IEEE P802.11
Wireless LANs

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| LB234 Comment resolution for coex CIDs 3297 3361 3480 3658 3688 |
| Date: 2018-12-18 |
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Abstract

Resolution of CIDs 3297, 3361, 3480, 3658, and 3688 is presented

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3297 | 213.00 | 5 | 10.40.6.2.2 | TDD channel access reduces throughput and robustness of the system. Its reliance on Service Period without the use of Listening Mode has serious co-existence implications with legacy DMG systems. | Rmove TDD Channel Access | **Reject**The TDD channel access enables efficient mitigation of intrastation and interstation interferences |
| 3361 | 328.00 | 12 | 11.33 | After introducing TDD channel access, there have been intense discussion on coexistence between BSS operating TDD channel access and BSS operating non-TDD channel access. However, there is no solid solution to enable fair coexistence yet. 802.11ay should provide a rule to mitigate neighbor unfriendly behavior. | Create a new subclause describing "Coexistence among BSSs operating in the 60GHz band", and specify the minimal coexistence rule. As bottom line, we should have a mechanim to detect operating BSS on a 60GHz channel, so that neighbor STA belonging to another BSS can determine the channel occupancy. | **Revised**The mechanism to inform about channel occupancy is proposed below in the submission |
| 3480 | 80.00 | 7 | 9.3.4.2 | The TDD Slot Schedule element is added to the DMG Beacon however currently the TDD Slot Schedule element is only referring to the Allocation ID which represents the whole TDD SP and not the scheduled receiving STA. For one Allocation ID there might be more than one TDD Slot Schedule elements. This means that multiple TDD Slot Schedule elements should be sent, all of them have the same Allocation ID and without refering to the receiving STA for this TDD Slot Schedule element. | Consider stating that more than one TDD Slot Schedule element can be added to the DMG beacon for the same allocation ID. In addition, since the TDD Slot Schedule elmenet is now broadcasting, it is needed to include the destination AID or address to the TDD Slot Schedule elment since it is currently not added | **Revised**Peer MAC address field is added to the IE |
| 3658 | 1898.00 | 21 | 10.40.6.2 | Under SP and TDD SP access listen before talk is not in use, so the third party STAs in proximity may be interfered even blocked and may not be able to identify source of the interference. Propose to define "SP Link Characteristics Beacon" to be periodically transmitted to convey information useful for identification of the specific link.In reference to IEEE P802.11-REVmd/D1.2, July 2018 | Define the frame and rules to transmit it. Submission will be provided | **Revised**The beacon frame and the rules to transmit it under TDD channel access operation are presented in the submission |
| 3688 | 82.00 | 4 | 9.3.4.2 | It will be very helpful for the AP operating in TDD network be able to provide useful information about its channel occupancy, and scheduling transmitted in periodically in the beacon, so that short range devices be able to use that information to make an inform decision to move to other channel or use the specific available schedule (if any). This will also prevent STA to send SLS and sending beacons/probe request which may impact its efficiency | Add IE for AP to be able to signal its channel occupancy | **Revised**The beacon frame that includes schedule IEs and the rules to transmit it under TDD channel access operation are presented in the submission |

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**9.3.4.2 DMG Beacon**

***TGay editor Insert the following row before the last row in Table 9-41***

|  |  |  |
| --- | --- | --- |
| 48 | DMG STA Tx power and Rx Sensitivity Parameters | This element is optionally present.  |

**9.4.2.266 TDD Slot Structure element**

***TGay editor in the Figure 88 —TDD Slot Structure element format insert new 6 octets field “Peer STA address” after the “Slot Structure Control” field***

***TGay editor insert new paragraph in the text after definition of the Slot Structure Control field***

Peer STA address specifies MAC address of the STA that is intended recipient of the TDD Slot Structure element.

**9.4.2.267 TDD Slot Schedule element**

***TGay editor in the Figure 91 —TDD Slot Schedule element format insert new 6 octets field “Peer STA address” after the “Slot Structure Control” field***

***TGay editor insert new paragraph in the text after definition of the Slot Structure Control field***

Peer STA address specifies MAC address of the STA that is intended recipient of the TDD Slot Schedule element.

**9.4.2 Elements**

**9.4.2.1 General**

***TGay editor Insert the following row in Table 9-77, renumbering as appropriate***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DMG STA Tx power and Rx Sensitivity Parameters | 255  | <ANA>  | Yes  | No  |

**9.4.2.274 DMG STA Tx power and Rx Sensitivity Parameters**

The STA Sensitivity parameters element contains TRP and C\_ADD\_SENS of the DMG STA. The format of the element is shown in Figure xy.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element ID  | Length  | Element ID Extension  | TRP  | G\_ADD\_SENS |
| Octets:  | 1 | 1 | 1 | 1 | 1 |

**Figure xy —DMG STA Tx power and Rx Sensitivity Parameters element format**

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1.

TRP – The value of the transmitter TRP (Total Radiated Power) reported in dBm. Value rounded to nearest integer in the range of 0 to 63.

