IEEE P802.11  
Wireless LANs

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| LB 200 Comment Resolution for Miscellaneus Part 2 | | | | |
| Date: 2014-03-01 | | | | |
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Abstract

This submission proposes resolutions for comments that impact multiple clauses of TGah Draft 1.0 with the following CIDs:

2519, 1390, 1580, 2481, 2657, 2774, 2966, 1400, 2665, 2867, 2868, 2875, 1405, 2571

Revisions

Rev 0 – Initial version of the document

Rev 1 – Minor editorial changes

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** |
| 2519 | 137.37 | 8.7 | Why is short beacon in clause 8.3, but short probe in clause 8.7? | Move short Beacon and its description to 8.7. | Revised –  Because the Short Beacon frame is compatible with PV0 frames (i.e., it has a Duration field) while Short Probe Response is compatible with Short frames (e.g., it does not have Duration field). To avoid confusion proposed resolution is to rename Short Beacon as S1G Beacon.  TGah Editor to make changes shown in 14/0324r1 under the heading for CIDs 2519 and 1390. |
| 1390 | 213.01 | 10 | An S1G BSS can generate two different beacons (a regular beacon at TBTT and a short beacon). It is not clear this is needed given that a short beacon with the Beacon Compatibility element is conceptually a regular beacon. | Specify that a Short Beacon with the compatibility element is sent at TBTT and that regular beacon is not sent in an S1G BSS. | Revised –  Agree in principle with the commenter. Proposed resolution accounts for the commenter suggestion.  TGah Editor to make changes shown in 14/0324r1 under the heading for CID 2519 and 1390. |

**Discussion:** *None.*

**TGah editor*: Add another definition to subclause 3.3 as shown:***

**3.3 Abbreviations and acronyms**

TSBTT target short beacon transmission time

**6.3.3.3.2 Semantics of the service primitive**

**Instructions to TGah Editor: *Change the sentences below in P12L50 as follows:***

The timestamp of the received frame (probe response/beacon, or short probe response/S1G beacon) from the found BSS. When a short probe response or an S1G beacon is received, the timestamp is the 4 least significant octets of the TSF timer value of the transmitting STA.

**Instructions to TGah Editor: *Change the sentence below in P13L21 as follows:***

The values from the Relay Discovery element. The parameter is optionally present if dot11RelaySupport is true and a Relay Discovery element was present in the (short) Probe Response or S1G Beacon frame from which the BSSDescription was determined, and not present otherwise. More description is provided in 9.48.5 (Relay discovery procedure).

**Instructions to TGah Editor: *Change the sentence below in P14L23 as follows:***

The values from the TSF Timer Accuracy element if such an element was present in the (short) Probe Response or S1G Beacon frame, else null. The parameter is optionally present only if dot11TSFTimerAccuracyImpemented is true.

**Instructions to TGah Editor: *Change the sentence below in P14L39 as follows:***

The Relay element is present in the S1G Beacon only if dot11RelayAPOperation is true. The Relay element is present in the Probe Request if dot11RelaySTACapable is true. The Relay element is optionally presents in (short) Probe Response if dot11RelaySupport is true. More description is provided in 9.48 (Relay operation).

**Instructions to TGah Editor: *Change the instruction below in P37L60 as follows:***

***Change the following Table 8-2 by adding a row for S1G Beacon, and Resource Allocation frames and modify the last value of Subtype for Reserved as follows. The changes are based on 802.11 REVmc D1.1 and 802.11ac D5.0:***

**Instructions to TGah Editor: *Replace “Short Beacon” with “S1G Beacon” in Table 8-2 (in P38L10).***

**Instructions to TGah Editor: *Change the sentence below in P43L27 as follows:***

Within a frame (excluding Data frames containing QoS CF-Poll, PSMP frames, ~~and~~ frames that have the RDG/More PPDU subfield equal to 1, S1G Beacon frames (#15,59,168), and frames transmitted by an S1G STA with the TXVECTOR parameter RESPONSE INDICATION equal to Long Response) transmitted under EDCA by a STA that initiates a TXOP, there are two classes of duration settings: single protection and multiple protection.

**Instructions to TGah Editor: *Change the sentence below in P43L38 as follows:***

S1G Beacon frames always use multiple protection(#15,59,168). Frames transmitted by an S1G STA with the TXVECTOR parameter RESPONSE INDICATION equal to Long Response always use multiple protection (#14/0038r1).

**8.3.3.2 Beacon frame format**

**Instructions to TGah Editor: *Change these rows in Table 8-24 as follows:***

|  |  |  |
| --- | --- | --- |
| 75 | Change Sequence | The Change Sequence is optionally present if dot11S1GOptionImplemented is true. |

|  |  |  |
| --- | --- | --- |
| 78 | Short Beacon Interval | The Short Beacon Interval element is present if dot11ShortBeaconInterval is true. |

**Instructions to TGah Editor: *Change these rows in Table 8-33 (and 8-34) as follows:***

|  |  |  |
| --- | --- | --- |
| 18 (70) | Change Sequence | The Change Sequence is optionally present if dot11S1GOptionImplemented is true. |

**Instructions to TGah Editor: *Replace all occurrences of “Short Beacon” with “S1G Beacon” within subclause 8.3.4.2 and including the subclause header.***

**Instructions to TGah Editor: *Replace all occurrences of “Short Beacon Compatibility” with “S1G Beacon Compatibility” throughout the 802.11ah draft to become D2.0.***

