IEEE P802.19
Wireless Coexistence Working Group

Project:
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Title:
Proposal for Reference Model

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Re:

Abstract:
Proposal for Reference Model

Purpose:

Notice:
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Release:
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5 Reference model

5.1 General description

Figure 5-1 illustrates reference model of P802.19.1 coexistence system. P802.19.1 coexistence system entities are located on the application layer. Each 802.19.1 entity has one or more the following service access point (SAP):

—COEX_SAP (Coexistence SAP): The SAP between the coexistence system entities, e.g., CE/CM/CDIS, and the TVBD network or device management entities, e.g., 802.11 SME, 802.22 NCMS.

—CX_TR_SAP (Coexistence Transport SAP): The SAP between coexistence system entities, e.g., CE/CM/CDIS, or between coexistence system entity and TVWS DB.

TVBD network or device management entity shall provide CXPM (coexistence primitive mapping) service. CXPM converts CX_DME_SAP primitives into TVBD-specific management/control primitives. 1-to-1 mapping might be highly desirable to fully support 802.19.1 standard, but it might depend upon the degree of modification of each TVDB standard. How to implement CXPM is out of scope of this standard.

Figure 5-2 illustrates reference model of Coexistence Enabler.

Coexistence Enabler has two service access points:

— Coexistence SAP (COEX_SAP)
— Coexistence Transport SAP (COEX_TR_SAP).
Figure 5-3 illustrates reference model of Coexistence Manager and Coexistence Discovery and Information Server. Coexistence Manager and Coexistence Discovery and Information Server have one service access point: Coexistence Transport SAP (COEX_TR_SAP). COEX_TR_SAP provides means for Coexistence Enabler, Coexistence Manager, and Coexistence Discovery and Information Server to communicate with each other and with external entities by using transport services provided by underlying layers. The underlying layers could be application layer, transport layer, network layer, and link layer. Example reference model of CE and CM describing example of using COEX_TR_SAP for interface B1 is shown in Figure 5-4.

Information required for coexistence and reconfiguration commands that are exchanged between CE and CM over interface B1 are forwarded to transport layer, for example, to TCP, for transmission. This is done using COEX_TR_SAP service access point of CE and CM.

COEX_SAP defines the interface A between CE and TVBD network/device. Example reference model of interface A for an IEEE 802.16h compliant device is shown in Figure 5-5.
The left side of Figure 5-5 shows typical reference model of radio interface including data, control and management planes for physical layer, MAC sublayer, and convergence sublayer. The middle part of Figure 5-5 shows base station management entity. The right part of Figure 5-5 shows CE. Typically, radio interface is implemented in such a way that it provides management interface for base station management entity. In Figure 5-5, such interface is represented by three service access points PHY_ME_SAP, MAC_ME_SAP, and CS_ME_SAP, corresponding to physical layer, MAC sublayer, and convergence sublayer. This service access points can be used to obtain information from radio interface and to request reconfiguration of radio interface. Correspondingly, CE can use these service access points to implement interface A. Interface A is defined by service access point COEX_SAP. Communication between radio interface management service access points PHY_ME_SAP, MAC_ME_SAP, and CS_ME_SAP and CE service access point COEX_MEDIA_SAP is done via base station management entity.

Figure 5-6 illustrate an example reference model for interface A for an 802.22 compliant device. The left side of Figure 5-6 shows the reference model for 802.22 including control and management planes for conversion sublayer, MAC layer and PHY layer. The middle part of Figure 5-6 shows the network control and management system (NCMS) which allows the PHY/MAC layers specified in 802.22 standards to be independent of network architecture, the transport network, and the protocols used at the backend. Then, the 802.19.1 system in the right part of Figure 4 employs NCMS to obtain information and request reconfiguration of the 802.22 system.
Figure 5-6 Example reference model of interface A for a 802.22 compliant device

Figure 5-7 shows an example reference model of interface A for an 802.11 compliant device. The coexistence services over IEEE 802.11 is carried either in the data frames by using existing primitives defined by the LSAP or by using primitives defined by the MAC State Generic Convergence Function (MSGCF) service access point (SAP) (MSGCF_SAP). The MSGCF has access to all management primitives and provides services to higher layers.

Figure 5-7 Example reference model of interface A for a 802.11 compliant device

5.2 Service access points

The SAPs are defined as a set of SAP primitives. Each primitive definition has the table of allowable parameters. Each parameter is defined using abstract data types. These types indicate the semantic value of that parameter. The parameters defined within the subclause for a particular primitive are produced or consumed by that primitive. Several of the abstract data types are used in multiple primitive definitions.
COEX_TR_SAP supports interface B1, B2, B3 and C providing means for Coexistence Enabler, Coexistence Manager, and Coexistence Discovery and Information Server to communicate with each other and with external entities by using transport services provided by underlying layers. COEX_TR_SAP is defined as a set of primitives that provides the following service:

- Transport service:
  - Used by CE, CM, CDIS or external entity to send coexistence protocol data unit to each other and to external entities and to receive acknowledgement of such operation
  - Used by CE, CM, and CDIS or external entity to receive coexistence protocol data unit from each other and from external entities.

Primitives described in Table 5-1 are used to define the Coexistence Transport SAP.

<table>
<thead>
<tr>
<th>Primitive</th>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COEX_TR_PACKET</td>
<td>Transport</td>
<td>Used by CE, CM, CDIS or external entity to send a coexistence protocol data unit using a transport service provider. Also used by a transport service provider to deliver a coexistence protocol data unit to CE, CM, CDIS or external entity.</td>
</tr>
</tbody>
</table>

5.2.1.1 Transport service

5.2.1.1.1 COEX_TR_PACKET

Function:
This primitive is used by CE, CM, CDIS or external entity to request the transport service provider to transport a coexistence protocol data unit.

