IEEE 802.19.1a  
Wireless Coexistence

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| --- | --- | --- | --- | --- |
| Text proposal on amendment to Section 6 | | | | |
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Abstract

This document provides text proposal on amendment to entity operations in section 6.

**Note:**

* Main body of proposed text is based on candidate draft D0.2.
* Main objectives of this contribution are as follows:
  + To merge all the approved text (19-16/0016r1, 19-16/0020r1, 19-16/0022r1, 19-16/0051r1, 19-16/0053r1, 19-16/0055r1, 19-16/0058r0 and 19-16/0060r2) and new text proposals(19-16/0083r0, 19-16/0084r019-16/0086r0, 19-16/0088r0) with consistency.
  + To add some missing features.
    - Ex) Section 6 for CM association procedure in 19-16/0016r1.
  + To clarify the value description.
* This proposal does not use track change. Same format as draft is used.

===== (Text starts below)

1. **Entity operation**
   1. **Common operation**
      1. **Transport SAP operation**
         1. **General operation**

The COEX\_TR\_SAP provides means for a CE, a COE, a CM, and a CDIS to communicate with each other and with external entities by using underlying transport service.

The transport service has the following functions:

* Address resolution
* Providing mapping between CxID parameter and IP address and port number
* Connection management
* Establishing connections to other entities and managing these connections
* Accepting connection requests from other entities and notifying them to the coexistence entity
* Detecting disconnection and notify it to the coexistence entity
* Applying security options
* Sending and receiving coexistence protocol messages

Figure 46 illustrates operation of the COEX\_TR\_SAP.



1. **—COEX\_TR\_SAP operation**
   * + 1. **Transport service configuration**

This procedure is not always used before the connection establishment procedure.

If a source entity is establishing connection with a destination entity with which it has not had any prior communication and the source entity has destination entity coexistence protocol ID, IP address, and port number, then the transport service configuration procedure is used.

This refers to the following connection establishment cases:

* From CE to CM
* From CM to CDIS
* From CM to ~~TVWS database (DB)~~ spectrum management database (SMDB)
* From CM to other CM
* From CM to COE
* From COE to COE
* From CDIS to other CDIS

If a source entity is establishing connection with a destination entity with which it has had prior communication and transport service of the source entity has destination entity coexistence protocol ID, IP address, and port number from prior communication, then the transport service configuration procedure is not used.

This refers to the following connection establishment cases:

* From CM to CE
* From CDIS to CM.

Figure 47 shows COEX\_TR\_SAP operation during transport service configuration.



1. **—COEX\_TR\_SAP operation during transport service configuration**

The source entity shall generate ***TrConfigurationRequest*** primitive and send it to the source entity transport service using COEX\_TR\_SAP. When generating the ***TrConfigurationRequest*** primitive, the source entity shall set its parameters as shown in the following table.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***sourceID*** | ***CxID*** | Source entity ID. |
| ***destinationID*** | ***CxID*** | Destination entity ID. |
| ***destinationIPAddress*** | ***OCTET STRING*** | Destination entity IP address. |
| ***destinationPortNumber*** | ***INTEGER*** | Destination entity port number. |

After the source entity has sent the ***TrConfigurationRequest*** primitive to its transport service, the source entity shall wait for the ***TrConfigurationResponse*** primitive from the transport service.

The following table shows expected parameters of the ***TrConfigurationResponse*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***destinationID*** | ***CxID*** | Value of the ***destinationID*** parameter from the sent ***TrConfigurationRequest*** primitive. |
| ***status*** | ***Status*** | ***~~noError~~*** Status |

* 1. **CDIS operation**

**6.2.4 Profile 3**

***Revise the text as follows***

6.2.4.1 General description

A CDIS that operates as per Profile 3 shall support the following procedures:

* ~~WSO~~GCO registration
* ~~WSO~~GCO registration update
* Obtaining coexistence set information

A high-level flow chart of the CDIS operation is provided in Figure 54.

After receiving a CM registration/update request, a CDIS shall perform the ~~WSO~~GCO registration (update) procedure and store/update the subject CM information. When a coexistence set information request is received from the subject CM and its operation code shows new or update, CDIS shall perform the obtaining coexistence set information procedure. When coexistence set information request is received from the subject CM and its operation code shows delete, CDIS shall check whether or not the number of registered CMs is larger than 1. If the number of registered CMs is none, the CDIS may stop the operation.



1. —High-level flow chart of the CDIS operation
   * + 1. **~~WSO~~GCO registration**

After the CDIS has received a ***CMRegistrationRequest*** message from a CM indicating new registration, the CDIS shall perform the ~~WSO~~GCO registration procedure described in clause 5.2.2.1. The CDIS shall generate and send the ***RegistrationResponse*** message to the CM.

Table below shows ***CxMessage*** fields in ***RegistrationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***registrationResponse*** |

Table below shows ***registrationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***~~CxMedia~~Status*** | status~~Status~~ |
| ***registrationUpdateDuration*** | ***REAL*** | Optionally present. This value shall be set to indicate the registration update duration if the duration is needed to be changed. |

* + - 1. **~~WSO~~GCO registration update**

After the CDIS has received a ***CMRegistrationRequest*** message from a CM indicating registration update, the CDIS shall perform the ~~WSO~~GCO registration update procedure described in clause 5.2.2.2. The CDIS shall generate and send the ***RegistrationResponse*** message to the CM.

Table below shows ***CxMessage*** fields in ***RegistrationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***registrationResponse*** |

Table below shows ***registrationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***~~CxMedia~~Status*** | status |
| ***registrationUpdateDuration*** | ***REAL*** | Optionally present. This value shall be set to indicate the registration update duration if the duration is needed to be changed. |

* + - 1. **Obtaining coexistence set information**

After the CDIS has received a ***CoexistenceSetInformationRequest*** message from a CM, the CDIS shall perform the obtaining coexistence information procedure described in clause 5.2.3.1. The CDIS shall generate and send the ***CoexistenceSetInformationResponse*** message to the CM.

Table below shows ***CxMessage*** fields in ***CoexistenceSetInformationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header~~Header~~*** | ***CxHeader*** | ***requestID*** |
| ***payload~~Payload~~*** | ***CxPayload*** | ***coexistenceSetInformationResponse*** |

Table below shows ***~~CxMessage~~*** ~~fields in~~ ***CoexistenceSetInformationResponse*** payload elements.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkID*** | ***OCTET STRING*** | Subject network ID for coexistence set information |
| ***~~listOfneighborCMs~~***  ***listOfNeighborCMs*** | ***~~ListOfneighborCMs~~***  ***ListOfNeighborCMs*** | Shall be set to indicate the list of neighbor CMs as specified in table below. ~~As specified in table below~~ |
| ***listOfMasterCMCandidate*** | ***ListOfMasterCMCandidate*** | Shall be set to indicate the list of master CM candidates as specified in table below. ~~As specified in table below~~ |

Table below shows ***~~ListOfneighborCMs~~ListOfNeighborCMs*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***~~cxID~~CxID*** | Shall be set to indicate CM ID |
| ***listOfNeighborCEs*** | ***ListOfNeighborCEs*** | As shown in table below |

Table below shows ***~~ListOfneighborCEs~~ListOfNeighborCEs*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~cmID~~ceID*** | ***~~cxID~~CxID*** | Shall be set to indicate CE ID |
| ***~~listOfNeighborWSOs~~ listOfNeighborGCOs*** | ***~~ListOfNeighborWSOs~~ ListOfNeighborGCOs*** | Shall be set to indicate the list of information of neighbor GCOs as shown in the table below. ~~As shown in table below~~ |

Table below shows ***~~ListOfneighborWSOs~~ListOfNeighborGCOs*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~wsoID~~gcoID*** | ***OCTET STRING*** | Shall be set to indicate ~~WSO~~GCO ID |
| ***networkTechnology*** | ***NetworkTechnology*** | Shall be set to indicate network ~~Network~~ technology |
| ***networkGeometryClass*** | ***NetworkGeometryClass*** | ~~As shown in table below~~  Shall be set to indicate the network geometry class as described in 7.2.2.10.2. |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | Shall be set to indicate the list of frequency information that is available at the location of the subject GCO as shown in table below. ~~As shown in table below~~ |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the list of operating frequency information that the subject GCO uses as shown in table below. ~~As shown in table below~~ |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |

Table below shows ***ListOfAvailableFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***timestamp*** | ***GeneralizedTime*** | Shall be set to indicate the time of obtaining available frequency by GCO, if available. |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the available frequency range. |
| ***txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the available frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the available frequency range if applicable. |
| ***availableDuration*** | ***REAL*** | Shall be set to indicate duration of the available frequency range if applicable. |
| ***availableStopTime*** | ***GeneralizedTime*** | Shall be set to indicate stop time of the available frequency range if applicable. |
| ***maxTotalBandwidth*** | ***REAL*** | Shall be set to indicate maximum total bandwidth of one channel, if available |
| ***maxContiguousBandwidth*** | ***REAL*** | Shall be set to indicate maximum channel bandwidth that can be used contiguously, if available |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate resolution bandwidth if available |
| ***typeOfAvailablefrequency*** | ***TypeOfFrequency*** | Shall be set to indicate the type of available frequency if the regulator specifies. The details are shown in Annex A. |
| ***locationValidity*** | ***REAL*** | Shall be set to indicate radius of the circle centered on the reported ge-location of the GCO, outside of which the available frequencies are not valid, if this parameter is available. |
| ***aggInterfControlParam*** | ***AggregatedInterference***  ***ControlParameters*** | May be set to indicate the parameters of aggregate interference control if available as~~As~~ specified in table below |

Table below shows ***AggregatedInterferenceControlParameters*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***referencePointID*** | ***INTEGER*** | Shall be set to indicate reference ~~Reference~~ point ID to be protected in controlling aggregated interference from the other ~~WSO~~GCO(s) if available |
| ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate installation parameters of reference point |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information of the reference point ID~~ |
| ***~~aCS~~*** | ***~~REAL~~*** | ~~Adjacent Channel Selectivity of the reception to be protected at the reference point if available~~ |
| ***~~aCLR~~*** | ***~~REAL~~*** | ~~Referenced adjacent channel leakage ratio if available~~ |
| ***~~antennaHeight~~*** | ***~~REAL~~*** | ~~Potential antenna height of the reception to be protected if available~~ |
| ***~~antennaGain~~*** | ***~~REAL~~*** | ~~Potential antenna gain of the reception to be protected at the reference point if available~~ |
| ***protectionRatio ~~ratio~~*** | ***REAL*** | Protection ratio of the reception to be protected at the reference point for the frequency if available |

The following table shows ***InstallationParameters*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***geolocation*** | ***Geolocation*** | Shall be set to indicate the geolocation of reference point antenna. |
| ***antennaCharacteristics*** | ***AntennaCharacteristics*** | Shall be set to indicate the antenna characteristics |
| ***maxTxPower*** | ***REAL*** | Not used here. |
| ***aclr*** | ***REAL*** | Not used here. |
| ***guaranteedQoSOf BackhaulConnection*** | ***GuaranteedQoSOf BackhaulConnection*** | Not used here. |
| ***receiverInfo*** | ***ReceiverInfo*** | Shall be set to indicate receiver information if available. |
| ***modulationType*** | ***ModulationType*** | Shall be set to indicate modulation type if available. |
| ***filterCharacteristics*** | ***FilterCharacteristics*** | Shall be set to indicate filter characteristics if available. |