**Instructions to TGah Editor: *Replace all occurrences of “(Short) Beacon” with “S1G Beacon” within subclause 8.4.2.170b (RPS element).***

**Instructions to TGah Editor: *Replace all occurrences of “Short Beacon” with “S1G Beacon” within subclause 9.3.2.4 (Setting and resetting the NAV).***

**Instructions to TGah Editor: *Replace all occurrences of “(Short) Beacon” with “S1G Beacon” within subclause 9.20.5 (Restricted Access Window (RAW) Operation).***

**Instructions to TGah Editor: *Replace all occurrences of “(Short) Beacon” with “S1G Beacon” within subclause 9.41.5 (NDP Paging Setup).***

**Instructions to TGah Editor: *Replace all occurrences of “(Short) Beacon frame” with “S1G Beacon frame” within subclause 9.42.1.1 (Resource protection for non-TIM STAs using periodic RAW (PRAW) operation).***

**Instructions to TGah Editor: *Replace all occurrences of “(Short) Beacon” with “S1G Beacon” except when it is part of “(Short) Beacon Interval” within subclause 9.46 (Subchannel Selective Transmission (SST)) and 9.50 (Support for energy limited STAs).***

* **MLME**
* ***modifications based on 802.11REVmc D1.1***
* **Synchronization**
* **TSF for infrastructure networks**

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

***Change the 1st and 2nd paragraphs of the subclause as follows:***

In an infrastructure BSS or in a PBSS, the AP in the infrastructure BSS or the PCP in the PBSS shall be the timing master for the TSF. A STA that is the AP or the PCP shall initialize its TSF timer independently of any simultaneously started APs or PCPs, respectively in an effort to minimize the synchronization of the TSF timers of multiple APs or PCPs. In a BSS that is neither DMG nor S1G, the AP shall periodically transmit special frames called Beacon frames. An S1G AP shall periodically transmit S1G Beacon frames instead of Beacon frames as described in 10.1.3.10.1 (General), which provide a similar function to the Beacon frame in a non-S1G BSS. Within an S1G BSS the generation and or reception of a Beacon frame refers to that of the S1G Beacon frame unless explicitly stated otherwise. In a DMG BSS, the PCP/AP shall periodically transmit special frames called DMG Beacon and Announce frames, which provide a similar function to the Beacon frame in a non-DMG BSS. Beacon, S1G Beacon, DMG Beacon, and Announce frames contain the value of the PCP's or AP's TSF timer in order to synchronize the TSF timers of other STAs in a BSS. A receiving STA shall accept the timing information in Beacon, S1G Beacon, DMG Beacon, and Announce frames sent from the AP or PCP servicing its BSS. An S1G STA that receives a S1G Beacon frame shall update its TSF timer according to the algorithm described in 10.1.3.10.3 (TSF timer accuracy with S1G Beacon). If a STA's TSF timer is different from the timestamp in the received Beacon, S1G Beacon, DMG Beacon, or Announce frame, the receiving STA shall set its local TSF timer to the received timestamp value.

In a BSS that is neither DMG nor S1G, Beacon frames shall be generated for transmission by the AP once every dot11BeaconPeriod TUs. In an S1G BSS, the S1G AP shall generate for S1G Beacon frames every dot11BeaconPeriod TUs and may additionally generate S1G Beacon frames every dot11ShortBeaconPeriod TUs as described in 10.1.3.10.1 (General). In a DMG infrastructure BSS, zero or more DMG Beacon frames shall be generated for transmission by the AP every dot11BeaconPeriod TUs (see 10.1.3.3 (Beacon generation in a DMG infrastructure BSS and in a PBSS). The AP shall transmit at least one DMG Beacon frame through each sector available to the AP within a time interval that is not longer than dot11BeaconPeriod × dot11MaxLostBeacons TUs. The TXSS Span field in the DMG Beacon shall be set to a value that is less than or equal to the dot11MaxLostBeacons attribute.

* **Maintaining synchronization**
* **Beacon generation in non-DMG infrastructure networks**

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

***Change the first sentence and insert two sentences at the end of the first paragraph of 10.1.3.2 as follows:***

~~The AP~~ The non-S1G AP shall define the timing for the entire BSS by transmitting Beacon frames according to dot11BeaconPeriod. The S1G AP shall define the timing for the entire BSS by transmitting S1G Beacon frames according to dot11BeaconPeriod.This defines a series of TBTTs exactly dot11BeaconPeriod TUs apart. Time 0 is defined to be a TBTT with the Beacon frame being a DTIM. At each TBTT, the AP shall schedule a Beacon frame as the next frame for transmission according to the medium access rules specified in Clause 9. The beacon period is included in Beacon and Probe Response frames, and a STA shall adopt that beacon period when joining the BSS, i.e., the STA sets its dot11BeaconPeriod variable to that beacon period.

A non-S1G AP shall not transmit S1G Beacon frames. The operation of an S1G AP is further defined in subclause 10.1.3.10.1 (General).