Semantics:
COEX_TR_PACKET.request(
  TransportPref,
  SourceAddress,
  DestinationAddress,
  ReliableDeliveryFlag,
  CXProtocolPDU
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TransportPref</td>
<td>TRANSPORT_PREF</td>
<td>Transport protocol preference.</td>
</tr>
<tr>
<td>SourceAddress</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity sending coexistence protocol data unit.</td>
</tr>
<tr>
<td>DestinationAddress</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity to receive coexistence protocol data unit.</td>
</tr>
<tr>
<td>CXProtocolPDU</td>
<td>OCTET_STRING</td>
<td>Coexistence protocol data unit to be transported.</td>
</tr>
</tbody>
</table>
5.2.1.1.1.1 COEX_TR_PACKET.indication

**When generated:**
This primitive is generated by CE, CM, CDIS or external entity to request the transport service provider to transport a coexistence protocol data unit.

**Effect on receipt:**
Upon receipt of this primitive, the specific transport service provider attempts to transport the coexistence protocol data unit.

**Semantics:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TransportPref</td>
<td>TRANSPORT_PREF</td>
<td>Transport protocol preference.</td>
</tr>
<tr>
<td>SourceAddress</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity sending coexistence protocol data unit.</td>
</tr>
<tr>
<td>DestinationAddress</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity to receive coexistence protocol data unit.</td>
</tr>
<tr>
<td>TransportStatus</td>
<td>BOOLEAN</td>
<td>Indicates whether the transfer of coexistence protocol data unit is successful or not.</td>
</tr>
</tbody>
</table>

**When generated:**
This primitive is generated by the transport service provider to confirm delivery of coexistence protocol data with coexistence system entity if such acknowledgement is supported by the transport service provider.

**Effect on receipt:**
Upon receipt of this primitive, CE, CM, CDIS or external entity receives learns about the status of the requested delivery of coexistence protocol data.

5.2.1.1.1.2 COEX_TR_PACKET.confirm

**Function:**
This primitive is used by transport service provider to notify a deliver of a coexistence protocol data unit to CE, CM, CDIS or external entity.

**Semantics:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TransportPref</td>
<td>TRANSPORT_PREF</td>
<td>Transport protocol preference.</td>
</tr>
<tr>
<td>SourceAddress</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity sending coexistence protocol data unit.</td>
</tr>
<tr>
<td>DestinationAddress</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity to receive coexistence protocol data unit.</td>
</tr>
<tr>
<td>TransportStatus</td>
<td>BOOLEAN</td>
<td>Indicates whether the transfer of coexistence protocol data unit is successful or not.</td>
</tr>
</tbody>
</table>

**When generated:**
This primitive is generated by the transport service provider to confirm delivery of coexistence protocol data with coexistence system entity if such acknowledgement is supported by the transport service provider.

**Effect on receipt:**
Upon receipt of this primitive, CE, CM, CDIS or external entity receives learns about the status of the requested delivery of coexistence protocol data.
<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TransportPref</td>
<td>TRANSPORT PREF</td>
<td>Transport protocol preference</td>
</tr>
<tr>
<td>SourceID</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity sending coexistence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>protocol data unit</td>
</tr>
<tr>
<td>DestinationID</td>
<td>TRANSPORT_ADDR</td>
<td>Protocol layer specific Transport Address of the entity to receive coexistence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>protocol data unit</td>
</tr>
<tr>
<td>CoexProtocolPDU</td>
<td>OCTET_STRING</td>
<td>Coexistence protocol data unit to be delivered</td>
</tr>
</tbody>
</table>

**When generated:**

This primitive is generated by the transport service provider when it has coexistence protocol data unit for CE, CM, CDIS or external entity.

**Effect on receipt:**

Upon receipt of this primitive, the CE, CM, CDIS or external entity gets coexistence protocol data unit.

5.2.2 **COEX_SAP**

Coexistence SAP (COEX_SAP) defines the interface A between CE and TVBD network/device. The Coexistence SAP is defined as a set of primitives that provides the following services:

- **Registration service:**
  - Used by TVBD network/device to set up a connection with CE
  - Used by CE to obtain subscription information from TVBD network/device
  - Used by CE to obtain authentication information from TVBD network/device
  - Used by CE to obtain registration information from TVBD network/devices

- **Information service:**
  - Used by CE to obtain information required for coexistence from TVBD network/device
  - Used by TVBD network/device to obtain information required for coexistence from CE
  - Used by TVBD network/device to share information required for coexistence with other TVBD network/devices via the IEEE 802.19.1 system

- **Measurement service:**
  - Used by CE to request TVBD network/device to perform measurements required for coexistence
  - Used by CE to obtain measurement results required for coexistence from TVBD network/device

- **Reconfiguration service:**
  - Used by CE to request TVBD network/device to perform reconfiguration required for coexistence

- **Event service:**
  - Used by TVBD network/device to receive information about observed or predicted events related to coexistence from CE
  - Used by CE to receive information about observed or predicted events related to coexistence from TVBD network/device.

Primitives described in Table 1 are used to define the Coexistence SAP.

