IEEE P802.11
Wireless LANs

|  |
| --- |
| LB 200 Comment Resolution for Clause 8.3.4.2 |
| Date: 2014-01-01 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| Amin Jafarian | Qualcomm Inc. |  |  | jafarian@qti.qualcomm.com |
| Bin Tian | Qualcomm inc. |  |  |  |

Abstract

This submission proposes resolutions for comments in clause 8.3.4.2 of TGah Draft 1.0 with the following CIDs:

1418, 1964, 2386, 2387, 2388, 2389, 2390, 2440, 2518, 2703, 2704, 2803, 2804, 2861, 2978

Revisions:

* Rev 0: initial version of the document
* Rev 1: changes the Capability Information field to Compatibility Information field to address some concerns that were received during the presentation.
* Rev 2: Adds text for Short Probe Response frame as a response to an NDP Paging frame (in 10.1.4.3.1).

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

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

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1418 | 47.29 | 8.3.4.2 | There are three fields optionally present in the short beacon: 1-Next TBTT, 2- Compressed SSID, 3-Access Network Options, | indicate those fields as (optionally present) in the frame format figure 8-54 | Agree with the commenter. Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 1964 | 48.13 | 8.3.4.2 | Authentication Control IE may appears in the short beacon, therefore, Authentication IE shall be included in the Table 8-39--Short Beacon Optional elements. | Include Authentication Control IE as an optional element in Table 8-39--Short Beacon Optional elements | Authentication Control element is already included in the Short Beacon that is transmitted at TBTT (see 10.1.3.10.1). Proposed resolution is to clarify this aspect in this subclause.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2386 | 47.50 | 8.3.4.2 | "The Duration field is 2 bytes in length and is set to the duration in microseconds of the NAV set by this frame." does not actually say anything new | Say something useful, inspired by the "The Duration field is set to"s in the baseline | Agree with the commenter.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2387 | 47.56 | 8.3.4.2 | The TSF is a function, and hence does not have a value (cf. TSF timer). Furthermore, exactly when is this value sampled? Ditto 8.4.2.170g/l. Also 8.7.5.3 regarding the sampling point | Say something like "TSF timer at the time that the data symbol containing the first bit of the Timestamp is transmitted to the PHY plus the transmitting STA's delays through its local PHY from the MAC-PHY interface to its interface with the WM [e.g., antenna]." (see baseline) | Agree with the commenter. In addition see discussion.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2388 | 48.40 | 8.3.4.2 | It would be more helpful if the contents of the FC field were described before the following fields | Move things around, and make sure the text still flows correctly | Agree with the commenter. Resolution is to move the description after the figure of Short Beacon frame format.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2389 | 48.13 | 8.3.4.2 | "in Short Beacon frames" is superfluous since this is what the whole table is about. Also, "Optional" should not be uppercase | Delete the "in Short Beacon frames"s and change "Optional elements" to "optional elements" | Agree with the commenter.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2390 | 48.59 | 8.3.4.2 | Calling the field "SSID Present" when the thing it refers to is a compressed SSID is confusing; ditto "Interworking Present" | Rename to "Compressed SSID Present" (twice) and "ANO Present" (twice) | Agree with the commenter.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2440 | 48.61 | 8.3.4.2 | "Internetworking" | "Interworking" | Agree with the commenter.Resolution renames the field to “ANO”.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2518 | 47.29 | 8.3.4.2 | Why is short beacon even required. Why not just send a normal beacon at a higher data rate? | Remove short beacon and all references in the draft. | Rejected –The design of a Short Beacon frame has widely been discussed and accepted by the TGah group. Transmitting a normal beacon at high rates reduces the BSS coverage range, is not suitable for sensor applications and does not solve the redundancy issue of normal beacon.  |
| 2703 | 48.01 | 8.3.4.2 | The compressed SSID field is optional. First of all the Figure 8-54 should indicate the field to be optional. Also not sure how the receiver of the frame determines that the compressed SSID field is present or abscent | Make changes to Figure as per the comment. Also clarify how the receiver determines the presence of this optional field. | Agree with the commenter.Resolution accounts for commeners suggestions.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2704 | 48.56 | 8.3.4.2 | The values of Type and Subtype fields are not defined for the FC field | Point to the table where the values of Type and Subtype fields are defined for the FC field (Table 8-2?) | Rejected –Short Beacon is an extension frame and as the commenter mentioned the values for Type/Subtype fields of such frames are already defined in Table 8.2.  |
| 2803 | 47.35 | 8.3.4.2 | How is the length of the "Optional Elements" sub-field determined, in Figure 8-54? | Some text should be added to explain how the length of this sub-field is determined. | Rejected –The overall length of the Short Beacon frame is indicated in the SIG field of the PPDU carrying the frame, and the presence/absence of certain fields is indicated in the FC of the Short Beacon frame. Hence, there is no ambiguity in determining the length of the Optional elements. |
| 2804 | 48.05 | 8.3.4.2 | Clause 8.4.2.91 is the "DMS response element". | Change reference to 8.4.2.94 | Rejected –According to REVmc 2.0 clause 8.4.2.91 is Interworking element. Hence, no changes are required to the document.  |
| 2861 | 48.64 | 8.3.4.2 | "The BSS BW field indicates the current operating bandwidth of the BSS."Table 8-40 (FC field BSS BW setting) indicates the maximum operating bandwidth of the BSS.It should also indicate the minimum operating bandwidth of the BSS as specified in Table 10-22--S1G BSS operating channel width | In order to indicate both a minimum operating bandwidth and the maximum operating bandwidth, modify the encoding of the BSS BW sub-field in the FC field. | Agree with the commenter. Proposed resolution is to modify encoding to allow indication of minimum operating BW.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |
| 2978 | 47.00 | 8.3.4.2 | brief description or references to FC in Figure 8-54 should be provided. There are a few FC format and FC for short beacon should be specified | The Frame Control filed is as defined in 8.2.4.1 and illustrated in Figure 8-2 | Agree in principle with the commenter. But the FC is specifically defined in this subclause for Short Beacon. Resolution is to move the description after the figure for Short Beacon frame format to avoid confusion.Revised –TGah editor to make changes shown in 14/0039r2 under the heading for CIDs from 1418 to 2978. |

