carries an RU with STAID set to 2045 (unassociated STAs). This will also help the case when a DL MU PPDU carries multi-STA BA for unassociated STAs (see 26.5.4.5 in 11ax D4.1). Further, an exception is added such that the PPDU color is not set to 0 when the PPDU carries TF. This is to help case when the AP allocated RA-RUs for unassociated STAs (see clause 26.5.4.5). In such case, an unassociated STA can determine the AP’s color based on the PPDU’s BSS color value.  **5/16/19 PM1**: resolution updated based on feedback from Liwen and other members to exempt an MU PPDU from setting the color to 0 when it carries RU for unassociated STA.  **TGax editor, please make changes as shown in doc 11-19/505r2 tagged as 20062** |

* BSS\_COLOR

***TGax Editor: Please make changes to the 1st paragraph in this subclause as shown below***

An HE STA that transmitted an HE Operation element shall set the TXVECTOR parameter BSS\_COLOR as follows:

* For an HE SU PPDU, HE ER SU PPDU or DL HE MU PPDU to the value indicated in the BSS Color subfield of its HE Operation element when all the recipient STAs are member of the transmitting STA’s HE BSS or the PPDU carries at least one Trigger frame or a frame carrying TRS Control subfield.
* For an HE SU PPDU or HE ER SU PPDU to 0 when the transmitter expects at least one intended recipient STA is not a member of its HE BSS and the PPDU does not carry Trigger frame or a frame carrying TRS Control subfield.[20062]