### Table 5-2 — COEX_SAP primitives

<table>
<thead>
<tr>
<th>Primitives</th>
<th>Services</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COEX_Connection</td>
<td>Registration</td>
<td>Used by TVBD to request connection with CE network/device.</td>
</tr>
<tr>
<td>COEX_Name</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>COEX_Auth</td>
<td>Used by TVBD network/device to request authentication with CE.</td>
<td></td>
</tr>
<tr>
<td>COEX_Reg</td>
<td>Used by TVBD network/device to request CE to do registration in coexistence system.</td>
<td></td>
</tr>
<tr>
<td>COEX_CE_DREG</td>
<td>Used by TVBD is transmitted to CE to request de-registration of the corresponding TVBD.</td>
<td></td>
</tr>
<tr>
<td>COEX_TVBD_DREG</td>
<td>Used by CE to request de-registration of the corresponding TVBD.</td>
<td></td>
</tr>
<tr>
<td>COEX_DeAuth</td>
<td>Used by TVBD network/device to request de-authentication with CE.</td>
<td></td>
</tr>
<tr>
<td>COEX_NeighbourList</td>
<td>Used by CE to update the neighbour list for TVBD network/device.</td>
<td></td>
</tr>
<tr>
<td>COEX_AvailableChannelList</td>
<td>Used by CE to obtain available channel list from TVBD network/device Also used by TVBD network/device to update the list of available channels it can operate to CE.</td>
<td></td>
</tr>
<tr>
<td>COEX_ChannelClassification</td>
<td>Used by TVBD network/device to request the channel classification of the corresponding TVBD network/device.</td>
<td></td>
</tr>
<tr>
<td>COEX_Information</td>
<td>Used by CE to obtain the context information of the corresponding TVBD for coexistence. Also used by TVBD is transmitted to CE to indicate the context information change of the corresponding TVBD for coexistence.</td>
<td></td>
</tr>
<tr>
<td>COEX_ResourceConfiguration</td>
<td>Used by CE to request reconfiguration of TVBD network/device required for coexistence.</td>
<td></td>
</tr>
<tr>
<td>COEX_Measurement</td>
<td>Used by CE to request TVBD network/device to perform measurement required for coexistence and to obtain measurement results.</td>
<td></td>
</tr>
<tr>
<td>COEX_Event</td>
<td>Used by TVBD network/device to inform CE about events related to coexistence observed or predicted by TVBD network/device. Also, used by CE to inform TVBD network/device about events related to coexistence observed or predicted by IEEE 802.19.1 system.</td>
<td></td>
</tr>
</tbody>
</table>
5.2.2.1 Registration service

5.2.2.1.1 COEX_Connection

5.2.2.1.1.1 COEX_Connection.request

**Function**

Used by TVBD network/device to request connection with CE.

**Semantics**

COEX_Connection.request(
  sourceID
  destinationID
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
</tbody>
</table>

**When generated**

Generated by TVBD network/device to request connection with CE.

**Effect on receipt**

When CE receives this primitive, the CE shall send COEX_Connection.response back to the TVBD network/device.

5.2.2.1.1.2 COEX_Connection.response

**Function**

Used by TVBD network/device to confirm the connection with CE.

**Semantics**

COEX_Connection.confirm(
  sourceID
  destinationID
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
</tbody>
</table>

**When generated**

Generated by CE in response to COEX_Connection.request from TVBD network/device.

**Effect on receipt**

When TVBD network/device receives this primitive, it confirms the connection with CE.
5.2.2.1.2 COEX_Auth

5.2.2.1.2.1 COEX_Auth.request

Function
Used by TVBD network/device to request authentication with CE.

Semantics
COEX_Auth.request ( 
    sourceID
    destinationID
    User ID
    User Password
)  

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>User ID</td>
<td>IA5String (ITU-T X.208)</td>
<td>This parameter contains User ID to be used by CE to authenticate with coexistence system.</td>
</tr>
<tr>
<td>User Password</td>
<td>IA5String</td>
<td>This parameter contains User Password to be used by CE to authenticate with coexistence system.</td>
</tr>
</tbody>
</table>

When generated
Generated by TVBD network/device to request authentication with CE.

Effect on receipt
When CE receives this primitive, it shall send COEX_Authentication.response back to the CE.

5.2.2.1.2.2 COEX_Auth.response

Function
Used by CE to inform TVBD network/device that the authentication is valid or not.

Semantics
COEX_Auth.response ( 
    sourceID
    destinationID
    status
)  

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>status</td>
<td>Status</td>
<td>This parameter shows that the authentication information in GetAuthInfo.response is valid or invalid status.</td>
</tr>
</tbody>
</table>

When generated
Generated by CE to TVBD network/device to indicate that the authentication information is valid or not.

Effect on receipt
When TVBD networks/devices receive this primitive, it shall examine authStatus.

### 5.2.2.1.3 COEX_Reg

#### 5.2.2.1.3.1 COEX_Reg.request

*Function*

Used by TVBD network/device to request CE to do registration in coexistence system.

*Semantics*

COEX_Reg.request(

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>networkID</td>
<td>NetworkID</td>
<td>E.g., FCC ID of TVBD network or device</td>
</tr>
<tr>
<td>serviceType</td>
<td>ServiceType</td>
<td>Discovery/Management</td>
</tr>
</tbody>
</table>

*When generated*

Generated by TVBD network/device to request CE to do registration in coexistence system.

*Effect on receipt*

When CE receives this primitive, it shall send COEX_Reg.response back to TVBD network/device.

#### 5.2.2.1.3.2 COEX_Reg.response

*Function*

Used by CE to confirm registration status with TVBD network/device.

*Semantics*

COEX_Reg.response(

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>status</td>
<td>STATUS</td>
<td>Returns the outcome of a request</td>
</tr>
</tbody>
</table>

*When generated*

Generated by CE in response to COEX_Reg.request from TVBD network/device.

