

IEEE P802.19
Wireless Coexistence Working Group

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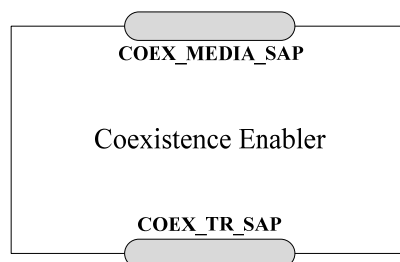
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1 **5. IEEE 802.19.1 reference model**

2 **5.1 General description**

3 Figure 1 illustrates reference model of a Coexistence Enabler.



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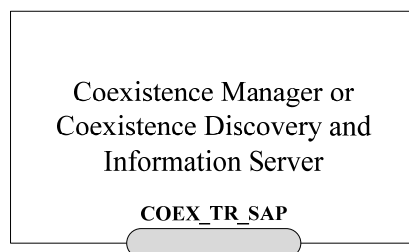
5 **Figure 1—Reference model of a Coexistence Enabler**

6 The Coexistence Enabler has two service access points:

7 — Coexistence Media SAP (COEX_MEDIA_SAP)

8 — Coexistence Transport SAP (COEX_TR_SAP).

9 Figure 2 illustrates reference model of a Coexistence Manager and a Coexistence Discovery and
10 Information Server.



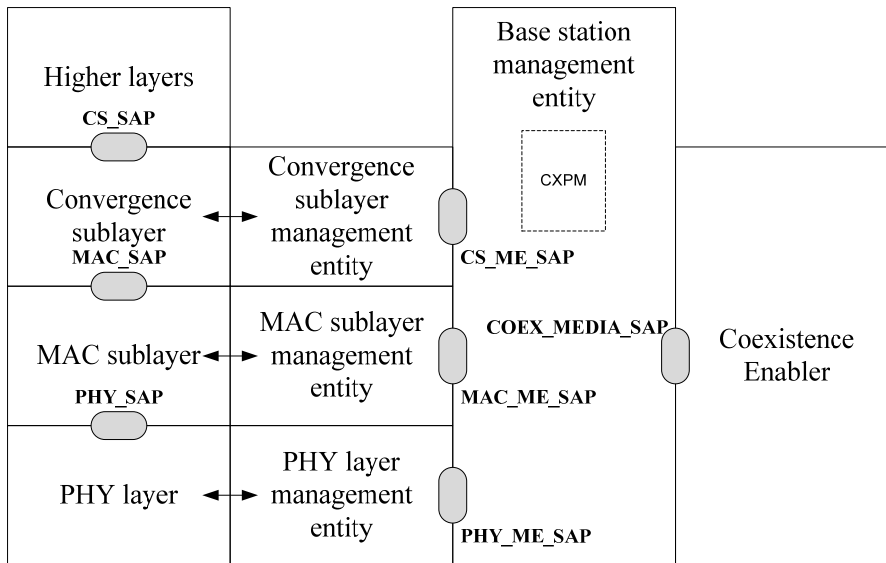
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12 **Figure 2— Reference model of a Coexistence Manager and a Coexistence Discovery and**
13 **Information Server**

14 The Coexistence Manager and the Coexistence Discovery and Information Server have one service access
15 point:

16 — Coexistence Transport SAP (COEX_TR_SAP).

17 COEX_MEDIA_SAP defines the interface A between the CE and a TVBD network/device. Example
18 reference model of a CE describing an example implementation of the interface A inside a base station is
19 shown in Figure 3.



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Figure 3— Example reference model for the interface A

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The left side of Figure 3 shows a typical reference model of a radio interface including data, control and management planes for physical layer, MAC sublayer, and convergence sublayer. The middle part of the Figure 3 shows the base station management entity. The right part of Figure 3 shows the CE.

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Typically, the radio interface is implemented in such a way that it provides a management interface for the base station management entity. In Figure 3, such interface is represented by three service access points PHY_ME_SAP, MAC_ME_SAP, and CS_ME_SAP, corresponding to the physical layer, the MAC sublayer, and the convergence sublayer. These service access points can be used to obtain information from the radio interface and to request reconfiguration of the radio interface. Correspondingly, the CE can use these service access points to implement the interface A. The interface A is defined by the service access point COEX_MEDIA_SAP. Communication between the radio interface management service access points PHY_ME_SAP, MAC_ME_SAP, and CS_ME_SAP and the CE service access point COEX_MEDIA_SAP is done via the base station management entity. Base station management entity (i.e., TVBD network or device management entity) provides CXPM (coexistence primitive mapping) service. CXPM converts CX_MEDIA_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.

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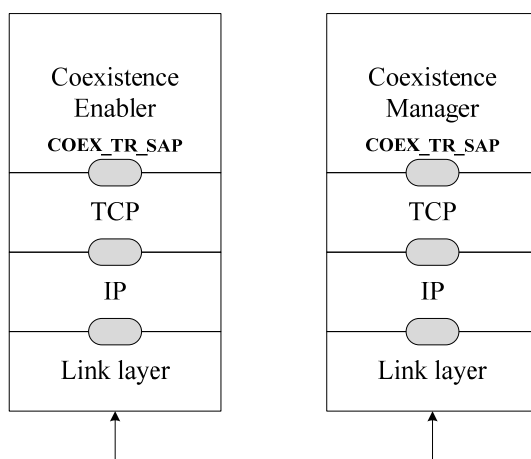
The COEX_TR_SAP provides means for a Coexistence Enabler, a Coexistence Manager, and a Coexistence Discovery and Information Server to communicate with each other and with external entities by using transport services provided by underlying layers. The underlying layers could be application layer, transport layer, network layer, and link layer. Example reference model of a CE and a CM describing example of using COEX_TR_SAP for interface B1 is shown in Figure 4.