The following table shows ***Geolocation*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coordinates*** | ***Coordinates*** | Shall be set to indicate the coordinates of GCO, if available. |

The following table shows ***Coordinates*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***longitude*** | ***REAL*** | Shall be set to indicate the longitude of GCO. |
| ***latitude*** | ***REAL*** | Shall be set to indicate the latitude of GCO |
| ***altitude*** | ***REAL*** | Shall be set to indicate the altitude of GCO |
| ***locationUncertainty*** | ***REAL*** | Shall be set to indicate the location uncertainty if available |

~~Table below shows~~ ***~~networkGeometryClass~~*** ~~parameter element.~~

|  |  |  |
| --- | --- | --- |
| *~~Parameter~~* | *~~Data type~~* | *~~Value~~* |
| ***~~networkGeometryClass~~*** | ***~~INTEGER~~*** | ~~0: Network geometry class 1~~  ~~1: Network geometry class 2~~  ~~2: Network geometry class 3~~  ~~3: Network geometry class 4~~  ~~4-x: Others~~ |

The following table shows ***AntennaCharacteristics*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***antennaHeight*** | ***REAL*** | Shall be set to indicate the antenna height of GCO, if available. |
| ***antennaHeightType*** | ***HeightType*** | Shall be set to indicate the antenna height type if available. AGL (above ground level) or ASL(above sea level) is used. |
| ***antennaGain*** | ***REAL*** | Shall be set to indicate the antenna gain if available |
| ***antennaType*** | ***AntennaType*** | Shall be set to indicate the antenna array type if the number of antenna is two or more. |
| ***numberOfAntenna*** | ***INTEGER*** | Shall be set to indicate the number of antenna. |
| ***mimoType*** | ***MIMOType*** | Shall be set to indicate the MIMO type if the number of antenna is two or more. |
| ***multiAntProCap*** | ***MultiAntProCap*** | Shall be set to indicate the antenna processing capability includes directional beam forming if the number of antenna is two or more. |
| ***azimuthAngle*** | ***REAL*** | Shall be set to indicate the antenna boresight azimuth angle direction measured in degree against longitude facing north in clockwise direction. (i.e. an azimuth angle of zero degrees) is a horizontal line in the direction to the north pole, starting from the antenna if the number of antenna is two or more. |
| ***downtiltAngle*** | ***REAL*** | Shall be set to indicate the antenna downtilt angle. |
| ***beamwidth*** | ***REAL*** | Shall be set to indicate the antenna beamwidth |

The following table shows ***FilterCharacteristics*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***acs*** | ***REAL*** | Shall be set to indicate the adjacent channel selectivity. |
| ***fbmcOverlappingFactor*** | ***INTEGER*** | Not used here. |

Table below shows ***listOfOperatingFreqeuencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate operating frequency range. ~~Operating frequency range~~ |
| ***txPower*** | ***REAL*** | Shall be set to indicate the transmission power of the GCO in frequencyRange. |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate the resolution bandwidth of available frequency where GCO is operating, if applicable. |
| ***typeOfOperatingFrequency*** | ***TypeOfFrequency*** | Shall be set to indicate the frequency type if the regulatory specifies. |
| ***occupancy*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate occupancy of the GCO frequency range. |
| ***energyDetectionInfo*** | ***EnergyDetectionInfo*** | Optionally present. If present, this parameter shall be set to indicate energy detection information. |
| ***modulationParameters*** | ***ModulationParameters*** | Shall be set to indicate modulation parameters. |
| ***sicDemodulationProcedure*** | ***SICDemodulationProcedure*** | Optionally present. If present, this parameter shall be set to indicate SIC demodulation procedures to be configured as shown in 7.x.x.x. |
| ***coChGCOLimit*** | ***CoChGCOLimit*** | Limit on the maximum number of co-channel GCOs that shall operate simultaneously within a given region and frequency |

Table below shows ***listOfMasterCMCandidate*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***~~cxID~~CxID*** | Shall be set to indicate CM ID |
| ***ipAddress*** | ***~~IOAddress~~OCTET STRING*** | Shall be set to indicate IP address of the subject CM |
| ***~~portnumber~~portNumber*** | ***~~PortNumber~~INTEGER*** | Shall be set to indicate its port number. ~~Its port number~~ |

* 1. **CM operation**
     1. **Profile 3**
        1. **General description**

A CM that operates as per Profile 3 shall support the following procedures:

* CM association
* ~~WSO~~GCO subscription
* ~~WSO~~GCO subscription update
* ~~WSO~~GCO subscription change
* ~~WSO~~GCO registration
* ~~WSO~~GCO registration update
* ~~WSO~~GCO reconfiguration
* Obtaining coexistence set information
* Providing coexistence report
* Master/slave CM configuration procedure
* Sending reconfiguration request from CM to another CM
* Proxy coexistence service procedure
* Inter-CM association procedure
* Inter-CM association procedure over COE
* Obtaining operating frequency information procedure
* Obtaining operating frequency information procedure over COE

CM association procedure is performed to establish connection for communication with CE when the CM receives request for CM association procedure.

A high-level flow chart of the CM operation except for CM association procedure is provided in Figure 59.

After receiving requests for both ~~WSO~~GCO subscription procedure and its registration procedure, a CM shall start operation either management service operation or information service operation for the subject ~~WSO~~GCO. In case of information service operation, the overall operation is as shown in Figure 60. Until receiving either a stop request of coexistence service subscription for the subject CE or having a need to start a coexistence subscription change procedure, CM will continue a coexistence set information procedure and a providing coexistence report procedure for its information service operation. If any update on its registered ~~WSO~~GCO information, CM shall perform a ~~WSO~~GCO registration update procedure.

In case of management service operation, the overall operation is as shown in Figure 61. Until receiving either a stop request of coexistence service subscription for the subject CE or having a need to start a coexistence subscription change procedure, CM will continue a coexistence set information procedure and a ~~WSO~~GCO reconfiguration procedure for its management service operation. If any update on its registered ~~WSO~~GCO information, CM shall perform a ~~WSO~~GCO registration update procedure. If the CM receives a request of master/slave configuration procedure from the other CM(s) and accepts that request, CM shall start a sending reconfiguration request from CM to another CM procedure when the CM wants to reconfigure the operational parameters of the subject ~~WSO~~GCO being connected to its slave CM.

In case of management service operation as slave CM, the overall operation is as shown in Figure 62. Until receiving either a stop request of coexistence service subscription for the subject CE or having a need to start a coexistence subscription change procedure, CM will wait a reconfiguration request from its master CM procedure and continue to conduct a ~~WSO~~GCO reconfiguration procedure to the subject CE for its management service operation as slave CM. If any update on its registered ~~WSO~~GCO information, CM shall perform a ~~WSO~~GCO registration update procedure.



1. —High-level flow chart of the CM operation



1. —Information service operation



1. —Management service operation



1. —Management service operation as slave CM
   * + 1. **~~WSO~~GCO subscription**

After the CM has received a ***SubscriptionRequest*** message from a CE indicating a new subscription, the CM shall perform the subscription procedure described in clause 5.2.1.1. The CM shall generate and send the ***SubscriptionResponse*** message to the CE.

***CxMessage*** fields in ***SubscriptionResponse*** message are shown in the table below.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***~~cxPayload~~CxPayload*** | ***subscriptionResponse*** |

Table below shows the parameters in the ***subscriptionResponse*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***serverID*** | ***IA5String*** | serverID |
| ***serverPassword*** | ***IA5String*** | serverPassword |
| ***status*** | ***~~CxMedia~~Status*** | status |

* + - 1. **~~WSO~~GCO subscription update**

After the CM has received a ***SubscriptionRequest*** message from a CE indicating a subscription change, the CM shall perform the subscription update procedure described in clause 5.2.1.2. The CM shall generate and send the ***SubscriptionResponse*** message to the CE.

Table below shows ***CxMessage*** fields in ***SubscriptionResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***cxPayload*** | ***subscriptionResponse*** |

Table below shows ***SubscriptionResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***serverID*** | ***IA5String*** | ~~serverID~~ Shall be set to indicate server ID |
| ***serverPassword*** | ***IA5String*** | ~~serverPassword~~ Shall be set to indicate server Password |
| ***status*** | ***~~CxMedia~~Status*** | ~~Status~~status |

* + - 1. **Subscription change**

When a CM requires to change subscription of a ~~WSO~~GCO, the CM shall perform the subscription change procedure described in clause 5.2.1.5. The CM shall generate and send the ***SubscriptionChangeRequest*** message to the CE serving this ~~WSO~~GCO.

The following table shows ***CxMessage*** fields in ***SubscriptionChangeRequest*** message.~~Table below shows~~ ***~~SubscriptionChangeRequest~~*** ~~payload element.~~

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~paylaod*** | ***CxPayload*** | ***sucscriptionChangeRequest*** |

Table below shows ***SubscriptionChangeRequest*** payload element.

~~Table below shows~~ ***~~CxMessage~~*** ~~fields in~~ ***~~SubscriptionChangeRequest~~*** ~~message.~~

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to update the service subscription to the information service.  Set to “management” if the intent is to update the service subscription to the management service. |

* + - 1. **~~WSO~~GCO registration**

After the CM has received a ***CERegistrationRequest*** message from a CE indicating a new registration, the CM shall perform the ~~WSO~~GCO registration procedure described in clause 5.2.2.1. The CM shall generate and send the ***RegistrationResponse*** message to the CE.

Table below shows ***CxMessage*** fields in ***RegistrationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***registrationResponse*** |

Table below shows ***RegistrationResponse ~~registrationResponse~~*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Status~~status*** | ***~~cxMedia~~Status*** | ~~Status~~status |
| ***registrationUpdateDuration*** | ***REAL*** | Optionally present. This value shall be set to indicate the registration update duration if the CM/CDIS needs regular update. |

Also, the CM shall generate and send the ***CMRegistrationRequest*** message to the CDIS to which this CM is subscribed.