*Effect on receipt*

When TVBD network/device receives this primitive, it examines the registration status.
5.2.2.1.4 COEX_DeReg

5.2.2.1.4.1 COEX_DeReg.request

Function:
Used by TVBD to request de-registration of the corresponding TVBD with CE.

Semantics:
COEX_DeReg.request(
    sourceID
    destinationID
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>DestinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated by TVBD when it needs to request de-registration of the corresponding TVBD.

Effect on receipt:
When receiving this primitive from TVBD, the CE shall send the de-registration request message to CM and give the response from CM the corresponding TVBD, which indicates “Success” or “Failure” for the de-registration request of the TVBD.

5.2.2.1.4.2 COEX_DeReg.response

Function:
Used by CE to response the de-registration request of the corresponding TVBD.

Semantics:
COEX_DeReg.response(
    sourceID
    destinationID
    status
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>status</td>
<td>Status</td>
<td>Status of de-registration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Success: De-registration of the corresponding TVBD is succeed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Failure: De-registration of the corresponding TVBD is failed.</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated in response to a COEX_CE_DREG.request primitive.

Effect on receipt:
When receiving this primitive, TVBD examines the received information about the status of the de-registration request of the corresponding TVBD.

### 5.2.2.1.5 COEX_TVBD_DeReg

#### 5.2.2.1.5.1 COEX_TVBD_DeReg.request

**Function:**

Used by CE to request de-registration of the corresponding TVBD.

**Semantics:**

```c
COEX_TVBD_DeReg.request(
    sourceID
    destinationID
)
```

**Parameters:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>DestinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
</tbody>
</table>

**When generated:**

This primitive is generated by CE when it needs to request de-registration of the corresponding TVBD.

**Effect on receipt:**

When receiving this primitive from CE, the TVBD shall send the response to CE, which indicates “Success” or “Failure” for de-registration of the corresponding TVBD.

#### 5.2.2.1.5.2 COEX_TVBD_DeReg.response

**Function:**

This primitive used by TVBD is transmitted to CE to give the response of de-registration of the corresponding TVBD.

**Semantics:**

```c
COEX_TVBD_DeReg.response(
    sourceID
    destinationID
    Status
)
```

**Parameters:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>status</td>
<td>Status</td>
<td>Status of de-registration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Success: De-registration of the corresponding TVBD is succeed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Failure: De-registration of the corresponding TVBD is failed.</td>
</tr>
</tbody>
</table>
When generated:
This primitive is generated in response to a COEX_TVBD_DREG.request primitive.

Effect on receipt:
When receiving this primitive from TVBD, the CE shall send the response from TVBD to CM, which indicates “Success” or “Failure” for de-registration of the corresponding TVBD.

5.2.2.1.6 COEX_DeAuth

5.2.2.1.6.1 COEX_DeAuth.request

Function
Used by TVBD network/device to request de-authentication with CE.

Semantics
COEX_DeAuth.request ( 
  sourceID
  destinationID
  User ID
  User Password
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>User ID</td>
<td>IA5String (ITU-T X.208)</td>
<td>This parameter contains User ID to be used by CE to authenticate with coexistence system.</td>
</tr>
<tr>
<td>User Password</td>
<td>IA5String</td>
<td>This parameter contains User Password to be used by CE to authenticate with coexistence system.</td>
</tr>
</tbody>
</table>

When generated
Generated by TVBD network/device to request de-authentication with CE.

Effect on receipt
When CE receives this primitive, it shall send COEX_DeAuth.response back to the CE.

5.2.2.1.6.2 COEX_DeAuth.response

Function
Used by CE to inform TVBD network/device that the de-authentication is valid or not.

Semantics
COEX_DeAuth.response ( 
  sourceID
  destinationID
  status
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
</tbody>
</table>
status | Status | This parameter shows that the authentication information in GetAuthInfo.response is valid or invalid status.
---|---|---

*When generated*
Generated by CE to TVBD network/device to indicate whether the de-authentication is successfully processed.

*Effect on receipt*
When TVBD network/device receives this primitive, it shall examine status.

5.2.2.2 Information service

5.2.2.2.1 COEX_NeighbourList

5.2.2.2.1.1 COEX_NeighbourList.indication

*Function*
Used by CE to update the neighbour list for TVBD network/device. This primitive is only used for TVBD network/device that is subscribed to discovery service.

*Semantics*
COEX_Neighbourlist.indication (  
  sourceID  
  destinationID  
  neighbourList )

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>neighbourList</td>
<td>NeighbourList</td>
<td>The list of TVBD neighbours</td>
</tr>
</tbody>
</table>

*When generated*
Generated by CE to update the neighbor information for TVBD network/device.

*Effect on receipt*
When TVBD network/device receives this primitive, it shall update the neighbour information with the new value provided in this primitive.

5.2.2.2.2 COEX_AvailableChannelList

5.2.2.2.2.1 COEX_AvailableChannelList.request

*Function*
Used by CE to obtain available channel list from TVBD network/device

*Semantics*
COEX_AvailableChannelList.request(  
  sourceID  
  destinationID  
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>

15
When generated
Generated by TVBD network/device to obtain available channel list from CE.

Effect on receipt
When TVBD network/device receives this primitive, the TVBD network/device shall send COEX_AvailableChannelList.request back to the CE.

5.2.2.2.2  COEX_AvailableChannelList.response

Function
Used by TVBD network/device to provide the list of available channels it can operate to CE.