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

***Insert a new subclause after clause 10.1.3.9 TSF timer accuracy (REVmc D1.1):***

* **Maintaining Synchronization with S1G Beacon**
* **General**

An S1G AP schedules for transmission an S1G Beacon frame at intervals given by the dot11BeaconPeriod or dot11ShortBeaconPeriod as described in 10.1.2 (TSF for infrastructure networks). The Timestamp field of the S1G 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(#14/0039r2). An S1G Beacon frame scheduled at TSBTT that is not a TBTT may include the elements shown in Table 8-39 (Minimum Set of optional elements). An S1G Beacon scheduled at TBTT shall include the S1G Beacon Compatibility element and may include all the other elements shown in Table 8-24 (Beacon frame body) . Note that the S1G Beacon Compatibility element replaces the following fields of the Beacon frame body: Timestamp, Beacon Interval and Capability which are not included in an S1G Beacon frame. The S1G Beacon Compatibility element shall be generated no later than the Timestamp field of the S1G Beacon frame that carries the element.(#14/0039r2) A STA can reconstruct the 8 octet TSF timer at the AP by concatenating the 4 octet TSF Completion field in the S1G Beacon Compatibility element with the Timestamp field in the S1G Beacon as described in 10.1.3.10.3 (TSF timer accuracy with S1G Beacon).(#14/0039r2)

* **Generation of S1G Beacon**

S1G Beacon frames shall be transmitted in an S1G BSS and S1G IBSS. The use of a S1G Beacon frames in a MBSS is beyond scope. An AP may define further timing for the BSS by sending S1G Beacon frames according to the dot11ShortBeaconPeriod. The value for the dot11ShortBeaconPeriod shall be such that dot11BeaconPeriod = ndot11ShortBeaconPeriod, where n is a positive integer. This defines a series of TSBTTs exactly dot11ShortBeaconPeriod TUs apart. If n is greater than 1, the Next TBTT Present field shall be set to 1 and the Next TBTT field shall be present in S1G Beacon frames. Time 0 is defined to be a TBTT or TSBTT with the S1G Beacon frame being a DTIM.

* **TSF timer accuracy with S1G Beacon**

Upon receiving a S1G Beacon frame with a valid FCS and BSSID, an S1G STA shall update its TSF timer according to the algorithm 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 MAHY interface.

If the received S1G Beacon frame does not include a S1G 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 S1G Beacon frame includes a S1G 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 S1G 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 S1G Beacon Compatibility element. (#14/0039r2)(#800)

* **Passive scanning with S1G Beacon**

If the ScanType parameter indicates a passive scan, the S1G STA shall listen to each channel scanned for no longer than a maximum duration defined by the MaxChannelTime parameter.

* **Terminating a BSS**

An infrastructure BSS may be terminated at any time. In addition to procedures described in Clause 10.1.6, upon receipt of an MLME-STOP.request primitive, an S1G STA shall stop transmitting S1G Beacon frames.

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

* **Acquiring synchronization, scanning**
* **General**

***Insert the following paragraph after the 2nd paragraph of the sub-clause 10.1.4.1:***

An S1G STA may use Short Probe Response frames as defined in 8.7.5.3 (Short Probe Response frame format) instead of Probe Response frames as defined in 8.3.3.10 (Probe Response frame format). Short Probe Response frame is used for reducing overhead of using long Probe Response frame in active scanning by optimizing the frame format and by allowing STA to request minimum information that is required for association with the responding STA to be included in the Short Probe Response frame.

Probe Response Option element defined in 8.4.2.170t (Probe Response Option element) is used by the requesting STA for indicating which optional information is requested to be included in the Short Probe Response frame that is transmitted by the responding STAs. A STA may include ProbeResponseOption in the MLME-SCAN.request primitive to include the Probe Response Option element in the Probe Request frame The requesting STA indicates the optional information to the responding STA by setting one or more bits in the Probe Response Option bitmaps in the Probe Response Option element transmitted in Probe Request frame as defined in Clause 8.4.2.170t (Probe Response Option element).

* **Active scanning**
* **Introduction**

***Change the following paragraph of the sub-clause 10.1.4.3.1 as follows:***

Active scanning involves the generation of Probe request frames and the subsequent processing of received probe responses. ~~Probe Response frames.~~ An S1G STA may include Probe Response Option element in the Probe Request frame to indicate which optional information is requested to be included in the Short Probe Response frame. If the responding STA is an S1G STA and if it receives a Probe Request frame with Probe Response Option element, then Short Probe Response frame may be transmitted by the responding STA as a probe response. Otherwise, a Probe Response frame shall be transmitted by the responding STA as a probe response. The details of the active scanning procedures are as specified in the following subclauses. Upon reception of a Short Probe Response frame that includes a S1G 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 S1G Beacon) for S1G Beacon frames.(#14/0039r2)

* **Sending a probe response**

***Insert the following paragraph after the 4th paragraph of the sub-clause 10.1.4.3.3(#868):***

If the requesting STA is an S1G STA and a Probe Response Option element (see Clause 8.4.2.170t (Probe Response Option element)) is included in the Probe Request frame, and if the responding STA is an S1G STA and supports Short Probe Response, then the responding S1G STA shall respond with Short Probe Response frame. If a bit in a Probe Response Option bitmap in the Probe Response Option element is set to 1, it means that corresponding optional information is requested by the requesting S1G STA, and the responding S1G STA shall include the corresponding information in the Short Probe Response frame if the S1G STA supports it. If the Request full SSID bit in the Probe Response Option element is set to 1, then the responding S1G STA shall include its full SSID in the Short Probe Response frame. If it is set to 0, then it shall include its compressed SSID instead of the full SSID. In S1G BSS, the (Short) Probe Response frame shall have the same CH\_BANDWIDTH as the preceding Probe Request frame. An S1G STA with dot11ShortProbeResponseOptionImplemented equal to true, scheduled to transmit a Short Probe Response frame that includes the S1G Beacon Compatibility element shall generate this element no later than the Timestamp field of the Short Probe Response frame that carries the element. (#14/0039r2) (#868)

NOTE- This rule does not allow that an S1G AP responds with a Probe Response frame in 1MHz channel width after receiving a Probe Request frame in 2MHz channel width.(#868)

***Change the 6-th paragraph of the sub-clause 10.1.4.3.3 as follows:***

Probe Response frames and Short Probe Response frames shall be sent as directed frames to the address of the STA that generated the probe request. The SSID List element shall not be included in a Probe Request frame in an IBSS.