G\_ADD\_SENS – Gain due to receiver’s additional sensitivity, field representing the extra sensitivity of the AP receiver

$G\\_ADD\\_SENS\_{[dB]}=P\_{min\\_sensitivity}-P\_{sensitivity}$

Where $P\_{min\\_sensitivity} $is the receiver sensitivity for MCS 0 defined in Table 20-3, Psensitivity is the actual PCP or AP receiver sensitivity measured in the same method as specified for $P\_{min\\_sensitivity}$. All values are in dBm units.

The value is rounded to nearest integer in the range of -16 to 15.

Note:

1. When a STA receives a beacon from the AP, its measured receive power is

$$P\_{RX}^{STA}=TRP^{AP}+G\_{TX}^{AP}\left(θ\right)-Linkloss+G\_{RX}^{STA}\left(ϕ\right)$$

When the AP receives a PPDU from this STA, using the same antenna configuration

$$P\_{RX}^{AP}=TRP^{STA}+G\_{TX}^{STA}\left(ϕ\right)-Linkloss+G\_{RX}^{AP}\left(θ\right)$$

Substituting $G\_{RX}^{AP}\left(θ\right)-Linkloss= P\_{RX}^{STA}- TRP^{AP}+G\_{RX}^{STA}\left(ϕ\right)$ (Assuming AP antenna pattern reciprocity)

We have that the STA should maintain

$$P\_{min\\_sensitivity}\geq TRP^{STA}+G\_{TX}^{STA}\left(ϕ\right)+ P\_{RX}^{STA}- TRP^{AP}+G\_{RX}^{STA}\left(ϕ\right)$$

to make sure it doesn’t create interference at the AP. (Note that All the elements on the right-hand side are known to the STA)

 $G\_{TX}^{AP}\left(θ\right)- $AP TX antenna gain in direction $θ$ - direction to the STA

$G\_{RX}^{AP}\left(θ\right)$ – AP RX antenna gain in direction $θ $- direction to the STA

$G\_{TX}^{STA}(ϕ)$ – STA TX antenna gain in direction $ϕ$ – direction to the AP – the STA may estimate $ϕ$ based on TRN field appended to the PPDU

$G\_{RX}^{STA}(ϕ)$- STA RX antenna gain in direction $ϕ$ – direction to the AP

$TRP^{AP}$ – Total Radiated Power at the AP (published in the SSW field)

$TRP^{STA}$ – Total Radiated Power at the STA – know to the STA.

1. The field value computation covers range of -16 to 15dB for the $G\\_ADD\\_SENS\_{[dB]}$ to enable also for reduced sensitivity to interference.

**11.1.3.3 Beacon generation in a DMG infrastructure BSS and in a PBSS**

**11.1.3.3.1 General**

***TGay editor insert the following after the 6th paragraph (REVmd/D1.6 P2111L30):***

A PCP and a DMG AP that proceeds with the TDD channel access operation as defined in 11.53 TDD channel access operationmay configure and schedule DMG Beacons for transmission according to the procedure specified in 11.1.3.xy Beacon generation under TDD channel access operation. Otherwise the following procedures shall apply.

At each BTI, a PCP and a DMG AP schedule DMG Beacon frames for transmission according to the

procedure specified in 10.43.4 (Beamforming in BTI). Subject to this constraint, the AP or PCP may delay…

***TGay editor: add the following text before 11.1.4***

***Append new subclause after 11.1.3.10***

**11.1.3.xy Beacon generation under TDD channel access operation**

The DMG AP STA that proceeds with the TDD channel access operation as defined in 11.53 and implements the beacon generation under TDD channel access operation shall configure and schedule the DMG Beacon as follows.

* The Next A-BFT subfield shall be set to a nonzero value
* A PPDU that conveys the DMG Beacon frame should contain at least four TRN-R units within the TRN field of the PPDU.
* One DMG Beacon frame shall be transmitted per each DMG antenna configuration that is established to communicate with one or more associated STAs at least once within a time interval that is not longer than dot11BeaconPeriod × dot11MaxLostBeacons TUs.
* A DMG Beacon frame transmitted per the antenna configuration may contain the TDD Slot structure element (9.4.2.266) and the TDD Slot schedule elements (9.4.2.267) of the associated STAs communicated using the same antenna configuration. The DMG Beacon shall contain the TDD Slot Structure element if the TDD Slot schedule element is present and vice versa.
* The DMG Beacon frame may contain the DMG STA Tx power and Rx Sensitivity Parameters IE (9.4.2.274)

**Annex C**

***TGay editor make the changes as follows***

dot11BeaconPeriod OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity.

Changes take effect for the next MLME-START.request primitive.

For non-DMG STAs, this attribute specifies the number of TUs that a

station uses for scheduling Beacon transmissions. For DMG STAs, this

attribute specifies the number of TUs that a station uses for scheduling

(BTI and/or ATI)or TDD Slot to transmit the DMG beacon in the beacon interval. This value is transmitted in Beacon

and Probe Response frames."

::= { dot11StationConfigEntry 12 }

**References:**

1. IEEE P802.11ay/D2.2, January 2019
2. IEEE P802.11-REVmd/D1.6, October 2018