Semantics
COEX_AvailableChannelList.response ( 
  sourceID
  destinationID
  regulatoryDomain
  availableChannelList
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>regulatoryDomain</td>
<td>RegulatoryDomain</td>
<td>The domain of regulatory of TVWS</td>
</tr>
<tr>
<td>availableChannelList</td>
<td>AvailableChannelList</td>
<td>Available channel list to operate in TVWS</td>
</tr>
</tbody>
</table>

When generated
Generated by TVBD network/device in response to COEX_AvailableChannelList.request from CE.

Effect on receipt
When CE receives this primitive, it examines the received information required for coexistence.

5.2.2.2.2.3  COEX_AvailableChannelList.indication

Function
Used by TVBD network/device to update the list of available channels it can operate to CE.

Semantics
COEX_AvailableChannelList.indication ( 
  sourceID
  destinationID
  regulatoryDomain
  availableChannelList
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
</tbody>
</table>

regulatoryDomain | RegulatoryDomain | The domain of regulatory of TVWS
availableChannelList | AvailableChannelList | Available channel list to operate in TVWS

When generated
Generated by TVBD network/device if information in the last COEX_AvailableChannelList.response changed.

Effect on receipt
When CE receives this primitive, it examines the received information required for coexistence.

5.2.2.2.3 COEX_ChannelClassification

5.2.2.2.3.1 COEX_ChannelClassification.request

Function:
This primitive is used by TVBD network/device to request the channel classification of the corresponding TVBD network/device.

Semantics:
Ch_Classification.request(  
  SourceID,  
  DestinationID  
)

Parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SourceID</td>
<td>COEX_ID</td>
<td>Source identifier</td>
</tr>
<tr>
<td>DestinationID</td>
<td>COEX_ID</td>
<td>Destination identifier</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated by TVBD network/device when it needs to request the channel classification of the corresponding TVBD network/device.

Effect on receipt:
When receiving this primitive from TVBD network/device, the CE shall request the channel classification information of the corresponding TVBD network/device to CM.

5.2.2.2.3.2 COEX_ChannelClassification.response

Function:
This primitive used by CE is transmitted to TVBD network/device to give the channel classification information of the corresponding TVBD network/device from CM

Semantics:
Ch_Classification.response(  
  SourceID,  
  DestinationID,  
  ChannelClassificationList,  
  TxMaxPower  
)

Parameters:
<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SourceID</td>
<td>COEX_ID</td>
<td>Source identifier</td>
</tr>
<tr>
<td>DestinationID</td>
<td>COEX_ID</td>
<td>Destination identifier</td>
</tr>
<tr>
<td>ChannelClassificationList</td>
<td>COEX_CH_CLASSIFICATION</td>
<td>Channel classification list</td>
</tr>
<tr>
<td>TxMaxPower</td>
<td>REAL</td>
<td>Maximum transmit power</td>
</tr>
</tbody>
</table>

*When generated:*  
This primitive is generated in response to a Ch_Classification.request primitive.

*Effect on receipt:*  
When receiving this primitive from CE, TVBD network/device shall employ the information for selecting operating channel of the corresponding TVBD network/device.

5.2.2.2.3 COEX_ChannelClassification.indication

*Function:*  
This primitive used by CE is transmitted to TVBD to update channel classification information of the corresponding TVBD from CM.

*Semantics:*  
Ch_Classification.response(
  SourceID,
  DestinationID,
  ChannelClassificationList,
  TxMaxPower
)

*Parameters:*

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SourceID</td>
<td>COEX_ID</td>
<td>Source identifier</td>
</tr>
<tr>
<td>DestinationID</td>
<td>COEX_ID</td>
<td>Destination identifier</td>
</tr>
<tr>
<td>ChannelClassificationList</td>
<td>COEX_CH_CLASSIFICATION</td>
<td>Channel classification list</td>
</tr>
<tr>
<td>TxMaxPower</td>
<td>REAL</td>
<td>Maximum transmit power</td>
</tr>
</tbody>
</table>

*When generated:*  
This primitive is generated to update channel classification information of the corresponding TVBD network/device.

*Effect on receipt:*  
When TVBD network/device receives this primitive, it shall update channel classification information of the corresponding TVBD network/device.

5.2.2.4 COEX_Information

5.2.2.4.1 COEX_Information.request

*Function:*  
This primitive is used by CE to obtain the context information of the corresponding TVBD for coexistence.
Semantics:
COEX_Information.request(
  sourceID
  destinationID
  coexInforIDs
)

Parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>coexInforIDs</td>
<td>CoexInfoIDs</td>
<td>ID list of reported context information</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated by the CE when it needs to obtain the context information of the corresponding TVBD for coexistence.

Effect on receipt:
When receiving this primitive from CE, the TVBD shall give its context information the CE, which is selected by information ID list from CE.

5.2.2.2.4.2 COEX_Information.response

Function:
This primitive used by TVBD is transmitted to CE to give the context information of the corresponding TVBD for coexistence.

Semantics
COEX_Information.response (  
  sourceID
  destinationID
  coexInfoValues
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>coexInfoValues</td>
<td>CoexInfoValues</td>
<td>A set of information requests, each containing a information type and a information value</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated in response to a COEX_Information.request primitive.

Effect on receipt:
When receiving this primitive from TVBD network/devices, the CE shall give the context information of the corresponding TVBD the CM, which is selected by information ID list from CM.

5.2.2.2.4.3 COEX_Information.indication

Function:
This primitive used by TVBD is transmitted to CE to indicate the context information change of the corresponding TVBD for coexistence.
Semantics
COEX_Information.Indication ( 
   sourceID
   destinationID
   coexInfoValues
)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>coexInfoValues</td>
<td>CoexInfoValues</td>
<td>A set of information requests, each containing a information type and a information value</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated to indicate the context information change of the corresponding TVBD for coexistence.