***TGah editor: Insert the following new subclauses 10.1.4.3.3a and 10.1.4.3.3b after 10.1.4.3.3 as the following:***

* **Active scanning for relay discovery**

S1G STAs that are performing an active scan to discover an operating APs, or Relay APs may include the Relay Discovery element (see 8.4.2.170q (Relay Discovery element)) in the Probe Request frame. This element provides information on the single-hop direct path, and QoS criteria on the relay path.

The active scanning procedure for Relay AP is similar to the Active scanning procedure outlined in 10.1.4.3.3.

A Relay AP receiving Probe Request frames may respond with a Probe Response if the criteria outlined in 10.1.4.3.2 are met. A Relay AP also may not respond with a Probe Response if the QoS criteria on the relay path specified in the Relay Discovery element cannot be satisfied.

A Relay AP sending Probe Response frames may include the Relay Discovery element to carry link budget information between the Relay AP and root AP.

An S1G STA may use the information received from different Relay APs to determine a suitable Relay AP for association. The Relay AP selection is made by the S1G STA, and the specific selection procedure is up to the implementation.

* **NDP Probing**

The NDP Probing is used to reduce the energy consumption during the scanning. Upon receipt of the MLME-SCAN.request primitive with ScanType indicating a NDP Probing, a STA for which dot11NDPProbingActivated is true shall transmit a NDP Probe Request frame that has either a compressed SSID or an access network option. NDP probing is allowed when a S1G STA knows the operating frequency bands and regulatory domains. (#2638)A non-S1G STA shall not transmit NDP Probe Request frames. (#2341)

APs receiving a NDP Probe Request frames shall respond with a (short) Probe Response frame only if:

* The compressed SSID in the NDP Probe Request frame is the specific compressed SSID of the AP.
* The access network option in the NDP Probe Request frame is the access network option of the AP.

When an AP responses a (short) Probe Response frame, it shall perform the Basic Access procedure as defined in 9.3.4.2. Because a NDP Probe Request frame does not have a MAC Address of STA requesting a NDP Probing, a (short) Probe Response frame shall be broadcasted.

If PHY-CCA.indication (busy) primitive has not been detected before the ProbeTimer reaches MinChannelTime, then set NAV to 0 and scan the next channel. Else, if it receives (short) Probe Response frame, STA may transmit a Probe Request frame/Association Request frame or listen to full Beacon frame for obtaining the more information.

An illustration of the NDP probing procedure is shown in Figure 10-5a (NDP Probing Procedure).

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|  |
| * **NDP Probing Procedure** |

* **Initializing a BSS**
* **General**

***Change the following paragraphs of subsection 10.1.4.4.1 as follows:***

Upon receipt of an MLME-START.request primitive, a STA shall determine the BSS’s BSSID (as described in 10.1.4 (Acquiring synchronization, scanning)), select channel synchronization information, select a beacon period, select the operational rate set, initialize and start its TSF timer, and begin transmitting Beacon frames if the STA is neither DMG nor an S1G STA or DMG Beacon frames if the STA is a DMG STA or S1G Beacon frames if the STA is an S1G STA. Upon receipt of an MLME-START.request primitive, an S1G STA may additionally select a short beacon period, and begin transmitting S1G Beacon frames.(#32)

A STA shall include a Country element in the transmission of (#32)Beacon frames, S1G Beacon frames transmitted at TBTT, and DMG Beacon frames if dot11MultiDomainCapabilityActivated, dot11SpectrumManagementRequired, or dot11RadioMeasurementActivated is true. See 8.3.3.2 (Beacon frame format) for the description of a properly formed (#32)Beacon frame, see 8.3.4.2 (S1G Beacon frame format) for the description of a properly formed S1G Beacon frame, and see 8.3.4.1 (DMG Beacon) for the description of a properly formed DMG Beacon frame.

* **Adjusting STA timers**

***Change the following paragraphs of subsection 10.1.5 as follow:***

In an infrastructure BSS or PBSS, STAs shall adopt the TSF timer value in a (#821)Beacon, S1G Beacon, (#821)(Short) Probe Response, DMG Beacon, or Announce frame coming from the AP in their BSS by using the algorithm in 10.1.3.9 (TSF timer accuracy).

In response to an MLME-JOIN.request primitive, a STA joining an IBSS shall initialize its TSF timer to 0 and shall not transmit a (#821)Beacon, S1G Beacon, (#821)(Short) Probe Response, or DMG Beacon frame until it hears a (#821) Beacon, S1G Beacon, (#821)(Short) Probe Response, or DMG Beacon frame from a member of the IBSS with a matching SSID. Consequently, the STA joining an IBSS adopts the timer from the next (#821)Beacon, S1G Beacon, (#821)(Short) Probe Response, or DMG Beacon frame from its IBSS.

