### IEEE P802.11Wireless LANs

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| 11ax D0.1 Comment Resolution for Spatial Reuse (Intra BSS detection) |
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Abstract

This submission proposes resolutions for comments in clause 25.9.2 of TGax Draft 0.1 with the following CIDs:

* 62, 640, 2434, 2438, 703, 2435, 66, 257, 447, 186, 2661, 2662, 776, 2660, 1577, 2332, 2718

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Title of 25.2.1 is changed and several editorial changes are made

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 D0.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D0.1 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** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 62 | 63.29 | 25.9 | There should be another condition that looks at both of the two conditions below (i.e. first and second conditions, or first and third conditions) and if there is a mismatch then the frame should not be classified as intra-BSS frame: "The detected frame is intra-BSS frame if one of the following conditions is true:--The BSS color in the detected PPDUis same as the BSS color announced by its associated AP,--The RA or TA of the detected frame is same as the BSSID or its bandwidth signaling variant of its associated AP--Its associated AP is identified by TBD Multiple BSSID element and the RA or TA of the detected frame is same as one of the BSSID or its bandwidth signaling variant defined by TBD Multiple BSSID element" | As in the comment | Revised.Agreed to the comment. There are 3 categoris that a received frame can be: intra-BSS frame, inter-BSS frame, and can-not-be-identifed as inter/intra-frame. Therefore, the spec. needs to describe conditions for these 3 categories separately and disjointly. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 62. |
| 640 | 63.29 | 25.9.2 | When STA detects a frame from the neighboring BSS which uses the same BSS Color, the STA would determine the frame as an intra-BSS frame using BSS Color. If the STA continues to decode the frame, STA would realize that the frame is an inter-BSS frame based on the address field in MAC header. However, following the rule for the determination of intra-BSS frame in 25.9.2, the frame is determined as an intra-BSS frame because this case meets "one of the conditions" for intra-BSS frame | Insert this sentence in 25.59.2."When both BSS color and MAC address are available, MAC address should be used to determine whether the detected frame is intra-BSS frame." | Revised.Agreed to the comment. In case a STA recognizes a valid address fields in the MAC header of a detected frame, the STA shall use the address fields in determining inter or intra BSS frame. Thefore, use of BSS Color for inter or intra BSS frame is limited only to the case that no valid address field is recognized. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 640. |
| 2434 | 63.29 | 25.9.2 | "An STA determines whether a detected frame is an inter-BSS or an intra-BSS frame by using BSS color or MAC address in the MAC header. The detected frame is intra-BSS frame if one of the following conditions is true:"As specified in 802.11ax Spec Framework, the Partial AID field of VHT PPDU can be used to determine an inter-BSS or an intra-BSS.Change the first paragraph of 25.9.2 as the following:"An STA determines whether a detected frame is an inter-BSS or an intra-BSS frame by using BSS color field in PHY Header of HE PPDU, Group ID and Partial AID fields in PHY Header of VHT PPDU or MAC address fields in the MAC header. The detected frame is intra-BSS frame if one of the following conditions is true:" | As per comment | Revised.Agreed to the comment. Several RXVECTOR parameters (BSS\_COLOR, GROUP\_ID, PARTIAL\_ID, etc) and address fields can be used in determining inter or intra BSS frame.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2434. |
| 2438 | 63.33 | 25.9.2 | The below rule is not referring the DLS or TDLS DATA frame."--The RA or TA of the detected frame is same as the BSSID or its bandwidth signaling variant of its associated AP""--Its associated AP is identified by TBD Multiple BSSID element and the RA or TA of the detected frame is same as one of the BSSID or its bandwidth signaling variant defined by TBD Multiple BSSID element"If the detected frame is DLS or TDLS DATA frame, the Address 3 should be used to detect an intra-BSS.Change the corresponding conditions as the following:"--The Address 1, Address 2 or Address 3 (if present) of the detected frame is same as the BSSID or its bandwidth signaling variant of its associated AP""--Its associated AP is identified by TBD Multiple BSSID element and the Address 1, Address 2 or Address 3 (if present) of the detected frame is same as one of the BSSID or its bandwidth signaling variant defined by TBD Multiple BSSID element" | As per comment | Revised.Agreed to the comment. There are cases that BSSID is indicated in Address 3 field such as TDLS DATA frame, in which case RA and TA is not enough for checking if the received frame is inter or intra BSS frame.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2438. |
| 703 | 63.37 | 25.9.2 | Remove the TBDs | Defined the TBD conditions | Revised.Agreed to the comment. This bullet describes the case that the AP is a member of a Multiple BSSID Set with two or more members. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 703. |
| 2435 | 63.29 | 25.9.2 | "The BSS color in the detected PPDUis same as the BSS color announced by its associated AP,"The meaning of the BSS color is not clear. Change it as the following:"The RXVECTOR parameter BSS\_COLOR in the detected HE PPDU is same as the BSS color announced by its associated AP," | As per comment | Revised.Agreed to the comment. RXVECTOR parameter BSS\_COLOR describes a STA’s behaviour more clearly.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2435. |