Effect on receipt:
When receiving this primitive from TVBD network/devices, the CE shall give the context information of the corresponding TVBD the CM, which is selected by information ID list from CM.

5.2.2.3 Resource configuration service

5.2.2.3.1 COEX_ResourceConfigure

5.2.2.3.1.1 COEX_ResourceConfigure.request

Function:
Used by CE to request reconfiguration of TVBD networks/devices required for coexistence.

Semantics:
COEX_Reconfigure.request( 
   sourceID
   destinationID
   DialogToken
   CoexistenceMode, 
   ChannelClassificationList, 
   ServiceStartEndTime, 
   ServiceCoverage, 
   reconfigurationRequest 
   CommandRequestSet 
)

Parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>DialogToken</td>
<td>Integer</td>
<td>The Dialog Token to identify the command transaction.</td>
</tr>
</tbody>
</table>
Coexistence mode such as
- Individual channel assignment mode
- Co-channel sharing mode

Channel classification list

Service time including
- Start time
- End time

Service coverage for communications

Set of command requests, each as defined in command request element

When generated:
This primitive is generated by the CE when it needs to request the reconfiguration of the corresponding TVBD network/device.

Effect on receipt:
When TVBD network/device receives this primitive from CE, it shall perform the reconfiguration based on the parameter information in this primitive.

5.2.2.3.1.2 COEX_ResourceConfigure.response

Function:
This primitive used by TVBD network/device to report the results of the requested reconfiguration

Semantics:
COEX_Reconfigure.response(
  sourceID
  destinationID
  DialogToken
  ReconfigurationParameters
  reconfigurationstatus
  CommandResponseSet
)

Parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>DialogToken</td>
<td>Interger</td>
<td>The Dialog Token to identify the command transaction.</td>
</tr>
<tr>
<td>ReconfigurationParameters</td>
<td>COEX_RC_PARAMETERS</td>
<td>The status information of reconfiguration parameters is provided with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• accepted values of parameters when reconfiguration is succeed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• recommended values of parameters when reconfiguration is failed</td>
</tr>
<tr>
<td>reconfigurationstatus</td>
<td>Boolen</td>
<td>This parameter shows the status of reconfiguration.</td>
</tr>
<tr>
<td>Name</td>
<td>Data Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>DialogToken</td>
<td>Integer</td>
<td>The Dialog Token to identify the command transaction.</td>
</tr>
<tr>
<td>MeasurementID</td>
<td>COEX_MES_ID</td>
<td>Measurement list such as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• TVBD QoS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• TVBD spectrum sensing</td>
</tr>
<tr>
<td>ChannelNumberList</td>
<td>SEQUENCE OF INTEGER</td>
<td>Measuring channel number list</td>
</tr>
<tr>
<td>MeasurementOptions</td>
<td>COEX_MES_OPTIONS</td>
<td>Measurement options such as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measurement duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measurement frequency range</td>
</tr>
<tr>
<td>measurementDescription</td>
<td>MeasurementDescription</td>
<td>Measurement Description</td>
</tr>
<tr>
<td>MeasurementRequestSet</td>
<td>Set of measurement requests,</td>
<td>A set of measurement requests, each</td>
</tr>
</tbody>
</table>

**CommandResponseSet**

Set of command responses, each as defined in command response element

A set of command responses, each containing a command type and a command response

**When generated:**

This primitive is generated by TVBD network/device in response to a COEX_Reconfigure.request primitive.

**Effect on receipt:**

When CE receives this primitive from TVBD network/device, the CE shall examine the status of the reconfiguration.

**5.2.2.4 Measurement service**

**5.2.2.4.1 COEX_Measurement**

**5.2.2.4.1.1 COEX_Measurement.request**

**Function:**

This primitive is used by CE to request TVBD network/device to perform the measurement required for coexistence.

**Semantics:**

```c
COEX_Measurement.request(
    sourceID,
    destinationID,
    DialogToken, MeasurementID,
    ChannelNumberList,
    MeasurementOptions,
    measurementDescription,
    MeasurementRequestSet
)
```

**Parameters:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>This identifies a CE that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>This identifies a TVBD that is destination of this request</td>
</tr>
<tr>
<td>DialogToken</td>
<td>The Dialog Token to identify the command transaction.</td>
</tr>
<tr>
<td>MeasurementID</td>
<td>Measurement list such as</td>
</tr>
<tr>
<td></td>
<td>• TVBD QoS</td>
</tr>
<tr>
<td></td>
<td>• TVBD spectrum sensing</td>
</tr>
<tr>
<td>ChannelNumberList</td>
<td>Measuring channel number list</td>
</tr>
<tr>
<td>MeasurementOptions</td>
<td>Measurement options such as</td>
</tr>
<tr>
<td></td>
<td>• Measurement duration</td>
</tr>
<tr>
<td></td>
<td>• Measurement frequency range</td>
</tr>
<tr>
<td>measurementDescription</td>
<td>Measurement Description</td>
</tr>
<tr>
<td>MeasurementRequestSet</td>
<td>A set of measurement requests, each</td>
</tr>
</tbody>
</table>
When generated:
This primitive is generated by the CE to request TVBD network/device to perform measurement required for coexistence.

Effect on receipt:
When TVBD network/device receives this primitive from CE, it shall perform the measurements based on the measurement options/Description in this primitive.

5.2.2.4.1.2 COEX_MEasurement.response

Function:
This primitive used by TVBD network/device to provide the results of the measurement to CE.