All (#821)Beacon, S1G Beacon, (#821)(Short) Probe Response, DMG Beacon, and Announce frames carry a Timestamp field. A STA receiving such a frame from another STA in an IBSS with the same SSID shall compare the Timestamp field with its own TSF time. If the Timestamp field of the received frame is later than its own TSF timer, a STA that is neither a DMG nor an S1G STA in the IBSS shall adopt all parameters contained in the (#821)Beacon frame according to the rule for that parameter found in the “IBSS adoption” column of the matching row of the BSSDescription table found in 6.3.3.3.2 (Semantics of the service primitive). An S1G STA shall adopt all parameters contained in the S1G Beacon frame according to the rule for that parameter found in “IBSS adoption” column of the matching row of the BSSDescrpition table found in 6.3.3.3.2 if the Timestamp field of the received frame is later than its own TSF timer and the TSF Completion field in the S1G Compatibility element is not less than the value of the 4 most significant octets of its own TSF timer, A DMG STA in an IBSS shall adopt each parameter contained in the DMG Beacon or Announce frames. Parameters adopted by a STA due to the receipt of a later timestamp shall not be changed by the STA except when adopting parameters due to a subsequently received (#821)Beacon, S1G Beacon, DMG Beacon, or Announce frame with a later timestamp.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1580 | 218.63 | 10.2 | change "true" to "1" | change "true" to "1" | Revised –  Comment resolution for CID 2456 has already resolved this comment and no further changes are required.  TGah Editor to make the changes proposed for CIDs 2456. |
| 2481 | 218.25 | 10.2.2.1 | "Beacon frame or Short Beacon frame" v. simply "(Short) Beacon frame" | Be consistent throughout | Revised –  Agree in principle with the commenter. Proposed resolution is to clarify that only one Beacon frame type is generated i.e.., S1G Beacon throughout the draft.  TGah Editor to make changes shown in 14/0324r1 under the heading for CIDs from 1580 to 2966. |
| 2657 | 218.47 | 10.2.2.1 | It is not clearly stated when does the "Listen Interval" period starts in which the non-TIM STA need to send the PS-Poll/trigger frame. Is it upon entering the PS mode or does it start when the STA changes from TIM to non-TIM mode? | Specify when does the "Listen Interval" period starts in which the non-TIM STA need to send the PS-Poll/trigger frame. | Revised –  Agree in principle with the commenter. Proposed resolution is to add the following clarification: ”…starting from the last known transition of the non-TIM STA in doze state”  TGah Editor to make changes shown in 14/0324r1 under the heading for CIDs from 1580 to 2966. |
| 2867 | 218.63 | 10.2.2.1 | "In an OBSS environment, when the partial BSSIDs of the overlapping APs are identical, the wrong AP can deliver the BU to a wrong STA.  If a STA detects that the partial BSSID of the overlapping AP is same with that of its associated AP, the STA shall not transmit the NDP PS-Poll frames." | "In order to protect the wrong data delivery triggered from the NDP PS-Poll, at least add the following constraint.  ""If a S1G STA detects that the partial BSSID of the overlapping AP is same with that of its associated AP, the S1G STA shall not transmit the NDP PS-Poll frames.""" | Revised –  Agree in principle with the commenter. Proposed resolution is inline with the suggestion by the commenter.  TGah Editor to make changes shown in 14/0324r1 under the heading for CIDs from 1580 to 2966. |
| 2774 | 220.21 | 10.2.2.4 | If S1G AP is not required to send TIM in non-DTIM beacon, TIM is not required in the beacon (e.g. all the STAs associated with the AP are non-TIM STAs if RAW is not allocated). Insert the text of "A non-DTIM Beacon frame transmitted by S1G AP may not include a TIM if no TIM segment is included. If S1G AP is not required to send TIM in non-DTIM beacon, TIM is not required in the beacon (e.g. all the STAs associated with the AP are non-TIM STAs if RAW is not allocated). Insert the text of "A non-DTIM Beacon frame transmitted by S1G AP may not include a TIM if no TIM segment is included. Change "The AP shall transmit a TIM with every Beacon frame." to "The non-S1G AP shall transmit a TIM with every Beacon frame." | as commented | Revised –  An S1G Beacon frame that is scheduled at TBTT shall include a TIM as in baseline. The S1G Beacon frame may include a TIM if it is scheduled for transmission in a TSBTT.  TGah editor to make changes shown in 14/0324r1 under the heading for CIDs from 1580 to 2966. |
| 2966 | 220.08 | 10.2.2.4 | dot11ShortBeaconInterval' should be 'dot11ShortBeaconOptionImplemented'. | Change 'dot11ShortBeaconInterval' to 'dot11ShortBeaconOptionImplemented'. | Rejected –  An S1G AP may optionally schedule Short Beacon frames for transmission at TSBTT and an S1G AP that does so is an S1G AP with dot11ShortBeaconInterval set to true. |

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

* **Power management**
* **Power management in a non-DMG infrastructure network**
* **General**

***Change the 3rd paragraph of subsection 10.2.2.1 as follows:***

If any STA in its BSS is in PS mode, the AP shall buffer all group addressed BUs and deliver them to all STAs immediately following the next Beacon frame containing a DTIM transmission.