**Discussion:** *CID 2387 - Proposed resolution is to specify when the TSF timer is sampled for Short Beacon frames (i.e., at the start of the data symbol containg the first bit of the Timestamp). Note that the STA including its TSF timer in a Short Beacon may split it into 2 parts (4 MSBs (included in the Short Beacon Compatibility element) and 4 LSBs (included in the Timestamp field).*

*For the 4 LSBs included in the Timestamp field the resolution is to clarify that: “The Timestamp field contains the 4 least significant octets of the transmitting STA’s TSF timer at the time that the start of the data symbol, containing the first bit of the Timestamp, is transmitted by the PHY plus the transmitting STA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM.”*

*For the 4 MSBs included in the Short Beacon Compatibility element we clarify that: “The TSF Completion field carries the 4 most significant octets of the TSF timer at the AP at the time of generation of the element carrying the TSF Completion field”*

*However, note that there may be cases where the TSF timer update procedure at the STA receiving the Short Beacon (and similarly for Short Probe Response frames) may fail due to the different time instants of generating/updating the two parts of the TSF timer (i.e., a rollover can occur between the instant of time the 4LSBs are updated and the instant of time the 4MSBs are updated at the receiver. To solve this issue a TSF Rollover Flag is added in the Capability Information field to help the receiving STA identify this case and correctly update its TSF timer accounting for this rollover if it occurs.*

* **Short Beacon frame format**

**Instructions to TGah Editor*: Change this subclause as follows:***

* ***The end of the figure number in subclause 8.3.4.1 is 8-53 and the table number is 8-38.***

The format of the Short Beacon is shown in Figure 8-54 (Short Beacon frame format).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | Frame Control | Duration(#15) | SA | Timestamp | Change Sequence | Next TBTT (optional) | Compressed SSID (optional) | Access Network Options (optional) | Optional Elements | FCS |
| Octets:  | 2 | 2 | 6 | 4 | 1 | 3 | 4 | 1 | variable | 4 |
| * **Short Beacon frame format**
 |

The Duration field is set to the duration of time, in microseconds, required by the paged STAs to transmit any pending QoS Null, PS-Poll or NDP PS-Poll frames as specified in 8.2.5.2. .(#15)

The SA field is the address of the STA transmitting the Short Beacon.

 The Timestamp field contains the 4 least significant octets of the transmitting STA’s TSF timer at the time that the start of the data symbol, containing the first bit of the Timestamp, is transmitted by the PHY plus the transmitting STA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM.The Change Sequence field is defined as an unsigned integer initialized to 0, that increments when a critical update to the Beacon frame has occurred (see 10.46.1 (System information update procedure)).