Table below shows ***CxMessage*** fields in ***CMRegistrationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***cmRegistrationRequest ~~cMRegistrationRequest~~*** |

Table below shows ***CMRegistrationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmProfile*** | ***EntityProfile*** | Shall be set to indicate the entity profile |
| ***cmRegistration*** | ***CMRegistration*** | Shall be set to indicate the CM registration information ~~As~~as specified in table below |
| ***ceRegistration*** | ***CERegistration*** | Shall be set to indicate the CE registration information that CM serves ~~As~~as specified in table below |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that information is new. |
| ***~~ceID~~cmID*** | ***CxID*** | Shall be set to indicate CM ID |
| ***~~maximumNumberOf ControllableWSO~~ maximumNumberOf ControllableGCO*** | ***INTEGER*** | Shall be set to indicate ~~Maximum~~ maximum number of controllable ~~WSO~~GCOs |

Table below shows ***CMRegistration*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~iPAddress~~ ipAddress*** | ***OCTET STRING*** | Shall be set to indicate IP address |
| ***portNumber*** | ***INTEGER*** | Shall be set to indicate ~~Port~~port number |

Table below shows ***CERegistration*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***ceID*** | ***CxID*** | Shall be set to indicate CE ID |
| ***~~listOfWSORegistrations~~ listOfGCORegistrations*** | ***~~ListOfWSORegistrations~~ ListOfGCORegistrations*** | Shall be set to indicate the list of GCO registration information ~~As~~as specified in table below |

Table below shows ***~~ListOfWSORegistrations~~ ListOfGCORegistrations*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~wsoID~~ gcoID*** | ***OCTET STRING*** | ~~WSO~~GCO ID |
| ***~~networkTechnology~~*** | ***~~NetworkTechnology~~*** | ~~Network technology~~ |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation~~ |
| ***gcoDescriptor*** | ***GCODescriptor*** | Shall be set to indicate a set of GCO parameters as specified in following table |
| ***networkID*** | ***OCTET STRING*** | Shall be set to indicate network ID |
| ***coverageArea*** | ***CoverageArea*** | Shall be set to indicate the coverage area of GCO as specified in following table ~~As specified in table below~~ |
| ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate the installation parameters of GCO as specified in following table ~~As specified in table below~~ |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | Shall be set to indicate the list of available frequencies as specified in following table ~~As specified in table below~~ |
| ***operationRegion*** | ***Range*** | Shall be set to indicate range of activity in which the available frequencies are valid for.. |
| ***~~operatingFrequency~~*** | ***~~OperatingFrequency~~*** | ~~As specified in table below~~ |
| ***~~txPowerLimit~~*** | ***~~REAL~~*** | ~~Transmission power limit of the operating frequency if available~~ |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the list of operating frequencies and related operational parameters as specified in following table |
| ***~~maximumNumberOf~~***  ***~~ControllableWSO~~ maximumNumberOf***  ***ControllableGCO*** | ***~~MaximumNumberOf~~***  ***~~ControlableWSO~~ INTEGER*** | ~~Optionally, present~~ Optionally present. If present, this parameter shall be set to indicate the maximum number of controllable GCO. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |

The following table shows ***GCODescriptor*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkType*** | ***NetworkType*** | Shall be set to indicate network type of GCO if the regulator specifies. The details are shown in Annex A. |
| ***emissionClass*** | ***EmissionClass*** | Shall be set to indicate the GCO emission class if the regulator specifies. |
| ***gcoType*** | ***GCOType*** | Shall be set to indicate GCO type if the regulator specifies. The details are shown in Annex A. |
| ***networkTechnology*** | ***NetworkTechnology*** | Shall be set to indicate current operating network technology |
| ***addNetworkTechnology*** | ***SEQUENCE OF NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s) |
| ***gcoRegulatoryID*** | ***OCTET STRING*** | Shall be set to indicate the regulatory ID of GCO. |

Table below shows ***CoverageArea*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***radius*** | ***REAL*** | Shall be set to indicate the ~~available frequency range.~~ radius of coverage area of the GCO. |

Table below shows ***InstallationParameters*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***geolocation*** | ***Geolocation*** | Shall be set to indicate the geolocation of ~~WSO~~GCO antenna. |
| ***~~opMasterHeight~~*** | ***~~REAL~~*** | ~~Shall be set to indicate the height of master station, if available~~ |
| ***~~opSlaveHeight~~*** | ***~~REAL~~*** | ~~Shall be set to indicate the height of slave station, if available~~ |
| ***antennaCharacteristics*** | ***AntennaCharacteristics*** | Shall be set to indicate the antenna characteristics |
| ***~~opTxPower~~maxTxPower*** | ***REAL*** | Shall be set to indicate the maximum transmission power level if applicable. |
| ***aclr ~~aCLR~~*** | ***REAL*** | Shall be set to indicate adjacent channel leakage ratio of GCO ~~Adjacent Channel Leakage Ratio~~ |
| ***~~aCS~~*** | ***~~REAL~~*** | ~~Adjacent Channel Selectivity~~ |
| ***guaranteedQoSOf BackhaulConnection*** | ***GuaranteedQoSOf BackhaulConnection*** | ~~As specified in table below~~ Shall be set to indicate the guaranteed QoS of backhaul connection as specified in following table, if available. |
| ***receiverInfo*** | ***ReceiverInfo*** | Shall be set to indicate receiver information if available. |
| ***modulationType*** | ***ModulationType*** | Shall be set to indicate modulation type if available. |
| ***filterCharacteristics*** | ***FilterCharacteristics*** | Shall be set to indicate filter characteristics if available. |

The following table shows ***Geolocation*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coordinates*** | ***Coordinates*** | Shall be set to indicate the coordinates of GCO, if available. |

The following table shows ***Coordinates*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***longitude*** | ***REAL*** | Shall be set to indicate the longitude of GCO. |
| ***latitude*** | ***REAL*** | Shall be set to indicate the latitude of GCO |
| ***altitude*** | ***REAL*** | Shall be set to indicate the altitude of GCO |
| ***locationUncertainty*** | ***REAL*** | Shall be set to indicate the location uncertainty if available |

The following table shows ***AntennaCharacteristics*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***antennaHeight*** | ***REAL*** | Shall be set to indicate the antenna height of GCO, if available. |
| ***antennaHeightType*** | ***HeightType*** | Shall be set to indicate the antenna height type, if available. “agl” or “asl” is indicated. |
| ***antennaGain*** | ***REAL*** | Shall be set to indicate the antenna gain if available |
| ***antennaType*** | ***AntennaType*** | Shall be set to indicate the antenna array type if the number of antenna is two or more. |
| ***numberOfAntenna*** | ***INTEGER*** | Shall be set to indicate the number of antenna. |
| ***mimoType*** | ***MIMOType*** | Shall be set to indicate the MIMO type if the number of antenna is two or more. |
| ***multiAntProCap*** | ***MultiAntProCap*** | Shall be set to indicate the antenna processing capability includes directional beam forming if the number of antenna is two or more. |
| ***azimuthAngle*** | ***REAL*** | Shall be set to indicate the antenna boresight azimuth angle direction measured in degree against longitude facing north in clockwise direction. (i.e. an azimuth angle of zero degrees) is a horizontal line in the direction to the north pole, starting from the antenna if the number of antenna is two or more. |
| ***downtiltAngle*** | ***REAL*** | Shall be set to indicate the antenna downtilt angle. |
| ***beamwidth*** | ***REAL*** | Shall be set to indicate the antenna beamwidth |

The following table shows ***FilterCharacteristics*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***acs*** | ***REAL*** | Shall be set to indicate the adjacent channel selectivity. |
| ***fbmcOverlappingFactor*** | ***INTEGER*** | Shall be set to indicate FBMC filter overlapping factor if the GCO uses FBMC as modulation method. |

Table below shows ***ListOfAvailableFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***timestamp*** | ***GeneralizedTime*** | Shall be set to indicate the time of obtaining available frequency by GCO, if available. |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the available frequency range. |
| ***txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the available frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the available frequency range if applicable. |
| ***availableStopTime*** | ***GeneralizedTime*** | Shall be set to indicate stop time of the available frequency range if applicable. |
| ***~~availableDuration~~*** | ***~~REAL~~*** | ~~Shall be set to indicate duration of the available frequency range if applicable.~~ |
| ***maxTotalBandwidth*** | ***REAL*** | Maximum total bandwidth of one channel, if available |
| ***maxContiguousBandwidth*** | ***REAL*** | Maximum channel bandwidth that can be used contiguously, if available |
| ***resolutionBandwidth*** | ***REAL*** | Resolution bandwidth if available |
| ***typeOfAvailablefrequency*** | ***TypeOfFrequency*** | Shall be set to indicate the frequency type if the regulatory specifies. |
| ***aggInterfControlParam*** | ***AggregatedInterference ControlParameters*** | ~~As specified in table below~~ Optionally present. If available, set to indicate as specified in following table |

Table below shows ***AggregatedInterferenceControlParameters*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***referencePointID*** | ***INTEGER*** | Shall be set to indicate reference ~~Reference~~ point ID to be protected in controlling aggregated interference from the other ~~WSO~~GCO(s) if available. |
| ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate installation parameters of reference point |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information of the reference point ID~~ |
| ***~~aCS~~*** | ***~~REAL~~*** | ~~Adjacent Channel Selectivity of the reception to be protected at the reference point if available~~ |
| ***~~aCLR~~*** | ***~~REAL~~*** | ~~Referenced adjacent channel leakage ratio if available~~ |
| ***~~antennaHeight~~*** | ***~~REAL~~*** | ~~Potential antenna height of the reception to be protected if available~~ |
| ***~~antennaGain~~*** | ***~~REAL~~*** | ~~Potential antenna gain of the reception to be protected at the reference point if available~~ |
| ***~~protection ratio~~***  ***protactionRatio*** | ***REAL*** | Protection ratio of the reception to be protected at the reference point for the frequency if available |

Table below shows ***ListOfOperatingFrequencies~~OperatingFrequency~~*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the ~~WSO~~GCO currently operates. |
| ***txPower*** | ***REAL*** | Shall be set to indicate the transmission power of the GCO in *frequencyRange.* |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate the resolution bandwidth of available frequency where GCO is operating, if applicable. |
| ***typeOfOperatingFrequency*** | ***TypeOfFrequency*** | Shall be set to indicate the frequency type if the regulatory specifies. |
| ***occupancy*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate occupancy of the ~~WSO~~GCO frequency range. |
| ***energyDetectionInfo*** | ***EnergyDetectionInfo*** | Optionally present. If present, this parameter shall be set to indicate energy detection information. |
| ***modulationParameters*** | ***ModulationParameters*** | Shall be set to indicate modulation parameters. |
| ***sicDemodulationProcedure*** | ***SICDemodulationProcedure*** | Optionally present. If present, this parameter shall be set to indicate SIC demodulation procedures to be configured. |
| ***intLeakageFactor*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate interference leakage weighting factor. The details are shown in 7.x.x.x. |
| ***listOfSpecUsageInfoOf RefPoints*** | ***ListOfSpecUsageInfo*** | Optionally present. If present, this parameter shall be set to indicate the list of reference point locations. The details are shown in 7.x.x.x. |
| ***listOfSpecUsageInfoOf NeightborGCOs*** | ***ListOfSpecUsageInfo*** | Optionally present. If present, this parameter shall be set to indicate the list of co-channel neighbor GCOs location. The details are shown in 7.x.x.x. |
| ***coChGCOLimit*** | ***CoChGCOLimit*** | Limit on the maximum number of co-channel GCOs that shall operate simultaneously within a given region and frequency |

The following table shows ***ListOfSpecUsageInfo*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***listOfGeolocation*** | ***SEQUENCE OF Geolocation*** | Shall be set to indicate the list of geolocation of GCO. |

Table below shows ***GuaranteedQoSOfBackhaulConnection*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***backhaulTypeID*** | ***BackhaulTypeID*** | Shall be set to indicate backhaul type of the ~~WSO~~GCO. |
| ***guranteedMinimumBitRates*** | ***REAL*** | Shall be set to indicate the guaranteed maximum latency of its backhaul connection |
| ***guranteedMaximumLatency*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate the guaranteed maximum latency of its backhaul connection |

* + - 1. **~~WSO~~GCO registration update**

After the CM has received a ***CERegistrationRequest*** message from a CE indicating a registration update, the CM shall perform the ~~WSO~~GCO registration update procedure described in clause 5.2.2.2. The CM shall generate and send the ***RegistrationResponse*** message to the CE.

Table below shows ***CxMessage*** fields in ***RegistrationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***registrationResponse*** |

Table below shows the parameters in the ***registrationResponse*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | ***~~noError~~status*** |
| ***registrationUpdateDuration*** | ***REAL*** | Optionally present. This value shall be set to indicate the registration update duration if the CM/CDIS needs regular update. |

Also, the CM shall generate and send the ***CMRegistrationRequest*** message to the CDIS to which this CM is subscribed.