An S1G AP with dot11NDPPSPollSupport equal to true shall set the NDP PS-Poll Supported field in the S1G Capabilities element to 1. Otherwise it shall set the NDP PS-Poll Supported field in the S1G Capabilities element to 0.

***Insert the following after the 4th paragraph of subsection 10.2.2.1:***

When dot11S1GOptionImplemented is false, the traffic-indication virtual bitmap, maintained by the AP, shall be transmitted in a TIM element. When dot11S1GOptionImplemented is true, the traffic-indication virtual bitmap may be divided into more than one page and each page shall be transmitted in a TIM element, hence, more than one TIM element may appear in an S1G Beacon frame. If more than one TIM element is present, then the TIM elements shall be ordered based their value of the Page Index and Page Slice Number subfields in the Bitmap Control field. TIM elements with Page Slice Number equal to 31 (if any) shall be the first ones and ordered from page 0 to page 3, followed by TIM elements (if any) with Page Slice Number from 0 to 30 each of which are also ordered from page 0 to page 3. When dot11S1GOptionImplemented is true, the traffic virtual bitmap shall be encoded as defined in 8.4.2.6.1 (S1G Partial Virtual Bitmap encoding) where the ADE mode may be used by the AP only if the TIM ADE Support field in the most recently received S1G Capabilities element from every STA with AID included in the TIM element, is 1. Otherwise ADE mode shall not be used to encode the TIM element.

***Change the 5th paragraph of subclause 10.2.2.1 as follows:***

STAs operating in PS modes with dot11NonTIMModeActivated set to false shall periodically listen for Beacon frames , as determined by the STA's ListenInterval and the ReceiveDTIMs parameter in the MLME-POWERMGT.request primitive. STAs operating in PS modes with dot11NonTIMModeActivated set to true transmit at least one frame that is individually addressed to the associated AP every ListenInterval Beacon Intervals starting from the last known transition of the non-TIM STA in doze state.

***Change the 6th paragraph of subclause 10.2.2.1 as follows:***

In a BSS operating under the DCF, or during the CP of a BSS using the PCF, upon determining that a BU is currently buffered in the AP, a STA operating in the PS mode shall transmit a (NDP) PS-Poll frame to the AP, which shall respond with the corresponding buffered BU immediately, or acknowledge the (NDP) PS-Poll and respond with the corresponding BU at a later time. If the TIM indicating the buffered BU is sent during a CFP, a CF-Pollable STA operating in the PS mode does not send a (NDP) PS-Poll frame, but remains active until the buffered BU is received (or the CFP ends). An S1G STA may transmit NDP PS-Poll frames instead of PS-Poll frames to an S1G AP from which it has received a frame containing an S1G Capabilities element with the NDP PS-Poll Supported field equal to 1; otherwise the S1G STA shall not transmit NDP PS-Poll frames. If an S1G STA detects that the partial BSSID of its associated AP is equal to the partial BSSID of at least another AP (i.e., the other AP and the associated AP have a different BSSID) from which it successfully receives frames, then the S1G STA shall not transmit NDP PS-Poll frames to its associated AP. A non-S1G STA shall not transmit NDP PS-Poll frames.

***Insert the following paragraphs after the last paragraph of subclause 10.2.2.1 as follows:***

An S1G AP may change its Power Management mode as described in 10.2.2.19 (AP Power management).

10.2.2.2 STA Power Management modes

**Instructions to TGah Editor: *Remove all occurrences of “ or Short Beacon frame(s)” within subclause 10.2.2.2.***

* **TIM types**

***Change the 2nd paragraph of subclause 10.2.2.4 as follows:***

The AP shall transmit a TIM with every Beacon frame except when the frame is scheduled for transmission in a TSBTT that is not a TBTT. Every dot11DTIMPeriod, a TIM of type DTIM is transmitted within a Beacon frame, rather than an ordinary TIM. An S1G AP with dot11ShortBeaconInterval equal to true, may include a TIM in a Beacon frame that is scheduled for transmission in a TSBTT that is not a TBTT.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1400 | 220.42 | 10.2.2.6 | what does it mean "specify with RPS element" | as in the comment | Revised –  Agree with the commenter. Proposed resolution is to point to the subclause where this behavior is defined.  TGah editor to make changes shown in 14/0324r1 under the heading for CIDs from 1400 to 2875. |
| 2665 | 220.43 | 10.2.2.6 | Line 43 mentions that an S1G AP should set the value of the Duration field in the (Short) Beacon frame. This contradicts Section 8.3.3.1 of the base specs (REVmc\_D1.3) which mentions that within all Management frames sent during the CP by non-QoS STAs, if the DA field contains a group address, the duration value is set to 0. | Clearly include the rule to set the Duration field of (Short) Beacon frames in section 8.3.3.1. | Revised –  Agree in principle with the comenter. Given that the S1G Beacon is of type Extension frame limitations in 8.3.3.1 do not apply to this frame. As for Beacon frames we clarify that Beacon frames are not generated in S1G.  TGah editor to make changes shown in 14/0324r1 under the heading for CIDs from 1400 to 2875. |
| 2868 | 220.55 | 10.2.2.6 | During the reserved time window (such as the RAW and PRAW), when a S1G AP receives a PS-Poll frame from the non-permitted STA, the S1G AP shall transmit the ACK frame only. It means that the immediate BU response shall not be allowed. | In order to improve the channel access efficiency during the reserved time window, the immediate BU response for the non-permitted S1G STA shall not be allowed. | Rejected –  Item g) specifies that the AP can respond with either an immediate Data or Management frame or with an ACK frame, while delaying the responding data or management frame. Limitations of the response frame type related to RAW/PRAW are included in the sections where these procedures are defined (see for example 9.20.5.6. |
| 2875 | 221.06 | 10.2.2.6 | "A More Data subfield equal to 0 in an (NDP) ACK frame that is sent by an S1G AP in response to a PS-Poll or in an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA indicates to the S1G STA that no service period starts, which implies that the S1G STA may enter the doze state." The proposed behavior does not say any normative behavior. The behavior after receiving a control response frame with the MD bit set to 0 is already described by the general power saving procedure. | Remove a second paragraph of page 221. | Revised –  Proposed resolution is to clarify the behavior in a normative way. Note that the sentence also refers to NDP (Modified) Ack frames which are not included in the general description of PS procedure in baseline.  TGah editor to make changes shown in 14/0324r1 under the heading for CIDs from 1400 to 2875. |

