IEEE 802.19.1a  
Wireless Coexistence

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Comment resolutions on CID7, CID8, CID9 and CID10 | | | | |
| Date: 2017-01-17 | | | | |
| Author(s): | | | | |
| Name | Company | Address | Phone | Email |
| Sho Furuichi | Sony |  |  | Sho.Furuichi@sony.com |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This document provides comment resolutions on CID7, CID8, CID9 and CID10 provided in WG letter ballot.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Comment ID** | **Page No.** | **Section** | **Line No.** | **Type (General, Editorial, Technical)** | **Comments** | **Proposed changes** |
| 7 | 67 |  | 6 | Technical | 47 C.F.R Part 96 requires for CBSD to register sensing capability (if supported) with SAS. In order for coexistence system to make sure the accordance with regulatory rule, such information should be included in ***ListOfGCORegistrations.*** Same modifications are needed in the other places where ***ListOfGCORegistrations*** is described. | Need proposal |
| 8 | 68 |  | 2 | Technical | 47 C.F.R Part 96 requires for CBSD to register "call sign", "user contact information" and "serial number" with SAS. In order for coexistence system to make sure the accordance with regulatory rule, such information should be included in ***GCODescriptor***. Same modifications are needed in the other places where ***GCODescriptor*** is described. | Need text proposal |
| 9 | 68 |  | 7 | Technical | 47 C.F.R Part 96 requires for CBSD to indicate to SAS whether the device will be operated indoors or outdoors. In order for coexistence system to make sure the accordance with regulatory rule, such information should be included in ***InstallationParameters.*** Same modifications are needed in the other places where ***InstallationParameters*** is described. | Need text proposal |
| 10 | 68 |  | 7 | Technical | ***maxTxPower*** is defined but it cannot be understood which it means, maximum permissible EIRP bounded by the regulatory rule, or maximum power as device capability. Regarding transmission power related parameters, their names should be reconsidered to be consistent through the spec. | Need text proposal |

r1: Editorial changes

r2: Missing parameters and definition of sensing are added.

# **Proposed changes**

===== (Text starts below)

**3.1 Definitions**

*Add the following terminology*

**sensing**: To measure the radio signal emitted by incumbent system.

6.2.4 Profile 3

***Revise the text as follows***

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

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*** | Shall be set to indicate the parameters of aggregate interference control if available as~~As~~ specified in table below |

===== (Text ends)

===== (Text starts below)

6.2.4 Profile 3

***Revise the text as follows***

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

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 |
| ***eirpCapability*** | ***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. |
| ***indoorDeployment*** | ***BOOLEAN*** | Shall be set to indicate whether the GCO is deployed indoor if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: indoor  False: outdoor |

===== (Text ends)

===== (Text starts)

6.2.4 Profile 3

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

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

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***freqRankIndex*** | ***INTEGER*** | Shall be set to indicate priority index of *frequencyRange* in this table if available. |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate operating frequency range. ~~Operating frequency range~~ |
| ***operatingEirp*** | ***REAL*** | Shall be set to indicate the operating EIRP 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 7.2.2.13. |
| ***coChGCOLimit*** | ***CoChGCOLimit*** | Shall be set to indicate the limit on the maximum number of co-channel GCOs that shall operate simultaneously within a given region and frequency |

===== (Text ends)

===== (Text starts)

* 1. CM operation
     1. Profile 3
        1. ~~WSO~~GCO registration

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. |
| ***listOfDesiredPerformances*** | ***ListOfDesiredPerformances*** | Shall be set to indicate the desired performance of GCO in each frequency band if available. |
| ***~~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. If present, this parameter shall be set to indicate the maximum number of controllable GCO. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Spectrum transition supported by the GCO or not |
| ***interferenceSet*** | ***SEQUENCE OF OCTET STRING*** | Optionally present, if present, this parameter shall be set to indicate the elements in the *interferenceSet*. |
| ***interferenceGraph*** | ***InterferenceRelationshipGraph*** | Optionally present. If present the parameter shall be set to indicate the relationship using graph representation. |

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. |
| ***callSign*** | ***OCTET STRING*** | Shall be set to indicate call sign assigned by regulatory body if the regulatory rule (e.g. C.F.R Part 96) requires. |
| ***serialNumber*** | ***OCTET STRING*** | Shall be set to indicate serial number of GCO. |
| ***userContactInformation*** | ***UserContactInformation*** | Shall be set to indicate the information of the GCO user if the regulatory rule requires. |
| ***sensingCapability*** | ***BOOLEAN*** | Shall be set to indicate whether the GCO supports sensing capability if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: Supported.  False: Unsupported. |