| 66 | 63.19 | 25.9 | A STA might be associated with multiple Color values e.g. depending on whether the STA has P2P activity in addition to the BSS it associated with. Need to revise some of the rules in this clause so that such a STA observes the multiple Color values it has to observe. | As in the comment. | Rejected.Currently, there’s no case defined that a STA is associated with multiple Color values. So, the commenter may need to bring this comment again when the spec. defines this situation. |
| 257 | 63.36 | 25.9.2 | What does TBD stand for? | Explain or remove TBD. | Revised.Agreed to the comment. This bullet describes the case that the AP is a member of a Multiple BSSID Set with two or more members. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 257. |
| 447 | 63.34 | 25.9.2 | BSSID doesn't have a BW signalling variant | Change to "The RA or TA (with the I/G bit forced to zero) of the detected frame is the same as the BSSID of its associated AP | Revised.Agreed to the comment. The STA needs to compare the address field with the Individual/Group bit forced to the value 0.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 447. |
| 186 | 81.28 | 25.9.2 | MAC knows nothing of the BSS Color. This is provided by the PHY via the RXVECTOR parameter(BSS\_COLOR). The "Otherwise it is an inter-BSS PPDU statement is missing. Also there is a TBD in the Multiple BSSID element. We do have a Multiple BSSID element. Is this another one? Please clarify. | As in comment. | Revised.Agreed to the comment. Several RXVECTOR parameters (BSS\_COLOR, GROUP\_ID, PARTIAL\_ID, etc) and address fields can be used in determining inter or intra BSS frame.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 186. |
| 2661 | 63.32 | 25.9.2 | Even in case BSS color in the detected PPDU is the same as the BSS color of its own, if the BSSID information in the MAC header is different from that of its own, the frame should be considered as inter-BSS frame. | Modify the sentences to include the commented case. | Revised.Agreed to the comment. In case a STA recognizes a valid address fields in the MAC header of a detected frame, the STA shall use the address fields in determining inter or intra BSS frame. Thefore, use of BSS Color for inter or intra BSS frame is limited only to the case that no valid address field is recognized. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2661. |
| 2662 | 63.34 | 25.9.2 | In case of TDLS frame transmission using non-HT frame format happened in intra-BSS, BSSID information will be carried in Address 3 field and both TA and RA are different from the receiving STA's Color. | Modify the second bullet as "The RA, TA, or BSSID of the detected frame is same as the BSSID or its bandwidth signaling variant of its associated AP". | Revised.Agreed to the comment. There are cases that BSSID is indicated in Address 3 field such as TDLS DATA frame, in which case RA and TA is not enough for checking if the received frame is inter or intra BSS frame.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2662. |
| 776 | 63.32 | 25.9.2 | Detecting the STA Color field value may not be enough to detect that the STA belongs to the same BSS. There may be Color value collisiosn. | Delete the BSS Color detection from the list | Revised.Agreed to the comment. In case a STA recognizes a valid address fields in the MAC header of a detected frame, the STA shall use the address fields in determining inter or intra BSS frame. Thefore, use of BSS Color for inter or intra BSS frame is limited only to the case that no valid address field is recognized. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 776. |
| 2660 | 63.28 | 25.9.2 | The definition of "detected frame" when MAC address in the MAC header is not clear. If the "detected frame" implies that a CRC of an MPDU passes, the frame detection happens at the end of an MPDU, in which case spatial reuse cannot be beneficial unless the PPDU contains more than one A-MPDU subframes. However, if the "detected frame" implies a time before checking CRC, there is a chance that wrong BSSID information is used for deciding spatial reuse. So, clarification on the definition of the "detected frame" is necessary. | As mentioned in the comment, clarify the definition of the "detected frame" when MAC address in the MAC header is used. | Rejected.The comment is an implementation issue and the spec. does not need to specify this feature. |
| 1577 | 63.25 | 25.9.2 | There are 5 "detected frame"s and 1 "detected PPDU" in this subclause, but what does detection entail? | Change each "detected" to "received" | Revised.Agreed to the comment. “received frame” is more appropriate than “detected frame” or “detected PPDU”.TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 1577. |
| 2332 | 63.36 | 25.9.2 | There are some TBDs that have to be resolved. | Please resolve TBDs in this subclause. | Revised.Agreed to the comment. This bullet describes the case that the AP is a member of a Multiple BSSID Set with two or more members. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2332. |
| 2718 | 63.32 | 25.9.2 | No definition of an inter-BSS, only an intra-BSS | Add "If the frame is not an intra-BSS frame, it is an inter-BSS frame." | Revised.Agreed to the comment that there’s no definition for an inter-BSS frame in D0.1. Therefore, the spec. needs to define for the cases that a received frame is an “inter-BSS frame”. TGax editor to make the changes shown in 11-16/0889r1 under all headings for CID 2718. |