**Instructions to TGah Editor: *Change these subclauses as follows:***

* **AP operation during the CP**

***Change the paragraph c) as follows:***

c) At every beacon interval, the AP shall assemble the partial virtual bitmap containing the buffer status per destination for STAs in the PS mode and shall send this out in the TIM field of the Beacon frame. At every beacon interval, the APSD-capable AP shall assemble the partial virtual bitmap containing the buffer status of nondelivery-enabled ACs (if there exists at least one nondeliveryenabled AC) per destination for STAs in PS mode and shall send this out in the TIM field of the Beacon frame. When all ACs are delivery-enabled, the APSD-capable AP shall assemble the partial virtual bitmap containing the buffer status for all ACs per destination. If FMS is enabled, the AP shall include the FMS Descriptor element in every Beacon frame. The FMS Descriptor element shall indicate all FMS group addressed frames that the AP buffers. An S1G AP should set the value of the Duration field in the S1Gr Beacon frame to the estimated time required for all the S1G STAs that are indicated in the TIM elements and/or are allowed to access the first RAW immediately following the S1G Beacon as described in 9.20.5.4 (Slotted channel access procedure in RAW) , to send the trigger or (NDP) PS-Poll frame and receive an acknowledgement from the AP.(#15,59,168) The operation described in this paragraph shall also be performed for every short beacon interval where a TIM is received.

***Change the paragraph g) as follows:***

g) A single buffered BU for a STA in the PS mode shall be forwarded to the STA after a PS-Poll has been received from that STA. For a STA using U-APSD, the AP transmits one BU destined for the STA from any AC that is not delivery-enabled in response to PS-Poll from the STA. When all ACs associated with the STA are delivery-enabled, AP transmits one BU from the highest priority AC. The AP can respond with either an immediate data or Management frame or with an ACK frame, while delaying the responding data or Management frame.

An S1G AP that sends an (NDP) ACK frame in response to a PS-Poll or (#746)an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA shall set the More Data subfield of the (NDP) ACK frame to 0 when no BU is buffered for the S1G STA and to 1 otherwise.

A More Data subfield equal to 0 in an (NDP) ACK frame that is sent by an S1G AP in response to a PS-Poll or (#747)in an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA indicates to the S1G STA that no service period starts and that it may enter the doze state.

A More Data subfield equal to 1 in an (NDP) ACK frame that is sent by an S1G AP in response to a PS-Poll or (#748)in an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA indicates to the S1G STA that a service period starts, after which the S1G STA shall remain in the wake state until a frame is received from the S1G AP with the EOSP subfield equal to 1. If the response with the More Data subfield equal to 1 is an NDP ACK with a Duration Indication subfield equal to 1, the service period starts at a time T after the end of the NDP ACK frame, where T is the time value indicated in the Duration field of the NDP ACK; if the Duration Indication subfield is 0, the service period starts immediately after the end of the NDP ACK frame. If the response with the More Data subfield equal to 1 is an NDP Modified ACK with a Duration Indication subfield equal to 1, the service period starts at a time T after the end of the NDP Modified ACK frame, where T is the time value indicated in the Duration field of the NDP Modified ACK; if the Duration Indication subfield is 0, the service period starts immediately after the end of the NDP Modified ACK frame.(#746,747,748)

***Change the paragraph i) as follows:***

i) If the AP does not receive an acknowledgment to an individually addressed data or bufferable management frame sent to a STA in PS mode following receipt of a PS-Poll from that STA, it may retransmit the frame for at most the lesser of the maximum retry limit and dot11QAPMissingAckRetryLimit times before the next Beacon frame, but it shall retransmit that frame at least once before the next Beacon frame, time permitting and subject to its appropriate lifetime limit. If an acknowledgment to the retransmission is not received, it may wait until after the next Beacon frame to further retransmit that frame subject to its appropriate lifetime limit.

* **Receive operation for STAs in PS mode during the CP**

***Change the first paragraph a) in subclause 10.2.1.8 as following:***

a) The STA with dot11NonTIMModeActivated set to false shall wake up early enough to be able to receive the first Beacon frame scheduled for transmission at the time corresponding to the last TBTT plus the ListenInterval. The STA with dot11NonTIMModeActivated set to true is not required to wake up to receive a Beacon frame and shall transmit at least one PS-Poll or trigger frame every listen interval starting from the last known transition of the non-TIM STA in doze state.