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Figure 4— Example of using COEX_TR_SAP for interface B1

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

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6 **5.2 Service access points**

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7 **5.2.1 COEX_TR_SAP**

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Coexistence Transport SAP (COEX_TR_SAP) provides means for a Coexistence Enabler, a Coexistence Manager, and a Coexistence Discovery and Information Server to communicate with each other and with external entities by using transport services provided by underlying layers. The Coexistence Transport SAP is defined as a set of primitives that provides the following service:

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— Transport service:

11

— Used by a CE, a CM, a CDIS or an external entity to send a coexistence protocol data unit to each other and to external entities and to receive an acknowledgement of such operation

12

— Used by a CE, a CM, and a CDIS or an external entity to receive a coexistence protocol data unit from each other and from external entities.

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

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Table 1—Coexistence Transport SAP primitives

Primitive	Service	Description
CP_PACKET_SEND	Transport	Used by a CE, CM, CDIS or external entity to send a coexistence protocol data unit using a transport service provider.
CP_PACKET_RECEIVE	Transport	Used by a transport service provider to deliver a coexistence protocol data unit to a CE, CM, CDIS or external entity.

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1 **Transport service**

2 **5.2.1.1.1 CP_PACKET_SEND.request**

3 **Function:**

4 Used by a CE, a CM, a CDIS or an external entity to request the transport service provider to transport a
5 coexistence protocol data unit.

6 **Semantics:**

7 CP_PACKET_SEND.request (

8 transportPref,

9 sourceID,

10 destinationID,

11 coexProtocolPDU

12)

Name	Data Type	Description
transportPref	TransportPref	Transport protocol preference.
sourceID	OCTET_STRING	Address of the entity sending a coexistence protocol data unit.
destinationID	OCTET_STRING	Address of the entity to receive a coexistence protocol data unit.
coexProtocolPDU	OCTET_STRING	Coexistence protocol data unit to be transported.

13 **When generated:**

14 Generated by a CE, a CM, a CDIS or an external entity to request the transport service provider to transport
15 a coexistence protocol data unit.

16 **Effect on receipt:**

17 The specific transport service provider receiving this primitive attempts to transport the coexistence
18 protocol data unit.

19 **5.2.1.1.2 CP_PACKET_SEND.confirm**

20 **Function:**

21 Used by a transport service provider to acknowledge transportation of the coexistence protocol data unit if
22 such acknowledgment is supported by the transport service provider.

23 **Semantics:**

24 CP_PACKET_SEND.confirm (

25 transportPref,

26 sourceID,

27 destinationID,

28 transportStatus

29)

Name	Data Type	Description
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transportPref	TransportPref	Transport protocol used.
sourceID	OCTET_STRING	Address of the entity sending a coexistence protocol data unit.
destinationID	OCTET_STRING	Address of the entity to receive a coexistence protocol data unit.
transportStatus	BOOLEAN	Indicates whether the transfer of a coexistence protocol data unit was successful or not.

1 **When generated:**

2 Generated by the transport service provider to indicate whether the transfer of a coexistence protocol data
3 unit is successful or not if such acknowledgement is supported by the transport service provider.

4 **Effect on receipt:**

5 When a CE, a CM, a CDIS or external entity receives this primitive, it learns about the status of the
6 requested delivery of coexistence protocol data unit.

7 **5.2.1.1.3 CP_PACKET_RECEIVE**8 **Function:**

9 Used by a transport service provider to deliver a coexistence protocol data unit to a CE, a CM, a CDIS or
10 an external entity.

11 **Semantics:**

12 CP_PACKET_RECEIVE (

13 transportPref,

14 sourceID,

15 coexProtocolPDU

16)

Name	Data Type	Description
transportPref	TransportPref	Transport protocol used.
sourceID	OCTET_STRING	Address of the entity from which a coexistence protocol data unit was received.
coexProtocolPDU	OCTET_STRING	The received coexistence protocol data unit.

17 **When generated:**

18 Generated by the transport service provider when it has coexistence protocol data unit for CE, CM, CDIS
19 or external entity

20 **Effect on receipt:**

21 The CE, CM, CDIS or external entity receiving this primitive gets a coexistence protocol data unit.

22 **5.2.2 COEX_MEDIA_SAP**

23 Coexistence Media SAP (COEX_MEDIA_SAP) defines the interface A between a CE and a TVBD
24 network or device. The Coexistence Media SAP is defined as a set of primitives that provides the following
25 services:

26 — Authentication service

27 — Used by the TVBD network or device to provide its authentication information to the coexistence
28 system

29 — Subscription service

30 — Used by the TVBD network or device to provide its subscription information to the coexistence
31 system and to update this subscription information

- 1 — Used by the coexistence system to ask TVBD network or device to change its subscribed
2 coexistence service.
- 3 — Registration service
- 4 — Used by the TVBD network or device to provide its registration information to the coexistence
5 system and to update this registration information
- 6 — Information service
- 7 — Used by the CE to send a neighbor report to the TVBD network or device subscribed to the
8 coexistence information service
- 9 — Used by the CE to obtain an available channel list from the TVBD network or device subscribed to
10 the coexistence management service
- 11 — Used by the CE to obtain information required for coexistence from the TVBD network or device
12 subscribed to the coexistence management service
- 13 — Used by the TVBD network or device to obtain channel classification information from the
14 coexistence system
- 15 — Measurement service
- 16 — Used by the CE to obtain measurement results required for coexistence from the TVBD network or
17 device subscribed to the coexistence management service
- 18 — Reconfiguration service
- 19 — Used by the CE to request the TVBD network or device subscribed to the coexistence management
20 service to perform reconfiguration required for coexistence
- 21 — Used by TVBD network or device to request for resource
- 22 — Event service
- 23 — Used by the CE and TVBD network or device to exchange indications of events related to
24 coexistence.
- 25 Primitives described in Table 2 are used to define the Coexistence Media SAP.

