IEEE P802.11
Wireless LANs

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| Resolution for CID 1000 |
| Date: April 28, 2021 |
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 Abstract

This submission proposes resolutions for CID 1000 received in LB258 (REVme D1.0).

**Revisions:**

* Rev 0: Initial version of the document.

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

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| **CID** | **Commenter** | **Clause** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1000 | Abhishek Patil | 3.2 | 240 | 11 | The term DTIM Beacon frame or DTIM beacon is used at many locations. However there isn't a definition or a paragraph explaining it. | Provide a definition for DTIM beacon | **Revised**Agree with the comment. A definition for DTIM Beacon frame is be added to clause 3.2. In addition all instances of DTIM [B][b]eacon are replaced with DTIM Beacon frame. In addition, the definition of DTIM interval is updated to clarify the location of DTIM Count field. Furthermore, all instances of the text ‘Beacon frame containing DTIM transmission’ is replaced with ‘DTIM Beacon frame’.**TGm editor please implement changes as shown in this document.** |

***TGm editor: The baseline for this section is REVme D1.2.***

**3.2 Definitions specific to IEEE Std 802.11**

***TGm editor: Please add the following definition in alphabetical order in this subclause as shown below:***

**delivery traffic indication map (DTIM) beacon frame:** A Beacon frame or an S1G Beacon frame in which the DTIM Count field has a value of 0. If the AP corresponds to a nontransmitted BSSID in a multiple BSSID set, the DTIM Count field is the one contained in the Multiple BSSID-Index element carried in the nontransmitted BSSID profile for that AP. Otherwise, the DTIM Count field is the one contained in the TIM element carried in the Beacon frame or S1G Beacon frame transmitted by that AP.

***TGm editor: Please modify the following definition in this subclause as shown below:***

**delivery traffic indication map (DTIM) interval**: The interval between the consecutive target beacon transmission times (TBTTs) of beacons containing a DTIM. The value, expressed in time units, is equal to the product of the value in the Beacon Interval field and the value in the DTIM Period field. If the AP corresponds to a nontransmitted BSSID in a multiple BSSID set, the DTIM Period field is the one contained in the Multiple BSSID-Index element carried in the nontransmitted BSSID profile for that AP. Otherwise, the DTIM Period field is the one contained in the TIM element carried in the Beacon frame or S1G Beacon frame transmitted by that AP.

**4.3.21.9 Flexible multicast service (FMS)**

**9.4.2.74 FMS Descriptor element**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The FMS Counters field contains zero or more FMS Counter fields. The format of the FMS Counter field is shown in Figure 9-515 (FMS Counter field format). When one or more FMS streams are accepted at the AP, at least one FMS counter is present in the FMS Descriptor element. A maximum of eight FMS counters are permitted. The FMS counters are used by the non-AP STA to identify the DTIM Beacon frame after which group addressed BUs assigned to a particular delivery interval are transmitted. A single FMS counter is shared by all FMS streams that use the same delivery interval.

**9.4.2.199 TWT element**

***TGm editor: Please modify the contents of the following table in this subclause as shown below:***

|  |
| --- |
| * Action field
 |
| Action  | Options |
| 0 | Send a PS-Poll or uplink trigger frame |
| 1 | Wake up at the time indicated by the Min Sleep Duration field |
| 2 | Wake up to receive the beacon |
| 3 | Wake up to receive the DTIM Beacon frame |
| 4 | Wakeup at the time indicated by the sum of the Min Sleep Duration field and the ASD subfield in the APDI field of the NDP Paging frame |
| 5–7 | Reserved |

**10.24.3.3 MCCAOP reservations**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The schedule is defined by means of the MCCAOP Reservation field defined in 9.4.2.105.2 (MCCAOP Reservation field). An MCCAOP reservation schedules a series of MCCAOPs with a common duration given in the MCCAOP Duration subfield of the MCCAOP Reservation field. This series is started after the first DTIM Beacon frame following the successful completion of the MCCAOP setup procedure and terminated when the MCCAOP reservation is torn down.

**10.30.2.8.1 Rules at the AP**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

NOTE—The transmission of a group addressed frame within a PSMP sequence does not change the rules regarding when that frame can be transmitted. In other words, if there is a power saving STA in the BSS, the group addressed frame is transmitted following a DTIM Beacon frame according to the rules in 11.2.3 (Power management in a non-DMG infrastructure network).

**10.51 Page slicing**

***TGm editor: Please replace “DTIM Beacon” in Figure 10-146 with “DTIM Beacon frame”***

**10.62 Energy limited STAs operation**

***TGm editor: Please modify the following bullet in this subclause as shown below:***

* The transmission of group addressed BU(s) has ended, where the group addressed BU(s) are expected to be received by the EL STA following a DTIM Beacon frame.

