IEEE P802.11
Wireless LANs

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| LB 266 Resolution for some CIDs for Clause 9 |
| Date: July 29, 2022 |
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 Abstract

This submission proposes resolutions for following 2 CIDs received for TGbe LB266:

10546, 10542

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: adding a note to the end of 35.16.3 based on the offline discussion
* Rev 2: add clarification based on the offline feedback from Yanjun
* Rev 3: some update in the call
* Rev 4: as suggested by Yongho per offline discussion, using a new “Bandwidth Indication” element instead of EHT Operation element to decrease redundancy; the new element can also be used in future for higher BWs etc
* Rev 5: updated the note based on the offline discussion with Ming

***TGbe editor: The baseline for this document is 11be D2.3***

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 TGbe Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e., they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 10546 | Abhishek Patil | 9.4.2.26 | 195.08 | Check other fields in Extended Capabilities element to see if there are other capabilities advertised in this element that apply to all the STAs affiliated with the MLD. Update the 'Notes' column as needed. | As in comment | **Revised**Agree in principle. The other fields in Extended Capabilities element are checked and the notes of corresponding fields are updated.**TGbe editor: please make the changes indicated in this doc 11-22/1369r3 tagged with 10546.** |
| 10542 | Abhishek Patil | 9.4.2.1 | 193.06 | The description and usage of Wide Bandwidth Channel Switch element needs to be updated to cover 320 MHz. For example see REVme D1.2 P1204L13, P1206L1 so on... | As in comment | **Revised**Agree in principle. For the EHT STA, a new element, “Bandwidth Indication element”, is used in addition to the Wide Bandwidth Channel Switch element to cover the 320 MHz and punctured channel case; the corresponding subclauses are updated. **Tgbe editor: please make the changes indicated in this doc 11-22/1369r5 tagged with 10542.** |

**9.4.2.26 Extended Capabilities element**

***Tgbe editor: Please change the contents of this Table as shown below:***

**Table 9-190—Extended Capabilities field** [#10546]

|  |  |  |
| --- | --- | --- |
| **Bit** | **Information** | **Notes** |
| 2 | Extended Channel Switching | A STA or all STAs affiliated with an MLD sets the Extended Channel Switching field to 1 to indicate support for the communication of channel switching information through the transmission and reception of the Extended Channel Switch Announcement element and Management frame, as described in 9.6.7.7 (Extended Channel Switch Announcement frame format). The Extended Channel Switching field is 0 to indicate a lack of support for extended channel switching. |
| 12 | Proxy ARP Service | An AP or all APs affiliated with an AP MLD sets the Proxy ARP Service field to 1 when dot11ProxyARPActivated is true, and sets it to 0 otherwise. See 11.21.14 (Proxy ARP service). A non-AP STA or all non-AP STAs affiliated with a non-AP MLD sets the Proxy ARP Service field to 0. |
| 17 | WNM Sleep Mode | ~~The~~ A STA or all STAs affiliated with an MLD sets the WNM Sleep Mode field to 1 when dot11WNMSleepModeActivated is true, and sets it to 0 otherwise. See 11.2.3.16 (WNM sleep mode). |
| 81 | SAE Password Identifiers In Use | An AP or all APs affiliated with an AP MLD sets the SAE Password Identifiers In Use field to 1 when any password in the dot11RSNAConfigPasswordValueTable has a password identifier and sets it to 0 otherwise. See 12.4.3 (Representation of a password). |
| 82 | SAE Password Identifiers Used Exclusively | An AP or all APs affiliated with an AP MLD sets the SAE Password Identifiers Used Exclusively field to 1 when every password in the dot11RSNAConfigPasswordValueTable has a password identifier and sets it to 0 otherwise. See 12.4.3 (Representation of a password). |
| 84 | Beacon Protection Enabled | An AP or all APs affiliated with an AP MLD sets the Beacon Protection Enabled field to 1 when dot11BeaconProtectionEnabled is true. Otherwise, it is set to 0. This field is reserved for a non-AP STA or all non-AP STAs affiliated with a non-AP MLD. See 11.52 (Beacon frame protection procedures). |
| 85 | Mirrored SCS | A STA or all STAs affiliated with an MLD sets the Mirrored SCS field to 1 when dot11MSCSActivated is true and sets it to 0 otherwise. |

* + 1. **Elements**

**9.4.2.1 General**

***TGbe editor: Please insert the following new row to the end of*** [***Table 9-128 (Element IDs)***](#bookmark99)***:***

 **Table 9-128—Element IDs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID Extension** | **Extensible** | **Fragmentable** |
| [#10542]Bandwidth Indication (see 9.4.2.x1 (Bandwidth Indication element) | 255 | <ANA> | Yes | No |

***TGbe editor: Please insert the following subclause at the end of subclause 9.4.2:***

[#10542]**9.4.2.x1 Bandwidth Indication element**

The Bandwidth Indication element contains the channel bandwidth and punctured subchannels which can be used for channel bandwidth indication. The format of the Bandwidth Indication element is shown in Figure 9-x1 (Bandwidth Indication element format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element ID | Length | Element ID Extension | Bandwidth Indication Parameters | Bandwidth Indication Information |

 Octets: 1 1 1 1 3 or 5

**Figure 9-x1—Bandwidth Indication element format**

The Element ID, Length, and Element ID Extension fields are defined in [9.4.2.1 (General)](#bookmark98).