26

Table 2—Coexistence Media SAP primitives

Primitive	Service	Description
GetAuthInfo	Authentication	Used by the TVBD network or device for authentication with the coexistence system
GetServiceSubscription	Subscription	Used by the TVBD network or device to provide its subscription information to the coexistence system
NewServiceSubscription		Used by the TVBD network or device to update its subscription information in the coexistence system
ChangeSubscription		Used by CE to ask TVBD network or device to change its subscription to the coexistence service
GetRegInfo	Registration	Used by the TVBD network or device to provide its registration information to the coexistence system
NewRegInfo		Used by the TVBD network or device to update its registration information in the coexistence system
NeighborReport	Information	Used by the CE to send neighbor report to the TVBD network or device subscribed to the coexistence information service

AvailableChannelList		Used by the CE to obtain available channel list from the TVBD network or device subscribed to the coexistence management service
ChannelClassification		Used by the TVBD network or device to obtain channel classification information from the coexistence system
GetInfo		Used by the CE to obtain information required for coexistence from the TVBD network or device subscribed to the coexistence management service
GetMeasurement	Measurement	Used by the CE to obtain measurement results required for coexistence from the TVBD network or device subscribed to the coexistence management service
PerformReconfiguration	Reconfiguration	Used by the CE to request the TVBD network or device subscribed to the coexistence management service to perform reconfiguration required for coexistence
ResourceReconfiguration		Used by TVBD network or device to request for resource
Event	Event	Used by the CE and TVBD network or device to exchange indications of events related to coexistence

1 Authentication service

2 5.2.2.1.1 GetAuthInfo

3 5.2.2.1.1.1 GetAuthInfo.request

4 *Function*

5 Used by a CE to request authentication information from the TVBD network or device.

6 *Semantics*

7 GetAuthInfo.request()

8 *When generated*

9 Generated by the CE to obtain authentication information from the TVBD network or device.

10 *Effect on receipt*

11 When the TVBD network or device receives this primitive, it sends a GetAuthInfo.response back to the CE.

12 5.2.2.1.1.2 GetAuthInfo.response

13 *Function*

14 Used by the TVBD network or device to provide the authentication information to the CE.

1 **Semantics**
 2 GetAuthInfo.response (
 3 UserID
 4 UserPassword
 5)

Name	Type	Description
UserID	IA5String (ITU-T X.208)	This parameter contains User ID to be used by a CE to authenticate with the coexistence system.
UserPassword	IA5String	This parameter contains User Password to be used by a CE to authenticate with the coexistence system.

6 **When generated**
 7 Generated by the TVBD network or device in response to a GetAuthInfo.request from the CE.

8 **Effect on receipt**
 9 When the CE receives this primitive, it starts authentication of the TVBD network or device with the
 10 coexistence system.

11 5.2.2.1.1.3 GetAuthInfo.confirm

12 **Function**
 13 Used by a CE to inform the TVBD network or device about the results of the authentication.

14 **Semantics**
 15 GetAuthInfo.confirm(
 16 status
 17)

Name	Type	Description
status	BOOLEAN	This parameter shows whether the authentication was successful or not.

18 **When generated**
 19 Generated by the CE after an attempt to authenticate the TVBD network or device in the coexistence
 20 system.

21 **Effect on receipt**
 22 If the authentication was not successful, the TVBD network or device re-examines its authentication
 23 information provided.

1 **Subscription service**

2 **5.2.2.1.2 GetServiceSubscription**

3 **5.2.2.1.2.1 GetServiceSubscription.request**

4 **Function**

5 Used by a CE to obtain subscription information from the TVBD network or device.

6 **Semantics**

7 GetServiceSubscription.request()

8 **When generated**

9 Generated by the CE to request the TVBD network or device to indicate the coexistence service which it
10 wants to receive from the coexistence system.

11 **Effect on receipt**

12 When the TVBD network or device receives this primitive, it sends a GetServiceSubscription.response
13 back to the CE.

14 **5.2.2.1.2.2 GetServiceSubscription.response**

15 **Function**

16 Used by the TVBD network or device to inform the CE about the coexistence service which it wants to
17 receive from the coexistence system.

18 **Semantics**

19 GetServiceSubscription.response (

20 subscribedService

21)

Name	Type	Description
subscribedService	SubscribedService	This parameter describes coexistence service that the TVBD network or device wishes to receive from the coexistence system.

22 **When generated**

23 Generated by the TVBD network or device in response to a GetServiceSubscription.request from the CE.

24 **Effect on receipt**

25 When CE receives this primitive, it requests a service subscription from a CM.

26 **5.2.2.1.2.3 GetServiceSubscription.confirm**

27 **Function**

1 Used by the CE to inform the TVBD network or device about the result of the subscription to the
 2 coexistence system.

3 **Semantics**

4 GetServiceSubscription.confirm(
 5 status
 6)

Name	Type	Description
status	BOOLEAN	This parameter shows whether the subscription is successful or not.

7 **When generated**

8 Generated by the CE when response from the CM is received.

9 **Effect on receipt**

10 When the TVBD network or device receives this primitive, it acts depending on the result.

11 **5.2.2.1.2.4 NewServiceSubscription.indication**

12 **Function**

13 Used by the TVBD network or device to inform the CE that it wants to update its subscription to the
 14 coexistence services.

15 **Semantics**

16 NewServiceSubscription.indication (
 17 subscribedService
 18)

Name	Type	Description
subscribedService	SubscribedService	This parameter describes the coexistence service that a TVBD network or device wishes to receive from the coexistence system.

19 **When generated**

20 Generated by the TVBD network or device when it wishes to change its subscription to the coexistence
 21 services.

22 **Effect on receipt**

23 When CE receives this primitive, it shall update the information of the subscribed coexistence service of its
 24 TVBD network or device in the coexistence system.

1 5.2.2.1.3 ChangeSubscription

2 5.2.2.1.3.1 ChangeSubscription.request

3 *Function*

4 Used by the CE to ask the TVBD network or device to change its subscription to the coexistence services.

5 *Semantics*

6 ChangeSubscription.request(
 7 newSubscribedService
 8)

Name	Type	Description
newSubscribedService	SubscribedService	Proposed new subscribed coexistence service

9 *When generated*

10 Generated by the CE when it needs to ask the TVBD network or device to change its subscription to the
 11 coexistence services.