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

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***userName*** | ***NumericString*** | Shall be set to indicate the user name of GCO |
| ***contact*** | ***SEQUENCE OF Contact*** | Shall be set to indicate the contact information such as phone number or e-mail address. |

===== (Text ends)

===== (Text starts)

* 1. CM operation
     1. Profile 3
        1. ~~WSO~~GCO registration

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~~eirpCapability*** | ***REAL*** | Shall be set to indicate the EIRP capability of GCO. ~~maximum transmission power level~~.  This value shall be considered as maximum limit of EIRP capability. |
| ***aclr ~~aCLR~~*** | ***REAL*** | Shall be set to indicate the value of adjacent channel leakage ratio.~~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. |
| ***indoorDeployment*** | ***BOOLEAN*** | Shall be set to indicate whether the GCO is deployed indoor if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: indoor  False: outdoor |

===== (Text ends)

===== (Text starts)

* 1. CM operation
     1. Profile 3
        1. ~~WSO~~GCO registration

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

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***freqRankIndex*** | ***INTEGER*** | Shall be set to indicate priority index of *frequencyRange* in this table if available. |
| ***frequencyRange*** | ***FrequenyRange*** | Shall be set to indicate the frequency range in which the ~~WSO~~GCO currently operates. |
| ***operatingEirp*** | ***REAL*** | Shall be set to indicate the operating EIRP 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 7.2.2.12 |
| ***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 7.2.2.12. |
| ***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 7.2.2.12. |
| ***coChGCOLimit*** | ***CoChGCOLimit*** | Shall be set to indicate the limit on the maximum number of co-channel GCOs that shall operate simultaneously within a given region and frequency |

===== (Text ends)

===== (Text starts)

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

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 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. |
| ***listOfDesiredPerformances*** | ***ListOfDesiredPerformances*** | Shall be set to indicate the desired performance of GCO in each frequency band if available. |
| ***~~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 transition supported by the GCO or not |
| ***interferenceSet*** | ***SEQUENCE OF OCTET STRING*** | Optionally present, if present, this paper shall be set to indicate the elements in the *interferenceSet*. |
| ***interferenceGraph*** | ***InterferenceRelationshipGraph*** | Optionally present. If present the parameter shall be set to indicate the relationship using graph representation. |

===== (Text ends)

===== (Text starts)

* + - 1. Proxy coexistence service procedure

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. |
| ***callSign*** | ***OCTET STRING*** | | Shall be set to indicate call sign assigned by regulatory body if the regulatory rule (e.g. C.F.R Part 96) requires. |
| ***serialNumber*** | | ***OCTET STRING*** | Shall be set to indicate serial number of GCO. |
| ***userContactInformation*** | | ***UserContactInformation*** | Shall be set to indicate the information of the GCO user if the regulatory rule requires. |
| ***sensingCapability*** | ***BOOLEAN*** | | Shall be set to indicate whether the GCO supports sensing capability if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: Supported.  False: Unsupported. |

===== (Text ends)

===== (Text starts)

* 1. CE operation
     1. Profile 3

**6.4.3.5 ~~WSO~~GCO registration**

The following table below shows *~~CERegistrationRequest~~* ~~payload element for one WSO when requesting registration.~~***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. |
| ***gcoDescriptor*** | ***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. |
| ***listOfDesiredPerformances*** | ***ListOfDesiredPerformances*** | Shall be set to indicate the desired performance of GCO in each frequency band if available. |
| ***spectrumTransitionCapability*** | ***BOOLEAN*** | Shall be set to a value that reqpreents whether the spectrum transition is supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Shall be set to indicate the 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. |
| ***callSign*** | ***OCTET STRING*** | Shall be set to indicate call sign assigned by regulatory body if the regulatory rule (e.g. C.F.R Part 96) requires. |
| ***serialNumber*** | ***OCTET STRING*** | Shall be set to indicate serial number of GCO. |
| ***userContactInformation*** | ***UserContactInformation*** | Shall be set to indicate the information of the GCO user if the regulatory rule requires. |
| ***sensingCapability*** | ***BOOLEAN*** | Shall be set to indicate whether the GCO supports sensing capability if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: Supported.  False: Unsupported. |

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

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***userName*** | ***NumericString*** | Shall be set to indicate the user name of GCO |
| ***contact*** | ***SEQUENCE OF Contact*** | Shall be set to indicate the contact information such as phone number or e-mail address. |