Table below shows ***CxMessage*** fields in ***CMRegistrationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***~~cMRegistrationRequest~~ cmRegistrationRequest*** |

Table below shows ***~~cMRegistrationRequest~~cmRegistrationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmProfile*** | ***EntityProfile*** | Shall be set to indicate the entity profile |
| ***cmRegistration*** | ***CMRegistration*** | Shall be set to indicate CM registration information as ~~As~~ specified in table below if any update |
| ***ceRegistration*** | ***CERegistration*** | Shall be set to indicate CE registration information as ~~As~~ specified in table below if any update |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that information is update/to-be-deleted. |
| ***~~ceID~~cmID*** | ***CxID*** | Shall be set to indicate CM ID |

Table below shows ***CMRegistration*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~iPAddress~~ipAddress*** | ***OCTET STRING*** | IP address |
| ***portNumber*** | ***INTEGER*** | Port number |

Table below shows ***CERegistration*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***ceID*** | ***CxID*** | Shall be set to indicate CE ID |
| ***~~listOfWSORegistrations~~ listOfGCORegistrations*** | ***~~ListOfWSORegistrations~~ ListOfGCORegistrations*** | Shall be set to indicate the list of GCO registration information as specified in following table ~~As specified in table below~~ |

Table below shows ***~~ListOfWSORegistrations~~ListOfGCORegistrations*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that information is update/to-be-deleted. |
| ***~~wsoID~~ gcoID*** | ***OCTET STRING*** | Shall be set to indicate GCO ID ~~WSO ID~~ |
| ***gcoDescriptor*** | ***GCODescriptor*** | Shall be set to indicate a set of GCO parameters as specified in 6.3.4.5~~As specified in 6.3.4.5~~ |
| ***~~networkTechnology~~*** | ***~~NetworkTechnology~~*** | ~~Network technology if any update~~ |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation if any update~~ |
| ***coverageArea*** | ***CoverageArea*** | Shall be set to indicate the coverage area of GCO as ~~As~~ specified in 6.3.4.5 if any update is needed. |
| ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate the installation parameters of GCO as ~~As~~ specified in 6.3.4.5 if any update is needed. |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | Shall be set to indicate the list of available frequency information at GCO’s geo-location as ~~As~~ specified in 6.3.4.5 if any update is needed. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the list of operating frequency and related operational parameters of GCO as ~~As~~ specified in 6.3.4.5 if any update is needed. |
| ***operationRegion*** | ***Range*** | Shall be set to indicate range of activity in which the available frequencies are valid for.. |
| ***~~operatingFrequency~~*** | ***~~OperatingFrequency~~*** | ~~Shall be set to indicate the operating frequency if any update~~ |
| ***~~txPowerLimit~~*** | ***~~REAL~~*** | ~~Transmission power limit of the operating frequency if any update~~ |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |

* + - 1. **Reconfiguration**

When a CM requires to reconfigure a ~~WSO~~GCO, the CM shall perform the ~~WSO~~GCO reconfiguration procedure described in clause 5.2.10.1. The CM shall generate and send the ***ReconfigurationRequest*** message to the CE serving this ~~WSO~~GCO.

Table below shows ***CxMessage*** fields in ***ReconfigurationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***reconfigurationRequest*** |

Table below shows ***reconfigurationRequest*** fields in ***ReconfigurationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~wsoID~~gcoID*** | ***OCTET STRING*** | Shall be set to indicate ~~WSO~~GCO ID. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the list of operating frequency and related parameters information of the GCO to be reconfigured. |
| ***~~OperatingFrequency~~*** | ***~~FrequencyRange~~*** | ~~Operating frequency range allocated for the WSO.~~ |
| ***~~txPowerLimit~~*** | ***~~REAL~~*** | ~~Transmission power limit~~ |
| ***~~addNetworkTechnology~~***  ***newNetworkTechnology*** | ***NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate its ~~WSO~~GCO network technology type~~(s)~~ to be reconfigured |
| ***specRequestModification*** | ***SpecRequestModification*** | Shall be set to indicate information to instruct the GCOs to make spectrum request to spectrum management database as per CM needs. |

* + - 1. **Obtaining coexistence set information**

When a CM requires to obtain coexistence set information, the CM shall perform the obtaining coexistence set information procedure described in clause 5.2.3.1. The CM shall generate and send the ***CoexistenceSetInformationRequest*** message to the CDIS to which this CM is subscribed.

Table below shows ***CxMessage*** fields in ***CoexistenceSetInformationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***coexistenceSetInformationRequest*** |

Table below shows the parameters in the ***coexistenceSetInformationRequest*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***listOfNetworkID*** | ***SEQUENCE OF  OCTET STRING*** | List of network ID |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that is new-request/update-request/stop-request. |

* + - 1. **Providing coexistence report**

When a CM requires to provide a coexistence report to a ~~WSO~~GCO, the CM shall perform the providing coexistence report procedure described in clause 5.2.3.6. The CM shall generate and send the ***CoexistenceReportResponse*** message to the CE that serves this ~~WSO~~GCO.

Table below shows ***CxMessage*** fields in ***CoexistenceReportResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***CoexistenceReportResponse*** |

The following table shows the parameters in the ***coexistenceReportResponse*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coexistenceReport*** | ***CoexistenceReport*** | Shall be set to indicate coexistence report in providing single coexistence report. Setting both *coexistenceReport* and *listOfCoexistenceReport* is not needed. |
| ***listOfCoexistenceReports*** | ***ListOfCoexistenceReports*** | Shall be set to indicate coexistence report in providing multiple coexistence report. Setting both *coexistenceReport* and *listOfCoexistenceReport* is not needed. |

Table below shows the parameters in the ***coexistenceReportResponse*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkID*** | ***OCTET STRING*** | Shall be set to indicate network ~~Network~~ ID |
| ***~~wsoID~~ gcoID*** | ***OCTET STRING*** | Shall be set to indicate ~~WSO~~GCO ID |
| ***~~listOfRecommended OperatingFrequency~~ listOfRecommended OperationFrequencies*** | ***ListOfRecommended OperatingFrequencies***  ***~~OperatingFrequency~~*** | Shall be set to indicate the list of recommended operation frequency and related operational parameters as specified in table below. ~~As specified in table below~~ |

Table below shows ***~~ListOfRecommendedOperationFrequency~~*** ***ListOfRecommendedOperationFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the recommended operation frequency range. |
| ***~~txPowerLevel~~txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the recommended frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the time duration when the recommended information can be utilized by GCO. ~~the recommended operation frequency range if applicable.~~ |
| ***~~availableDuration~~*** | ***~~REAL~~*** | ~~Shall be set to indicate duration of the operation recommended frequency range if applicable.~~ |
| ***availableStopTime*** | ***GeneralizedTime*** | Shall be set to indicate stop time of the time duration when the recommended information can be utilized by GCO. |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate the resolution bandwidth of available frequency where GCO is operating, if applicable. |
| ***locationValidity*** | ***REAL*** | Shall be set to indicate radius of the circle centered on the reported geo-location of the GCO, outside of which the recommended operation frequencies are not valid, if this parameter is available. |

The following table shows the parameters in the ***ListOfCoexistenceReports*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***region*** | | ***Region*** | Shall be set to indicate the region information that represents the below *listOfRecommendedOperationFrequencies* is valid if available. |
| ***listOfRecommended OperationFrequencies*** | ***ListOfRecommended OperationFrequencies*** | As specified in the above table |

* + - 1. **Master/Slave CM configuration**

When a CM requires to start a master/slave configuration, the CM shall perform the master/slave configuration procedure described in clause 5.2.9.2. The CM shall generate and send the ***MasterSlaveCMConfigurationRequest*** message to the CM with which it requires to do master/slave configuration.

Table below shows ***CxMessage*** fields in ***MasterSlaveCMConfigurationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***~~MasterSlaveCM ConfigurationRequest~~***  ***masterSlaveCM ConfigurationRequest*** |

Table below shows the parameters in the ***masterSlaveCMConfigurationRequest*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***~~cxID~~CxID*** | Subject CM ID |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that subject configuration request is new/update/ deleted. |
| ***cmProfile*** | ***EntityProfile*** | Shall be set to indicate the entity profile |
| ***~~registeredCeInfo~~***  ***ceRegistration*** | ***CERegistration*** | Shall be set to indicate the CE registration information that CM serves as specified in 6.3.4.6  ~~As specified in 6.3.4.6~~ |

The CM shall send ***MasterSlaveCMConfigurationResponse*** to the subject CM when receiving ***MasterSlaveCMConfigurationRequest*** from the subject CM.

Table below shows ***CxMessage*** fields in ***MasterSlaveCMConfigurationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***~~MasterSlaveCM ConfigurationResponse~~***  ***masterSlaveCM ConfigurationResponse*** |

Table below shows the parameters ***~~CxMessage~~*** ~~fields~~ in ***MasterSlaveCMConfigurationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***~~CxMedia~~Status*** | ~~Status~~status |

* + - 1. **Sending reconfiguration request from CM to another CM**

When a CM 1 requires to reconfigure a ~~WSO~~GCO served by a CM 2, the CM 1 shall perform the sending reconfiguration request from CM to another CM procedure described in clause 5.2.10.2. The CM shall generate and send the ***CMReconfigurationRequest*** message to the CM2.

Table below shows ***CxMessage*** fields in ***CMReconfigurationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***~~cMReconfigurationRequest~~***  ***cmReconfigurationRequest*** |

Table below shows ***~~cMReconfigurationRequest~~*** ***cmReconfigurationRequest*** fields in ***CMReconfigurationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~wsoID~~ gcoID*** | ***OCTET STRING*** | Shall be set to indicate ~~WSO~~GCO ID. |
| ***~~cmID~~ ceID*** | ***~~cxID~~CxID*** | Shall be set to indicate subject CE ID. ~~Subject CE ID~~ |
| ***listOfOperatingFrequencies*** | ***ListOfOperating Frequencies*** | Shall be set to indicate the operational parameters to be configured. |
| ***~~OperatingFrequency~~*** | ***~~FrequencyRange~~*** | ~~Operating frequency range allocated for the WSO.~~ |
| ***~~txPowerLimit~~*** | ***~~REAL~~*** | ~~Transmission power limit~~ |
| ***newNetworkTechnology*** | ***NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate its ~~WSO~~GCO network technology type(s) to be reconfigured |
| ***~~newNetowkTechnology~~*** | ***~~NetworkTechnology~~*** | ~~Change request for its operating network technology if available~~ |

The CM 2 shall send the ***CMReconfigurationResponse*** message to the CM 1 after it has received the ***CMReconfigurationRequest*** message from the CM 1.

Table below shows ***CxMessage*** fields in ***CMReconfigurationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***~~cMReconfigurationResponse~~***  ***cmReconfigurationResponse*** |

Table below shows ***~~cMReconfigurationResponse~~cmReconfigurationResponse*** fields in ***CMReconfigurationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***~~CxMedia~~Status*** | ~~Status~~status |

***Insert the following subclauses after 6.3.4.11***

**6.3.4.12 Inter-CM association procedure**

When a CM requires to communicate with the other CM, the CM shall perform the inter-CM association procedure described in 5.2.16. The CM shall generate and send the ***InterCMAssociationRequest*** message to the other CM.

The following table shows ***CxMessage*** fields in ***InterCMAssociationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCMAssociationRequest*** |

The following table shows ***InterCMAssociationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | Shall be set to indicate CM ID |
| ***managementRegion*** | ***Region*** | Shall be set to indicate the geographical region that CM manages, if available. |

After the CM has received a ***InterCMAssociationRequest*** message from the other CM, the CM shall process this ***InterCMAssociationRequest*** message. The CM shall generate and send the ***InterCMAssociationResponse*** message to the source CM.

