IEEE P802.11
Wireless LANs

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| Proposed resolution for comments related to HE Operation element |
| Date: 2017-01-16 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs (3 CIDs): 3034, 3035, 3036, 3177, 4772, 4927, 5331, 6062, 7561, 8134, 8259, 8400, 8683, 9337, 9510, 9663, 9845, 5214

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** | **Section** | **Pg / Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 3034 | 9.4.2.219 | P91L8 | A non-AP STA may determine BSS Color overlap with a neighboring (OBSS) AP. In such cases, the non-AP STA needs a mechanism to report a color collision to its associated AP. | Define a mechanism where a non-AP STA can autonomously report a color collision to its associated AP. | AcceptedPlease see document 11-17-0135-00-00ax |
| 3035 | 9.4.2.219 | P91L1 | VHT Operation Information field is useful only when operating in 5GHz. Make the 3-octet VHT Operation Information field option and add a bit in the HE Parameters to indicate the presence of VHT Operation Information field | As in comment | AcceptedPlease see document 11-17-0135-00-00ax |
| 3036 | 9.4.2.219 | P91L39 | Remove text that doesn’t apply anymore and is covered in the following paragraph | Remove paragraph starting on line 39. Paragraph starting on line 44 is correct and should be kept | AcceptedDeleted duplicate paragraph which was approved for removal in an earlier motion (CC23)Please see document 11-17-0135-00-00ax |
| 3177 | 9.4.2.219 | P91L39 | Duplicated sentences in this paragraph and the next one. | Unify the two paragraphs or remove one. | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 4772 | 9.4.2.219 | P91L39 | Duplicated (conflicting) definition of the BSS Color field. Remove the first occurrence. | As in comment. | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 4927 | 9.4.2.219 | P91L39 | """The BSS Color field is an unsigned integer whose value is the BSS color of the BSS corresponding to the AP | Actually this para looks like an inferior version of the para at P91L44. So delete lines 39-42. Also generalize "AP" as appropriate at P92L19/28 para, P149L40, P150L10, P197L1-28, etc |  |
| 5331 | 9.4.2.219 | P91L39 | which transmitted this element, except that a value of 0 in this field indicates that there is no BSS color for | Join sentences describing the BSS Color field | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 6062 | 9.4.2.219 | P91L39 | this BSS."" - BSS Color is also needed for IBSSs otherwise they get priority over infra BSSs" | "Delete the following paragraph: | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 7561 | 9.4.2.219 | P91L39 | The two consequent sentences describe the same idea except for the "except" clause. | As in comment | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 8134 | 9.4.2.219 | P91L39 | According to 27.11.4 BSS\_COLOR, BSS Color (0) indicates that one or more intended recipient STAs is not a member of a transmitting STA's BSS. Therefore, the indicated paragraph (p91, l39) should be deleted. | There are two differing descriptions of the meaning of the value 0 for BSS color - merge them or delete one or somehow reconcile them. | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 8259 | 9.4.2.219 | P91L39 | ""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.""" | as per comment | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 8400 | 9.4.2.219 | P91L39 | This paragraph should be removed since the following paragraph replaces it. | Merge these two paragraphs into one paragraph for the descriptions of AP. | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 8683 | 9.4.2.219 | P91L39 | There are two differing descriptions of the meaning of the value 0 for BSS color - merge them or delete one or somehow reconcile them. | Clarify | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 9337 | 9.4.2.219 | P91L39 | In HE Operation element section, there are 2 different descriptions of BSS Color field. Clarification is needed. | Delete the paragraph starting from line 39 of page 91. | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 9510 | 9.4.2.219 | P91L39 | There are two paragraphs for the description of BSS Color field. | As in the comment. | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 9663 | 9.4.2.219 | P91L39 | The "BSS Color" field has two definitions: lines 39-42 and lines 44-47. Which is correct? | "Remove the following paragraph: | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 9845 | 9.4.2.219 | P91L39 | The content of the paragraph starting from line 39 is repeated in the next paragraph. The next paragraph also the other cases and should be kept. | ""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.""" | Revised - Please see resolution for CID 3036Please see document 11-17-0135-00-00ax |
| 5214 | 27.11.4 | P196L63 | 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- The cited sentence (in 9.4.2.219) was approved for deletion in a previous motion of CC23. However for some unknown reason, the sentence is still present in the draft. The incorrect sentence is to be removed from section 9.4.2.219Please see document 11-17-0135-00-00ax |

TGax Editor: Please modify this section as follows:

* HE Operation element

The operation of HE STAs in an HE BSS is controlled by the HT Operation element, the VHT Operation element and the HE Operation element. The format of the HE Operation element is defined in Figure 9-589cq (HE Operation element format).