**11.1.3.8.3 Discovery of a nontransmitted BSSID profile**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

An EMA AP that includes a partial list of nontransmitted BSSID profiles in its Beacon frame, S1G Beacon frame, or DMG Beacon frame, shall advertise a particular nontransmitted BSSID profile in a repeating pattern such that the profile is present in at least one beacon in a sequence of beacons indicated by the Full Set Rx Periodicity field of the Multiple BSSID Configuration element, unless the membership of the multiple BSSID set changes. An EMA AP shall include a nontransmitted BSSID profile in the DTIM Beacon frame of that BSS so that STAs associated to that AP can receive the profile (and any updates to the BSS configuration) without having to wake up for additional beacons. An EMA AP shall select the DTIM interval for a nontransmitted BSSID as a multiple of the value carried in the Full Set Rx Periodicity field of the Multiple BSSID Configuration element. Annex AA provides several example configurations.

NOTE 3 – An AP corresponding to a nontransmitted BSSID advertises any changes to its BSS operational parameters during the beacon interval that follows the profile's DTIM Beacon frame. For example, an AP corresponding to the nontransmitted BSSID can send a broadcast Disassociation frame to disassociate all STAs associated with it.

**11.2.3.5.1 Power management with APSD procedures**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

If a scheduled SP overlaps the period during which the AP is required to transmit non-GCR-SP group addressed frames and individually addressed frames to STAs in PS mode that follow a DTIM Beacon frame that has at least 1 bit set to 1 in the partial virtual bitmap of its TIM, the scheduled SP shall be deferred until the AP has transmitted all such buffered frames.

**11.2.3.14.2 FMS general procedures**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

Each FMS counter decrements once per DTIM Beacon frame and when the FMS counter reaches 0, buffered group addressed BUs assigned to that particular interval are scheduled for delivery immediately following the next Beacon frame containing the DTIM transmission. After transmission of the buffered group addressed BUs, the AP shall reset the FMS counter to the delivery interval for the FMS streams associated with that FMS counter.

**11.2.3.14.4 FMS Response procedures**

***TGm editor: Please modify the following bullet in this subclause as shown below:***

* After receiving the FMS Response element, the non-AP STA shall be awake for the next DTIM Beacon frame so that the non-AP STA can synchronize with the FMS Current Count for the requested FMS stream. Once synchronized with the FMS Current Count, the non-AP STA need not wake up at every DTIM interval to receive group addressed BUs.

**11.21.16.3.8 GCR-SP**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

NOTE – Group addressed traffic transmitted at the end of a DTIM Beacon frame might be an impediment to providing QoS for uplink transmissions and in OBSSs. Therefore, APs in an overlapped environment are advised to make use of GCR-SP for group addressed traffic that consumes appreciable medium time.

**14.14.7 Power save support**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

As described in 14.14.4 (TIM transmissions in an MBSS), a mesh STA indicates the presence of buffered traffic in TIM elements for all peer mesh STAs that operate in light or deep sleep mode toward the mesh STA. The mesh STA sets the bit for AID 0 (zero) in the Bitmap Control field of the TIM element to 1 when group addressed traffic is buffered, according to 9.4.2.5 (TIM element). As described in 14.14.5 (TIM types), a mesh STA transmits its group addressed frames after its DTIM Beacon frame if any of its peer mesh STA is in light or deep sleep mode toward the mesh STA.

**14.14.8.4 Operation in light sleep mode for a mesh peering**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

If a mesh STA is in light sleep mode for a mesh peering, it shall enter the awake state prior to every TBTT of the corresponding peer mesh STA to receive the Beacon frame from the peer mesh STA. The mesh STA may return to the doze state after the beacon reception from this peer mesh STA, if the peer mesh STA did not indicate buffered individually addressed or group addressed frames. If an indication of buffered individually addressed frames is received, the light sleep mode mesh STA shall send a peer trigger frame with the RSPI field set to 1 to initiate a mesh peer service period with the mesh STA that transmitted the Beacon frame (see 14.14.9.2 (Initiation of a mesh peer service period)). If an indication of buffered group addressed frames is received, the light sleep mode mesh STA shall remain in awake state after the DTIM Beacon frame reception to receive group addressed frames The mesh STA shall remain awake state until the More Data subfield of a received group addressed frame is set to 0 or if no group addressed frame is received within the PHY specific Group Delivery Idle Time. (See 14.14.5 (TIM types).)

**AA.1 Introduction**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

This annex provides examples showing the relationship between profile periodicity (indicated by the Full Set Rx Periodicity field in the Multiple BSSID Configuration element) and the DTIM interval (DTIM Period field in the Multiple BSSID-Index element) for a multiple BSSID set as described in 11.1.3.8.3 (Discovery of a nontransmitted BSSID profile(11ax)). The examples provide guidance on how an AP might organize the advertisement of nontransmitted BSSID profiles in its Beacon frames if it cannot fit all the profiles in a single Beacon frame (i.e., partial list of profiles) it is advertising. By having the DTIM interval for a nontransmitted BSSID a multiple of the profile periodicity, the profile for that BSSID would always appear in its DTIM Beacon frame. This helps an associated non-AP STA save power as it is able to receive any updates to the profile when it wakes to receive the DTIM Beacon frame.