The following table shows ***CxMessage*** fields in ***InterCMAssociationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCMAssociationResponse*** |

The following table shows ***InterCMAssociationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | status |
| ***listOfAccessibleCM*** | ***ListOfAccessibleCM*** | Optionally present to indicate list of the accessible CM. If the CM cannot accept the request, accessible CM information may be included in this message. |

The following table shows ***ListOfAccessibleCM*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | CM ID |
| ***ipAddress*** | ***OCTET STRING*** | IP address |
| ***portNumber*** | ***Integer*** | Port number |
| ***serverPassword*** | ***IA5String*** | May be set to indicate the server password if needed. |

**6.3.4.13 Inter-CM association procedure over COE**

When a CM requires to communicate with the other CM within different coexistence system, the CM shall perform the COE association procedure described in 5.2.17. The CM shall generate and send the ***InterCMAssociationRequest*** message to the COE within the same coexistence system.

The following table shows ***CxMessage*** fields in ***InterCMAssociationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCMAssociationRequest*** |

The following table shows ***InterCMAssociationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | Shall be set to indicate the CM ID |
| ***managementRegion*** | ***Region*** | Shall be set to indicate the geographical region that CM manages, if available. |

After the CM has received a ***InterCMAssociationRequest*** message from the other CM via the COE within the same coexistence system, the CM shall process this ***InterCMAssociationRequest*** message. The CM shall generate and send the ***InterCMAssociationResponse*** message to the COE within the same coexistence system.

The following table shows ***CxMessage*** fields in ***InterCMAssociationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCMAssociationResponse*** |

The following table shows ***InterCMAssociationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | status |
| ***listOfAccessibleCM*** | ***ListOfAccessibleCM*** | Optionally present to indicate list of the accessible CM. If the CM cannot accept the request, accessible CM information may be included in this message. |

The following table shows ***ListOfAccessibleCM*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | Shall be set to indicate CM ID |
| ***ipAddress*** | ***OCTET STRING*** | Shall be set to indicate IP address of CM |
| ***portNumber*** | ***INTEGER*** | Shall be set to indicate port number of CM |
| ***serverPassword*** | ***IA5String*** | May be set to indicate the server password if needed. |

**6.3.4.14 Obtaining operating frequency information procedure**

When a CM requires to obtain operating frequency information of GCOs that are served by the other CM, the CM shall perform the obtaining operating frequency information procedure described in 5.2.18. The CM shall generate and send the ***OperatingFreqInformationRequest*** message to the other CM.

The following table shows ***CxMessage*** fields in ***OperatingFreqInformationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***operatingFreqInformationRequest*** |

The following table shows ***OperatingFreqInformationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | CM ID |
| ***region*** | ***Region*** | Shall be set to indicate the geographical region where CM would like to obtain operating frequency information of GCOs. |

After the CM has received a ***OperatingFreqInformationRequest*** message from the other CM, the CM shall process this ***OperatingFreqInformationRequest*** message. The CM shall generate and send the ***OperatingFreqInformationResponse*** message to the source CM.

The following table shows ***CxMessage*** fields in ***OperatingFreqInformationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***operatingFreqInformationResponse*** |

The following table shows ***OperatingFreqInformationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | status |
| ***listOfCoexistenceReports*** | ***ListOfCoexistenceReports*** | Shall be set to indicate the operating frequency information corresponding to the region information included in the *OperatingFreqInformationRequest*. No need to be included when “status” shows error or rejected. |

The following table shows ***ListOfCoexistenceReports*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***region*** | ***Region*** | Shall be set to indicate the region that GCOs are operating within. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the operating frequencies of the GCOs as specified in the below table. |

The following table shows ***ListOfOperatingFrequencies*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the GCO currently operates. |

**6.3.4.15 Obtaining operating frequency information procedure over COE**

When a CM requires to obtain operating frequency information of GCOs that are served by the other CM within different coexistence system, the CM shall perform the obtaining operating frequency information procedure over COE described in 5.2.19. The CM shall generate and send the ***OperatingFreqInformationRequest*** message to the COE within the same coexistence system.

The following table shows ***CxMessage*** fields in ***OperatingFreqInformationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***operatingFreqInformationRequest*** |

The following table shows ***OperatingFreqInformationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | CM ID |
| ***region*** | ***Region*** | Shall be set to indicate the geographical region where CM would like to obtain operating frequency information of GCOs. |

After the CM has received a ***OperatingFreqInformationRequest*** message from the other CM via the COE within the same coexistence system, the CM shall process this ***OperatingFreqInformationRequest*** message. The CM shall generate and send the ***OperatingFreqInformationResponse*** message to the source CM via the COE within the same coexistence system.

The following table shows ***CxMessage*** fields in ***OperatingFreqInformationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***operatingFreqInformationResponse*** |

The following table shows ***OperatingFreqInformationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | status |
| ***listOfCoexistenceReports*** | ***ListOfCoexistenceReports*** | Shall be set to indicate the operating frequency information corresponding to the region information included in the *OperatingFreqInformationRequest*. No need to be included when “status” shows error or rejected. |

The following table shows ***ListOfCoexistenceReports*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***region*** | ***Region*** | Shall be set to indicate the region that GCOs are operating within. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the operating frequencies of the GCOs as specified in the below table. |

The following table shows ***ListOfOperatingFrequencies*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the GCO currently operates. |

**6.3.4.16 Proxy coexistence service procedure**

When a CM receives ***CEProxyCoexistenceServiceRequest*** from CE, CM shall perform the proxy coexistence service procedure described in 5.2.20. The CM shall generate and send the ***CMProxyCoexistenceServiceRequest*** message to the other CM.

The following table shows ***CxMessage*** fields in ***CMProxyCoexistenceServiceRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***cmProxyCoexistenceServiceRequest*** |

The following table shows the parameters in the ***cmProxyCoexistenceServiceRequest*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | Shall be set to indicate CM ID |
| ***listOfCEs*** | ***ListOfCEs*** | Shall be set to indicate the list of CEs to be served proxy service. |

The following table shows the parameters in the ***listOfCEs***.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***ceID*** | ***CxID*** | Shall be set to indicate tCE ID |
| ***listOfGCOs*** | ***ListOfGCOs*** | Shall be set to indicate the list of GCOs to be served proxy service. |

The following table shows the parameters in the ***listOfGCOs***.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***gcoID*** | ***OCTET STRING*** | Shall be set to indicate GCO ID. |
| ***gcoDescriptor*** | ***GCODescriptor*** | Shall be set to indicate the GCO parameters. |

The following table shows ***GCODescriptor*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkType*** | ***NetworkType*** | Shall be set to indicate network type of GCO if the regulator specifies. The details are shown in Annex A. |
| ***emissionClass*** | ***EmissionClass*** | Shall be set to indicate the emission class if the regulator specifies. |
| ***gcoType*** | ***GCOType*** | Shall be set to indicate GCO type if the regulator specifies. The details are shown in Annex A. |
| ***networkTechnology*** | ***NetworkTechnology*** | Shall be set to indicate current operating network technology |
| ***addNetworkTechnology*** | ***SEQUENCE OF NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s) |
| ***gcoRegulatoryID*** | ***OCTET STRING*** | Shall be set to indicate the regulatory ID of GCO. |

**6.3.4.17 CM association procedure**

After the CM has received a ***CMAssociationRequest*** message from a CE, the CM shall perform the CM association procedure described in 5.2.15. The CM shall generate and send the ***CMAssociationResponse*** message to the CE.

***CxMessage*** fields in ***CMAssociationResponse*** message are shown in the following table.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***cmAssociationResponse*** |

The following table shows the parameters in the ***cmAssociationResponse*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | Status |

* 1. **CE operation**
     1. **Profile 3**
        1. **General description**

A CE that operates as per Profile 3 shall support the following procedures:

* CM association
* ~~WSO~~GCO subscription
* ~~WSO~~GCO subscription update
* ~~WSO~~GCO subscription change
* ~~WSO~~GCO registration
* ~~WSO~~GCO registration update
* ~~WSO~~GCO reconfiguration
* Providing coexistence report

CM association procedure is performed to start communicating with CM when the CE does not associated with any of CMs or CE needs to change its serving CM. How to obtain CM association information is implementation dependent (e.g. external weblisting server). A high-level flow chart of the CE operation except for CM association is provided in Figure 65. Information service CE operation is shown in Figure 66. Management service CE operation is shown in Figure 67.



1. —High-level flow chart of the CE operation



1. —Information service CE operation



1. —Management service CE operation

After receiving a request to start operation, a CE shall perform the initial step sequences that are composed of ~~WSO~~GCO subscription and registration procedures for the coexistence service subscription of each subject ~~WSO~~GCO/RLSS for the CE, which will be coordinated by its connected CM. After that, the CE shall switch to its operation mode in accordance with subscription service type, which is either information service or management service.

In the case of subscribing information service, CE shall provide coexistence report being served by its connected CM to its connected ~~WSO~~GCO/RLSS until CE stops coexistence service subscription or changes it to the management service subscription.

In the case of subscribing management service, CE shall provide reconfiguration request being served by its connected CM to the subject ~~WSO~~GCO/RLSS until CE stops coexistence service subscription or changes it to the information service subscription.

In both cases, when the CE tries to stop its coexistence service subscription to its connected CM, CE shall indicate “no service subscription” to the subject CM via ~~WSO~~GCO subscription update procedure, and CE shall request deregistration as “remove” to its CM via ~~WSO~~GCO registration procedure.

In both cases, when the CE tries to change its coexistence service subscription to its connected CM, CE shall request the change to different type of service subscription via ~~WSO~~GCO subscription update procedure.

Subsequently, when CM requests a change of the type of coexistence service subscription to the subject CE, CE shall respond that request from the CM whether or not such request is acceptable via ~~WSO~~GCO subscription change procedure.

* + - 1. **~~WSO~~GCO subscription**

After the start-up, a CE shall perform the ~~WSO~~GCO subscription procedure described in clause 5.2.1.1. The CE shall send the ***CxMediaSubscriptionRequest*** primitive to the ~~WSO~~GCO/RLSS it serves and shall wait for the ***CxMediaSubscriptionResponse*** primitive from this ~~WSO~~GCO/RLSS. After the CE has received the ***CxMediaSubscriptionResponse*** primitive from the ~~WSO~~GCO/RLSS, the CE shall generate and send the ***SubscriptionRequest*** message to the CM to which it prefers to subscribe.

Table below shows ***CxMediaSubscriptionResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | ~~WSO~~GCO subscription identifier |
| ***clientPassword*** | ***IA5String*** | ~~WSO~~GCO subscription password |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to subscribe to the information service.  Set to “management” if the intent is to subscribe to the management service. |

Table below shows ***CxMessage*** fields in ***SubscriptionRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***subscriptionRequest*** |

Table below shows ***subscriptionRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | ~~WSO~~GCO subscription identifier |
| ***clientPassword*** | ***IA5String*** | ~~WSO~~GCO subscription password |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to subscribe to the information service.  Set to “management” if the intent is to subscribe to the management service. |

The CE shall send the ***CxMediaSubscriptionConfirm*** primitive to the ~~WSO~~GCO/RLSS after it has received the ***SubscriptionResponse*** message from the CM.