12 *Effect on receipt*

13 When TVBD network or device receives this primitive, it shall send ChangeSubscription.response back to
 14 CE.

15 5.2.2.1.3.2 ChangeSubscription.response

16 *Function*

17 Used by the TVBD network or device accept/reject the request to change its subscription to the coexistence
 18 services.

19 *Semantics*

20 ChangeSubscription.request(
 21 status
 22)

Name	Type	Description
status	BOOLEAN	Status: accepted or not

23 *When generated*

24 Generated by the TVBD network or device in response to the ChangeSubscription.request from the CE.

25 *Effect on receipt*

26 When the CE receives this primitive it reports the status to the CM.

1 **Registration service**

2 **5.2.2.1.4 GetRegInfo**

3 **5.2.2.1.4.1 GetRegInfo.request**

4 ***Function***

5 Used by a CE to request the TVBD network or device to provide registration information.

6 ***Semantics***

7 GetRegInfo.request ()

8 ***When generated***

9 Generated by the CE to request the TVBD network or device to provide registration information.

10 ***Effect on receipt***

11 When the TVBD network or device receives this primitive, it shall send a GetRegInfo.response back to the
12 CE.

13 **5.2.2.1.4.2 GetRegInfo.response**

14 ***Function***

15 Used by the TVBD network or device to provide requested registration information to CE.

16 ***Semantics***

17 GetRegInfo.response (

18 networkID,

19 networkTechnology,

20 networkType,

21 discoveryInformation,

22 ACLR,

23 ACS,

24 guranteedQoSOfBackhaulConnection,

25 listOfSupportedFrequencies,

26 listOfSupportedChNumber

27 minTxPower,

28 txScheduleSupported,

1 networkTechnologyReconfigurationSupported,
 2 addNetworkTechnology,
 3 listOfOperatingFrequencies,
 4 listOfOperatingChNumber,
 5 radioEnvironmentInformation OPTIONAL,
 6 requiredResource
 7)

Name	Type	Description
networkID	NetworkID	E.g., BSS ID
networkTechnology	NetworkTechnology	E.g., 802.11af, 802.22
networkType	NetworkType	E.g., fixed, mode 2
discoveryInformation	DiscoveryInformation	Information for neighbor discovery, e.g., location information, maximum transmission power, receiver sensitivity, antenna gain, minimum SINR required for system operation, other information needed to calculate coverage and interference areas
ACLR	REAL	Adjacent Channel Leakage Ratio of the TVBD device
ACS	REAL	Adjacent Channel Selection of the receiver
guranteedQoSof BackhaulConnection	GuranteedQoSOf BackhaulConnection	Guaranteed QoS of backhaul connection in the TVBD device
listOfSupportedFrequencies	ListOfSupportedFrequencies OPTIONAL	List of supported operating frequencies
listOfSupportedChNumber	SEQUENCE OF INTEGER OPTIONAL	List of supported channel numbers
minTxPower	REAL	Minimum transmission power
txScheduleSupported	BOOLEAN	Indicates whether scheduled transmission is supported or not
networkTechnology	BOOLEAN	Indicates whether network technology reconfiguration can be

ReconfigurationSupported		requested by CM
addNetworkTechnology	SEQUENCE OF NetworkTechnology	Additional supported network technologies
listOfOperatingFrequencies	ListOfOperatingFrequencies OPTIONAL	List of operating frequencies including occupancy of each operating frequency
listOfOperatingChNumber	SEQUENCE OF INTEGER OPTIONAL	List of operating channel numbers
radioEnvironmentInformation	RadioEnvironmentInformation OPTIONAL	Information on radio environment as observed by this TVBD network or device
requiredResource	RequiredResource	Information on resource required for operation of this TVBD network or device

1 ***When generated***

2 Generated by the TVBD network or device in response to the GetRegInfo.request from the CE.

3 ***Effect on receipt***

4 When the CE receives this primitive it registers the TVBD network or device in the coexistence system.

5 **5.2.2.1.5 NewRegInfo**

6 **5.2.2.1.5.1 NewRegInfo.indication**

7 ***Function***

8 Used by a TVBD network or device to update its registration information in the coexistence system.

9 ***Semantics***

10 NewRegInfo.indication (

11 networkID,

12 networkTechnology,

13 networkType,

14 discoveryInformation,

15 ACLR,

16 ACS,

17 guranteedQoSofBackhaulConnection,

18 listOfSupportedFrequencies,

1 listOfSupportedChNumber,
 2 minTxPower,
 3 txScheduleSupported,
 4 networkTechnologyReconfigurationSupported,
 5 addNetworkTechnology,
 6 listOfOperatingFrequencies,
 7 listOfOperatingChNumber,
 8 radioEnvironmentInformation OPTIONAL,
 9 requiredResource
 10)

Name	Type	Description
networkID	NetworkID	E.g., BSS ID
networkTechnology	NetworkTechnology	E.g., 802.11af, 802.22
networkType	NetworkType	E.g., fixed, mode 2
discoveryInformation	DiscoveryInformation	Information for neighbor discovery, e.g., location information, maximum transmission power, receiver sensitivity, antenna gain, minimum SINR required for system operation, other information needed to calculate coverage and interference areas
ACLR	REAL	Adjacent Channel Leakage Ratio of the TVBD device
ACS	REAL	Adjacent Channel Selection of the receiver
guranteedQoSof BackhaulConnection	GuranteedQoSof BackhaulConnection	Guaranteed QoS of backhaul connection in the TVBD device
listOfSupportedFrequencies	ListOfSupportedFrequencies OPTIONAL	List of supported operating frequencies
listOfSupportedChNumber	SEQUENCE OF INTEGER OPTIONAL	List of supported channel numbers

minTxPower	REAL	Minimum transmission power
txScheduleSupported	BOOLEAN	Indicates whether scheduled transmission is supported or not
networkTechnology ReconfigurationSupported	BOOLEAN	Indicates whether network technology reconfiguration can be requested by CM
addNetworkTechnology	SEQUENCE OF NetworkTechnology	Additional supported network technologies
listOfOperatingFrequencies	ListOfOperatingFrequencies OPTIONAL	List of operating frequencies including occupancy of each operating frequency
listOfOperatingChNumber	SEQUENCE OF INTEGER OPTIONAL	List of operating channel numbers
radioEnvironmentInformation	RadioEnvironmentInformation OPTIONAL	Information on radio environment as observed by this TVBD network or device
requiredResource	RequiredResource	Information on resource required for operation of this TVBD network or device

