IEEE P802.11
Wireless LANs

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| Resolution for CIDs related to beacon optimization |
| Date: May 13, 2025 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Technologies Inc. |  |  | appatil@qti.qualcomm.com |
| Gaurang Naik |  |  |  |
| Alfred Asterjadhi |  |  |  |
| George Cherian |  |  |  |
|  |  |  |  |

 Abstract

This submission proposes resolutions for the following CIDs received for TGbn D0.1 CC:

3338, 3843

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Revised based on offline feedback

***TGbn editor: Baseline for this document is 11bn D0.1 and REVme D7.0***

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

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Page.line** | **Comment** | **Proposed Change** | **Resolution** |
| 3338 | Ahmadreza Hedayat | 37 | 67.05 | To avoid worsening the issue of Beacon bloat, it's wise to avoid adding UHR IEs to Beacon, and instead let non-AP STAs to obtain them during association. Define rules for UHR APs and non-AP STAs accordingly. | As in comment | **Revised**Agree with the comment. As mentioned by the comment, beacon length has reached critical threshold causing interop issues with legacy devices. The proposed resolution disallows inclusion of static parameters defined by UHR (i.e., UHR Capabilities element) and proposes to include a ‘restricted’ UHR Operation element (i.e., does not include parameters). The UHR Capabilities element is carried in Probe and (Re)Association Response frames.**TGbn editor, please make changes as proposed in this document.** |
| 3843 | Abhishek Patil | 9.3.3.2 | 55.45 | Beacon bloat is an industry wide problem. A large Beacon frame occupies more medium time and in some cases creates legacy interop issues. UHR must provide mechanisms to address beacon bloating. For example, consider not including static and semi-static parameters (such as UHR Capabilities etc) in the Beacon frame. | The commenter will bring a contribution | **Revised**Agree with the comment. As mentioned by the comment, beacon length has reached critical threshold causing interop issues with legacy devices. The proposed resolution disallows inclusion of static parameters defined by UHR (i.e., UHR Capabilities element) and proposes to include a ‘restricted’ UHR Operation element (i.e., does not include parameters). The UHR Capabilities element is carried in Probe and (Re)Association Response frames.**TGbn editor, please make changes as proposed in this document.** |

***TGbn editor: Please insert a new subclause in clause 37 as shown below:***

**37.x.x Beacon Optimization**

A UHR AP shall not include UHR Capabilities element in a Beacon frame that it transmits. A UHR AP with dot11MultiBSSActived equal to true shall not include UHR Capabilities element in a Nontransmitted BSSID Profile subelement of the Multiple BSSID element carried in a Beacon frame that it transmits.

A UHR AP shall include UHR Capabilities element in a Probe Response and (Re)Association Response frames that it transmits.

A UHR AP shall include the UHR Operation element in a Beacon, Probe Response and (Re)Association Response frames that it transmits.

A UHR AP shall only include, in the UHR Operation element carried in a Beacon frame that it transmits, the Basic UHR-MCS And NSS Set field and the UHR Operation Bitmap field.

NOTE - A UHR AP does not include, in the UHR Operation element carried in a Beacon frame that it transmits, parameters associated with the UHR features that are enabled at the AP.

* **Elements**
* **(PV0) Management frames**
* **Beacon frame format**

***TGbn editor: Please delete the Editor’s Note from this subclause.***

* ***It is a placeholder subclause***

***TGbn editor: Please insert the following entry to Table 9-62 (Beacon frame body) (not all lines shown) in numeric order:***

|  |
| --- |
| **Table 9-62 – Beacon frame body** |
| **Order** | **Information** | **Notes** |
| <Lastassigned + 1> | UHR Operation | The UHR Operation element is present if dot11UHROptionImplemented is true; otherwise, it is not present. |

* **UHR Operation Element**

The operation of UHR STAs in a UHR BSS is controlled by the following:

* The HT Operation element, HE Operation element, EHT Operation element, and UHR Operation element if operating in the 2.4 GHz band
* The HT Operation element, VHT Operation element (if present), HE Operation element, EHT Operation element, and UHR Operation element if operating in the 5 GHz band
* The HE Operation element, EHT Operation element and UHR Operation element if operating in the 6 GHz band

The format of the UHR Operation element is shown in Figure 9-aa1 (UHR Operation element format).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Basic UHR-MCS And NSS Set | UHR Operation Bitmap |  | UHR Operation Parameters |  |
| Octets: | 1 | 1 | 1 | TBD | TBD |  | TBD |  |
|  | * **UHR Operation element format**
 |

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

The format of the UHR Operation Bitmap field is shown in Figure 9-aa2 (UHR Operation Bitmap field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 B7 |  |   |  |
|  | DPS Enabled | NPCA Operation Enabled | Reserved |  |  |  |
| Bits: | 1 | 1 | 6 |  |  |  |
| * **UHR Operation Bitmap field format**
 |

The DPS Enabled field is set to 1 if the AP sending a frame containing the UHR Operation element is a mobile AP (TBD for non-mobile AP) and dynamic power save (DPS) is enabled at the AP and set to 0 otherwise.

The NPCA Operation Enabled field is set to 1 to indicate that NPCA operation is enabled at the AP transmitting this field; Otherwise, the NPCA Operation Enabled field is set to 0.

The format of the UHR Operation Parameter field is shown in Figure 9-aa2 (UHR Operation Parameters field format).

|  |  |  |
| --- | --- | --- |
|  | DPS Operation Parameters field | NPCA Operation Information field |
| Octet: | 2 | TBD |
| **Figure 9-aa3 – UHR Operation Parameters field format** |

The DPS Operation Parameters field contains parameters for dynamic power save operation as defined in 9.4.1.85 (DPS Operation Parameters field). The DPS Operation Parameters field is present if the DPS Enabled field is 1 and the frame carrying the UHR Operation element is not a Beacon frame; Otherwise, the DPS Operation Parameters field is not present.

The format of the NPCA Operation Parameters field is defined in Figure 9-aa4 (NPCA Operation Parameters field format). The NPCA Operation Parameters field is present if NPCA Operation Enabled field is 1 and the frame carrying the UHR Operation element is not a Beacon frame; Otherwise, the NPCA Operation Parameters field is not present.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B7 | B8 Bx | Bx+1 Bx+6 | Bx+7 Bx+12 |
|  | NPCA Primary Channel | NPCA Minimum Duration Threshold | NPCA Switching Delay | NPCA Switch Back Delay |
| Bits: | 8 | TBD | 6 | 6 |
| **Figure 9-aa4 – NPCA Operation Parameters** **field format** |

The NPCA Primary Channel field indicates the channel number of a channel within the BSS bandwidth that corresponds to the channel that the NPCA AP and its associated NPCA non-AP STAs switch to in order to perform NPCA operation, as described in 37.11 (Non-primary channel access (NPCA)).

The NPCA Minimum Duration Threshold field indicates the minimum duration of inter-BSS activity (inter-BSS PPDU or inter-BSS TXOP) that is required to have been indicated on the primary channel of the BSS as a necessary condition to permit an NPCA STA to switch to the NPCA primary channel to perform NPCA operation. The encoding and the maximum value of this field are TBD.

The NPCA Switching Delay field indicates the time needed by an NPCA STA to switch from the BSS primary channel to the NPCA primary channel in units of 4 µs.

The NPCA Switch Back Delay field indicates the time needed by an NPCA STA to switch from the NPCA primary channel to the BSS primary channel in units of 4 µs.