IEEE P802.11
Wireless LANs

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| Comment resolution for CIDs 3358-3643 |
| Date: 2018-11-12 |
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Resolution of CIDs 3358, 3479, 3481, 3578, 3586, 3626, 3627, 3628, 3629, 3633, 3641, 3642, 3643, 3654 is presented

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Recommendation**  |
| 3358 | 673.00 | Annex X | How the 802.11ay STAs behave as Distribution Nodes in 11-17/1321 are not described at all. TDD channel access is added to allow implementation of Distribution Nodes. It should be reader friendly how the TDD channel access is actually used to form Distribution Nodes. | At least, an example implementation practice should be shown somewhere in the spec (maybe in Annex) | **Proposal: Revised**Discussion: suggest adding reference model in the clause 4 and explanation of life cycle in the clause 11. The text is presented below |
| 3479 | 78.00 | 9.3.3.6 | TDD Slot Schedule is added to the (Re)Association Request and Response frames without the TDD Slot Structure element. These two elements should be sent together especially for the case when the non-AP/PCP is sending the Slot Schedule elemnt to the AP/PCP | Consider the TDD Slot Structure to be optionally added to the Association Request, Association Response, Reassociation Request and Reassociation Response frames | **Proposal: Revised**Discussion: The TDDSlotStructureList is added to the MLME-ASSOCIATE.response and MLME-REASSOCIATE.response primitives |
| 3578 |  |  | Announce frame is stricly for AP/PCP to non-AP/non-PCP, yet TDD mode operation makes liberal use of this Action frame in both directions.Fuirthermore, Announce is not a DMG protected frame; it will be unacceptable to network operatprsto send out network information in an unprotected management frame (e.g. uplink bandwith information, beam information...); Sometimes sending information in clear mau be done to promote coexistence fr example, but tha should be by design and choice (i.e., control over what ot share and what not to share), not as a consequence of frame subtype. | - TDD-related IEs defined for downlink (AP/PCP to non-AP/non-PCP direction) can still be kept to give the choice to advertise them in Announce (and DMG Beacon) if desired.- However, protected frame subtypes are needed (one if applicable to both directions, two if applicable to one direction) to exchange TDD related information | **Proposal: Revised**Discussion:New category of Protected Dual of Unprotected DMG Action is introduced. The protected Announce frame resolves the comment |
| 3586 |  |  | All TDD related protocols need to have a variant that works without a controller (loal SME/proprietary management) at non-AP;i.e., non-AP in the architeture must be able to fully communicate and be managed by AP, through standard management frames, and without assming an out-of-band mechanism. |  | **Proposal: Revised**Discussion:The new set of primitives in 6.3.120, and new subclause 11.yy provides functuinalty that under TDD channel access the non-AP STA is fully managed by the AP STA |
| 3626 | 25.00 | 4.9 | The mmW Distribution Network Use Cases presented in document 11-17-1022-00-00ay-changes-to-ieee-802-11ay-in-support-of-mmw-mesh-network-use-cases introduces few new features. The most important among the features are TDD link access and coordinated scheduling across multiple links. The features allow interference mitigation across multiple links. There is no description of the new functionality in the section 4.9 Reference model. The reference model shall provide mapping of the Distribution network to the existent 802.11 entities - BSS, AP STA, non-AP STA and illustrate the TDD link access and coordinated scheduling features. The reference model may illustrate working of TDD slot structure, TDD slot schedule and TDD Bandwidth Request. | Submission will be presented to provide the reference model in new subclause 4.9.5 | **Proposal: Revised**Discussion: Reference model is presented in 4.9.5 Reference model for co-channel coordinated management operation |