1 ***When generated***

2 Generated by the TVBD network or device when its registration information is changed.

3 ***Effect on receipt***

4 When the CE receives this primitive, it updates the registration information with the most newly received
5 values.

6 **Information service**

7 **5.2.2.1.6 NeighborReport**

8 **5.2.2.1.6.1 NeighborReport.request**

9 ***Function***

10 Used by a TVBD network or device subscribed to the coexistence information service to request a neighbor
11 report.

12 ***Semantics***

13 NeighborReport.indication()

14 ***When generated***

15 Generated by the TVBD network or device to request a neighbor report.

1 ***Effect on receipt***

2 When the CE receives this primitive, it sends NeighborReport.response back to TVBD network or device.

3 **5.2.2.1.6.2 NeighborReport.response**4 ***Function***5 Used by a CE to provide a neighbor report to the TVBD network or device subscribed to the coexistence
6 information service.7 ***Semantics***8 NeighborReport.response(
9 neighborReport
10)

Name	Type	Description
neighborReport	NeighborReport	Information about neighbors of the TVBD network or device in form of a neighbor report

11 ***When generated***

12 Generated by the CE in response to NeighborReport.request from the TVBD network or device.

13 ***Effect on receipt***14 When the TVBD network or device receives this primitive, it updates the neighbor information with the
15 new information provided in this primitive.16 **5.2.2.1.6.3 NeighborReport.indication**17 ***Function***18 Used by a CE to provide a neighbor report to the TVBD network or device subscribed to the coexistence
19 information service.20 ***Semantics***21 NeighborReport.indication (
22 neighborReport
23)

Name	Type	Description
neighborReport	NeighborReport	The list of neighbors of the TVBD network or device

24 ***When generated***

25 Generated by the CE to provide a neighbor report to the TVBD network or device.

1 ***Effect on receipt***

2 When the TVBD network or device receives this primitive, it updates the neighbor information with the
3 new information provided in this primitive.

4 **5.2.2.1.7 AvailableChannelList**

5 **5.2.2.1.7.1 AvailableChannelList.request**

6 ***Function***

7 Used by a CE to obtain an available channel list from the TVBD network or device

8 ***Semantics***

9 AvailableChannelList.request()

10 ***When generated***

11 Generated by the CE to obtain an available channel list from the TVBD network or device.

12 ***Effect on receipt***

13 When the TVBD network or device receives this primitive, it sends an AvailableChannelList.response back
14 to the CE.

15 **5.2.2.1.7.2 AvailableChannelList.response**

16 ***Function***

17 Used by a TVBD network or device to provide its list of available channels to the CE.

18 ***Semantics***

19 AvailableChannelList.response (

20 availableChannelList,

21 listOfAllowedTVWSChNumber,

22 constOfChUses

23)

Name	Type	Description
availableChannelList	AvailableChannelList	Available channel list to operate in TVWS
listOfAllowedTVWSChNumber	ListOfAllowedTVWSChNumber OPTIONAL	Allowed TVWS channel number list
constOfChUses	ConstOfChUses OPTIONAL	Channel user constraint

24 ***When generated***

1 Generated by the TVBD network or device in response to an AvailableChannelList.request from the CE.

2 ***Effect on receipt***

3 When the CE receives this primitive, it provides the available channel list to the CM.

4 **5.2.2.1.7.3 AvailableChannelList.indication**

5 ***Function***

6 Used by the TVBD network or device to update the list of its available channels to the CE.

7 ***Semantics***

8 AvailableChannelList.indication (

9 availableChannelList,

10 listOfAllowedTVWSChNumber,

11 constOfChUses

12)

Name	Type	Description
availableChannelList	AvailableChannelList	Available channel list to operate in TVWS
listOfAllowedTVWSChNumber	ListOfAllowedTVWSChNumber OPTIONAL	Allowed TVWS channel number list
constOfChUses	ConstOfChUses OPTIONAL	Channel user constraint

13 ***When generated***

14 Generated by the TVBD network or device if information in the list of available channels has changed.

15 ***Effect on receipt***

16 When the CE receives this primitive, it provides the list of available channels to the CM.

17 **5.2.2.1.8 ChannelClassification**

18 **5.2.2.1.8.1 ChannelClassification.request**

19 ***Function***

20 Used by a TVBD network or device subscribed to coexistence information service to obtain channel
21 classification information.

22 ***Semantics***

23 ChannelClassification.request(

1 listOfNetworkID

2)

Name	Type	Description
listOfNetworkID	SEQUENCE OF NetworkID	Network ID list

3 ***When generated***

4 Generated by the TVBD network or device to obtain channel classification information.

5 ***Effect on receipt***

6 When the CE receives this primitive, it sends a ChannelClassification.response back to the TVBD network
7 or device.

8 **5.2.2.1.8.2 ChannelClassification.response**

9 ***Function***

10 Used by a CE to provide channel classification information to the TVBD network or device.

11 ***Semantics***

12 ChannelClassification.response(
13 chClassInfoList
14)

Name	Type	Description
chClassInfoList	ChClassInfoList	Channel classification information list

15 ***When generated***

16 Generated by the CE in response to a ChannelClassification.request from the TVBD network or device.

17 ***Effect on receipt***

18 When the TVBD network or device receives this primitive, it gets requested channel classification
19 information.

20 **5.2.2.1.8.3 ChannelClassification.announcement**

21 ***Function***

22 Used by a CE to provide updated channel classification information to the TVBD network or device.

23 ***Semantics***

24 ChannelClassification.announcement(
25 chClassInfoList

1)

Name	Type	Description
chClassInfoList	ChClassInfoList	Channel classification information list

2 ***When generated***

3 Generated by the CE if channel classification information has changed.

4 ***Effect on receipt***

5 When the TVBD network or device receives this primitive, it gets requested channel classification
6 information.

7 **5.2.2.1.9 GetInfo**

8 **5.2.2.1.9.1 GetInfo.request**

9 ***Function***

10 Used by a CE to obtain information from the TVBD network or device.

11 ***Semantics***

12 GetInfo.request(
13 reqInfoDescr
14)

Name	Type	Description
reqInfoDescr	ReqInfoDescr	Requested information ID.