* **Receive operation for STAs in PS mode during the CFP**

***Insert a new item e) after the item d):***

e) An S1G STA may enter the sleep state after receiving from an S1G AP, and in response to a PS-Poll frame sent to the S1G AP, an (NDP) ACK frame with the More Data subfield equal to 0.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1405 | 222.36 | 10.2.2.19 | PRAW is modified in D1.0 | merge the bullet 1 and 2 in the description to reflect the changes in the V1.0 | Revised –  Agree with the commenter.  TGah editor to make changes shown in 14/0324r1 under the heading for CID 1405. |

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

***Insert a subclause 10.2.2.19 after 10.2.2.18 WNM-Sleep mode based on REVmc D1.1 as the following:***

* **AP Power management**

An S1G AP may operate in the following Power Management modes:

* Active
* Power save

An AP in Active mode shall be in Awake state and may receive frames at any time.

An AP in Power Save mode may be in any of the following two power states:

* Awake
* Doze

The AP may indicate it is operating in Power Save mode by:

* including an AP Power Management element in the S1G Beacon frame with the PM Mode subfield set to 1;
* or including one or more RPS elements in the S1G Beacon frame, with the RAW Assignment Type set to AP PM RAW/non-TIM RAW and RAW Type Options is set to 00.

The AP shall operate in Active mode during a beacon interval or short beacon interval if the AP Power Management element is either absent in the S1G Beacon frame or the PM Mode subfield is set to 0. Similarly, the AP shall operate in Active mode during one or more RAWs defined by an RPS element with the RAW Assignment type set to Regular RAW, Sounding RAW, Triggering Frame RAW or AP PM RAW/non-TIM RAW with RAW Type Options set to 01.

An AP including an AP Power Management element with the PM Mode subfield set to 1 in the S1G Beacon frame may be in Doze state at any time, except that it shall be in Awake state during any of the following intervals of time:

* any RAW or PRAW intervals that are setup according to 9.20.5 (Restricted Access Window (RAW) Operation), except for RAWs that are defined by any RPS element with RAW Assignment Type set to AP PM RAW/non-TIM RAW and RAW Type Options is set to 00;
* starting at any TWT start time, and for the following Adjusted Minimum Awake Duration as described in 9.41 (Target Wake Time(TWT)).

An AP may be in Doze state during the interval of time defined by any RPS element sent by the AP with AP PM field set to 1.

An AP including an AP Power Management element with the PM Mode subfield set to 1 in an S1G Beacon frame shall include an RPS element in the S1G Beacon frame that includes a RAW during which all STAs are allowed to access (by setting the RAW Group field to all zeros). This RAW may be used for association of new STAs.(#924)

Irrespective of the Power Management mode and Power States, an AP shall maintain the synchronization of the network by generating beacons as described in clause 10.1.3 (Maintaining synchronization).

A STA that is the intended receiver of a frame transmitted by an AP that has the PM Mode subfield set to 0 shall consider the AP in Active mode.(#66)

An AP that has previously sent a frame to one or a group of STAs with PM bit equal to 0, shall send a frame with PM bit set to 1 to the same set of STAs before changing its operation mode to Power Save mode.(#66)

A STA that is the intended receiver of a frame transmitted by an AP that has the PM Mode subfield set to 1 shall consider the AP in Power Save mode.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2571 |  | 10.2.1.17 | It is necessary to add S1G related events to the condition of increase the value of the Check Beacon field. | Insert the subclause 10.2.1.17 and change the 11th paragraph by adding following new items to the list. -- n) Inclusion of an S1G Channel Switch Announcement o) Modification of the Segment Count element | Revised –  Note that the comment refers to subclause 10.2.1.17 but subclause 10.46 supersedes that subclause so any changes related to 11ah should be applied to 10.46.  As specified in subclause 10.47.2 of 802.11ah D1.2 channel switching procedure for S1G uses only the Extended Channel Switch Announcement element which is already included in the critical update classification in 10.46. Also there is no Segment Count present in the latest draft of 11ah.  TGah editor to make changes shown in 14/0324r1 under the heading for CID 2571. |

10.46 System information update procedure(#1292)

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

The S1G AP shall increase the value (modulo 256) of the Change Sequence field in the next transmitted S1G Beacon frame(s) when a critical update occurs to any of the elements inside the S1G Beacon frame. The following events shall classify as a critical update:

1. Inclusion of an Extended Channel Switch Announcement
2. Modification of the EDCA parameters
3. Modification of the S1G Operation element

An S1G AP can classify other changes in the S1G Beacon frame as critical updates as described in 10.2.2.17 (TIM Broadcast).

The S1G STA shall attempt to either receive the next S1G Beacon frame or transmit a Probe Request frame when it receives a Change Sequence field that contains a value that is different from the previously received Change Sequence field. When an S1G STA transmits a Probe Request frame to obtain the updated system information, it may include the Change Sequence field in the Probe Request frame to request a (#245) compressed Probe Response frame.

When an S1G AP receives a probe request frame with a Change Sequence from an S1G STA associated with the S1G AP, it compares the value of received Change Sequence with the value of its current Change Sequence. If the value of the received Change Sequence is not equal to the value of the current Change Sequence, the S1G AP should send a compressed Probe Response frame which is a Probe Response frame that includes the Change Sequence element and only the elements that need be updated by the STA. Otherwise (#14/0072r0), the AP shall send a Probe Response frame as defined in 10.1.4.3.3 (Sending a probe response).