IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution for CIDs in clause 9 (TGbn D0.1 cc) | | | | |
| Date: July 01, 2025 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Technologies Inc. |  |  | appatil@qti.qualcomm.com |
| Alfred Asterjadhi |  |  |  |
| Alice Chen |  |  |  |
| Gaurang Naik |  |  |  |
| Duncan Ho |  |  |  |
| George Cherian |  |  |  |
| Sanket Kalamkar |  |  |  |
| Giovanni Chisci |  |  |  |
| Sherief Helwa |  |  |  |
| Bo Cao | ZTE |  |  |  |
| Jay Yang |  |  |  |

Abstract

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

3848, 3849, 3851, 3852, 3853, 3859, 144

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Revised based on feedback from Mark R, Xiaofei and Bo Cao.
* Minor updates based on comments received when the doc was discussed on 3/31 TGbn MAC call.
  + CID 3849 is deferred for further (offline) discussion.
* Rev 3: Alfred’s comment. Also deferred 3851.
* Rev 4: Resolves CID 3851.
* Rev 5: Minor revisions to resolution for CID 3851 based on offline feedback.
* Rev 6: Further revisions to resolution for CID 3851 based additional offline feedback.
* Rev 7: Additional revision based on offline feedback.

***TGbn editor: Baseline for this document is 802.11-2024, TGbe D7.0 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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Page.line** | **Comment** | **Proposed Change** | **Resolution** |
| 3849 | Abhishek Patil | 9.4.2.3 | 58.11 | Add an entry to Table 9-131 (BSS Membership selector value encoding) in Clause 9.4.2.3 | As in comment | **Revised**  Agree with the comment. The proposed resolution updates Table 9-131 to include a row for UHR.  **TGbn editor, please incorporate changes tagged with 3849 in this document.** |
| 3852 | Abhishek Patil | 9.4.2.35 | 58.11 | Add a subfield to BSSID Information field of Neighbor Report element (9.4.2.35) to indicate that a reported AP is a UHR AP. | As in comment | **Revised**  Agree with the comment. The proposed resolution adds a subfield to BSS Information field of Neighbor Report element to indicate that a reported AP is a UHR AP.  **TGbn editor, please incorporate changes tagged with 3852 in <this document>.** |
| 144 | Jay Yang | 9.4.2.36 | 1068.11 | the UHR(ultra high reliability) subfield shall be included in Neighbor Report element (see 9.4.2.35) | the commenter will provide a solution on this. | **Revised**  Agree with the comment. The proposed resolution adds a subfield to BSS Information field of Neighbor Report element to indicate that a reported AP is a UHR AP. Same resolution as CID 3852  **TGbn editor, please incorporate changes tagged with 3852 in <this document>.** |
| 3848 | Abhishek Patil | 9.4.2.35 | 58.11 | Add a subfield to BSSID Information field of Neighbor Report element (9.4.2.35) to indicate that a reported AP belongs to the same SMD as the reporting AP. | As in comment | **Revised**  Agree with the comment. The proposed resolution adds a subfield to BSS Information field of Neighbor Report element to indicate that a reported AP belongs to the same SMD.  **TGbn editor, please incorporate changes tagged with 3848 in <this document>.** |
| 3851 | Abhishek Patil | 9.4.2.169 | 58.11 | Provide a mechanism to indicate if a reported (non-collocated) AP belongs to the same SMD or not. Every field added to RNR leads to multiplicative overheads (since it is repeated for each reported AP). Therefore, in the interest of keeping the RNR overhead low, utilize an existing reserved bit field (such as B7 of BSS Parameters field) in the TBTT Information field (Type = 0) of Reduced Neighbor Report element (9.4.2.169) to indicate whether a reported AP belongs to the same SMD as the reporting AP. | As in comment | **Revised**  Agree in principle with the comment. A reporting AP must identify the SMD of a reported AP. However, adding new fields to the RNR results in a multiplicative increase in the Beacon frame size. TGbn is exploring mechanisms to minimize the impact on Beacon size. In this context, the proposed resolution introduces methods to eliminate the need for an explicit SMD ID field when the SMD ID can be inferred from existing fields within the TBTT Information field of the reported AP.  **TGbn editor, please incorporate changes tagged with 3851 in <this document>.** |
| 3853 | Abhishek Patil | 9.4.2.176 | 58.11 | Add an entry for UHR in to Table 9-337 (PHY Support Criterion subfield) in 9.4.2.176 (FILS Request Parameters element). | As in comment | **Revised**  Agree with the comment. The proposed resolution updates Table 9-337 to include a row for UHR.  **TGbn editor, please incorporate changes tagged with 3853 in <this document>.** |
| 3859 | Abhishek Patil | 9.6.7.36 | 63.25 | Make appropriate updates to FILS Discovery frame (e.g., add UHR to tables 9-492, 9-494, and 9-495). | As in comment | **Revised**  Agree with the comment. The proposed resolution updates cited tables in FILS Discovery frame format to include content for a UHR AP.  **TGbn editor, please incorporate changes tagged with 3859 in <this document>.** |