| 3627 | 54.00 | 6.3.120.2 | The primitives of MLME-TDD-SLOT-STRUCTURE are defined "to request TDD slot structure establishment in the MAC entity within an AP or PCP". If it is true not clear what is a meaning of the sentence "Specifies the MAC address of the STA that is the intended recipient of the TDD Slot Structure element". The latter is also supported by the TDD slot structure element defined in 9.4.2.266 and by definition of Announce frame (9.6.21.2) that conveys the element. Use of the defined primitives is not presented anywhere. | The slot structure element provides timing of the TDD Intervals, the TDD slots, and Guard intervals. The information is unified across the entire Distribution network. The information is delivered from upper layers of the Distribution network to nodes controlled by the upper layer. Correct the text to keep the primitive for that purpose. Append the Association related primitives to convey the TDD structure information. Define primitive to convey the information by the Announce frame. Provide clear definition how the primitive is used to cover the functionality in section 11. Submission will be presented | **Proposal: Revised**Discussion:The primitives are defined in the subclauses 6.3.120.2 – 6.3.120.13. The MLME rules are defined in 11.yy and relevant changes are done in the sub clause 10.40.6.2.2 |
| 3628 | 56.00 | 6.3.120.5 | Primitives of the MLME-TDD-SLOT-SCHEDULE are defined to requests TDD slot schedule establishment in the MAC entity within a STA. It is not clear either the STA is one that gets the primitive or it is the target STA with the specified MAC address the TDD slot schedule element shall be conveyed in the announce frame (9.6.21.2). It may be few different circumstances how the TDD slot schedule is delivered.This information is shared by the Distribution network upper layer, so it may be first delivered to the node for its own use. In the second case It may be delivered as part of the association establishment and in the other case the TDD slot schedule is used to advertise specific TDD slots the STA uses to communicate in the link. It is kind of mutual notification sent to the peer STA, no response needed. No change of TDD intervals in this stage is allowed. This functionality is applicable for both AP STA and non-AP STA. | Correct the text to keep the primitive for the purpose of updating the node by the upper layer controller. Append the Association related primitives to convey the TDD schedule information. Define primitive to convey the information by the Announce frame. Provide clear definition how the primitive is used to cover the functionality in section 11. Submission will be presented | **Proposal: Revised**Discussion:The primitives are defined in the subclauses 6.3.120.2 – 6.3.120.13. The MLME rules are defined in 11.yy and relevant changes are done in the sub clause 10.40.6.2.2 |
| 3629 | 54.00 | 6.3.120 | No primitives are defined to initiate submission of TDD Bandwidth Request information. In the existent solution of DMG the time allocation request information is delivered by the MLME-ADDTS primitives to be conveyed in ADDTS frames. The flow existent flow is TS driven that is not well suited for the TDD Bandwidth. | 1. Define primitive and provide definition how to use the primitive to initiate frame conveying TDD bandwidth request.2. Provide normative definition of expected reaction to the delivery of the TDD Bandwidth Request - potential changes of the TDD schedule and/or TDD structure as result of the TDD Bandwidth Request delivery. Submission will be presented | **Proposal: Revised**Discussion:The primitives are defined in the subclauses 6.3.120.11 – 6.3.120.13. The MLME rules are defined in 11.yy. The irrelevant text in the subclause 11.4.13.1 General, and in 11.4.13.4 TDD slot allocation is removed |