**AA.2 Examples**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The first example illustrates the case where MaxBSSID Indicator (n) is set to 4 and there are 11 active nontransmitted BSSIDs in a multiple BSSID set. The AP is able to fit up to 3 nontransmitted BSSID profiles in each beacon, and the Full Set Rx Periodicity field is set to 4. Figure AA-1 (Example of partial list of profiles with a profile periodicity of 4 shows the configuration for DTIM count and DTIM period of each BSSID in this set. With the DTIM period being a multiple of profile periodicity, the AP is able to include a nontransmitted BSSID in its DTIM Beacon frame.

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The next example considers the case where MaxBSSID Indicator (n) is set to 4 and there are 15 active nontransmitted BSSID in a multiple BSSID set. In this example, the AP's Beacon frame is able to fit up to 6 nontransmitted BSSID profiles; therefore, the profile periodicity for the set has a value equal to 3. Figure AA-2 (Example of partial list of profiles with a profile periodicity of 3) shows the configuration for DTIM count and DTIM period of each BSSID in this set. A BSSID profile would be included every third Beacon frame. In addition, since the DTIM interval is a multiple of profile periodicity, it would appear in the DTIM Beacon frameof each profile.

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The next example considers the case where a BSSID that was not active earlier is activated. In this case, there are 14 nontransmitted BSSIDs that are active, and a new BSSID (BSSID-Index = 15 with DTIM period = 6) is activated at some point. The AP is able to fit it as part of set C. Figure AA-4 (Example of a BSSID being activated) illustrates this case. This BSSID is included in the next set of beacons and is advertised as part of set C. When the BSSID is included in a Beacon frame for the first time, it is started with DTIM count set to 0. With the DTIM Period being a multiple of profile periodicity, the AP can ensure that the profile appears in its DTIM Beacon frame.

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The next example considers the case where the DTIM period for a BSSID is updated. In this case, the DTIM period for a BSSID (BSSID-Index = 12) is changed from 6 to 15. This change would be indicated during a DTIM Beacon framefor that profile. This will ensure that STAs associated with that profile are able to receive the update. After the change, when the BSSID is included in a Beacon frame for the first time, it starts with DTIM count set to 0. With the new DTIM period (of 15) being a multiple of profile periodicity (of 3), the profile will appear in its DTIM Beacon frame. Figure AA-5 (Example of DTIM period being changed for a particular BSSID) shows the configuration for DTIM count and DTIM period of each BSSID in this set.

**11.2.3.4 TIM types**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

The third and fourth lines in Figure 11-14 (Infrastructure power management operation) depict the activity of two STAs operating with different power management requirements. Both STAs power-on their receivers when they need to listen for a TIM. This is indicated as a rampup of the receiver power prior to the TBTT. The first STA, for example, powers up its receiver and receives a TIM in the first Beacon frame; that TIM indicates the presence of a buffered BU for the receiving STA. The receiving STA then generates a PS-Poll frame, which elicits the transmission of the buffered BU from the AP. Non-GCR-SP group addressed BUs are sent by the AP subsequent to the transmission of a DTIM Beacon frame.

**11.2.3.1 General**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

If any non-GLK STA in its BSS is in PS mode, the AP shall buffer all non-GCR-SP group addressed BUs that arrive via the DS and deliver them to all non-GLK STAs immediately following the next DTIM Beacon frame. If the AP is an S1G AP, the AP may additionally deliver these BUs using group AID as defined in 10.55 (Group AID). If any GLK STA in its BSS is in PS mode, the AP shall not include any such STAs as a SYNRA destination and shall buffer all group addressed BUs that arrive from the attached bridge and are destined to such STAs, delivering them with individually addressed MPDUs using power save delivery methods.

**11.2.3.14.2 FMS general procedures**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

Each FMS counter decrements once per DTIM beacon and when the FMS counter reaches 0, buffered group addressed BUs assigned to that particular interval are scheduled for delivery immediately following the next DTIM Beacon frame. After transmission of the buffered group addressed BUs, the AP shall reset the FMS counter to the delivery interval for the FMS streams associated with that FMS counter.

**29.6.2 WUR Beacon frame generation**

***TGm editor: Please modify the following paragraph in this subclause as shown below:***

If the WUR AP schedules a WUR Beacon frame, the WUR Beacon frame shall be the next frame for transmission according to the medium access rules specified in 10 (MAC sublayer functional description) unless a Beacon frame is scheduled for transmission as defined in 11.1.3.2 (Beacon generation in non-DMG infrastructure networks) in which case the Beacon frame is the next frame for transmission and the WUR Beacon frame is the next frame for transmission after transmitting the Beacon frame and non-GCR-SP group addressed if the Beacon frame is a DTIM Beacon frame (see11.2.3.1 (General)).