IEEE P802.11
Wireless LANs

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| Resolution for CIDs related to beacon optimization |
| Date: July 1st, 2025 |
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 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
* Rev 2: Further revision based on offline feedback
* Rev 3: Editorial fixes based on feedback from Binita
* Rev 4: Additional revisions based on offline feedback from Binita, Reza and Vishnu
* Rev 5: Revision based on feedback received when the doc was presented on 5/15/25 AM1
* Rev 6: Revised based on offline feedback received during and after the May f2f meeting
* Rev 7:
	+ minor updates based on offline feedback.
	+ Also, added discussion section (as requested by some members) to clarify the procedure.
* Rev 8: Revised based on feedback received when the doc was presented on 7/3/25

***TGbn editor: Baseline for this document is IEEE 802.11-2024 and 11bn D0.3***

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 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.***

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| **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. Each amendment adds more IEs to the Beacon frame which worsens the issue. UHR must break this pattern. The proposed resolution disallows the 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 which allows unassociated STAs discover the full capabilities and parameters of the AP.**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. Each amendment adds more IEs to the Beacon frame which worsens the issue. UHR must break this pattern. The proposed resolution disallows the 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 which allows unassociated STAs discover the full capabilities and parameters of the AP.**TGbn editor, please make changes as proposed in this document.** |

**Discussion:**

Over time, the Beacon frame has grown significantly in size, leading to increased medium occupancy and various operational challenges in the field. TGbn must aim to minimize its footprint within the Beacon frame. To that effect, the proposal is to not include static and semi-static parameters (such UHR Capabilities element and parameters for UHR mode of operations) in the Beacon frame except when specified otherwise. Instead, a non-AP can gather this information via probing and/or during association. To reduce probing overheads, the proposal is to leverage existing probe deferral techniques defined by 11ai/FILS and encourage UHR APs to transmit a broadcast probe response when it receives a probe request from a UHR non-AP STA.

**Proposed changes:**

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

**37.x Beacon Optimization**

A UHR AP shall not include the parameters associated with operating modes currently enabled at the AP defined by UHR in the UHR Operation element or any other element carried in the Beacon frame, except when specified otherwise.

NOTE 1 – A UHR AP provides the parameters for enabled operating modes defined by UHR in the UHR Operation element carried in the Probe Response, Link Reconfiguration Response, and (Re)Association Response frames that it transmits.

NOTE 2 - A UHR AP does not include UHR Capabilities element in a Beacon frame that it transmits. A UHR AP includes the UHR Capabilities element in Probe Response and (Re)Association Response frames that it transmits. A UHR AP includes the UHR Operation element in a Beacon, Probe Response and (Re)Association Response frames that it transmits. A UHR AP includes the Basic UHR-MCS And NSS Set field in the UHR Operation element carried in the Beacon frame it transmits. A UHR AP provides in the UHR Operation element carried in the Beacon, Probe Response and (Re)Association Response frames that it transmits, an indication of which operating modes defined by UHR are currently enabled at the AP.

* **Active scanning procedure for a non-DMG STA**

***TGbn editor: Please update bullet b) in the second paragraph in this subclause as shown below:***

For each channel to be scanned:

* If the STA is a FILS STA, a UHR STA or a 6 GHz HE STA, set the FILSProbeTimer to 0 and starts the FILSProbeTimer. While the FILSProbeTimer is less than dot11FILSProbeDelay, the STA may skip a Probe Request frame transmission and proceed to step g) after setting the ActiveScanningTimer to 0 and starting the ActiveScanningTimer, if one of the following conditions matches:
* **Criteria for sending a response**

***TGbn editor: Please update the following paragraphs in this subclause as shown below:***

The FILS STA that is a non-UHR STA shall respond with the next Beacon frame, as described in 11.1.3 (Maintaining synchronization), to Probe Request frames addressed to individual or broadcast address if all of the following conditions are met:

* The STA is queuing a Beacon frame for transmission;
* The next TBTT of the responding STA is within dot11FILSBeaconResponseWindow;
* The next TBTT is no later than any deadline of Max Channel Time indicated in the FILS Request Parameter element of the Probe Request frame(s), if present; and
* The Beacon frame contains all elements requested by the Request element.

If the next Beacon frame is not used as a response, a Probe Response frame is transmitted. The Probe Response frame shall be addressed to the broadcast or the address of the transmitter of the Probe Request frame. The Probe Response frame should be addressed to the broadcast if both the soliciting STA and the responding STAs are UHR STAs. The Probe Response frame may be transmitted to all or some of the Probe Request frames received from FILS STAs. A first FILS STA may choose not to respond to Probe Request frames from a second FILS STA addressed to the broadcast address if the first STA receives an acknowledged Probe Response frame addressed to the second STA containing the SSID of the first STA’s BSS. A non-S1G AP shall remain in the awake state, and shall respond to Probe Request frames, subject to the criteria above.