15 ***When generated***

16 Generated by the CE to request the TVBD network or device to provide coexistence information.

17 ***Effect on receipt***

18 When the TVBD network or device receives this primitive, it sends a GetInfo.response back to the CE.

19 **5.2.2.1.9.2 GetInfo.response**

20 ***Function***

21 Used by a TVBD network or device to provide requested information to the CE.

22 ***Semantics***

23 GetRegInfo.response (
24 reqInfoValue

1)

Name	Type	Description
reqInfoValue	ReqInfoValue	Requested information

2 **When generated**

3 Generated by the TVBD network or device in response to a GetInfo.request from the CE.

4 **Effect on receipt**

5 When the CE receives this primitive, it examines the received information.

6 **Measurement service**

7 **5.2.2.1.10 GetMeasurement**

8 **5.2.2.1.10.1 GetMeasurement.request**

9 **Function**

10 Used by a CE to request the TVBD network or device to perform measurements.

11 **Semantics**

12 GetMeasurement.request(

13 measurementDescription

14)

<i>Name</i>	<i>Type</i>	<i>Description</i>
measurementDescription	MeasurementDescription	Measurement Description

15 **When generated**

16 Generated by the CE to request the TVBD network or device to perform measurements.

17 **Effect on receipt**

18 When the TVBD network or device receives this primitive, it performs measurements required by the CE
19 and responds back either with a GetMeasurement.response or a GetMeasurement.indication.

20 **5.2.2.1.10.2 GetMeasurement.response**

21 **Function**

22 Used by a TVBD network or device to provide one time measurement results to the CE.

23 **Semantics**

24 GetAvailableChannelList.response (

1 measurementResult

2)

Name	Type	Description
measurementResult	MeasurementResult	Measurement Result

3 ***When generated***

4 Generated by the TVBD network or device in response to a GetMeasurement.request from the CE to
5 provide one time measurement results.

6 ***Effect on receipt***

7 When the CE receives this primitive, it examines the received measurement results.

8 **5.2.2.1.10.3 GetMeasurement.indication**

9 ***Function***

10 Used by a TVBD network or device to provide scheduled measurement results to the CE.

11 ***Semantics***

12 GetMeasurement.indication (

13 measurementResult

14)

Name	Type	Description
measurementResult	MeasurementResult	Measurement Result

15 ***When generated***

16 Generated by the TVBD network or device in response to a GetMeasurement.request from the CE to
17 provide scheduled measurement results.

18 ***Effect on receipt***

19 When the CE receives this primitive, it examines the received measurement results.

20 **Reconfiguration service**

21 **5.2.2.1.11 PerformReconfiguration**

22 **5.2.2.1.11.1 PerformReconfiguration.request**

23 ***Function***

24 Used by a CE to request reconfiguration of the TVBD network or device required for coexistence.

1 **Semantics**
 2 PerformReconfiguration.request(
 3 reconfigurationRequest,
 4 chClassInfo
 5)

Name	Type	Description
reconfigurationRequest	ReconfigurationRequest	Reconfiguration description.
chClassInfo	ChClassInfo OPTIONAL	Channel classification info.

6 **When generated**
 7 Generated by the CE to request the TVBD network or device to reconfigure.

8 **Effect on receipt**

9 When the TVBD network or device receives this primitive, it reconfigures according to reconfiguration
 10 description and sends a PerformReconfiguration.response to the CE.

11 **5.2.2.1.11.2 PerformReconfiguration.response**

12 **Function**

13 Used by a TVBD network or device to report the result of the requested reconfiguration to the CE.

14 **Semantics**

15 PerformReconfiguration.response (
 16 reconfigurationStatus,
 17 failedParameters
 18)

Name	Type	Description
reconfigurationStatus	BOOLEAN	This parameter shows the status of reconfiguration.
failedParameters	FailedParameters OPTIONAL	Failed reconfiguration parameters with recommended values of parameters id reconfiguration request is failed.

19 **When generated**
 20 Generated by the TVBD network or device in response to a PerformReconfiguration.request from the CE.

21 **Effect on receipt**

22 When the CE receives this primitive, it examines the received information.

1 **5.2.2.1.12 ResourceReconfiguration**2 **5.2.2.1.12.1 ResourceReconfiguration.request**3 ***Function***

4 Used by a TVBD network or device to request resource.

5 ***Semantics***6 ResourceReconfiguration.request(
7 networkType,
8 Geolocation,
9 ChannelNumber,
10 startFreq,
11 endFreq,
12 MaximumPowerLevel,
13 ChannelLoad
14)

Name	Type	Description
networkType	NetworkType	TVBD device or network type
Geolocation	GEO_LOC	Registered geolocation
ChannelNumber	INTEGER OPTIONAL	Channel number
startFreq	REAL OPTIONAL	Start frequency
endFreq	REAL OPTIONAL	End frequency
MaximumPowerLevel	REAL	Power limit
ChannelLoad	REAL OPTIONAL	Expected throughput