| 3633 | 54.00 | 6.3.120 | Multiple IE are conveyed by Announce frame as defined in 9.6.21.2 Announce frame format. There is no primitive defined to initiate transmission of Announce frame that conveys the IEs. | Suggest to define primitive to initiate delivery of relevant IE by Announce frame | **Proposal: Revised**Discussion:In the cases that transmission of the Announce fraem is not triggered by the protocol the primitives are defined in the subclauses 6.3.120.11 – 6.3.120.13. |
| 3641 | 166.00 | 9.6.21.1 | Announce is defined as the Unprotected DMG Action frame. In some circumstances information delivered by the frame may need protection, for example instructions to change schedule. | Few options are applicable:- use Information Response frame- define new action frame "Protected Announce" of category DMG- define new action frame "Public Announce" of category Public Action and Protected Dual of PublicActionOne solution should be chosen and normative text shall be provided | **Proposal: Revised**Discussion:New category Protected Dual of Unprotected DMG Action is defined in the Protected Announce frame is defined (9.6.yy) |
| 3642 | 213.00 | 10.40.6.2.2 | Sentence like "The DMG AP or DMG PCP issues an MLME-TDD-SLOT-STRUCTURE.confirm primitive" is wrong. At each appearance of the MLME primitive it should be clearly stated that it happens between SME and MLME/MAC. Otherwise it leads to errors like P214L5 that the normative rule cannot be implemented in presented order and timing. | Rewrite the text following definition of the MLME interface. | **Proposal: Revised**Discussion:The text is modified to keep the MLME convention |
| 3643 | 214.00 | 10.40.6.2.2 | "A non-AP and non-PCP DMG STA may transmit a TDD Slot Schedule element in an Announce frame or Association Request frame to a DMG AP or DMG PCP. In this case, the Bitmap and Access Type Schedule field in the element is set from the viewpoint of the AP or PCP and indicates the availability of the STA, which can be used as input to the AP or PCP scheduling."The defined MLME-TDD\_SLOT\_SCHEDULE and MLME-TDD\_SLOT\_STRUCTURE primitives provide information to the local MAC and do not specify that the information is delivered to other STA and what is the frame to be used for this purpose. As it is convenient in the .11 spec the primitive shall provide clear indication of the specific frame to be used for the information delivery. | Resolve the issue by- adding TDDSlotStructureList and TDDSlotScheduleList to attributes of the MLME-ASSOCIATE.response primitive- definition of new primitive MLME-TDD\_SLOT\_ANNOUNCE with parameters TDDSlotStructureList and TDDSlotScheduleList to deliver the TDD IEs in the Announce frame- providing normative text in the subclause 10.40.6.2.2 or in new subclause in the part 11 how the primitives MLME-TDD\_SLOT\_SCHEDULE, MLME-TDD\_SLOT\_STRUCTURE, MLME-ASSOCIATE.response and MLME-TDD\_SLOT\_ANNOUNCE are used.Submission will be provided | **Proposal: Revised**Discussion:The primitives are defined in the subclauses 6.3.120.2 – 6.3.120.13. The MLME rules are defined in 11.yy and relevant changes are done in the sub clause 10.40.6.2.2 |
| 3654 | 318.00 | 11.4.13.1 | TDD Bandwidth Request element has nothing to do with the TSPEC and the 11.4 subclause is explicitly about TSPEC and subordinates | Remove references to the TDD Bandwidth Request element from the subclause. Remunerate the subclause 11.4.13.4 to be not part of 11.4 TS operation. Use the subclause to provide normative text that refers to primitives that initiates sending Announce frame that conveys the TDD Bandwidth Request element. | **Proposal: Revised**Discussion:The primitives are defined in the subclauses 6.3.120.11 – 6.3.120.13. The MLME rules are defined in 11.yy. The irrelevant text in the subclause 11.4.13.1 General, and in 11.4.13.4 TDD slot allocation is removed |