The Next TBTT field is present if the Next TBTT Present field in the Frame Control field is 1 and indicates the most significant 3 bytes of the 4 least significant bytes of the next TBTT. Otherwise, it is not present.

The Compressed SSID field is present if the Compressed SSID Present field in the Frame Control is 1 and indicates a 32-bit CRC calculated as defined in 8.2.4.8 FCS field, wherein the *calculation fields* is the SSID field in the Short Beacon frame. Otherwise, it is not present.

The Access Network Options field is present if the ANO field in the Frame Control field is 1 and it is defined in 8.4.2.91 (Interworking element) (see Figure 8-386—Access Network Options field format). Otherwise, it is not present.

The Optional Elements field contains the minimum set of optional information elements, as defined in Table 8-39 (Minimum Set of optional elements). The minimum set of optional elements is included in a Short Beacon frame transmitted at a TSBTT that is not a TBTT and the full set of optional elements, defined in Table 8-24 (Beacon frame body) is included in a Short Beacon frame that is transmitted at a TBTT (see 10.1.3.10.1 (General)).

.

|  |
| --- |
| * **Minimum Set of optional elements**
 |
| **Order** | **Information** | **Notes** |
| 1 | Traffic indicationmap (TIM) | The TIM element is optionally present. |
| 2 | FMS Descriptor | The FMS Descriptor element is present if dot11FMSActivated is true. |
| 3 | RPS | The RPS element is optionally present if dot11RAWOptionActivated is true. |
| 4 | Subchannel Selective Transmission | The Subchannel Selective Transmission element is optionally present if dot11SubchannelSelectiveTransmissionActivated is true.  |
| 5 | AP Power Management | The AP Power Management element is optionally present. |
| 6 | Relay | The Relay element is optionally present if dot11RelaySupport is true. |

**Instructions to TGah Editor*: Change the following text as specified below. After the changes move all the content below immediately after the heading for Figure 8-54 – Short Beacon frame format:***

The format of the Frame Control field of the Short Beacon is shown in Figure 8-55 (Frame Control field format).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  | ProtocolVersion | Type | Subtype | Next TBTT Present | Compressed SSID Present | ANO Present | BSS BW | Security | Reserved |
| Bits:  | 2 | 2 | 4 | 1 | 1 | 1 | 3 | 1 | 1 |
| * **Frame Control field format**
 |

The Next TBTT Present field is set to 1 if the Next TBTT field is present; otherwise it is set to 0.

The Compressed SSID Present field is set to 1 if the Compressed SSID field is present; otherwise it is set to 0.
The ANO Present field is set to 1 if the Access Network Options field is present; otherwise it is set to 0.

The BSS BW field indicates the minimum and the maximum operating bandwidths of the BSS as defined in Table 8-40 (Frame Control field BSS BW Setting).

|  |
| --- |
| **Table 8-40 -- Frame Control field BSS BW setting** |
| **BSS BW** | **Minimum BSS BW [MHz]** | **Maximum BSS BW [MHz]** |
| 0 | 1 | 2 |
| 1 | Equal to the BW of the PPDU carrying the BSS BW field  | Equal to the BW of the PPDU carrying the BSS BW field |
| 2 | 1 | 4 |
| 3 | 2 | 4 |
| 4 | 1 | 8 |
| 5 | 2 | 8 |
| 6 | 1 | 16 |
| 7 | 2 | 16 |

The Security field is set to 1 if the AP is an RSNA AP.

* **General**

**Instructions to TGah Editor*: Change this subclause as follows:***

An S1G AP with dot11ShortBeaconOptionImplemented set to true shall schedule a Short Beacon frame at intervals given by the dot11ShortBeaconPeriod with the following exception: a Beacon may be scheduled instead of a Short Beacon in a Short Beacon Interval of a TSBTT that coincides with a TBTT. The Timestamp field of the Short Beacon frame shall be set to the 4 least significant octets of the transmitting STA’s TSF timer at the time that the start of the data symbol, containing the first bit of the Timestamp, is transmitted by the PHY plus the transmitting STA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM. Note that an AP that has dot11ShortBeaconOptionImplemented set to true may use the procedures of clause 10.1.3.2 when transmitting a Short Beacon.

