IEEE P802.11 Wireless LANs

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| Suggested resolution for submitted TGai comment (Specification text for Reduced Neighbor Report) |
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Abstract

This submission proposes the 802.11ai specification text of Reduced Neighbor Report for channel, band or AP redirection, as a suggested resolution to a comment submitted for IEEE 802.11 Comment Collection 8 for 802.11ai Draft 0.5[Ref-2].

# Introduction

The following comments have been submitted to IEEE 802.11 Comment Collection 8 for 802.11ai Draft 0.5[Ref-2]:

**Comments for Reduced Neighbor Report for channel switching, band switching or AP redirection:**

CID 1023, 1037, 1069, 1070, 1195, 1212, 1349, 1350, 1363, 1419, 1420, 1421, 1422

This contribution proposes detailed changes in 802.11ai/D0.5 [Ref-2], to modify the text of the Reduced Neighbor Report element for channel switching, band switching or AP redirection.

# Conventions

In this contribution, the proposed 802.11ai Specification Document text will be presented as changes to the current TGai draft specification, 11ai/D0.5[Ref-2]. The following format conventions are used:

1. The new added text is marked as blue underline text;
2. The deleted text is marked as ~~red strikethrough text~~;
3. The unchanged baseline standard text stays in black text in the context of proposed TGai specification text;
4. The editorial instruction is marked as *italic text highlighted by Yellow*; and
5. Any other text, e.g., discussions, proposed motions, etc., is in black text, but not in the context of proposed TGai specification text.

# Proposed resolution

**CID 1212, 1419, 1420**

1. **1212 Comment (Technical): line 61 on page 31**

*How is the BSSID presence is indicated if the TBTT field is also allowed to be included fof type=1?*

1. **1419 Comment (Editorial)**
2. **1420 Comment (Technical): line 61 on page 31**

*There is a duplication of the behavior that is already described in last paragraph of clause 10.25.3 on page 73. Delete the last 2 sentences in line 61 on page 31.*

**Responses to comments:**

1. *Comment 1212: Based on the proposed remedy of the comment 1212, I added the new description of the TBTT information length subfield.*
2. *Comment 1419: Modified the text. Moreover, I additionaly modified the text based on the CID 1070.*
3. *Comment 1420: Deleted the duplicated text in line 61, page 31.*

**Proposed 802.11ai Specification Text:**

* *Comment 1212*

*Instructions to Editor: Add the text in line 61, page 31 as follows:*

**8.4.2.176 Reduced Neighbor Report element**

The TBTT Information Length subfield is 1 octet in length and contains the length in octets of each TBTT Information field included in the Neighbor AP Information field. If the TBTT Information Field Type is set to 0, then the value of the TBTT Information Length subfield is 1, i.e., the TBTT Information field contains 1-octet TBTT Offset. If the TBTT Information Field Type is set to 1, then the value of the TBTT Information Length subfield can be 1 or 7, which indicates if and what (if any) additional information is provided for redirect recommendation, in addition to the band / chnnael as given in the operating class and channel number fields. When the TBTT Information Length subfield is set to 1, TBTT Offset is included in the TBTT Information field. When it is set to 7, both TBTT Offset and BSSID are included in the TBTT Information field.

* *Comment 1419*

*Instructions to Editor: Modify the text of line 51 on page 31 as follows:*

**8.4.2.176 Reduced Neighbor Report element**

Value 1 indicates the presence of the Neighbor AP Information that is used to recommend the STA to switch to ~~other~~ another channel, ~~other~~ another band, or a neighbor AP. Values 2, and 3 are reserved.