**9.4.2.3 Supported Rates and BSS Membership Selectors element**

***TGbn editor: Please insert the following entry (only the last row) to Table 9-131 (BSS membership selector value encoding) (not all lines shown):***

**Table 9-131—BSS membership selector value encoding**[#3849]

|  |  |  |
| --- | --- | --- |
| **Value** | **Feature** | **Interpretation** |
| <Last assigned – 1> | UHR PHY | Support for the mandatory features of Clause 38 (Ultra High Reliability (UHR) PHY specification) is required in order to join the BSS that was the source of the Supported Rates and BSS Membership Selectors element or Extended Supported Rates and BSS Membership Selectors element containing this value. |

* + - 1. **Neighbor Report element**

***TGbn editor: Please change Figure 9-416 (BSSID Information field format) as follows:***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B0 B1 | B2 | B3 | B4 B9 | B10 | B11 | B12 | B13 | B14 |
| AP  Reachability | Security | Key Scope | Capabilities | Mobility Domain | High Throughput | Very High Throughput | FTM | High Efficiency |
| 2 | 1 | 1 | 6 | 1 | 1 | 1 | 1 | 1 |

Bits:

B15 B16 B17 B18 B19 B20 B21 B22 <ANA> <ANA> <ANA> B31

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ER BSS | Colocated AP | Unsolicited Probe Responses Active | Members Of ESS With  2.4/5 GHz  Colocated AP | OCT  Supported With Reporting AP | Colocated With 6 GHz AP | Extremely High Throughput | DMG  Positioning | Same SMD [#3848] | Ultra High Reliability [#3852] | Reserved |

Bits: 1 1 1 1 1 1 1 1 1 1 7

**Figure 9-416—BSSID Information field format**

***TGbn editor: please insert the following paragraphs before the paragraph “The Operating Class and Channel Number fields...”***

[3848]The Same SMD subfield is set to 1 to indicate that the AP represented by this BSSID (reported AP) belongs to the same SMD as the reporting AP. Otherwise, the Same SMD subfield is set to 0.

[3852]The Ultra High Reliability subfield is set to 1 to indicate that the AP represented by this BSSID (reported AP) is a UHR AP. Otherwise, the Ultra High Reliability subfield is set to 0.

**9.4.2.176 FILS Request Parameters element**

***TGbn editor: please insert a new row to Table 9-337 (PHY Support Criterion subfield) (not all lines shown) and change the value of the reserved row as follows:***

**Table 9-337—PHY Support Criterion subfield**[#3853]

|  |  |
| --- | --- |
| **Value** | **Explanation** |
| 5 | Indicates that a responding FILS STA is UHR capable. |
| 6–7 | Reserved |