Table below shows ***CxMediaSubscriptionConfirm*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***CxMediaStatus*** | ~~Status~~cxMediaStatus |

* + - 1. **~~WSO~~GCO subscription update**

After a CE has received a ***CxMediaSubscriptionIndication*** primitive from the ~~WSO~~GCO/RLSS it serves, the CE shall perform the ~~WSO~~GCO subscription update procedure described in clause 5.2.1.2. The CE shall generate and send the ***SubscriptionRequest*** message to the CM to which it is subscribed.

Table below shows ***CxMediaSubscriptionIndication*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | ~~WSO~~GCO subscription identifier |
| ***clientPassword*** | ***IA5String*** | ~~WSO~~GCO subscription password |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to subscribe to the information service.  Set to “management” if the intent is to subscribe to the management service. |

Table below shows ***CxMessage*** fields in ***SubscriptionRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***subscriptionRequest*** |

Table below shows ***subscriptionRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | ~~WSO~~GCO subscription identifier |
| ***clientPassword*** | ***IA5String*** | ~~WSO~~GCO subscription password |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to subscribe to the information service.  Set to “management” if the intent is to subscribe to the management service.  Set to “noService” if the intent is to stop the service subscription |

The CE shall send the ***CxMediaSubscriptionConfirm*** primitive to the ~~WSO~~GCO/RLSS after it has received the ***SubscriptionResponse*** message from the CM.

Table below shows ***CxMediaSubscriptionConfirm*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***cxMediaStatus*** | ***~~Status~~***cxMediaStatus |

* + - 1. **Subscription change**

After a CE has received a ***SubscriptionChangeRequest*** message from the CM to which it is subscribed, the CE shall perform the subscription change procedure described in clause 5.2.1.5. The CE shall generate and send the ***CxMediaChangeSubscriptionRequest~~CxMediaChangeSybscriptionRequest~~*** primitive to the ~~WSO~~GCO/RLSS that is serves.

Table below shows ***CxMediaChangeSubscriptionRequest*** primitives.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coexistenceService*** | ***CoexistenceService*** | Set to “information” if the intent is to update the service subscription to the information service.  Set to “management” if the intent is to update the service subscription to the management service. |

Also, the CE shall send the ***SubscriptionChangeResponse*** message to the CM after it has received the ***CxMediaChangeSubscriptionResponse*** primitive from the ~~WSO~~GCO/RLSS.

Table below shows ***CxMessage*** fields in ***SubscriptionChangeResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~Header~~header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~payload*** | ***CxPayload*** | ***sucscriptionChangeResponse*** |

Table below shows ***SubscriptionChangeResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***~~CxMedia~~Status*** | ***~~Status~~status*** |

* + - 1. **~~WSO~~GCO registration**

After a CE has performed the ~~WSO~~GCO subscription procedure, the CE shall perform the ~~WSO~~GCO registration procedure described in clause 5.2.2.1. The CE shall generate and send the ***cxMediaRegistrationRequest*** message to the CM to which it is subscribed. After receiving ***CxMediaRegistrationResponse*** from GCO, The CE shall generate and send the ***CERegistrationRequest*** message to the CM to which it is subscribed.



Table below shows ***CxMediaRegistrationResponse*** for one ~~WSO~~GCO.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate new registration as “new”. |
| ***~~wsoID~~gcoID*** | ***~~INTEGER~~OCTET STRING*** | ~~WSO~~GCO ID |
| ***networkID*** | ***OCTET STRING*** | Identifier of the network to which the ~~WSO~~GCO belongs. |
| ***gcoDescription*** | ***GCODescriptor*** | Shall be set to indicate the GCO parameters as specified in the following table. |
| ***~~networkTechnology~~*** | ***~~NetworkTechnology~~*** | ~~Shall be set to a value that represents the network technology of the WSO.~~ |
| ***~~networkType~~*** | ***~~NetworkType~~*** | ~~Shall be set to a value that represents the network type of the WSO.~~ |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information of the WSO~~ |
| ***~~deviceRegulatoryID~~*** | ***~~OCTET STRING~~*** | ~~Shall be set to a value that equals the regulatory identifier of the WSO.~~ |
| ***installationParameters*** | ***InstallationParameters*** | As specified in table below |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | As specified in table below. |
| ***txScheduleSupported*** | ***BOOLEAN*** | Shall be set to a value that represents the ~~WSO~~GCO’s capability to support transmit scheduling. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | As specified in table below. |
| ***listOfSuppFrequencies*** | ***ListOfSupportedFrequencies*** | As specified in table below. |
| ***~~addNetworkTechnology~~*** | ***~~SEQUENCE of NetworkTechnology~~*** | ~~Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s)~~ |
| ***requiredResource*** | ***RequiredResource*** | As specified in table below. |
| ***mobilityInformation*** | ***MobilityInformation*** | As specified in table below. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Range of activity in which the available frequencies are valid for. |

The following table shows ***GCODescriptor*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkType*** | ***NetworkType*** | Shall be set to indicate network type of GCO if the regulator specifies. The details are shown in Annex A. |
| ***emissionClass*** | ***EmissionClass*** | Shall be set to indicate emission class of GCO if the regulator specifies. The details are shown in Annex A. |
| ***gcoType*** | ***GCOType*** | Shall be set to indicate GCO type if the regulator specifies. The details are shown in Annex A. |
| ***networkTechnology*** | ***NetworkTechnology*** | Shall be set to indicate current operating network technology |
| ***addNetworkTechnology*** | ***SEQUENCE OF NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s) |
| ***gcoRegulatoryID*** | ***OCTET STRING*** | Shall be set to indicate the regulatory ID of GCO. |

Table below shows ***InstallationParameters*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***geolocation*** | ***Geolocation*** | Shall be set to indicate the geolocation information of GCO if available. |
| ***~~opMasterHeight~~*** | ***~~REAL~~*** | ~~Shall be set to indicate the height of master station, if available~~ |
| ***~~opSlaveHeight~~*** | ***~~REAL~~*** | ~~Shall be set to indicate the height of slave station, if available~~ |
| ***antennaCharacteristics*** | ***AntennaCharacteristics*** | Shall be set to indicate the antenna information of GCO |
| ***~~opTxPower~~maxTxPower*** | ***REAL*** | Shall be set to indicate the maximum transmission power level if applicable. |
| ***aclr~~aCLR~~*** | ***REAL*** | Adjacent Channel Leakage Ratio |
| ***~~aCS~~*** | ***~~REAL~~*** | ~~Adjacent Channel Selectivity~~ |
| ***guaranteedQoSOf***  ***BackhaulConnection*** | ***GuaranteedQoSOf***  ***BackhaulConnection*** | ~~As specified in table below~~ Shall be set to indicate the guaranteed QoS of backhaul connection as specified in following table, if available |
| ***receiverInfo*** | ***ReceiverInfo*** | Shall be set to indicate GCO receiver information if available. |
| ***modulationType*** | ***ModulationType*** | Shall be set to indicate modulation type if available. |
| ***filterCharacteristics*** | ***FilterCharacteristics*** | Shall be set to indicate filter characteristics if available. |

The following table shows ***Geolocation*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coordinates*** | ***Coordinates*** | Shall be set to indicate the coordinates of ~~WSO~~GCO, if available. |

The following table shows ***Coordinates*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***longitude*** | ***REAL*** | Shall be set to indicate the longitude of ~~WSO~~GCO. |
| ***latitude*** | ***REAL*** | Shall be set to indicate the latitude of ~~WSO~~GCO |
| ***altitude*** | ***REAL*** | Shall be set to indicate the altitude of ~~WSO~~GCO |
| ***locationUncertainty*** | ***REAL*** | Shall be set to indicate the antenna gain if available |

The following table shows ***AntennaCharacteristics*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***antennaHeight*** | ***REAL*** | Shall be set to indicate the antenna height of GCO, if available. |
| ***antennaHeightType*** | ***HeightType*** | Shall be set to indicate the antenna height type, if available. “agl” or “asl” is indicated. |
| ***antennaGain*** | ***REAL*** | Shall be set to indicate the antenna gain if available |
| ***antennaType*** | ***AntennaType*** | Shall be set to indicate the antenna array type if the number of antenna is two or more. |
| ***numberOfAntenna*** | ***INTEGER*** | Shall be set to indicate the number of antenna. |
| ***mimoType*** | ***MIMOType*** | Shall be set to indicate the MIMO type if the number of antenna is two or more. |
| ***multiAntProCap*** | ***MultiAntProCap*** | Shall be set to indicate the antenna processing capability includes directional beam forming if the number of antenna is two or more. |
| ***azimuthAngle*** | ***REAL*** | Shall be set to indicate the antenna boresight azimuth angle direction measured in degree against longitude facing north in clockwise direction. (i.e. an azimuth angle of zero degrees) is a horizontal line in the direction to the north pole, starting from the antenna if the number of antenna is two or more. |
| ***downtiltAngle*** | ***REAL*** | Shall be set to indicate the antenna downtilt angle. |
| ***beamwidth*** | ***REAL*** | Shall be set to indicate the antenna beamwidth |

Table below shows ***GuaranteedQoSOfBackhaulConnection*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***backhaulTypeID*** | ***~~BackhalTypeID~~***  ***BackhaulTypeID*** | Shall be set to indicate backhaul type of the ~~WSO~~GCO. |
| ***guaranteedMinimum BitRates*** | ***REAL*** | Shall be set to indicate the guaranteed maximum latency of its backhaul connection |
| ***guaranteedMaximum Latency*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate the guaranteed maximum latency of its backhaul connection |

Table below shows ***ListOfAvailableFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***timestamp*** | ***GeneralizedTime*** | Shall be set to indicate the time of obtaining available frequency by GCO, if available. |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the available frequency range. |
| ***txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the available frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the available frequency range if applicable. |
| ***~~availableDuration~~*** | ***~~REAL~~*** | ~~Shall be set to indicate duration of the available frequency range if applicable.~~ |
| ***availableStopTime*** | ***GeneralizedTime*** | Shall be set to indicate stop time of the available frequency range if applicable. |
| ***maxTotalBandwidth*** | ***REAL*** | Maximum total bandwidth of one channel, if available |
| ***maxContiguousBandwidth*** | ***REAL*** | Maximum channel bandwidth that can be used contiguously, if available |
| ***resolutionBandwidth*** | ***REAL*** | Resolution bandwidth if available |
| ***typeOfAvailablefrequency*** | ***TypeOfFrequency*** | Shall be set to indicate the frequency type if the regulatory specifies. |
| ***locationValidity*** | ***REAL*** | Shall be set to indicate radius of the circle centered on the reported ge-location of the GCO, outside of which the available frequencies are not valid, if this parameter is available. |
| ***aggInterfControlParam*** | ***AggregatedInterference***  ***ControlParameters*** | ~~As specified in table below~~ Shall be set to indicate the aggregated interference parameters as specified in following table, if available. |

Table below shows ***AggregatedInterferenceControlParameters*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***referencePointID*** | ***INTEGER*** | ~~Reference~~ Shall be set to indicate reference point ID to be protected in controlling aggregated interference from the other ~~WSO~~GCO(s) if available |
| ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate installation parameters of reference point if available. |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information of the reference point ID~~ |
| ***~~aCS~~*** | ***~~REAL~~*** | ~~Adjacent Channel Selectivity of the reception to be protected at the reference point if available~~ |
| ***~~aCLR~~*** | ***~~REAL~~*** | ~~Referenced adjacent channel leakage ratio if available~~ |
| ***~~antennaHeight~~*** | ***~~REAL~~*** | ~~Potential antenna height of the reception to be protected if available~~ |
| ***~~antennaGain~~*** | ***~~REAL~~*** | ~~Potential antenna gain of the reception to be protected at the reference point if available~~ |
| ***protectionRatio ~~ratio~~*** | ***REAL*** | Protection ratio of the reception to be protected at the reference point for the frequency if available |