CID3358, 3626

***TGay editor implement following changes***

**4.9.4 Reference model for multi-band operation**

*P25L12 remove*

*Add new subclause*

**4.9.5 Reference model for co-channel coordinated management operation**

The reference model of a device that uses co-channel coordinated management operation is shown in Figure xy1. The reference model for co-channel coordinated management operation allows a device to operate on the same channel with more than one STA, where each STA is associated with a different antenna or DMG antenna configuration. Each STA can have its own PHY and MAC sublayer for channel access and MPDU processing. The STAs using co-channel coordinated management operation can share the same PHY, antenna or DMG antenna.

The co-channel coordinated management operation reference model can be used in devices to provide TDD channel access as defined in 11.xy and in 10.40.6.2.2.

**Figure xy1—Reference model for a coordinated management operation**

The SME of a device that uses the co-channel coordinated management operation contains a coordinated management entity that is responsible for coordinating the setup, configuration, time synchronization and scheduling of STAs belonging to the device.

Different MAC SAPs are presented to higher layers since different MAC addresses are used by each STA. Each MAC SAP is controlled by a separate and independent RSNA key management entity. The coordinated

management entity is responsible for coordinating with each of the SMEs if a single IEEE 802.1X entity of the IEEE 802.1X Authenticator/Supplicant is shared among the MACs.

 CID3641, 3578

Discussion:

*Define new category of Protected Dual of Unprotected DMG Action and present the Announce frame in the new category to keep the action value of the Announce frame unchanged*

***TGay editor implement following changes***

*In the Table 9-54—Category values of the 9.4.1.11 Action field (IEEE P802.11-REVmd/D1.5, September 2018) append after last defined code*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code** | **Meaning**  | **See subclause**  | **Robust** | **Group addressed privacy** |
| <ANA> | Protected Dual of Unprotected DMG Action | 9.6.yy | Yes | No |

*At end of subclause 9.6 (IEEE P802.11-REVmd/D1.5, September 2018) append new subclause*

**9.6.yy Protected Dual of Unprotected DMG Action**

The Protected Dual of Unprotected DMG Action frame is defined to allow robust STA-STA communications of the same information that is conveyed in Unprotected DMG Action frames that are not robust (see 9.6.21.1 Unprotected DMG Action field)). The defined Protected Dual of Unprotected DMG Action frames are listed in Table xy2 (Action field values for Protected Dual of Unprotected DMG Action frames).

The Protected Dual of Unprotected DMG Action frames have the same format as the corresponding Unprotected DMG Action frames.

**Table xy2—Action field values for Protected Dual of Unprotected DMG Action frames**

|  |  |  |
| --- | --- | --- |
|  **Action field value** | **Description** | **Defined in** |
| 0 | Protected Announce | 9.6.21.2 |
| 1 | Protected BRP | 9.6.21.3 |
| 2 | Protected MIMO BF Setup | 9.6.21.4 |
| 3 | Protected MIMO BF Poll | 9.6.21.5 |
| 4 | Protected MIMO BF Feedback | 9.6.21.6 |
| 5 | Protected MIMO BF Selection  | 9.6.21.7 |

***TGay editor implement following changes***

* *P320L10 - In the subclause 11.4.13.1 General remove text that starts with “Using the Announce frame …”*
* *P321L26 – remove the subclause 11.4.13.4 TDD slot allocation*
* *At end of clause 11 (IEEE P802.11-REVmd/D1.5, September 2018) append new subclause*

**11.yy TDD channel access Operation**

**11.yy.1 General**

In a TDD SP, co-channel interference mitigation requires managing the TDD schedule in each stage of the TDD channel access life cycle. The TDD schedule may change during the TDD channel access life cycle. Different STAs in the device of the co-channel Coordinated Management (4.9.5) may coordinate setup of the DMG antennas and the TDD schedule to mitigate the co-channel interference.

**11.yy.2 Life cycle of the operation of the TDD channel access**

Figure 11xy1 (Life cycle of the operation of the TDD channel access) summarizes the TDD operation life cycle.

Initially, a STA is inactive and not performing any TDD channel access. The STA shall not transmit any MSDUs when the operation is inactive.

The operation of the TDD channel access includes the five following phases:

* Initial TDD beamforming
* Scheduling of the TDD channel access for association and secure authentication
* Association and secure authentication
* Scheduling of the TDD channel access for data traffic, ongoing beamforming and link maintenance
* Data exchange accompanied by beamforming and link maintenance

TDD channel access becomes active for data transfer (i.e., MSDUs may be transmitted) after successful completion of a secure authentication. TDD channel access becomes inactive when frames can no longer be successfully delivered. The Initial TDD Beamforming is defined in 11.36.2-11.36.4 and in 10.43.10. Scheduling for association and authentication and relevant operations are defined in 11.yy.3. Scheduling for data traffic is defined in 11.yy.4. Data traffic transfer under TDD access is defined in 10.40.6.2.2 and link maintenance is defined in 10.44.5.