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~~eirpCapability*** | ***REAL*** | Shall be set to indicate the EIRP capability of GCO. ~~maximum transmission power level if applicable.~~  This value shall be considered as maximum limit of EIRP capability. |
| ***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. |
| ***indoorDeployment*** | ***BOOLEAN*** | Shall be set to indicate whether the GCO is deployed indoor if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: indoor  False: outdoor |

===== (Text ends)

===== (Text starts)

CE operation

**6.4.3.5 ~~WSO~~GCO registration**

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. |
| ***operatingEirp*** | ***REAL*** | Shall be set to indicate operating EIRP 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 7.2.2.12. |
| ***intLeakageFactor*** | ***REAL*** | Optionally present. If present, this parameter shall be set to indicate interference leakage weighting factor. The details are shown in 7.2.2.12. |
| ***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 7.2.2.14. |
| ***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 7.2.2.15. |
| ***coChGCOLimit*** | ***CoChGCOLimit*** | Optionally present. If present, this parameter shall be set to indicate the limit on the maximum number of co-channel GCOs that shall operate simultaneously within a given region and frequency |

===== (Text ends)

===== (Text starts)

**6.4.3.5 ~~WSO~~GCO registration**

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. |
| ***gcoDescriptor*** | ***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 transition supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Range of activity in which the available frequencies are valid for. |

===== (Text ends)

===== (Text starts)

* + - 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*** | Shall be set to a value that represents whether the spectrum transition supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Shall be set to indicate the 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*** |

===== (Text ends)

===== (Text starts)

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

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*** | Shall be set to indicate the spectrum transition supported by the GCO or not |
| ***operationRegion*** | ***Range*** | Shall be set to indicate the range of activity in which the available frequencies are valid for. |

===== (Text ends)

===== (Text starts)

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

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

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the recommended operation frequency range. |
| ***~~txPowerLevel~~***  ***recommendedMaxEirp*** | ***REAL*** | Shall be set to indicate the recommended maximum operating EIRP ~~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. |

===== (Text ends)

===== (Text starts)

* + - 1. **Proxy coexistence service**

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. |
| ***callSign*** | ***OCTET STRING*** | Shall be set to indicate call sign assigned by regulatory body if the regulatory rule (e.g. C.F.R Part 96) requires. | |
| ***serialNumber*** | ***OCTET STRING*** | Shall be set to indicate serial number of GCO. | |
| ***userContactInformation*** | ***UserContactInformation*** | Shall be set to indicate the information of the GCO user if the regulatory rule requires. | |
| ***sensingCapability*** | ***BOOLEAN*** | | Shall be set to indicate whether the GCO supports sensing capability if the regulatory rule (e.g. C.F.R Part 96) requires. In other cases, this parameter may be set.  True: Supported.  False: Unsupported. |

===== (Text ends)

===== (Text starts)

* + - 1. **Proxy coexistence service**

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

|  |  |  |
| --- | --- | --- |
| *Parameter* | *Data type* | *Value* |
| ***frequencyRange*** | ***FrequencyRange*** | Shall be set to indicate the recommended operation frequency range. |
| ***recommendedMaxEirp*** | ***REAL*** | Shall be set to indicate the recommended maximum operating EIRP 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. |

===== (Text ends)

===== (Text starts)

# **(normative) Data types**

## **Profile 3**

--Installation parameters

InstallationParameters ::= SEQUENCE {

--Geolocation of GCO

geolocation Geolocation OPTIONAL,

--Antenna characteristics

antennaCharacteristics AntennaCharacteristics OPTIONAL,

--EIRP capability [dBm]

eirpCapability REAL OPTIONAL,

--Adjacent channel leakage ratio of the GCO [dB]

aclr REAL OPTIONAL,

--Guaranteed QoS of backhaul connection of the GCO

guaranteedQoSOfBackhaulConnection GuaranteedQoSOfBackhaulConnection OPTIONAL,

--Receiver information

receiverInfo ReceiverInfo OPTIONAL,

--Management regional range of GCO

managementRange Range OPTIONAL,

--Indoor deployment

indoorDeployment Boolean OPTIONAL,

...