Table below shows ***listOfSuppFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~supportedFrequency~~***  ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the ~~WSO~~GCO is capable of operating. |
| ***~~Extrachannelization IsSupported~~***  ***extraChannelization IsSupported*** | ***BOOLEAN*** | Shall be set to indicate if subchannelization or channel aggregation) supported or not |
| ***~~Extrachannelization Description~~***  ***extraChannelization Description*** | ***~~ExtrachannelizationDescription~~***  ***ExtraChannelizationDescription*** | If present, this parameter shall be set to indicate the extra channel configuration description |

The following table shows ***ExtraChannelizationDescription*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***maxNumberOf SimultaneousUse*** | ***INTEGER*** | Shall be set to indicate the maximum number of channels supported for channel/carrier aggregation or bonding. |
| ***listOfSupportedBandwidth*** | ***SEQUENCE OF REAL*** | Shall be set to indicate the list of supported bandwidth information |

Table below shows ***listOfOperatingFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the ~~WSO~~GCO currently operates. |
| ***txPower*** | ***REAL*** | Shall be set to indicate transmission power using at the frequency indicated by the above *frequencyRange.* |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate resolution bandwidth if available |
| ***typeOfOperatingFrequency*** | ***TypeOfFrequency*** | Shall be set to indicate the frequency type if the regulatory specifies. |
| ***occupancy*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate occupancy of the ~~WSO~~GCO frequency range. |
| ***modulationParameters*** | ***ModulationParameters*** | Shall be set to indicate modulation parameters. |
| ***sicDemodulationProcedure*** | ***SICDemodulationProcedure*** | Optionally present. If present, this parameter shall be set to indicate SIC demodulation procedures. The details are shown in 7.x.x.x. |
| ***intLeakageFactor*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate interference leakage weighting factor. The details are shown in 7.x.x.x. |
| ***listOfSpecUsageInfoOf RefPoints*** | ***ListOfSpecUsageInfo*** | Optionally present. If present, this parameter shall be set to indicate the list of reference point locations. The details are shown in 7.x.x.x. |
| ***listOfSpecUsageInfoOf NeightborGCOs*** | ***ListOfSpecUsageInfo*** | Optionally present. If present, this parameter shall be set to indicate the list of co-channel neighbor GCOs location. The details are shown in 7.x.x.x. |
| ***coChGCOLimit*** | ***CoChGCOLimit*** | Limit on the maximum number of co-channel GCOs that shall operate simultaneously within a given region and frequency |

The following table shows ***ListOfSpecUsageInfo*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***listOfGeolocation*** | ***SEQUENCE OF Geolocation*** | Shall be set to indicate the list of geolocation of GCO. |

Table below shows ***requiredResource*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***requiredBandwidth*** | ***REAL*** | Shall be set to indicate bandwidth requested for the ~~WSO~~GCO. |

Also, the CE shall send the ***CxMediaRegistrationConfirm*** primitive to the ~~WSO~~GCO/RLSS after it has received the ***RegistrationResponse*** message from the CM.

Table below shows ***MobilityInformation*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***maxSpeed*** | ***REAL*** | If present, this parameter shall be set to indicate the maximum speed value of the ~~WSO~~GCO (in km/h) |
| ***speedInformation*** | ***SpeedInformation*** | If present, this parameter shall be set to indicate detailed information on the ~~WSO~~GCO speed and direction. |
| ***routeInformation*** | ***RouteInformation*** | If present, this parameter shall be set to indicate the ~~WSO~~GCO planned route and time. |

The following table shows ***ListOfDesiredPerformances*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the frequency range to be set desired performance. |
| ***desiredEnergyDection SuccessRate*** | ***REAL*** | Shall be set to indicate desired energy detection successful rate in percentage if needed. |
| ***desiredActivationRate*** | ***REAL*** | Shall be set to indicate desired percentage of activated cells of one operator if needed. |

Table below shows ***CxMessage*** fields in ***CERegistrationRequest*** message when requesting registration.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***ceRegistrationRequest ~~registrationRequest~~*** |

Table below shows ***CERegistrationRequest*** payload element for one ~~WSO~~GCO when requesting registration.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate new registration as “new”. |
| ***~~wsoID~~gcoID*** | ***~~INTEGER~~OCTET STRING*** | ~~WSO~~GCO ID |
| ***networkID*** | ***OCTET STRING*** | Identifier of the network to which the ~~WSO~~GCO belongs. |
| ***gcoDescription*** | ***GCODescriptor*** | Shall be set to indicate the GCO parameters as specified in the following table. |
| ***~~networkTechnology~~*** | ***~~NetworkTechnology~~*** | ~~Shall be set to a value that represents the network technology of the WSO.~~ |
| ***~~networkType~~*** | ***~~NetworkType~~*** | ~~Shall be set to a value that represents the network type of the WSO.~~ |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information of the WSO~~ |
| ***~~deviceRegulatoryID~~*** | ***~~OCTET STRING~~*** | ~~Shall be set to a value that equals the regulatory identifier of the WSO.~~ |
| ***installationParameters*** | ***InstallationParameters*** | As specified in table below |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | As specified in table below. |
| ***txScheduleSupported*** | ***BOOLEAN*** | Shall be set to a value that represents the ~~WSO~~GCO’s capability to support transmit scheduling. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | As specified in table below. |
| ***listOfSuppFrequencies*** | ***ListOfSupportedFrequencies*** | As specified in table below. |
| ***~~addNetworkTechnology~~*** | ***~~SEQUENCE of NetworkTechnology~~*** | ~~Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s)~~ |
| ***requiredResource*** | ***RequiredResource*** | As specified in table below. |
| ***mobilityInformation*** | ***MobilityInformation*** | As specified in table below. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Range of activity in which the available frequencies are valid for. |

Table below shows ***CxMediaRegistrationConfirm*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***~~cxMediaStatus~~CxMediaStatus*** | ***~~Status~~cxMediaStatus*** |

* + - 1. **~~WSO~~GCO registration update**

After a CE has received a ***CxMediaRegistrationIndication*** primitive from the ~~WSO~~GCO/RLSS it serves, the CE shall perform the ~~WSO~~GCO registration update procedure described in clause 5.2.2.2. The CE shall generate and send the ***CERegistrationRequest*** message to the CM to which it is subscribed.

Table below shows ***CxMediaRegistrationIndication*** payload element for one ~~WSO~~GCO when requesting registration update.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate registration update as “modify” or “remove”. |
| ***~~wsoID~~gcoID*** | ***~~INTEGER~~***  ***OCTET STRING*** | Shall be set to indicate ~~WSO~~GCO ID |
| ***networkID*** | ***OCTET STRING*** | Shall be set to indicate identifier of the network to which the GCO belongs. |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information if any update~~ |
| ***gcoDescriptor*** | ***GCODescriptor*** | Shall be set to indicate a set of GCO parameters if update is needed. |
| ***~~InstallationParameters~~***  ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate the installation parameters of GCO as~~As~~ specified in 6.4.3.5 if any update is needed. |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | Shall be set to indicate the list of available frequency at the GCO’s location as~~As~~ specified in if any update is needed. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the list of operating frequency and related operational parameters of GCO as~~As~~ specified in 6.4.3.5 if any update is needed. |
| ***~~addNetworkTechnology~~*** | ***~~SEQUENCE of NetworkTechnology~~*** | ~~Optionally present. If present, this parameter shall be set to indicate the sequence of its WSO operable network technology type(s)~~ |
| ***requiredResource*** | ***RequiredResource*** | Shall be set to indicate the required resource of GCO as~~As~~ specified in 6.4.3.5 if any update |
| ***mobilityInformation*** | ***MobilityInformation*** | Shall be set to indicate the mobility information of GCO as~~As~~ specified in 6.4.3.5 if any update. |
| ***listOfDesiredPerformances*** | ***ListOfDesiredPerformances*** | Shall be set to indicate the desired performance of GCO in each frequency band if available. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Range of activity in which the available frequencies are valid for. |

Table below shows ***CxMessage*** fields in ***CERegistrationRequest*** message when requesting registration update.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***~~registrationRequest~~ ceRegistrationRequest*** |

Table below shows ***~~CEregistrationRequest~~CERegistrationRequest*** payload element for one ~~WSO~~GCO when requesting registration update.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate registration update as “modify” or “remove”. |
| ***~~wsoID~~gcoID*** | ***~~INTEGER~~***  ***OCTET STRING*** | Shall be set to indicate ~~WSO~~GCO ID |
| ***networkID*** | ***OCTET STRING*** | Shall be set to indicate identifier of the network to which the GCO belongs. |
| ***~~geolocation~~*** | ***~~Geolocation~~*** | ~~Geolocation information if any update~~ |
| ***gcoDescriptor*** | ***GCODescriptor*** | Shall be set to indicate a set of GCO parameters if update is needed. |
| ***~~InstallationParameters~~***  ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate the installation parameters of GCO as~~As~~ specified in 6.4.3.5 if any update is needed. |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | Shall be set to indicate the list of available frequency at the GCO’s location as~~As~~ specified in if any update is needed. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the list of operating frequency and related operational parameters of GCO as~~As~~ specified in 6.4.3.5 if any update is needed. |
| ***~~addNetworkTechnology~~*** | ***~~SEQUENCE of NetworkTechnology~~*** | ~~Optionally present. If present, this parameter shall be set to indicate the sequence of its WSO operable network technology type(s)~~ |
| ***requiredResource*** | ***RequiredResource*** | Shall be set to indicate the required resource of GCO as~~As~~ specified in 6.4.3.5 if any update |
| ***mobilityInformation*** | ***MobilityInformation*** | Shall be set to indicate the mobility information of GCO as~~As~~ specified in 6.4.3.5 if any update. |
| ***listOfDesiredPerformances*** | ***ListOfDesiredPerformances*** | Shall be set to indicate the desired performance of GCO in each frequency band if available. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transmission supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Range of activity in which the available frequencies are valid for. |

Also, the CE shall send the ***CxMediaRegistrationConfirm*** primitive to the ~~WSO~~GCO/RLSS after it has received the ***RegistrationResponse*** from the CM.

Table below shows ***CxMediaRegistrationConfirm*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cxMediaStatus*** | ***~~cxMediaStatus~~CxMediaStatus*** | ***~~Status~~cxMediaStatus*** |

* + - 1. **~~WSO~~GCO reconfiguration**

After a CE has received a ***ReconfigurationRequest*** message from the CM to which it is subscribed, the CE shall perform the ~~WSO~~GCO reconfiguration procedure described in clause 5.2.10.1. The CE shall generate and send the ***CxMediaReconfigurationRequest*** primitive to the ~~WSO~~GCO/RLSS it serves.

Table below shows ***CxMediaReconfigurationRequest*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~wsoID~~***  ***gcoID*** | ***OCTET STRING*** | ~~WSO~~GCO ID. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the operating frequencies to be reconfigured. |
| ***~~OperatingFrequency~~*** | ***~~FrequencyRange~~*** | ~~Operating frequency range allocated for the WSO.~~ |
| ***~~txPowerLimit~~*** | ***~~REAL~~*** | ~~Transmission power limit~~ |
| ***~~addNetworkTechnology~~***  ***newNetworkTechnology*** | ***NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate its ~~WSO~~GCO network technology type(s) to be reconfigured |
| ***specRequestModification*** | ***SpecRequestModification*** | Information to instruct the GCOs to make spectrum request to spectrum management database |

Also, the CE shall send the ***ReconfigurationResponse*** message to the CM after it has received the ***CxMediaReconfigurationResponse*** primitive from the ~~WSO~~GCO/RLSS.