TDD channel access is suspended if an expected MPDU transmission does not succeed within the AckTimeout (10.3.2.11). A beamformed link is considered lost if no successful MPDU transmission takes place after multiple consecutive attempts.



**Figure 11yy1 Life cycle of the operation of the TDD channel access**

**11.yy.3 Scheduling for association and secure authentication**

The schedule for the association and secure authentication is delivered by an AP STA (or PCP STA) as illustrated by the Figure 11yy3 Scheduling for association and secure authentication. Announce frames of category Unprotected DMG shall be used to deliver the schedule. The Announce frame conveys the TDD Slot Structure element and TDD Slot schedule element. (10.40.6.2.2)



**Figure 11yy3 Scheduling for association and secure authentication**

Association shall be performed as defined in 11.3.5 Association, reassociation, and disassociation.

Secure authentication shall be performed as defined in 12.5 – 12.9. Transmission and acknowledgment of Management and Data frames shall follow rules defined in 10.40.6.2.2.

The 802.11X controlled port is unblocked after completion of the 802.11X EAP Authentication and the operation, after which time the TDD channel access becomes active.

**11.yy.4 Scheduling for data traffic and supported functionality**

There are a few options to deliver the schedule for data transmission and related functionality. Figure 11yy4 illustrates an option that has the SME deliver the schedule to a STA. In this case, the MLME primitives are local and do not cause a frame to be transmitted.



**Figure 11yy4 high-level delivery of schedule for data traffic and supported functionality**

Figure 11yy5 illustrates an option where an AP STA (or PCP STA) delivers the schedule to a non-AP STA (or non-PCP STA). The AP STA may choose to reserve an amount of time to satisfy the bandwidth request contained in a received TDD Bandwidth Request element. The schedule delivered by the AP may be a response to a bandwidth request from the non-AP STA or initiated by the AP STA without getting a request. Announce frames of a category equal to Protected Dual of Unprotected DMG Action shall be used to deliver the elements.



**Figure 11yy5 AP STA delivery of schedule for data traffic and supported functionality**

An AP STA (or PCP STA) and non-AP STA that belong to different devices may exchange TDD Slot Schedule elements to notify each other of changes in the use of TDD slots already allocated to STAs. The Figure 11yy6 illustrates this case. Announce frames of a category equal to Protected Dual of Unprotected DMG Action shall be used to deliver the elements.



**Figure 11yy6 Mutual delivery of schedule for data traffic and supported functionality**

***TGay editor implement following changes in the Association and Reassociation request subclauses:***

**6.3.7.5.2 Semantics of the service primitive**

*P35*

*Add to the table*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Valid range**  | **Description**  |
| TDDSlotStructureList | A set of TDD Slot Structure elements  | As defined in 9.4.2.266  | Optionally presented if the TDD Channel Access Supported subfield is set to 1 in the TDD Capability Information field. Specifies the parameters within one or more TDD Slot Structure elements corresponding to a target STA.  |

**6.3.8.4.2 Semantics of the service primitive**

*P41*

*Add to the table*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Valid range**  | **Description**  |
| TDDSlotStructureList | A set of TDD Slot Structure elements  | As defined in 9.4.2.266  | Optionally presented if the TDD Channel Access Supported subfield is set to 1 in the TDD Capability Information field. Specifies the parameters within one or more TDD Slot Structure elements corresponding to a target STA. |

**6.3.120.1 General**

*P54*

This set of primitives supports the TDD scheduled access as described in 10.40.6.2.2 and in 11.yy

**6.3.120.2 MLME-TDD-SLOT-STRUCTURE.request**

**6.3.120.2.1 Function**

This primitive requests TDD slot structure establishment in the MAC entity within a STA

**6.3.120.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-SLOT-STRUCTURE.request(

STAAddress,

TDDSlotStructureList,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Valid Range**  | **Description**  |
| STAAddress  | MAC Address  | Any valid individual MAC address  | Specifies the MAC address of the STA  |

P55

**6.3.120.2.3 When generated**

This primitive is generated by the SME to establish TDD slot structure in its MAC.