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| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Element ID | Length | HE Operation Parameters | Basic HE MCS And NSS Set | VHT Operation Information | MaxBSSID Indicator[3034] |
| Octets: | 1 | 1 | 4 | 3 | 0 or 3[3035] | 0 or 1[3034] |
| * HE Operation element format
 |  |

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

The format of the HE Operation Parameters field is defined in Figure 9-589cr (HE Operation Parameters field format).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B5 | B6    B8 | B9 | B10  B19 | B20 | ~~B21    B28~~ | B21 | B22 B27 | B28 | B29 | B30 | B31 |
|  | BSS Color | Default PE Duration | TWT Required | HE Duration Based RTS Threshold | Partial BSS Color | ~~MaxBSSID Indicator~~ | VHT Operation Info Present[3035] | Reserved[3034, 3035] | Multiple BSSID AP[3034] | Tx BSSID Indicator | BSS Color Disabled | Dual Beacon |
| Bits: | 6 | 3 | 1 | 10 | 1 | ~~8~~ | 1 | 6 | 1 | 1 | 1 | 1 |
| * HE Operation Parameters field format
 |

 [3036, , 3177, 4772, 4927, 5331, 6062, 7561, 8134, 8259, 8400, 8683, 9337, 9510, 9663, 9845, 5214]The BSS Color field is an unsigned integer whose value is the BSS Color of the BSS corresponding to the AP, IBSS STA, mesh STA or TDLS STA that transmitted this element, except that a value of 0 in this field is used if one or more intended recipient STAs of an HE PPDU is not a member of a transmitting STA's BSS.

The Default PE Duration subfield indicates the PE duration in units of 4 μs, for an HE trigger-based PPDU that is solicited with UL MU Response Scheduling in the A-Control subfield. Values 5-7 of the Default PE Duration subfield are reserved.

The TWT Required subfield is set to 1 to indicate that the AP requires the non-AP HE STAs to operate in the role of either TWT requesting STA, as described 27.7.2 (Individual TWT agreements), or TWT scheduled STA, as described in 27.7.3 (Broadcast TWT operation) and set to 0 otherwise.

The HE Duration Based RTS Threshold field enables an HE AP to manage RTS/CTS usage by HE non-AP STAs that are associated with it. The HE Duration Based RTS Threshold field contains the duration based RTS threshold in units of 32 s, which enables the use of RTS/CTS except for values 0 and 1023. The value 0 indicates that RTS/CTS must be used for all frame exchanges. The value 1023 indicates that HE duration-based RTS is disabled.

The Partial BSS Color field indicates whether or not the BSS applies an AID assignment rule using the partial BSS color bits. If the Partial BSS Color field is set to 1, then the 4 least significant bits of BSS color are used in AID assignment. If the Partial BSS Color field is set to 0, no partial BSS color bits are used in the AID assignment.

VHT Operation Info Present bit indicates whether or not the 3 octet VHT Operation Information field is carried in the HE Operation element. A bit value of 1 indicates the field is present; otherwise the field is not present in the element. [3035]

Multiple BSSID AP bit indicates whether or not the AP transmitting this element belongs to a Multiple BSSID set. A value of 1 indicates the AP belongs to Multiple BSSID set, otherwise the value is set to 0. A non-AP STA transmitting this element shall set the value of this bit to 0. [3034]