The Bandwidth Indication Parameters field is defined in Figure 9-x2 (Bandwidth Indication Parameters field format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 | B2 B7 |
|  | Reserved | Disabled Subchannel Bitmap Present | Reserved |
| Bits: | 1 | 1 | 6 |

**Figure 9-x2—Bandwidth Indication Parameters field format**

The Disabled Subchannel Bitmap Present subfield is set to 1 if the Disabled Subchannel Bitmap subfield in the Bandwidth Indication Information field is present and set to 0 otherwise.

The Bandwidth Indication Information field has the same definition as the EHT Operation Information field in EHT Operation element, which is described in 9.4.2.311 (EHT Operation element).

**9.6.2.6 Channel Switch Announcement frame format**

***Tgbe editor: Please change the contents of this Figure as shown below:***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | Optional | Zero or more | Optional |
|  | Category | Spectrum Management Action | Channel Switch -Announcement element  | Secondary Channel Offset element | Mesh Channel Switch Parameters element | Wide Bandwidth Channel Switch element | New Transmit Power Envelope element | Bandwidth Indication element |
| Octets: | 1 | 1 | 5 | 0 or 3 | 0 or 8 | 0 or 5 | variable | variable |

**Figure 9-1086—Channel Switch Announcement frame Action field format**[#10542]

***TGbe editor: Please insert this paragraph after 8th paragraph in this subclause as shown below:***

[#10542]The Bandwidth Indication element is defined in 9.4.2.x1 (Bandwidth Indication element). This element is present for EHT STAs when switching to an EHT BSS operating channel width wider than 160 MHz or when switching to an EHT BSS operating channel width including at least one punctured 20MHz subchannel; otherwise, the Bandwidth Indication element is not present. The Bandwidth Indication element indicates the EHT BSS operating bandwidth after channel switching (see 35.16.3 (Channel switching methods for an EHT BSS)).

**9.6.7.7 Extended Channel Switch Announcement frame format**

***Tgbe editor: Please change the contents of this Figure as shown below:***

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | Zero or one | Zero or one | Zero or more | Zero or one |
|  | Category | Public Action | Channel Switch Mode | New Operating Class | New Channel Number | Channel Switch Count | Mesh Channel Switch Parameters element | New Country element | Wide Bandwidth Channel Switch element | New Transmit Power Envelope element | Bandwidth Indication element |
| Octets: | 1 | 1 | 1 | 1 | 1 | 1 | 0 or 8 | variable | variable | variable | variable |

**Figure 9-1099—Extended Channel Switch Announcement frame Action field format**[#10542]

***TGbe editor: Please insert this paragraph after the 8th paragraph in this subclause as shown below:***

[#10542]The Bandwidth Indication element is defined in 9.4.2.x1 (Bandwidth Indication element). This element is present for EHT STAs when extended channel switching to an EHT BSS operating channel width wider than 160 MHz or extended channel switching to an EHT BSS operating channel width including at least one punctured 20MHz subchannel; otherwise, the Bandwidth Indication element is not present. The Bandwidth Indication element indicates the EHT BSS operating bandwidth after extended channel switching (see 35.16.3 (Channel switching methods for an EHT BSS)).

**9.4.2.174 Future Channel Guidance element**

***Tgbe editor: Please change the contents of this Figure as shown below:***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | New Channel Number | Secondary Channel Offset element | Mesh Channel Switch Parameters element | Wide Bandwidth Channel Switch element | New Transmit Power Envelope element | Bandwidth Indication element |
| Octets: | 1 | 1 | 1 | 4 | 0 or 3 | 0 or 6 | 0 or 5 | variable | variable |

**Figure 9-715— Future Channel Guidance element format**[#10542]

***TGbe editor: Please insert this paragraph after the 7th paragraph in this subclause as shown below***

[#10542]The Bandwidth Indication element is defined in 9.4.2.x1 (Bandwidth Indication element). This element is present for an EHT STA when switching to an EHT BSS operating channel width wider than 160 MHz or when switching to an EHT BSS operating channel width including at least one punctured 20MHz subchannel; otherwise, the Bandwidth Indication element is not present.

