IEEE P802.11
Wireless LANs

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| Comment Resolutions on PHY INTRODUCTION Part 3 |
| Date: 2018-01-10 |
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Abstract

This submission proposes resolutions for the following comments on section HE PHY Capabilities of TGax D2.0:

11466, 12680, 13976

Revisions:

* Rev 0: Initial version of the document.

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** | **Clause Number** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 11466 | 9.4.2.237.3 | 139.44 | Is Dual Band support bit needed? | seems to be unnecessary given that the Channel Width Set explicitly separates 2.4 and 5 GHz support, so the information can be derived from that field. Eliminate this field | Revised—The capabilities are indicated for the current BSS in which the STA is operating. Hence, when operating in 2.4 GHz, the Channel Width Set indicates capabilities applicable to 2.4 GHz band only. However, Dual Band Support bit use and behaviour is not defined in 11ax D2.0. The intent is to indicate support of dual bands (2.4 and 5 GHz). There are shortcomings in the anticipated behaviour of Dual Band Support subfield and alternatives to it already exist in .11 (Supported Operating Classes Element). Thus, we propose to delete the Dual Band Support subfield. Further discussion is provided in 11-18/46r0.Tgax Editor to make the changes for CID11466 as suggested in proposed resolution in IEEE 802.11-18/0046r0 |
| 12680 | 9.4.2.237.2 | 139.45 | "Indicates support of both 2.4 GHz and 5 GHz frequency bands" -- a STA only operates in one band. And the Dual Band Support field has no behaviour attached anyway | Delete the "Dual Band Support" field (table and figure) | Revised—Dual Band Support bit use and behaviour is not defined in 11ax D2.0. The intent is to indicate support of dual bands (2.4 and 5 GHz). There are shortcomings in the anticipated behaviour of Dual Band Support subfield and alternatives to it already exist in .11 (Supported Operating Classes Element). Thus, we propose to delete the Dual Band Support subfield. Further discussion is provided in 11-18/46r0.Tgax Editor to make the changes for CID12680 as suggested in proposed resolution in IEEE 802.11-18/00467r0 |
| 13976 | 9.4.2.237.3 | 139.44 | What is the usage of the "Dual Band Support" subfield? | Clarify the usage of the "Dual Band Support" subfield". | Revised—Dual Band Support bit use and behaviour is not defined in 11ax D2.0. The intent is to indicate support of dual bands (2.4 and 5 GHz). There are shortcomings in the anticipated behaviour of Dual Band Support subfield and alternatives to it already exist in .11 (Supported Operating Classes Element). Thus, we propose to delete the Dual Band Support subfield. Further discussion is provided in 11-18/46r0.Tgax Editor to make the changes for CID13976 as suggested in proposed resolution in IEEE 802.11-18/00467r0 |
| 12063 | 9.4.2.237.3 | 143.00 | For 80+80MHz and 80x2MHz BW, sounding feedback for Ng=4 takes a lot of BW and therefore reduce the efficiency of the WLAN. Make Ng=4 grouping for 80+80MHz and 80x2MHz BW as optional instead of mandaotry. | Make Ng=4 sounding feedback for 80+80MHz and 80x2MHz BW as optional instead of mandaotry. Add one capability in Figure 9-589cl and Table 9-262aa to indicate Ng=4 support for 80+80 MHz and 160MHz BW. | Reject—11ax allows two Ng (Tone Grouping Factor) values, 4 and 16. Regardless of BW, support of Ng = 16 is optional at the HE Beamformee. Simulations have shown that Ng = 16 feedback cannot support satisfactory performance for MU-MIMO and hence Ng = 4 is mandated.Making Ng = 4 optional for 160/80+80 MHz, implies there is no mandated tone grouping factor for 160/80+80 MHz sounding.The HE CBF size for 160 MHz with Ng = 4 is similar to VHT CBF with Ng = 1.Furthermore, if 160 MHz PPDU is used to transmit the CBF, the CBF PPDU is comparable in ‘duration’ than the lower BW sounding cases. |

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**Resolution on CID 11466, 12680, 13976**

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Intent of the field: Dual Band Support subfield indicates if an HE STA supports both 2.4 GHz and 5 GHz or not. The use case envisioned was an HE AP managing performance through load balancing and band steering of clients that indicate having Dual Band Support set to 1.

One of the issues with Dual Band Support subfield: Exchange of HE capabilities on a single band along with indication of Dual Band Support set to 1 is not sufficient for load balancing and band steering by the AP because HE capabilities are for the current BSS in which the client and AP are operating. AP and the client need to perform HE capability exchange in both 2.4 GHz and 5 GHz band, if load balancing and band steering functions are to be used by the AP. Therefore, AP is aware of frequency bands supported by the client.

One of the existing alternatives to Dual Band Support subfield: *Supported Operating Classes Element* (section 9.4.2.54, Revmd\_D0.4) exchanged through management frames such as Probe REQ/RESP, Assoc REQ/RESP, etc., enable AP and clients to exchange the list of frequency bands and channels supported by it in this country.



The fields (Current Operating Class, Operating Classes) in this element indicate values from Annex E. For clarity can excerpt of Annex E is shown below.



Few other issues with Dual Band Support subfield:

* What is the setting of Dual Band Support subfield if a STA supports both 2.4 GHz and 5 GHz bands but only has one band powered-up now?
* The use and normative behaviour associated with Dual Band Support subfield is not defined in D2.0

Proposed Resolution: Delete the Dual Band Support subfield.

**Resolution for CID 11466, 12680, 13976**

**TGax Editor: Please make the following changes to Table 9-262aa (CIDs: 11466, 12680, 13976)**

**Table 9-262aa—Subfields of the HE PHY Capabilities Information field**

|  |  |  |
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| **Subfield** | **Definition** | **Encoding** |
| **~~Dual Band Support (#~~11466, #12680, #13976)** | **~~Indicates support of both 2.4 GHz and 5 GHz frequency bands(#~~11466, #12680, #13976)** | **~~Set to 0 if not supported.~~****~~Set to 1 if supported. (#~~11466, #12680, #13976)** |

**TGax Editor: In Figure 9-589cl (HE PHY Capabilities Information field format), replace “Dual Band Support” with “Reserved” ~~(#~~11466, #12680, #13976)**

**References:**

1. **IEEE P802.11axTM/D2.0, Oct 2017.**