15 ***When generated***

16 Generated by the TVBD network or device to request new resource.

17 ***Effect on receipt***

18 When the CE receives this primitive, it forwards this request to the CM.

1 **5.2.2.1.12.2 ResourceReconfiguration.response**

2 ***Function***

3 Used by a CE to provide resource reconfiguration to the TVBD network or device.

4 ***Semantics***

5 ResourceReconfiguration.response(
 6 ChannelNumber,
 7 startFreq,
 8 endFreq,
 9 MaximumPowerLevel
 10)

Name	Type	Description
ChannelNumber	INTEGER OPTIONAL	Channel number
startFreq	REAL OPTIONAL	Start frequency
endFreq	REAL OPTIONAL	End frequency
MaximumPowerLevel	REAL	Power limit

11 ***When generated***

12 Generated by the CE to allocate resources to the TVBD network or device.

13 ***Effect on receipt***

14 When the TVBD network or device receives this primitive, it follows the allocated resource.

15 **Event service**

16 **5.2.2.1.13 Event**

17 **5.2.2.1.13.1 Event.indication**

18 ***Function***

19 Used by a TVBD network or device to inform the CE about events related to coexistence observed or
 20 predicted by the TVBD network or device.

21 Also, used by a CE to inform the TVBD network or device about events related to coexistence observed or
 22 predicted by the coexistence system.

23 ***Semantics***

24 Event.indication(
 25)

1 eventParams

2)

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

3 ***When generated***

4 Generated by the TVBD network or device to inform the CE about events related to coexistence observed
5 or predicted by the TVBD network or device.

6 Generated by the CE to inform the TVBD network or device about events related to coexistence observed
7 or predicted by the coexistence system.

8 ***Effect on receipt***

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

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

13 **5.3 Data type definition**

14 **5.3.1 COEX_TR_SAP**

15 TransportPref ::= ENUMERATED{

16 TCP,

17 UDP,

18 HTTP,

19 SNMP,

20 ...

21 }

22 **5.3.2 COEX_MEDIA_SAP**

23 SubscribedService ::= ENUMERATED{

24 information,

25 management

26

27 }

```
1
2 NetworkID ::= ENUMERATED{
3     BSSID,
4     ...
5 }
6
7 NetworkTechnology ::= ENUMERATED{
8     IEEE802.11af,
9     IEEE802.22,
10    ECMA392,
11    ...
12 }
13
14 NetworkType ::= ENUMERATED{
15     fixed,
16     mode2,
17     ...
18 }
19
20 DiscoveryInformation ::= SEQUENCE{
21     coordinateX    REAL,
22     coordinateY    REAL,
23     coordinateZ    REAL,
24     maxTxPower    REAL,
25     rxSensitivity  REAL,
26     antennaGain    REAL,
27     minReqSNR     REAL,
28     TolerableInterferenceLevel REAL,
```

```

1   antennaHeight REAL,
2   ...
3   }
4
5   ListOfSupportedFrequencies ::= SEQUENCE OF SEQUENCE{
6     startFreq REAL,
7     stopFreq REAL
8   }
9
10  ListOfOperatingFrequencies ::= SEQUENCE OF SEQUENCE{
11    startFreq REAL,
12    stopFreq REAL,
13    occupancy REAL,
14    totalOccupancy REAL OPTIONAL
15  }
16
17  FreqDescription ::= SEQUENCE{
18    networkID NetworkID OPTIONAL,
19    networkTechnology NetworkTechnology OPTIONAL,
20    coexType ENUMERATED{known, unknown},
21    interferenceDirection ENUMERATED{mutual, source, victim},
22    occupancy REAL OPTIONAL,
23    totalOccupancy REAL OPTIONAL
24  }
25
26  RadioEnvironmentInformation ::= SEQUENCE OF SEQUENCE{
27    startFreq REAL,
28    stopFreq REAL,

```

```

1   state          ENUMERATED{free, occupiedKnown, occupiedUnknown, notMeasured},
2   freqDescription FreqDescription OPTIONAL
3   }
4
5   NetworkGeometryClass ::= CHOICE{Class#1, Class#2, Class#3, Class#4}
6
7   NeighborReport ::= SEQUENCE OF SEQUENCE{
8     networkID          NetworkID,
9     networkTechnology  NetworkTechnology,
10    interferenceDirection  ENUMERATED{mutual, source, victim},
11    interferenceLevelFromNeighbor REAL,
12    interferenceLevelToNeighbor REAL,
13    listOfOperatingChannelNumber SEQUENCE OF INTEGER OPTIONAL,
14    listOfOperatingFrequencies ListOfOperatingFrequencies OPTIONAL,
15    radioEnvironmentInformation RadioEnvironmentInformation OPTIONAL,
16    networkGeometryClass NetworkGeometryClass
17  }
18
19  AggregatedInterferenceControlParameters ::= SEQUENCE{
20    ReferencePointID      INTEGER,
21    Geolocation           ReferencePointGeolocation,
22    ACS                   REAL,
23    Antenna height       REAL,
24    Antenna gain         REAL,
25    Protection ratio     REAL,
26    ...
27  }
28
29  ReferencePointGeolocation ::= ENUMERATED {
30    Latitude              REAL,
31    Longitude             REAL,
32    Altitude              REAL,
33    ...
34  }
35
36  AvailableChannelList ::= SEQUENCE OF SEQUENCE{

```



```

1   startFreq      REAL,
2   stopFreq       REAL,
3   txPowerLimit   REAL,
4   aggregatedInterferenceControlParameters  AggregatedInterferenceControlParameters
5   }
6
7   RequiredResource ::= SEQUENCE OF SEQUENCE{
8     requiredBandwidth  REAL,
9     expectedLoad        REAL
10  }
11
12  ListOfAllowedTVWSchNumber ::= SEQUENCE OF INTEGER
13
14  ConstOfChUseID ::= ENUMERATED{
15      regulationMaxTxPower,
16      regulationMaxAntGain,
17      regulationMaxAntHeight,
18      regulationTVDBUpdateTime,
19      OutOfBandEmissionLimit,
20      ...
21  }
22
23  ConstOfChUseValue ::= CHOICE{
24      regulationMaxTxPower          REAL,
25      regulationMaxAntMaxGain       REAL,
26      regulationAntMaxHeight        REAL,
27      regulationTVDBUpdateTime      REAL,
28      OutOfBandEmissionLimit        REAL,
29      ...
30  }
31
32  ConstOfChUse ::= SEQUENCE{
33      constOfChUseID                ConstOfChUseID,
34      constOfChUseValue              ConstOfChUseValue
35  }
36
37  ConstOfChUses ::= SEQUENCE OF ConstOfChUse
38
39  OperatingChannelInfo ::= SEQUENCE {