* *Comment 1420*

*Instructions to Editor: Delete the text of line 61 on page 31 as follows:*

**8.4.2.176 Reduced Neighbor Report element**

The TBTT Information Length subfield is 1 octet in length and contains the length in octets of each TBTT Information field included in the Neighbor AP Information field. ~~If the TBTT Information Field Type is set to 1 and the BSSID field is not included in the TBTT Information field, this indicates that AP redirects the STAs to other BSS by indicating the information of the BSS of a neighbor AP and the channel. If the TBTT Information Field Type is set to 1 and the BSSID field is not included in the TBTT Information field, this indicates that AP redirects the STA to other channel, other band, or neighbor AP with the operating band and channel number information provided.~~

**CID 1023, 1212, 1349**

**Comment (Technical): line 61, page 31**

1. *Comment 1023: When the AP redirects the STA to other AP, it includes the BSSID field in the TBTT information. But text has been wrongly written in the D0.5.*
2. *Comment 1212: The two If-statements have the same condition, but have different results;*
3. *Comment 1349: There are two similar explaination for the same condition, needs technical clearup.*

**Responses to comments:**

*These three comments are superceded by Comment 1420.*

*According to the proposed change of the Comment 1420, I deleted the two paragraphs in line 61, page 31. Becaure the similar text already exists in line 14, page 73.*

**CID 1037**

**Comment: (in page 31)**

1. *"Value 1 indicates the presence of the Neighbor AP Information that is used to recommend the STA to switch other channel, other band, or neighbor AP. Values 2, and 3 are reserved." I have to admit confusion with this Neighbor AP information. At P31L12 it states that the group of neighbor APs are on one channel. But the quoted sentence indicates this field is to tell a STA to go elsewhere, even to another channel or band.*
2. *If set to 1, and no BSSID provided it then states the operating band and channel number is provided, but this is not what P32L36 says. I can't see where the channel number is given.*
3. *Also is a value 1 saying 'don't use this AP that I am telling you about" or is it saying "don't use me?" If the latter, then stupid to put it in the individual BTT Info header, it should be in the main field. Very confused, it needs fixing.*
4. *Need to re-write this paragraph to make it clear.*

**Responses to comments:**

1. *Neighbor AP Information of channel switching is also the information per one channel. Thus, following existing text is reasonable. “The Neighbor AP Information field specifies TBTT and other information related to a group of neighbor APs on one channel.”*
2. *The procedure of the channel switching and band switching is discribed in the page 73.*
3. *Multiple neighbor AP information may be included in the Reduced Neighbor AP Report. If the BSSID is located in the main field, multiple BSSID information can not be included in the Reduced Neighbor Report element.*

**Proposed 802.11ai Specification Text:**

*Instructions to Editor: Modify the text in line 35, page 32 as follows:*

**8.4.2.176 Reduced Neighbor Report element**

~~If the TBTT Information Field Type is set to 1 and the TBTT Information Length subfield is set to non-zero, BSSID subfield is included in TBTT Information field to indicated target AP of the redirection.~~ If the BSSID field is not included in the TBTT Information field, this indicates channel switching or band switching. If the BSSID field is included in the TBTT Information field, this indicates AP redirection. A STA may send the Probe Request frame including the received BSSID on channel indicated in Neighbor AP Information field.

**CID 1069, 1070, 1195, 1363**

1. **1069 Comment (Technical): line 14 to line 20 on page 73**

*Huge unreadable sentence at page 73*

1. **1070 Comment (Editorial): line 28 on73 page, line 31 on page 73**

*L28 "may switch to ~~other~~ another channel or to ~~other~~ another band"*

*L31 "may switch to a neighbor AP"*

1. **1195 Comment (Technical): line 15 on page 73**

*This sentence is way too long and obscure.* *Rewrite sentence.*

1. **1363 Comment (Editorial): line 20 on page 73**

*Remove "the" before " too congested".*

**Responses to comments:**

1. *Comment 1069: Based on the proposed change of comment 1069, I modified the current text as follow proposed specification text. Moreover, I added additional clarification text in the proposed text, instead of deleting the description of the page 31 (Comment 1420).*
2. *Comment 1070: Modified the text as indication.*
3. *Comment 1195: Based on the proposed chage of comment 1069, I modified the text*
4. *Comment 1363: Modified the text as indication*