**9.6.7.36 FILS Discovery frame format**[#3859]

***TGbn editor: please change Table 9-492 (BSS Operating Channel Width) as follows:***

**Table 9-492—BSS Operating Channel Width**

|  |  |  |  |
| --- | --- | --- | --- |
| **BSS Operating Channel Width field** | **HR/DSSS, OFDM, ERP, HT, VHT, or HE BSS**  **operating channel width** | **EHT or UHR BSS operating channel width** | **TVHT BSS operating channel width** |
| 0 | 20 MHz or 22 MHz | 20 MHz or 22 MHz | TVHT\_W |
| 1 | 40 MHz | 40 MHz | TVHT\_W+W |
| 2 | 80 MHz | 80 MHz | TVHT\_2W |
| 3 | 160 MHz or 80+80 MHz | 160 MHz | TVHT\_4W or TVHT\_2W+2W |
| 4 | Reserved | 320 MHz | Reserved |
| ~~4~~5–7 | Reserved | Reserved | Reserved |

## *TGbn editor: please insert a new row to Table 9-494 (PHY Index subfield) (not all lines shown) as follows:*

**Table 9-494—PHY Index subfield**

|  |  |
| --- | --- |
| **PHY Index subfield** | **PHY** |
| 6 | UHR (see Clause 38 (Ultra high Reliability (UHR) PHY specification)) |
| 7 | Reserved |

## *TGbn editor: please insert the following column in Table 9-495 (FILS Minimum Rate):*

**Table 9-495—FILS Minimum Rate**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FILS**  **Minimum Rate subfield** | **PHY Index subfield is 0 (HR/DSSS)** | **PHY Index subfield is 1 (ERP-OFDM)** | **PHY Index subfield is 2 (HT)** | **PHY Index subfield is 3 (VHT or TVHT)** | **PHY Index subfield is 4 (HE)** | **PHY Index subfield is 5 (EHT)** | **PHY Index subfield is 6 (UHR)** |
| 0 | 1 Mb/s | 6 Mb/s | HT-MCS 0 | VHT-MCS 0 | HE-MCS 0 | EHT-MCS 0 | UHR-MCS 0 |
| 1 | 2 Mb/s | 9 Mb/s | HT-MCS 1 | VHT-MCS 1 | HE-MCS 1 | EHT-MCS 1 | UHR-MCS 1 |
| 2 | 5.5 Mb/s | 12 Mb/s | HT-MCS 2 | VHT-MCS 2 | HE-MCS 2 | EHT-MCS 2 | UHR-MCS 2 |
| 3 | 11 Mb/s | 18 Mb/s | HT-MCS 3 | VHT-MCS 3 | HE-MCS 3 | EHT-MCS 3 | UHR-MCS 3 |
| 4 | Reserved | 24 Mb/s | HT-MCS 4 | VHT-MCS 4 | HE-MCS 4 | EHT-MCS 4 | UHR-MCS 4 |
| 5–7 | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |

------------x-x-x Start of changes for CID 3851 x-x-x-------------

**Discussion**:

**Beacon frame Optimization and SMD ID Signaling in RNR**

Over time, the Beacon frame has grown significantly in size, leading to increased medium occupancy and various operational challenges in the field. TGbn aims to minimize its footprint within the Beacon frame. In particular, any extension to the Reduced Neighbor Report (RNR) element results in a linear increase in Beacon frame length, as each additional field is replicated per reported BSS. This multiplicative effect can substantially impact airtime efficiency, especially in dense deployments. This contribution provides mechanisms that avoid extensions to the RNR element for providing SMD information by leveraging the following properties:

1. **Reported AP is Collocated with the Reporting AP**

(a) Per TGbe, the AP MLD ID field for a partner link of the reporting AP is set to 0.  
 → TGbn can apply the same rule for the SMD ID in such cases and eliminate the need for an explicit field to carry the SMD ID for the case when a reported AP is affiliated with the same MLD as the reporting AP.

(b) TGbe specifies that the AP MLD ID field for a partner link of an AP corresponding to a nontransmitted BSSID (nonTxBSSID) is equal to its BSSID Index.  
 → TGbn can adopt the same rule for the SMD ID and eliminate the need for an explicit field to carry SMD ID for the case when the reported AP is affiliated with the AP MLD of a nonTxBSSID in the same multiple BSSID set as the reporting AP.

(c) Based on (a) and (b), the SMD ID for any collocated AP can be inferred from the AP MLD ID field in the MLD Parameters field of the TBTT Information field.  
 → This eliminates the need for an explicit SMD ID field for collocated APs.