***TGay editor remove text of 6.3.120.4 MLME-TDD-SLOT-STRUCTURE.indication from P55L22 till P56L14***

***TGay editor implement following changes:***

*P57*

**6.3.120.5.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-SLOT-SCHEDULE.request(

STAAddress,

TDDSlotScheduleList,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Valid Range**  | **Description**  |
| STAAddress  | MAC Address  | Any valid individual MAC address  | Specifies the MAC address of the STA  |

***TGay editor remove text of 6.3.120.7 MLME-TDD-SLOT-SCHEDULE.indication from P58L3 till P58L20***

***TGay editor append following subclauses in subclause 6.3.120:***

**6.3.120.8 MLME-TDD-SLOT-ANNOUNCE.request**

**6.3.120.8.1 Function**

This primitive request transmission of an Announce frame to the peer STA to convey the TDD Slot Structure information element and/or the TDD Slot Schedule information element.

**6.3.120.8.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-SLOT-ANNOUNCE.request(

PeerSTAAddress,

TDDSlotStructureList,

TDDSlotScheduleList,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| PeerSTAAddress | MAC Address | Any valid individual MAC address | Specific MAC address of the STA that is intended recipient of the TDD Slot Schedule and the TDD Slot Structure elements  |
| TDDSlotStructureList | A set of TDD Slot Structure elements  | As defined in 9.4.2.266  | Optionally presented. Specifies the parameters within one or more TDD Slot Structure elements corresponding to a target STA.  |
| TDDSlotScheduleList | A set of TDD Slot Schedule elements  | As defined in 9.4.2.267  | Specifies the parameters within one or more TDD Slot Schedule elements corresponding to the target STA  |
| VendorSpecificInfo  | A set of elements  | As defined in 9.4.2.25 (Vendor Specific element)  | Zero or more elements  |

**6.3.120.8.3 When generated**

This primitive is generated by the SME to initiate transmission of an Announce frame to the peer STA to convey the TDD Slot Structure information element and/or the TDD Slot Schedule information element.

**6.3.120.8.4 Effect on receipt**

The Announce frame that conveys the TDD Slot Structure information element and/or the TDD Slot Schedule information element is transmitted to the peer STA.

**6.3.120.9 MLME-TDD-SLOT-ANNOUNCE.confirm**

**6.3.120.9.1 Function**

This primitive report the outcome of a TDD slot structure and a TDD slot schedule establishment according to procedures defined in 8 10.40.6.2.2. and in 11.yy

**6.3.120.9.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-SLOT-ANNOUNCE.confirm(

ResultCode,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Valid Range**  | **Description**  |
| ResultCode  | Enumeration  | SUCCESS, FAILURE  | Indicates the result of the TDD slot structure and the TDD slot schedule establishment  |
| VendorSpecificInfo  | A set of elements  | As defined in 9.4.2.25 (Vendor Specific element)  | Zero or more elements.  |

**6.3.120.9.3 When generated**

This primitive is generated by the MLME to report the result of a TDD slot structure and a TDD slot schedule establishment in the peer STA.

**6.3.120.9.4 Effect on receipt**

The SME is notified of the result of the procedure.

**6.3.120.10 MLME-TDD-SLOT-ANNOUNCE.indication**

**6.3.120.10.1 Function**

This primitive indicates that a specific peer MAC entity is requesting a TDD slot structure and a TDD slot schedule with the local MAC entity.