Semantics:
COEX_TVBD_MES.response(
    sourceID
    destinationID
    DialogToken
    MeasurementID,
    ChannelNumberList,
    MeasurementResults,
    MeasurementParameters
    measurementResult
    MeasurementReportSet
)

Parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceID</td>
<td>COEX_ID</td>
<td>This identifies a TVBD that is source of this request</td>
</tr>
<tr>
<td>destinationID</td>
<td>COEX_ID</td>
<td>This identifies a CE that is destination of this request</td>
</tr>
<tr>
<td>DialogToken</td>
<td>Integer</td>
<td>The Dialog Token to identify the command transaction.</td>
</tr>
<tr>
<td>MeasurementID</td>
<td>COEX_MES_ID</td>
<td>Measurement ID</td>
</tr>
<tr>
<td>ChannelNumberList</td>
<td>SEQUENCE OF INTEGER</td>
<td>Measured channel number list</td>
</tr>
<tr>
<td>MeasurementResults</td>
<td>COEX_MES_RESULTS</td>
<td>Measurement results</td>
</tr>
<tr>
<td>MeasurementParameters</td>
<td>COEX_MES_OPTIONS</td>
<td>Actual measurement parameters such as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Actual measurement duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Actual measurement frequency range</td>
</tr>
<tr>
<td>measurementResult</td>
<td>MeasurementResult</td>
<td>Measurement Result</td>
</tr>
<tr>
<td>MeasurementReportSet</td>
<td>Set of measurement reports, each as defined in measurement report element</td>
<td>A set of measurement reports, each containing a measurement type and a measurement report</td>
</tr>
</tbody>
</table>

When generated:
This primitive is generated by TVBD network/device in response to a COEX_MEasurement.request primitive.

Effect on receipt:
When CE receives this primitive from TVBD network/device, the CE shall examine the measurement results required for coexistence.

5.2.2.4.1.3 COEX_Measurement.indication

*Function*
Used by TVBD network/device to provide measurement results to CE.

*Semantics*
GetAvailableChannelList.indication (measurementResult)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MeasurementResult</td>
<td>MeasurementResult</td>
<td>Measurement Result</td>
</tr>
</tbody>
</table>

*When generated*
Generated by TVBD network/device in response to GetMeasurement.request from CE.

*Effect on receipt*
When CE receives this primitive, it examines the received measurement results required for coexistence.

5.2.2.5 Event service

5.2.2.5.1 COEX_TVBD_EV

5.2.2.5.1.1 COEX_Event.request

*Function:*
This primitive, which is periodically generated, is used by CE to transmit to TVBD to request the event detection of the corresponding TVBD.

*Semantics:*
COEX_TVBD_EV.request(
    EventIDS
)

*Parameters:*

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| EventIDs | COEX_EV_IDS | Event list such as
        • TVBD QoS event, which is detected when QoS of TVBD is degraded under the required reliability.
        • TVBD geolocation change
        • TVBD coverage change |

*When generated:*
This primitive is generated by the CE when it needs to request the event detection of the corresponding TVBD.
Effect on receipt:
When receiving this primitive from CE, the TVBD shall notify whether the event of the corresponding TVBD is occurred or not.

5.2.2.5.2 COEX_Event.indication

Function:
Used by TVBD network/device to inform CE about events related to coexistence observed or predicted by TVBD network/device. Also, used by CE to inform TVBD network/device about events related to coexistence observed or predicted by IEEE 802.19.1 system.

Semantics:
EVENT.indication(
  eventParams
)

Name | Type    | Description
-----|---------|-------------
eventParams | EventParams | This parameter contains list of event parameters.

When generated:
Generated by TVBD network/device to inform CE about events related to coexistence observed or predicted by TVBD network/device.
Generated by CE to inform TVBD network/device about events related to coexistence observed or predicted by IEEE 802.19.1 system.

Effect on receipt
When CE receives this primitive, it examines the received information about events related to coexistence observed or predicted by TVBD network/device.

When TVBD network/device receives this primitive, it examines the received information about events related to coexistence observed or predicted by IEEE 802.19.1 system.

5.3 Data type definition

5.3.1 Coexistence Network SAP data types / Coexistence Transport SAP data types

5.3.1.1 Transport service

The following data types are defined for Coexistence Transport SAP.

TRANSPORT_PREF ::= ENUMERATED{
  TCP,
  UDP,
  HTTP,
  SNMP,
  ...
}

TRANSPORT_ADDR ::= OCTET_STRING

5.3.2 Coexistence Media/Link/DME SAP

5.3.2.1 Registration service

COEX_ID ::= CHOICE{
  CE_ID INTEGER,
  TVBD_ID INTEGER
}

Status ::= ENUMERATED{
  Success,
  Failure
}

NetworkID ::= ENUMERATED{
  BSSID,
  ...
}

ServiceType ::= ENUMERATED{
  Discovery,
  Management
}

5.3.2.2 Information service

NetworkType ::= ENUMERATED{
IEEE802.11af,
        IEEE802.22,
        ECMA392,
        ...
    }
OperatingTVChannelList ::= SEQUENCE OF INTEGER
NeighbourList ::= SEQUENCE OF SEQUENCE {
    networkID      NetworkID,
    networkType    NetworkType,
    operatingTVChannelList  OperatingTVChannelList
}
RegulatoryDomain ::= ENUMERATED {
    USA,
    UK,
    Singapore,
    ...
}
AvailableChannelList ::= SEQUENCE OF SEQUENCE {
    TVChannelNumber  INTEGER,
    txPowerLimit     REAL
}
ServiceArea ::= TBD
InterferenceArea ::= TBD
RequiredServiceCoverage ::= TBD
SeparateDistance ::= TBD
Coverage ::= TBD
TVBD_GEOLOCATION ::= SEQUENCE {
    LatitudeResolution REAL,
    Latitude       REAL,
    LongitudeResolution REAL,
    Longitude      REAL,
    AltitudeResolution REAL,
    Altitude        REAL
}
ANT_POLAR ::= ENUMERATED {
    HorizontalPolarization,
    VerticalPolarization,
    LeftHandCircularPolarization,
    RightHandCircularPolarization,
    ...
}
TVBD_RC_OPTION_ID ::= ENUMERATED {
TVBD_RC_OPTION VALUE ::= CHOICE {
  TransmitPowerControlResolution REAL,
  TransmitPowerRange REAL,
  ReconfigurableAntenna PolarizationList SEQUENCE OF ANT_POLAR,
  AntennaHPBWControlResolution REAL,
  AntennaHPBWControlRange REAL,
  ...
}