}

===== (Text ends)

===== (Text starts)

# **(normative) Data types**

## **Profile 3**

--List of operating frequencies and related operational parameters

ListOfOperatingFrequencies ::= SEQUENCE OF SEQUENCE {

--Priority index of frequencyRange

freqRankIndex INTEGER OPTIONAL,

--Frequency range

frequencyRange FrequencyRange OPTIONAL,

--Operating EIRP [dBm]

operatingEirp REAL OPTIONAL,

--Resolution bandwidth [Hz]

resolutionBandwidth REAL OPTIONAL,

--Type of operating frequency

typeOfOperatingFrequency TypeOfFrequency OPTIONAL,

--Occupancy if known [fractional value between 0 and 1]

occupancy REAL OPTIONAL,

--Energy detection information

energyDetectionInfo EnergyDetectionInfo OPTIONAL,

--Modulation parameters

modulationParameters ModulationParameters OPTIONAL,

--Demodulation procedure

sicDemodulationProcedure SICDemodulationProcedure OPTIONAL,

--Interference leakage weighting factor

intLeakageFactor REAL OPTIONAL,

--List of reference point locations.

listOfSpecUsageInfoOfRefPoints ListOfSpecUsageInfo OPTIONAL,

--List of co-channel neighbor GCOs location

listOfSpecUsageInfoOfNeightborGCOs ListOfSpecUsageInfo OPTIONAL,

--Co-channel GCO limit

coChGCOLimit CoChGCOLimit OPTIONAL,

...

}

===== (Text ends)

===== (Text starts)

# **(normative) Data types**

## **Profile 3**

--List of GCOs for registration

ListOfGCORegistrations ::= SEQUENCE OF SEQUENCE {

--New registration, registration update or deregistration

operationCode OperationCode OPTIONAL,

--GCO ID

gcoID OCTET STRING OPTIONAL,

--Network ID

networkID OCTET STRING OPTIONAL,

--GCO Descriptor

gcoDescriptor GCODescriptor OPTIONAL,

--Coverage area

coverageArea CoverageArea OPTIONAL,

--Installation parameters

installationParameters InstallationParameters OPTIONAL,

--List of available frequencies

listOfAvailableFrequencies ListOfAvailableFrequencies OPTIONAL,

-- List of operating frequencies

listOfOperatingFrequencies ListOfOperatingFrequencies OPTIONAL,

-- operation region

operationRegion Range OPTIONAL,

--Maximum number of controllable GCO

maximumNumberOfControllableGCO INTEGER OPTIONAL,

--Spectrum transition capability

spectrumTransitionCapability BOOLEAN OPTIONAL,

--List of desired performance

listOfDesiredPerformances ListOfDesiredPerformances OPTIONAL,

--GCO IDs that are included in interference set

interferenceSet SEQUENCE OF OCTET STRING OPTIONAL,

--Graph information to represent interference relationship

interferenceGraph InterferenceRelationshipGraph OPTIONAL,

...

}

--GCO Descriptor

GCODescriptor ::= SEQUENCE {

--Network type

networkType NetworkType OPTIONAL,

--Emission class

emissionClass EmissionClass OPTIONAL,

--GCO type

gcoType GCOType OPTIONAL,

--Network technology

networkTechnology NetworkTechnology OPTIONAL,

--Additional network technologies of GCO

addNetworkTechnologies SEQUENCE OF NetworkTechnology OPTIONAL,

--Regulatory ID of GCO

gcoRegulatoryID OCTET STRING OPTIONAL,

--Call sign

callSign OCTET STRING OPTIONAL,

--Serial number

serialNumber OCTET STRING OPTIONAL,

--User contact information

userContactInformation UserContactInformation OPTIONAL,

--Sensing capability

sensingCapability BOOLEAN OPTIONAL,

...

}

--User contact information

UserContactInformation ::= SEQUENCE {

--User name

userName OCTET STRING,

--Contact information

contact SEQUENCE OF Contact

}

--Set of detailed contact information

Contact ::= CHOICE {

phoneNumber NumericString,

email UTF8String,

...

}

===== (Text ends)

# **(normative) Data types**

## **Profile 3**

-- List of recommended operation frequencies

ListOfRecommendedOperationFrequencies ::= SEQUENCE OF SEQUENCE {

--Range of recommended operation frequency

frequencyRange FrequencyRange OPTIONAL,

--Transmission power limit [dBm]

recommendedMaxEirp REAL OPTIONAL,

--Start time

availableStartTime GeneralizedTime OPTIONAL,

--Stop time

availableStopTime GeneralizedTime OPTIONAL,

--Resolution bandwidth [Hz]

resolutionBandwidth REAL OPTIONAL,

--location validity [meter]

locationValidity REAL OPTIONAL,

...

}

===== (Text ends)