```

```

1         operatingChannelNumber      INTEGER,
2         listOfNetworkID             SEQUENCE OF NetworkID,
3         ...
4     }
5
6     ChClassInfo ::= SEQUENCE {
7         availableChannelList         SEQUENCE OF INTEGER,
8         restrictedChannelList        SEQUENCE OF INTEGER,
9         protectedChannelList        SEQUENCE OF INTEGER,
10        unclassifiedChannelList      SEQUENCE OF INTEGER,
11        operatingChannelList        SEQUENCE OF OperatingChannelInfo,
12        coexistenceChannelList      SEQUENCE OF OperatingChannelInfo,
13        ...
14    }
15
16
17    ChClassInfoList ::= SEQUENCE OF SEQUENCE{
18        networkID    NetworkID,
19        chClassInfo  ChClassInfo
20    }
21
22    ReqInfoDescr ::= SEQUENCE OF ENUMERATED{
23        SINR,
24        ....desiredBandwidth,
25        desiredOccupancy,
26        desiredQoS,
27        desiredCoverage,
28        channelNumber,
29        ...
30    }
31
32    ReqInfoValue ::= SEQUENCE OF SEQUENCE{

```

```

1   reqInfoDescr  ReqInfoDescr,
2   reqInfoValue  CHOICE{SINRValue  REAL, desiredBandwidthValue  REAL,
3                   desiredOccupancyValue  REAL, desiredQoSValue  REAL,
4                   desiredCoverageValue  REAL, channelNumberValue  REAL,
5                   otherValue  ANY}
6   }
7
8   MeasSchedule ::= SEQUENCE {
9       measStartTime          REAL,
10      numberOfMeasurements   INTEGER,
11      timeBetweenMeasurements REAL
12  }
13
14  MeasFreq ::= SEQUENCE{
15      measStartAFreq  REAL OPTIONAL,
16      measEndFreq    REAL OPTIONAL,
17      listOfChNumber SEQUENCE OF INTEGER OPTIONAL
18  }
19
20  MeasurementDescription ::= SEQUENCE OF SEQUENCE{
21      measDescr  ENUMERATED{SINR, BER, SensingLevel, PrimaryDetection, TVBDDetection,
22                          ChannelLoadMeasurement, ...},
23      measSchedule  MeasSchedule,
24      measFreq      MeasFreq
25  }
26
27  MeasurementResult ::= SEQUENCE OF SEQUENCE{
28      reqInfoDescr  ReqInfoDescr,

```

```

1   reqInfoValue CHOICE{SINRValue REAL, BERValue REAL,
2
3       SensingLevelValue REAL, PrimaryDetectionValue BOOLEAN,
4       TVBDDetectionValue BOOLEAN, ChannelLoadMeasurementValue REAL,
5       otherValue ANY}
6
7   TxSchedule ::= SEQUENCE {
8       scheduleStartTime REAL,
9       scheduleDuration REAL,
10      numberOfScheduleRepetitions INTEGER,
11      transmissionStartTime REAL,
12      transmissionDuration REAL
13  }
14
15  ReconfigurationRequest ::= SEQUENCE OF SEQUENCE {
16      operatingFrequency SEQUENCE{startFreq REAL, stopFreq REAL} OPTIONAL,
17      listOfOperatingChNumber SEQUENCE OF INTEGER OPTIONAL,
18      txPowerLimit REAL OPTIONAL,
19      channelIsShared BOOLEAN,
20      txSchedule SEQUENCE OF TxSchedule OPTIONAL,
21      networkTechnology NetworkTechnology,
22  }
23
24  FailedParameterID ::= ENUMERATED {
25      operatingFrequency,
26      listOfoperatingChNumber,
27      txPowerLimit,
28      channelIsShared,
29      txSchedule,
30  }
31
32

```

```

1  FailedParameterValue ::= CHOICE{
2      operatingFrequency      SEQUENCE{startFreq REAL, stopFreq REAL},
3      listOfoperatingChNumber SEQUENCE OF INTEGER,
4      txPowerLimit            REAL,
5      channelIsShared         BOOLEAN,
6      txSchedule              SEQUENCE OF TxSchedule OPTIONAL
7  }
8
9  FailedParameter ::= SEQUENCE{
10     failedParameterID      FailedParameterID,
11     failedParameterValue   FailedParameterValue
12 }
13
14 FailedParameters ::= SEQUENCE OF FailedParameter
15
16 EventDescr ::= ENUMERATED{
17     SINRThresholdReached,
18     QoSDegradation,
19     MisLocatedTVBDDetected,
20     ...
21 }
22
23 MisLocatedTVBDDetectedInfo ::= SEQUENCE{
24     networkID      NetworkID,
25     listOfoperatingFrequency SEQUENCE OF SEQUENCE{startFreq REAL, stopFreq REAL}
26     OPTIONAL,
27     listOfChannelNumber SEQUENCE OF INTEGER OPTIONAL
28 }
29
30 AddInfo ::= CHOICE{
31     misLocatedTVBDDetectedInfo MisLocatedTVBDDetectedInfo,
32     ...
33 }
34
35 EventParams ::= SEQUENCE{

```

```
1   eventDescr  EventDescr,  
2   addInfo     AddInfo OPTIONAL  
3 }  
4  
5 GuranteedQoSofWiredConnection ::= ENUMERATED{  
6     CHOICE{xDSL, OpticalFibre, Others},  
7     GuranteedMinimumBitRates,  
8     GuranteedMaximumLatency OPTIONAL,  
9     ...  
10 }  
11  
12
```