TVBD_RC_OPTION ::= SEQUENCE {
  RCOptionsID TVBD_RC_OPTION_ID,
  RCOptionsValue TVBD_RC_OPTION_VALUE
}

COEX_TVBD_RC_OPTIONS ::= SEQUENCE OF TVBD_RC_OPTION

CoexInfoID CHOICE {
  serviceType,
  networkID,
  networkType,
  operatingTVChannelList,
  serviceArea,
  interferenceArea,
  requiredBandwidth,
  requiredServiceDuration,
  requiredServiceCoverage,
  antennaGain,
  antennaHeight,
  geolocation,
  reconfigurationOptions,
  geolocation,
  separateDistance,
  coverage
}

CoexInfoIDs ::= SEQUENCE OF CoexInfoID

CoexInfoValue CHOICE {
  serviceType ServiceType,
  networkID NetworkID,
  networkType NetworkType,
  operatingTVChannelList OperatingTVChannelList,
  serviceArea ServiceArea,
  interferenceArea InterferenceArea,
requiredBandwidth REAL,  
requiredServiceDuration GeneralizedTime,  
requiredServiceCoverage RequiredServiceCoverage,  
antennaGain REAL,  
antennaHeight REAL,  
geolocation TVBD_GEOLOCATION,  
reconfigurationOptions COEX_TVBD_RC_OPTIONS,  
geolocation Geolocation,  
separateDistance SeparateDistance,  
coverage Coverage
}

CoexInfoValues ::= SEQUENCE OF CoexInfoValue

5.3.2.3 Reconfiguration service

COEX_MODE ::= ENUMERATED{
  IndividualChannelAssignmentMode,  
  CoChannelSaringMode,  
  ...
}

COEX_CH_CLASSIFICATION ::= SEQUENCE {
  AllowedChannelList SEQUENCE OF INTEGER,  
  AvailableChannelList SEQUENCE OF INTEGER,  
  RestrictedChannelList SEQUENCE OF INTEGER  
}

COEX_SER_TIME ::= SEQUENCE {
  StartTime INTEGER,  
  EndTime INTEGER
}

ANT_POLAR ::= ENUMERATED{
  HorizontalPolarization,  
  VerticalPolarization,  
  LeftHandCircularPolarization,  
  RightHandCircularPolarization,  
  ...
}

COEX_RC_OPTIONS ::= SEQUENCE {
  TransmitPower REAL,  
  AntennaPolarization ANT_POLAR,  
  AntennaHPBW REAL
}

RC_PARAMETER_ID ::= ENUMERATED{
  CoexistenceMode,  
  OperatingChannelList,  
  ServiceStartEndTime,  
  ServiceCoverage,  
  ReconfigurationOptions,
RC_PARAMETER_VALUE ::= CHOICE{
  CoexistenceMode     COEX_MODE,
  OperatingChannelList    SEQUENCE OF INTEGER,
  ServiceStartEndTime    COEX_SER_TIME,
  ServiceCoverage     REAL,
  ReconfigurationOptions   COEX_RC_OPTIONS,
...
}
RC_PARAMETER ::= SEQUENCE{
  ParametersID     RC_PARAMETER_ID,
  ParameterStatus    BOOLEAN,
  ParameterValue    RC_PARAMETER_VALUE
}
COEX_RC_PARAMETERS ::= SEQUENCE OF RC_PARAMETER
ReconfigurationRequest ::= SEQUENCE OF SEQUENCE {
  operationChannel OperationChannel,
  txPowerLimit REAL,
  channelIsShared BOOLEAN,
  txScheduleSEQUENCE OF TxSchedule
}
TxSchedule ::= SEQUENCE {
  scheduleStartTime REAL,
  scheduleDuration REAL,
  numberOfScheduleRepetitions INTEGER,
  transmissionStartTime REAL,
  transmissionDuration REAL
}

5.3.2.4 Measurement service

COEX_MES_ID ::= ENUMERATED{
  TVBDQoS,
  TVBDSpectrumSensing,
...
}
COEX_MES_OPTIONS ::= ENUMERATED{
  MeasureDuration INTEGER,
  MeasureFrequencyRange REAL,
...
}
COEX_MES_RESULTS ::= ENUMERATED{
  TVBDQoSResult REAL,
  TVBDSpectrumSensingResults REAL,
...
}
MeasurementDescription ::= TBD
MeasurementResult ::= TBD

5.3.2.5 Event service

EV_ID ::= ENUMERATED {
  TVBDQoSChange,
  TVBDGeolocationChange,
  TVBDCoverageChange,
  ...
}

COEX_EV_IDS ::= SEQUENCE OF EV_ID

COEX_EV_STATUS ::= SEQUENCE {
  EventID EV_ID,
  EventStatus BOOLEAN
}

EventParams ::= TBD