**Proposed 802.11ai Specification Text:**

* *Comment 1069, 1195, 1363*

*Instructions to Editor: Modify the text in line 14 on page 73 as follows:*

**10.25.3 Reduced Neighbor Report**

~~If the AP considers its operating channel too congested to accommodate STAs, the AP should include one (or more) Neighbor AP Information element with TBTT Information Field Type indicating value 1 to the TBTT Information Header of the Neighbor AP Information field of the Reduced Neighbor AP Report element in the Beacon or FILS Discovery frame or Probe Response frame to redirect the STA conducting initial link setup from current band to other band or to redirect the STA conducting initial link setup to other AP of the current channel.~~ In the Beacon, FILS Discovery frame or Probe Response frame, if the AP considers its operating channel too congested to accommodate STAs, the AP should set the TBTT Information Field Type to 1 in the first TBTT Information Header of the Neighbor AP Information field of the Reduced Neighbor AP Report element. This then informs the STA conducting the initial link setup to redirect to another channel, another band or another AP. The decision when AP considers its operating channel ~~the~~ too congested is implementation specific.

* *Comment 1070*

*Instructions to Editor: Modify the text in line 28, line 31 on page 73 as follows:*

**10.25.3 Reduced Neighbor Report**

If the STA detects that the TBTT Information Field Type is set to 1 and BSSID field is not included in the TBTT Information, the STA may switch to ~~other~~ another channel or to ~~other~~ another band as specified in the received Operating Class field and Channel Number field. If the STA detects that the TBTT Information Field Type is set to 1 and BSSID field is included in the TBTT Information, the STA may switch to a neighbor AP as specified in the received Operating Class field, Channel Number field and BSSID field.

**CID 1421, 1422**

1. **1421 Comment (Technical):**

*TBTT Offset field inclusion is unclear. The field should always be included and the value of 255 should be used to indicate that the TBTT offset is unknown*

1. **1422 Comment (Technical):**

*The STA sending probe request frame is subjected to the operating class rules.*

**Proposed 802.11ai Specification Text:**

* *Comment 1421*

*Instructions to Editor: Modify the figure 8.401ct as shown (page 32, line22):*

**8.4.2.176 Reduced Neighbor Report element**

|  |  |  |
| --- | --- | --- |
|  | **TBTT Offset** | **BSSID** |
| Octets: | ~~0 or~~ 1 | 0 or 6 |

**Figure 8.401ct – TBTT Information field**

* *Comment 1421*

*Instructions to Editor: Modify the figure 8.401ct as shown (page 32, line36):*

**8.4.2.176 Reduced Neighbor Report element**

If the TBTT Information Field Type is set to 1 and the TBTT Information Length subfield is set to ~~non-zero~~ a value greater than 1, BSSID subfield is included in TBTT Information field to indicated target AP of the redirection.

* *Comment 1422*

*Instructions to Editor: Modify the figure 8.401ct as shown (page 32, line38):*

**8.4.2.176 Reduced Neighbor Report element**

A STA may send the Probe Request frame including the received BSSID on channel indicated in Neighbor AP Information field, subject to regulations.

**CID 1350**

**Comment (Technical):**

*As either of TBTT Offset and BSSID can be 0 in length, for a Neighbor AP information field with multiple TBTT Information fields, how can a sta tell how many TBTT information fields are included? Or it requires that all TBTT information fields to be the same length as indicated in The TBTT Information Length subfield.*

**Proposed 802.11ai Specification Text:**

*Instructions to Editor: Add the text as shown (page 31, line61):*

**8.4.2.176 Reduced Neighbor Report element**

The TBTT Information Length subfield is 1 octet in length and contains the length in octets of each TBTT Information field included in the Neighbor AP Information field. If there are more than 1 TBTT information fields in a Neighbor AP information field, the TBTT information fields will be same in length.

# References:

1. IEEE Std 802.11 – 2012
2. IEEE Std 802.11ai/D0.5