Table below shows ***CxMessage*** fields in ***ReconfigurationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***~~Payload~~***  ***payload*** | ***~~cxPayload~~***  ***CxPayload*** | ***~~status~~***  ***reconfigurationResponse*** |

Table below shows ***ReconfigurationResponse*** payload elements for one GCO.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***gcoID*** | ***OCTET STRING*** | GCO ID |
| ***status*** | ***Status*** | status |
| ***listOfAvailableFrequencies*** | ***ListOfAvailableFrequencies*** | Shall be set to indicate the list of available frequency at the GCO’s location as per ***specRequestModification*** is included in the reconfiguration request. |

* + - 1. **Providing coexistence report**

After a CE has received a ***CoexistenceReportResonse*** message from the CM to which it is subscribed, the CE shall perform the providing coexistence report procedure described in clause 5.2.3.6. The CE shall generate and send the ***CxMediaCoexistenceReportResponse*** primitive to the ~~WSO~~GCO/RLSS it serves.

Table below shows ***CxMedia*** fields in ***CxMediaCoexistenceReportResponse*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***~~networkID~~*** | ***~~OCTET STRING~~*** | ~~Network ID~~ |
| ***~~listOfRecommended~~***  ***~~OperatingFrequency~~***  ***~~OperatingFrequencies~~*** | ***~~ListOfRecommended~~***  ***~~OperatingFrequency~~***  ***~~OperatingFrequencies~~*** | ~~As specified in table below~~ |
| ***coexistenceReport*** | ***CoexistenceReport*** | Shall be set to indicate coexistence report in providing single coexistence report. Setting both *coexistenceReport* and *listOfCoexistenceReport* is not needed. |
| ***listOfCoexistenceReports*** | ***ListOfCoexistenceReports*** | Shall be set to indicate coexistence report in providing multiple coexistence report. Setting both *coexistenceReport* and *listOfCoexistenceReport* is not needed. |

The following table shows the parameters in the ***coexistenceReport***

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkID*** | ***OCTET STRING*** | Shall be set to indicate network ID |
| ***gcoID*** | ***OCTET STRING*** | Shall be set to indicate GCO ID |
| ***listOfRecommended OperationFrequencies*** | ***ListOfRecommended OperationFrequencies*** | As specified in following table |

Table below shows ***~~listOfRecommendedOperationFrequency~~listOfRecommendedOperationFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the recommended operation frequency range. |
| ***~~txPowerLevel~~***  ***txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the recommended operation frequency range if applicable. |
| ***~~availableDuration~~***  ***availableStopTime*** | ***GeneralizedTime~~REAL~~*** | Shall be set to indicate ~~duration~~stop time of the operation recommended frequency range if applicable. |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate the resolution bandwidth of available frequency where GCO is operating, if applicable. |
| ***locationValidity*** | ***REAL*** | Shall be set to indicate radius of the circle centered on the reported geo-location of the GCO, outside of which the recommended operation frequencies are not valid, if this parameter is available. |

The following table shows the parameters in the ***ListOfCoexistenceReports*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***region*** | ***Region*** | Shall be set to indicate the region information that represents the below *listOfRecommendedOperationFrequencies* is valid if available. |
| ***listOfRecommended OperationFrequencies*** | ***ListOfRecommended OperationFrequencies*** | As specified in the above table |

***Insert the following subclauses after 6.4.3.8***

**6.4.3.9 Proxy coexistence service**

After a CE has received a ***CxMediaProxyCoexistenceServiceRequest*** from the GCO it serves, the CE shall generate and send the ***CEProxyCoexistenceServiceRequest*** message to the CM.

The following table shows CxMessage fields in ***CEProxyCoexistenceServiceRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***ceProxyCoexistenceServiceRequest*** |

The following table shows the parameters in the ***ceProxyCoexistenceServiceRequest*** payload.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***ceID*** | ***CxID*** | CE ID |
| ***listOfGCOs*** | ***ListOfGCOs*** | List of GCOs to be served proxy service. |

The following table shows the parameters in the ***listOfGCOs***.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***gcoID*** | ***OCTET STRING*** | Shall be set to indicate GCO ID. |
| ***gcoDescriptor*** | ***GCODescriptor*** | Shall be set to indicate the GCO parameters. |

The following table shows ***GCODescriptor*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkType*** | ***NetworkType*** | Shall be set to indicate network type of GCO if the regulator specifies. The details are shown in Annex A. |
| ***emissionClass*** | ***EmissionClass*** | Shall be set to indicate the GCO emission class if this value is specified by regulation. |
| ***gcoType*** | ***GCOType*** | Shall be set to indicate the GCO type if the regulator specifies. The details are shown in Annex A. |
| ***networkTechnology*** | ***NetworkTechnology*** | Shall be set to indicate current operating network technology |
| ***addNetworkTechnology*** | ***SEQUENCE OF NetworkTechnology*** | Optionally present. If present, this parameter shall be set to indicate the sequence of its operable network technology type(s) |
| ***gcoRegulatoryID*** | ***OCTET STRING*** | Shall be set to indicate the regulatory ID of GCO. |

After a CE has received a ***CoexistenceReportResonse*** message from the CM, the CE shall generate and send the ***CxMediaCoexistenceReportResponse*** primitive to the GCO/RLSS it serves. The following table shows ***CxMedia*** fields in ***CxMediaCoexistenceReportResponse*** primitive.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coexistenceReport*** | ***CoexistenceReport*** | Shall be set to indicate coexistence report in providing single coexistence report. Setting both *coexistenceReport* and *listOfCoexistenceReport* is not needed. |
| ***listOfCoexistenceReports*** | ***ListOfCoexistenceReports*** | Shall be set to indicate coexistence report in providing multiple coexistence report. Setting both *coexistenceReport* and *listOfCoexistenceReport* is not needed. |

The following table shows the parameters in the ***coexistenceReport***

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***networkID*** | ***OCTET STRING*** | Network ID |
| ***gcoID*** | ***OCTET STRING*** | GCO ID |
| ***listOfRecommended OperationFrequencies*** | ***ListOfRecommended OperationFrequencies*** | As specified in following table |

The following table shows ***ListOfRecommendedOperationFrequencies*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the recommended operation frequency range. |
| ***txPowerLimit*** | ***REAL*** | Shall be set to indicate the power limit in the frequency range. |
| ***availableStartTime*** | ***GeneralizedTime*** | Shall be set to indicate start time of the recommended operation frequency range if applicable. |
| ***availableStopTime*** | ***GeneralizedTime*** | Shall be set to indicate stop time of the recommended operation frequency range if applicable. |
| ***resolutionBandwidth*** | ***REAL*** | Shall be set to indicate the resolution bandwidth of available frequency where GCO is operating, if applicable. |
| ***locationValidity*** | ***REAL*** | Shall be set to indicate radius of the circle centered on the reported geo-location of the GCO, outside of which the recommended operation frequencies are not valid, if this parameter is available. |

The following table shows the parameters in the ***ListOfCoexistenceReports*** parameter element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***region*** | ***Region*** | Shall be set to indicate the region information that represents the below *listOfRecommendedOperationFrequencies* is valid if available. |
| ***listOfRecommended OperationFrequencies*** | ***ListOfRecommended OperationFrequencies*** | As specified in the above table |

**6.4.3.10 CM association procedure**

A CE shall perform this procedure to start communicating with CM when the CE does not associated with any of CMs or CE needs to change its serving CM. The following table shows ***CxMessage*** fields in ***CMAssociationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***cmAssociationRequest*** |

The following table shows ***cmAssociationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***clientID*** | ***IA5String*** | GCO identifier |

* 1. **COE operation**

**6.5.1 Inter-CM association procedure over COE**

After the COE has received a ***InterCMAssociationRequest*** message from the CM, the COE shall process this ***InterCMAssociationRequest*** message. The COE shall generate and send the ***InterCOEAssociationRequest*** message to the COE that connects with the target CM.

The following table shows ***CxMessage*** fields in ***InterCOEAssociationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCOEAssociationRequest*** |

The following table shows ***InterCOEAssociationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coeID*** | ***CxID*** | COE ID |
| ***interCMAssociationRequest*** | ***InterCMAssociationRequest*** | ***interCMAssociationRequest*** |

The following table shows ***InterCMAssociationRequest*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | CM ID |
| ***managementRegion*** | ***Region*** | Shall be set to indicate the geographical region that CM manages, if available. |

**6.5.2 Obtaining operating frequency information procedure over COE**

After a COE receives ***OperatingFreqInformationRequest*** message from a CM, the COE shall perform the obtaining operating frequency information procedure described in 5.2.19. The COE shall generate and send the ***InterCOEOperatingFreqInformationRequest*** message to the other COE.

The following table shows ***CxMessage*** fields in ***InterCOEOperatingFreqInformationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCOEOperatingFreq InformationRequest*** |

The following table shows ***InterCOEOperatingFreqInformationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coeID*** | ***CxID*** | COE ID |
| ***operatingFreq InformationRequest*** | ***OperatingFreq InformationRequest*** | ***operatingFreq InformationRequest*** |

After the COE has received a ***InterCOEOperatingFreqInformationRequest*** message from the other COE, the COE shall process this ***InterCOEOperatingFreqInformationRequest*** message. The COE shall generate and send the ***OperatingFreqInformationRequest*** message to the target CM.

The following table shows ***CxMessage*** fields in ***OperatingFreqInformationRequest*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***operatingFreq InformationRequest*** |

The following table shows ***OperatingFreqInformationRequest*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***cmID*** | ***CxID*** | CM ID |
| ***region*** | ***Region*** | Shall be set to indicate the geographical region. |

After the COE has received a ***OperatingFreqInformationResponse*** message from the CM, the COE shall process this ***OperatingFreqInformationResponse*** message. The COE shall generate and send the ***InterCOEOperatingFreqInformationResponse*** message to the target CM.

The following table shows ***CxMessage*** fields in ***InterCOEOperatingFreqInformationResponse*** message.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***header*** | ***CxHeader*** | ***requestID*** |
| ***payload*** | ***CxPayload*** | ***interCOEOperatingFreq InformationResponse*** |

The following table shows ***InterCOEOperatingFreqInformationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***coeID*** | ***CxID*** | COE ID |
| ***operatingFreq InformationResponse*** | ***OperatingFreq InformationResponse*** | ***operatingFreq InformationResponse*** |

The following table shows ***OperatingFreqInformationResponse*** payload element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***status*** | ***Status*** | status |
| ***listOfCoexistenceReports*** | ***ListOfCoexistenceReports*** | Shall be set to indicate the operating frequency information corresponding to the region information included in the *OperatingFreqInformationRequest*. No need to be included when “status” shows error or rejected. |

The following table shows ***ListOfCoexistenceReports*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***region*** | ***Region*** | Shall be set to indicate the region that GCOs are operating within. |
| ***operationRegion*** | ***Range*** | Range of activity in which the available frequencies are valid for. |
| ***listOfOperatingFrequencies*** | ***ListOfOperatingFrequencies*** | Shall be set to indicate the operating frequencies of the GCOs as specified in the below table. |

The following table shows ***ListOfOperatingFrequencies*** information element.

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the GCO currently operates. |