IEEE 802.19.1a
Wireless Coexistence

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| CID 161 resolution: Text proposal on the algorithm and parameters for spectrum allocation  |
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Abstract

This contribution provides text proposals for coexistence algorithm based on receiver information.

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6.3.4.5 ~~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~~ 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 |
| ***interferenceSet*** | ***SEQUENCE OF OCTET STRING*** | Optionally present, if present, this paper shall be set to indicate the elements in the *interferenceSet*. |

* + - 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 1.3 if any update is needed. |
| ***installationParameters*** | ***InstallationParameters*** | Shall be set to indicate the installation parameters of GCO as ~~As~~ specified in 1.3 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 1.3 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 1.3 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 transmission 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. |

7.2.2.x Algorithm for spectrum allocation of system spectrum with different priority levels

7.2.2.x.1 Introduction

In a system where different GCOs have different priority levels, the low priority GCO uses the spectrum while maintain performance to the high priority GCO. In such system, the spectrum is normally allocated to the high priority GCO first, then the low priority GCO. This leads to the situation where the spectrum allocation of high priority GCO does not taking into account of the future spectrum utilization of low priority GCO. Thus, the available spectrum of the low priority GCO might not be maximized. This algorithm allocates spectrum of high priority GCO while considering the interference relationship between the high and low priority systems, thus increasing the spectrum of the low priority system.

7.2.2.x.2 Interference set of GCOs

In one deployment example is shown in Figure xx. There are different GCOs with different priority levels of spectrum utilization. Before spectrum allocation, the interference relationship can be established by assuming the default operation parameters while utilizing the location information and local propagation model. The set of the GCOs, that receive potential harmful interference from low priority GCOs, are called as the interference set. The harmful interference from high priority GCOs to low priority GCOs can also be used as a criteria when establishing the interference set.



Figure XX Example of deployment for determining interference set among GCOs with different priority levels.

7.2.2.x.3 Algorithm description

The processes are as follows.

* P#1
P#1 is the procedure operated at the CDIS where the CDIS receives the receiver information of the GCO through the GCO registration procedure as specified in 5.2.3.1 GCO registration procedure.
* P#2
In this process, the interference set is determined. If there are multiple CMs, the interference set information can be exchanged via Master/Slave Configuration procedure in 6.3.4.10 where the master CM obtains all the information of the GCOs and constructs the interference set.
* P#3
The cluster based spectrum allocation of the high priority GCO in the interference set is allocated
* P#4
In this procedure, the spectrum of low priority GCOs.
* P#5
Allocate the spectrum of low priority GCOs while considering the protection requirement of the high priority GCOs.
* P#6
The reconfiguration information and the demodulation procedure information are sent to the GCO through the procedure as specified in 5.2.10.1 GCO reconfiguration procedure.
* P#6
No configuration is made.

The branch conditions are as follows.

* BC#1
This branch condition shall be conducted based on the information of GCOs registered at the CDIS. If coexistence is needed, go to BC#2. If not go to P#6. No reconfiguration is needed.



Figure XX flow chart of the spectrum allocation

**Annex A** (normative) **Data types**

## A.2 Data types for IEEE 802.19.1a

--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,

--List of desired performance

 listOfDesiredPerformances ListOfDesiredPerformances OPTIONAL,

, ...

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