An HE AP corresponds to a nontransmitted BSSID if the AP's BSSID can be derived from Multiple BSSID element present in the Beacon or Probe Response frame transmitted by another AP (i.e., the AP identified by the Transmitted BSSID). The Tx BSSID Indicator indicates whether an HE AP corresponds to transmitted BSSID. [3034]~~The definition of MaxBSSID Indicator is same as the MaxBSSID Indicator in Multiple BSSID element.~~ An HE AP corresponding to a nontransmitted BSSID sets Tx BSSID Indicator to 0. An HE AP corresponding to a transmitted BSSID sets Tx BSSID Indicator to 1. [3034]~~An HE AP corresponding to Nontransmitted BSSID or a transmitted BSSID sets the MaxBSSID Indicator field to non-zero value.An AP corresponding to neither a nontransmitted BSSID nor a transmitted BSSID sets both MaxBSSID Indicator and Tx BSSID Indicator to 0.~~ TxBSSID Indicator bit field is reserved when Multiple BSSID AP bit is set to 0. [3034]

The BSS Color Disabled subfield indicates whether the transmitting AP recommends the associated STAs to disable the use of BSS Color parameter when making decisions related to Intra-PPDU power save and setting Intra BSS NAV. An HE AP sets the BSS Color Disabled subfield to 1 if the HE AP decides to disable the use of the BSS color for the BSS that it serves, for example, after detecting a BSS Color overlap in the neighborhood as described in 27.11.4 (BSS\_COLOR); otherwise the HE AP sets the BSS Color Disabled subfield to 0.

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. Instead, the non-AP STA should use the MAC header to make such decisions (see 27.11.4 (BSS\_COLOR)). HE non-AP STA may (re)enable BSS Color related features once it receives from the associated AP a BSS Color Disabled subfield equal to 0 in an HE Operation element.

The Dual Beacon subfield indicates whether the HE AP transmits beacons 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 frame in HE extended range SU PPDU in 11.1.3.10 (Beacon generation in an HE BSS). The subfield is set to 0, if the HE AP transmits beacons in one PHY format. The subfield is set to 1 if the HE AP transmits beacons in an HE extended range SU PPDU and a non-HE PPDU.

The Basic HE MCS And NSS Set field indicates the HE-MCSs for each number of spatial streams in HE PPDUs that are supported by all HE STAs in the BSS (including IBSS and MBSS). The Basic HE MCS And NSS Set field is a bitmap of size 24 bits. Each 3 bit pair in the bitmap indicates the supported HE-MCS set for NSS from 1 to 8. The Basic HE-MCS And NSS Set field is defined in Figure 9-589cs (Basic HE-MCS And NSS Set field format).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0         B2 | B3         B5 | B6         B8 | B9        B11 | B12     B14 | B15     B17 | B18     B20 | B21      B23 |
|  | Max HE MCS For 1 SS | Max HE MCS For 2 SS | Max HE MCS For 3 SS | Max HE MCS For 4 SS | Max HE MCS For 5 SS | Max HE MCS For 6 SS | Max HE MCS For 7 SS | Max HE MCS For 8 SS |
| Bits: | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| * Basic HE-MCS And NSS Set field format
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The Max HE MCS For n SS subfield (where *n* = 1, ..., 8) is encoded as follows:

* 0 indicates support for HE-MCS 0-7 for *n* spatial streams
* 1 indicates support for HE-MCS 0-8 for *n* spatial streams
* 2 indicates support for HE-MCS 0-9 for *n* spatial streams
* 3 indicates support for HE-MCS 0-10 for *n* spatial streams
* 4 indicates support for HE-MCS 0-11 for *n* spatial streams
* 5-7 are reserved

The structure of the VHT Operation Information field is defined in Figure 9-564 (VHT Operation Information field) and its subfields are defined in Table 9-252 (VHT Operation Information subfields). This 3-octet field is present when VHT Operation Info Present bit field is set to 1; else the field is not carried in the element. [3035]

[3034]The definition of MaxBSSID Indicator is same as the MaxBSSID Indicator in Multiple BSSID element (see section 9.4.2.46). An HE AP belonging to Multiple BSSID set includes this 1-octet field in the element. The field is not present if the Multiple BSSID AP bit is set to 0 in HE Parameters field.