A Short Beacon frame scheduled at TSBTT that is not a TBTT may include the elements shown in Table 8-39 (Minimum Set of optional elements). A Short Beacon scheduled at TBTT may include all the elements shown in Table 8-24 (Beacon frame body) plus the Short Beacon Compatibility element and the Short Beacon Interval element.The Short Beacon Compatibility element shall be generated no later than the Timestamp field of the Short Beacon frame that carries the element. A STA can reconstruct the 8 octet TSF timer at the AP by concatenating the 4 octet TSF Completion field in the Short Beacon Compatibility element with the Timestamp field in the Short Beacon as described in 10.1.3.10.3 (TSF timer accuracy with Short Beacon).

* **TSF timer accuracy with Short Beacon**

**Instructions to TGah Editor*: Change this subclause as follows:***

Upon receiving a Short Beacon frame with a valid FCS and BSSID, an S1G STA shall update its TSF timer according to thealgorithm described below.

The received Timestamp value shall be adjusted by adding an amount equal to the receiving STA’s delay through its local PHY components plus the time since the first bit of the Timestamp field was received at the MAC/PHY interface.

If the received Short Beacon frame does not include a Short Beacon Compatibility element:

*
* If the most significant bit (MSB) of the adjusted value of the received Timestamp is not equal to the MSB of the 4 least significant octets of the local TSF timer then the value of the 4 most significant octets of the TSF timer shall be adjusted to account for roll over as follows:
	+ The value shall be increased by one unit (modulo 232) if LT > AT and LT > AT + 231
	+ The value shall be decreased by one unit (modulo 232) if LT < AT and LT < AT - 231

where: AT is the adjusted value of the received Timestamp and LT is the value of the 4 least significant octets of the local TSF timer

* The 4 least significant octets of the STA’s local TSF timer shall be set to the adjusted value of the Timestamp.

If the received Short Beacon frame includes a Short Beacon Compatibility element:

* The 4 least significant octets of the STA’s TSF timer shall then be set to the adjusted value of the Timestamp.

If the most significant bit of the adjusted value of the Timestamp is 0 and the value of the TSF Rollover Flag field in the Short Beacon Compatibility element is 1, then the 4 most significant octets of the TSF timer shall be adjusted to account for roll over (i.e., the value shall be increased by one unit (modulo 232). Otherwise, the 4 most significant octets of the TSF timer shall be set to the value of the TSF Completion field in the Short Beacon Compatibility element.

**8.4.2.170g Short Beacon Compatibility element**

**Instructions to TGah Editor*: Change this subclause as follows (@802.11ah D1.1):***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Compatibility Information | Beacon Interval | TSF Completion |
| Octets | 1 | 1 | 2 | 2 | 4 |
| * **Short Beacon Compatibility element format**
 |

The Compatibility Information field contains all the subfields defined in clause 8.4.1.4 (Capability Information field) except for the subfield located in B13 of the field which is defined as the TSF Rollover Flag. An S1G AP sets the TSF Rollover Flag subfield to the value of the most significant bit of the 4 least significant octets of the TSF timer at the time the TSF timer is read for the purpose of creating the element carrying the Compatibility Information field.

The Beacon Interval field in the element is defined in 8.4.1.3.

The TSF Completion field carries the 4 most significant octets of the TSF timer at the AP at the time of generation of the element carrying the TSF Completion field.

* **Short Probe Response frame format(#12)**

**Instructions to TGah Editor*: Change this sentence as follows:***

The Timestamp field contains the 4 least significant octets of the transmitting STA’s TSF timer at the time that the start of the data symbol, containing the first bit of the Timestamp, is transmitted by the PHY plus the transmitting STA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM.

**10.1.4.3.3 Sending a probe response**

**Instructions to TGah Editor*: Insert the following sentence at the end of the first inserted paragraph:***

An S1G STA with dot11ShortProbeResponseOptionImplemented equal to true, scheduled to transmit a Short Probe Response frame that includes the Short Beacon Compatibility element shall generate this element no later than the Timestamp field of the Short Probe Response frame that carries the element.

**10.1.4.3.1 Introduction**

**Instructions to TGah Editor*: Insert the following sentence at the end of the first modified paragraph:***

Upon reception of a Short Probe Response frame that includes a Short Beacon Compatibility element the S1G STA that included the Probe Response Option element in a previously transmitted Probe Request frame or that set the Requested Probe Response Type to 0 in a previously transmitted NDP Probe Request frame , may update its TSF timer using the same TSF timer update procedure described in 10.1.3.10.3 (TSF timer accuracy with Short Beacon) for Short Beacon frames.

**Instructions to TGah Editor*: Change line 39 in page 37 as follows (@802.11ah D1.0):***

* Any pending PS-Poll or NDP PS-Poll frame exchanges by paged STAs