**9.4.2.162 Channel Switch Wrapper element**

***Tgbe editor: Please change the contents of this Figure as shown below:***

    **Figure 9-695—Channel Switch Wrapper element format**[#10542]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | New Country subelement (optional) | Wide Bandwidth Channel Switch subelement (optional) | New Transmit Power Envelope subelement (optional) | Bandwidth Indication subelement (optional) |
| Octets: | 1 | 1 | variable | variable | variable | variable |

***TGbe editor: Please insert this paragraph after the 8th paragraph in this subclause as shown below***

[#10542]The format of the Bandwidth Indication subelement is the same as the Bandwidth Indication element (see 9.4.2.x1 (Bandwidth Indication element)). This subelement is present for an EHT STA when channel switching or extended channel switching to an EHT BSS operating channel width wider than 160 MHz or to an EHT BSS operating channel width including at least one punctured 20MHz subchannel; otherwise, the Bandwidth Indication subelement is not present.

**11.8.10 Future Channel Guidance operation**

***TGbe editor: Please insert this paragraph after the 7th paragraph in this subclause as shown below***

If the Future Channel Guidance element is used to indicate a switch to an EHT BSS operating channel width wider than 160 MHz or to an EHT BSS operating channel width including at least one punctured 20MHz subchannel, then the Bandwidth Indication element shall be present in this element. If an EHT STA determines the EHT BSS operating channel bandwidth based on the Bandwidth Indication element in a Future Channel Guidance element, then the STA shall ignore the Wide Bandwidth Channel Switch element in the Future Channel Guidance element for determining the EHT BSS operating channel bandwidth.

When the Bandwidth Indication element is present along with the Wide Bandwidth Channel Switch element,

* the announced BSS bandwidth in the Wide Bandwidth Channel Switch element is the maximum bandwidth including the primary channel without covering any punctured 20 MHz subchannel indicated in the Disabled Subchannel Bitmap subfield in the Bandwidth Indication element as defined in 35.15.2 (Preamble puncturing operation), and
* the announced BSS bandwidth in the Wide Bandwidth Channel Switch element is less than the BSS bandwidth in the Bandwidth Indication element and the corresponding BSS shall not operate as an 80+80 MHz BSS.

**35.16 EHT BSS**

***TGbe editor: Please insert this subclause after the 35.16.2 subclause in this subclause as shown below***

[#10542]**35.16.3 Channel switching methods for an EHT BSS**

An EHT STA follows the rules defined in 11.38.4 (Channel switching methods for a VHT BSS) and the additional rules defined in this subclause.

If a Channel Switch Announcement frame or an Extended Channel Switch Announcement frame is used to announce a switch to an EHT BSS operating channel width wider than 160 MHz or to an EHT BSS operating channel width including at least one punctured 20MHz subchannel, then the Bandwidth Indication element shall be present in the same frame. If an EHT STA determines the EHT BSS operating channel bandwidth based on the Bandwidth Indication element in the frame, then the STA shall ignore the Wide Bandwidth Channel Switch element in the same frame for determining the EHT BSS operating channel bandwidth. When the Bandwidth Indication element is present along with the Wide Bandwidth Channel Switch element in the frame,

* the announced BSS bandwidth in the Wide Bandwidth Channel Switch element is the maximum bandwidth including the primary channel without covering any punctured 20 MHz subchannel indicated in the Disabled Subchannel Bitmap subfield in the Bandwidth Indication element as defined in 35.15.2 (Preamble puncturing operation), and
* the announced BSS bandwidth in the Wide Bandwidth Channel Switch element is less than the BSS bandwidth in the Bandwidth Indication element and the corresponding BSS shall not operate as an 80+80 MHz BSS.

If a Channel Switch Announcement element or an Extended Channel Switch Announcement element is used to announce a switch to an EHT BSS operating channel width wider than 160 MHz or to an EHT BSS operating channel width including at least one punctured 20MHz subchannel, then Bandwidth Indication subelement in the Channel Switch Wrapper element shall be present in the same frame. If an EHT STA determines the EHT BSS operating channel bandwidth based on the Bandwidth Indication subelement in the frame, then the STA shall ignore the Wide Bandwidth Channel Switch subelement in the same frame for determining the EHT BSS operating channel bandwidth. When the Bandwidth Indication subelement is present along with the Wide Bandwidth Channel Switch subelement in the frame,

* the announced BSS bandwidth in the Wide Bandwidth Channel Switch subelement is the maximum bandwidth including the primary channel without covering any punctured 20 MHz subchannel indicated in the Disabled Subchannel Bitmap subfield in the Bandwidth Indication subelement as defined in 35.15.2 (Preamble puncturing operation), and
* the announced BSS bandwidth in the Wide Bandwidth Channel Switch subelement is less than the BSS bandwidth in the Bandwidth Indication subelement and the corresponding BSS shall not operate as an 80+80 MHz BSS.

NOTE - If the EHT AP after switching to the new channel has an EHT BSS operating channel width wider than 160 MHz or EHT BSS operating channel width including at least one punctured 20MHz subchannel, its associated EHT STAs that have performed channel switching or extended channel switching can also determine that information in the EHT Operation element in the Beacon or Probe Response frames received from the EHT AP on the new channel.