**6.3.120.10.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-SLOT-ANNOUNCE.indication(

PeerSTAAddress,

TDDSlotStructureList,

TDDSlotScheduleList,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| PeerSTAAddress | MAC Address | Any valid individual MAC address | Specifies MAC address of the peer STA from which the TDD Slot Schedule and the TDD Slot Structure elements are received.  |
| TDDSlotStructureList | A set of TDD Slot Structure elements  | As defined in 9.4.2.266  | Optionally presented. Specifies the parameters within one or more TDD Slot Structure elements received from a peer STA.  |
| TDDSlotScheduleList | A set of TDD Slot Schedule elements  | As defined in 9.4.2.267  | Specifies the parameters within one or more TDD Slot Schedule elements received from a peer STA.  |
| VendorSpecificInfo  | A set of elements  | As defined in 9.4.2.25 (Vendor Specific element)  | Zero or more elements  |

**6.3.120.10.3 When generated**

This primitive is generated by the MLME as a result of the receipt of TDD slot structure and TDD slot schedule from a specific peer MAC entity.

**6.3.120.10.4 Effect on receipt**

The SME is notified of the receipt of TDD slot structure and TDD slot schedule.

**6.3.120.11 MLME-TDD-BANDWIDTH.request**

**6.3.120.11.1 Function**

This primitive request transmission of an Announce frame to the AP or PCP STA to convey the TDD Bandwidth Request element.

**6.3.120.11.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-BANDWIDTH.request(

PeerSTAAddress,

TDDBandwidthRequest,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| PeerSTAAddress | MAC Address | Any valid individual MAC address | Specific MAC address of the AP or PCP STA that is intended recipient of the TDD Bandwidth Request element |
| TDDBandwidthRequest | A TDD Bandwidth Request element  | As defined in 9.4.2.270  | Specifies the parameters within TDD Bandwidth Request element corresponding to a target STA.  |
| VendorSpecificInfo  | A set of elements  | As defined in 9.4.2.25 (Vendor Specific element)  | Zero or more elements  |

**6.3.120.11.3 When generated**

This primitive is generated by the SME of non-AP and non-PCP STA to initiate transmission of an Announce frame to the AP or PCP STA to convey the TDD Bandwidth Request.

**6.3.120.11.4 Effect on receipt**

The Announce frame that conveys the TDD Bandwidth Request is transmitted to the AP or PCP STA.

**6.3.120.12 MLME-TDD-BANDWIDTH.confirm**

**6.3.120.12.1 Function**

This primitive report the outcome of a TDD Bandwidth Request according to procedures defined in 10.40.6.2.2 and in 11.yy

**6.3.120.12.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-BANDWIDTH.confirm(

ResultCode,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Valid Range**  | **Description**  |
| ResultCode  | Enumeration  | SUCCESS, FAILURE  | Indicates the result of the TDD Bandwidth Request element delivery |
| VendorSpecificInfo  | A set of elements  | As defined in 9.4.2.25 (Vendor Specific element)  | Zero or more elements.  |

**6.3.120.12.3 When generated**

This primitive is generated by the MLME to report the result of a TDD Bandwidth Request transmission to the AP or PCP STA.

**6.3.120.12.4 Effect on receipt**

The SME is notified of the result of the procedure.

**6.3.120.13 MLME-TDD-BANDWIDTH.indication**

**6.3.120.13.1 Function**

This primitive indicates that a specific non-AP and non-PCP MAC entity is requesting a TDD Bandwidth Request with the local MAC entity.

**6.3.120.13.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-TDD-BANDWIDTH.indication(

PeerSTAAddress,

TDDBandwidthRequest,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| PeerSTAAddress | MAC Address | Any valid individual MAC address | Specifies MAC address of the non-AP and non-PCP STA from which the TDD Bandwidth Request element is received.  |
| TDDBandwidthRequest | A TDD Bandwidth Request element  | As defined in 9.4.2.270  | Specifies the parameters within TDD Bandwidth Request element received from a peer STA.  |
| VendorSpecificInfo  | A set of elements  | As defined in 9.4.2.25 (Vendor Specific element)  | Zero or more elements  |

**6.3.120.13.3 When generated**

This primitive is generated by the MLME as a result of the receipt of TDD Bandwidth Request from a specific non-AP and non-PCP MAC entity.