**Discussion:** *None.*

***TGax editor: Delete the first paragraph of sub-clause 25.9.2 and change the subclause 25.2.1 as the following (CID 62, 640, 2434, 2438, 703, 2435, 257, 447, 186, 2661, 2662, 776, 1577, 2332, 2718):***

**25.9.2 Color code based CCA rules**
~~An STA determines whether a detected frame is an inter-BSS or an intra-BSS frame by using BSS color or
MAC address in the MAC header. The detected frame is intra-BSS frame if one of the following conditions
is true:~~

* ~~The BSS color in the detected PPDU is same as the BSS color announced by its associated AP~~
* ~~The RA or TA of the detected frame is same as the BSSID or its bandwidth signaling variant of its
associated AP~~
* ~~Its associated AP is identified by TBD Multiple BSSID element and the RA or TA of the detected
frame is same as one of the BSSID or its bandwidth signaling variant defined by TBD Multiple
BSSID element~~

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**25.2 Channel Access**

**25.2.1 *Intra-BSS and inter-BSS frame detection ~~Updating two NAVs~~***

A HE STA determines whether a received (#1577) frame is an inter-BSS or an intra-BSS frame by using the RXVECTOR parameters (e.g., BSS\_COLOR in HE PPDUs or GROUP\_ID and PARTIAL\_AID in VHT PPDUs) (#186, #2434) or MAC address in the MAC header.

A frame received (#1577) by the STA is an intra-BSS frame if one of the following conditions is true:

* The RXVECTOR parameter BSS\_COLOR (#2435) in the received PPDU carrying the frame (#1577) is the same as the BSS color announced by the AP to which the STA is associated
* The RA, TA, or BSSID (#2438, #2662) of the received (#1577) frame with the Individual/Group bit forced to the value 0 (#447) is the same as the BSSID of AP to which the STA is associated
* AP to which the STA is associated is a member of a Multiple BSSID Set with two or more members (#703, #257, #2332) and the RA, TA, or BSSID (#2438, #2662) of the received (#1577) frame with the Individual/Group bit forced to the value 0 (#447) is same as the BSSID of any member of the Multiple BSSID Set

A frame received by the STA is an inter-BSS frame if one of the following conditions is true (#62, #2718):

* The RXVECTOR parameter BSS\_COLOR in the received PPDU carrying the frame is not 0 and does not match the BSS color announced by the AP to which the STA is associated
* When there is no BSS\_COLOR subfield in the received PPDU carrying the frame:
	+ The BSSID field of the received frame with Individual/Group bit forced to the value 0, if available, does not match the BSSID of AP to which the STA is associated
	+ If the BSSID field is not available, both RA and TA fields exist, and none of the address field of the received frame with Individual/Group bit forced to the value 0 matches the BSSID of AP to which the STA is associated
* AP to which the STA is associated is a member of a Multiple BSSID Set with two or more members, and the BSSID field of the received frame with Individual/Group bit forced to the value 0, if available, does not match the BSSID of any member of the Multiple BSSID Set
* If AP to which the STA is associated is a member of a Multiple BSSID Set with two or more members, the BSSID field is not available, both RA and TA fields exist, and none of the address field of the received frame with the Individual/Group bit forced to the value 0 matches the BSSID of any member of the Multiple BSSID Set

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 (#640, #2661, #776).

If the received frame does not satisfy any of the intra-BSS and inter-BSS conditions, then the frame cannot be determined as intra-BSS or inter-BSS frame (#62).

**25.2.2 Updating two NAVs**