1. **Reported AP is not Collocated with the Reporting AP**

(a) If the reported AP belongs to the same SMD as the reporting AP:  
 - The SMD ID is 0, while the AP MLD ID is nonzero.  
Proposal: Repurpose a reserved field in an existing field to indicate that the reported non-collocated AP belongs to the same SMD as the reporting AP.

This is expected to be the most common case (i.e., a reported non-collocated AP being in the same SMD as a single-BSS AP or the txBSSID). This approach avoids the need for an explicit field to carry SMD information.  
(b) If the reported AP does not belong to the same SMD as the reporting AP, then the AP’s SMD affiliation cannot be indicated in RNR element.

**Proposed changes**:

* **Neighbor AP Information field**

***TGbn editor: please update Figure 9-734 as shown below:***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
|  | OCT Recommended | Same SSID | Multiple BSSID | Transmitted BSSID | Member Of ESS With 2.4/5 GHz Colocated AP | Unsolicited Probe Responses Active | Colocated AP | Member Of SMD |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Figure 9-735 – BSS Parameters subfield format** | | | | | | | | |

***TGbn editor: please insert the following paragraphs after “NOTE 3—For example, suppose the reported AP transmits …”***

The Member Of SMD subfield is set to 1 when the reported AP belongs to an SMD. Otherwise, the Member Of SMD subfield is set to 0 if the reported AP does not belong to an SMD or if the reporting AP does not have that information.

***TGbn editor: please update Figure 9-733c as shown below:***

B0 B7 B8 B11 B12 B19 B20 B21 B22 B23

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| AP MLD ID | Link ID | BSS Parameters Change Count | All Updates Included | Disabled Link Indication | Same SMD | Reserved |

Bits: 8 4 8 1 1 1 1

**Figure 9-733c—MLD Parameters subfield format**

***TGbn editor: please insert the following paragraphs after “The Disabled Link Indication subfield is set to 1 …”***

The Same SMD subfield is set to 1 when the Member Of SMD subfield is set to 1 and the reported AP belongs to the same SMD as the reporting AP. Otherwise, the Same SMD subfield is set to 0.

* **SMD BSS transition discovery procedure**

***TGbn editor: please add the following paragraphs at the end of this subclause as shown below:***

All APs that belong to the same SMD are members of the same ESS and are connected to the same DS. All APs that belong to the same SMD shall advertise the same SSID.

A Reduced Neighbor Report element does not include an explicit field for identifying the SMD of a reported AP that belongs to an SMD. Instead, for certain cases, a reported AP’s SMD affiliation is inferred based on other fields carried in the TBTT Information field corresponding to the reported AP. The following applies for an AP that is reported in a Reduced Neighbor Report element with the Member Of SMD subfield set to 1:

* The SMD of a collocated AP is determined based on the AP MLD ID:
  + If the value carried in the AP MLD ID subfield is 0, then the reported AP belongs to the same SMD as the reporting AP. The Same SMD subfield is set to 1.
  + If the reporting AP is in a multiple BSSID set and the value carried in the AP MLD ID matches the BSSID index of a nontransmitted BSSID in the same set, then the SMD of the reported AP is the same as the AP corresponding to the nontransmitted BSSID. The Same SMD subfield is set to 0.
  + If the reporting AP is in a cohosted BSSID set and the Same SMD subfield for a reported collocated AP is set to 0, then the SMD affiliation of the reported collocated AP cannot be determined. However, two collocated reported APs with the same value carried in their respective AP MLD ID subfields belong to the same SMD.
* If a reported non-collocated AP belongs to the same SMD as the reporting AP, then the Same SMD subfield is set to 1 in the TBTT Information field corresponding to the reported AP
* The SMD affiliation of a reported non-collocated AP that does not belong to the same SMD as the reporting AP (i.e., the Same SMD subfield set to 0) cannot be determined.

NOTE – A non-AP MLD can use other discovery mechanisms described in this subclause to either identify the SMD of a non-collocated AP or to obtain attributes of a reported AP, including one that belongs to the same SMD as the reporting AP.

------------x-x-x End of changes for CID 3851 x-x-x-------------