

**IEEE P802.11**  
**Wireless LANs**

Proposed Resolution for CID 193 (BSS Color Disable Indication)

Date: 2016-11-09

**Author(s):**

<b>Name</b>	<b>Affiliation</b>	<b>Address</b>	<b>Phone</b>	<b>email</b>
Abhishek Patil	Qualcomm Inc.	5775 Morehouse Drive, San Diego, CA 92121	+1-858-845-4434	appatil@qti.qualcomm.com
Alfred Asterjadhi	Qualcomm Inc.	5775 Morehouse Drive, San Diego, CA 92121	+1-858-658-5302	aasterja@qti.qualcomm.com
George Cherian	Qualcomm Inc.	5775 Morehouse Drive, San Diego, CA 92121	+1-858-651-6645	gcherian@qti.qualcomm.com

### Abstract

This submission proposes resolution for CID 193

Revision History:

Rev0: Initial version of the document

Rev1, 2: Fixed author affiliation, fixed rev # in document header

Rev3: updated text to separate NAV setting and Intra-PPDU PS case based on feedback

Rev4: added discussion section

Rev5: changed PPDU power save to Intra-PPDU power save based on feedback

Rev6: revised based on received feedback (IEEE San Antonio, 11/8/16 AM2)

Included proposed changes to section 25.2.1 and 25.15.1

Rev7: Updated proposed text in 9.4.2.219 and 25.11.3

Removed proposed changed to 25.2.1 & 25.15.1

Rev8: fixed typo

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	Pg / Ln	Comment	Proposed Change	Resolution
193	25.11	There may be cases where multiple APs have selected the same BSS Color as such a STA in rare occasions may happen to decide and go in doze state during the wrong PPDU. Enable the AP to turn off intra-PPDU PS based on BSS Color.	As in comment.	Revised. Please see contribution in document 11-16/1413r8  TGax editor please capture changes from this document (11-16/1413r8) for CID 193.

**Discussion:**

6-bits for BSS Color. Based on Birthday Paradox, in a dense environment, there is a high likelihood that 2 APs select the same color (for example, with only 8 APs in the neighborhood, there is a 50% chance that 2 of them select the same color)

If BSS Color collision is not handled, it can cause:

- STAs to incorrectly set Intra-NAV values
- STAs to incorrectly enter power-save mode and miss frames from its AP

Therefore, it is critical for HE APs to:

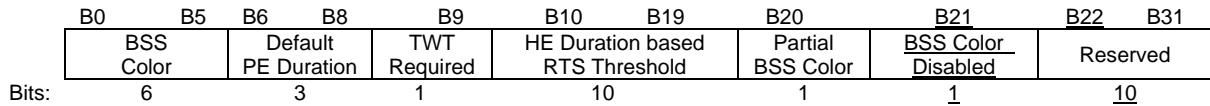
- Signal and inform associated STAs that there is BSS color overlap
- If needed, switch to a new color (see doc 11-16/1415)

The proposed resolution is to disable BSS Color when AP determines that there is a color collision.

The proposed text language is general so that it covers other situations such as an operator reorganizing a managed network.

### 9.4.2.219 HE Operation element

**TGax Editor: Please update this section with the underlined changes:**



**Figure Error! No text of specified style in document.-589cr - HE Operation Parameters field format**

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 25.11.3 (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 details in 25.11.3). 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.

## 25.11 TXVECTOR parameters STA\_ID\_LIST, UPLINK\_FLAG and BSS\_COLOR for an HE PPDU

### 25.11.3 BSS\_COLOR

**TGax Editor: Please add the underline at the end of this section:**

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 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 25.15.1 (Intra-PPDU power save for HE non-AP STAs)).

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.