**6.3.120.13.4 Effect on receipt**

The SME is notified of the receipt of TDD Bandwidth Request.

**9.4.2.267 TDD Slot Schedule element**

***TGay editor modify on P141L21 in the Table 22 —Bitmap and Access Type Schedule field encoding as follows***

|  |  |
| --- | --- |
| **Encoding**  | **Operation between DMG STA during TDD slot**  |
| **Behavior of STA that transmitted the TDD Slot Schedule element**  | **Behavior of STA that received the TDD Slot Schedule element**  |
| 0 | N/A; TDD slot unassigned  |
| 1 | TX  | RX  |
| 2 | RX  | TX  |
| 3 | Unavailable  |

**10.40.6.2.2 SP with TDD channel access**

***TGay editor modify on P214L19 – P215L25***

The parameters of the TDD structure and guard times that are used within a TDD SP are defined by the TDD Slot Structure element (9.4.2.266). The assignment of the TDD SP’s is defined by the TDD Slot Schedule element (9.4.2.267). A non-AP or non-PCP STA shall not transmit the TDD Slot Structure element. A DMG AP or DMG PCP shall transmit a TDD Slot Structure element to each non-AP and non-PCP DMG STA that is expected to transmit or receive during a TDD SP. The TDD Slot Structure elements, may be included in DMG Beacon or Announce frames transmitted by the DMG AP or DMG PCP.

Upon reception of a TDD Slot Structure element corresponding to allocations identified by the Allocation ID subfield value within the element, a DMG STA shall

* adopt the TDD structure within the element for all the TDD SPs identified by the same Allocation ID subfield value at the time indicated by the value of the Slot Structure Start Time subfield in the element. From the time the DMG STA receives an updated TDD Slot Structure element until the TDD structure is adopted, the current TDD structure shall remain in effect;

Except for the transmission of a TDD Beamforming frame prior to association, a DMG STA shall not transmit during a TDD SP unless it receives a TDD Slot Schedule element that indicates at least one TDD slot within the TDD SP is assigned to TX by the DMG AP or DMG PCP. The DMG AP or DMG PCP shall transmit the TDD Slot Schedule element to each DMG STA that is assigned to access the TDD SP; this transmission shall be done using an Announce frame or Association Response frame before the time indicated by the value of the Slot Schedule Start Time subfield within the element.. Upon reception of a TDD Slot Schedule element corresponding to allocations identified by the Allocation ID subfield value within the element, a DMG STA shall adopt the schedule within the element at the time indicated by the value of the Slot Schedule Start Time subfield within the element.

A non-AP and non-PCP DMG STA may transmit a TDD Slot Schedule element in an Announce frame or (Re)Association Request frame to a DMG AP or DMG PCP. In this case, the Bitmap and Access Type Schedule field in the element indicates the availability of the STA, which can be used as input to the AP or PCP scheduling.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3481 | 95.00 | 9.4.2.131 | The TDD Applicable SP subfield should only be defined when the Allocation Type subfield is SP | The TDD Applicable SP subfield should be reserved if the Allocation Type subfield is anything other than SP | **Proposal: Revised**P94L21In case the Allocation Type subfield is set to SP, the TDD Applicable SP subfield is set to 1 to indicate that the SP allocation is using TDD channel access as described in 10.40.6.2.2. Otherwise, it is set to 0. In all cases the Allocation Type subfield is set to value different from SP, the TDD Applicable SP subfield is reserved. |

**References:**

IEEE P802.11ay/D2.1, October 2018

IEEE P802.11-REVmd/D1.6, October 2018