IEEE 802.19.1a
Wireless Coexistence

|  |
| --- |
| CID 161 resolution: Text proposal on the algorithm and parameters for spectrum allocation  |
| Date: 2016-09-11 |
| Author(s): |
| Name | Company | Address | Phone | Email |
| Chen Sun | Sony China |  |  | csun@ieee.org |
| Sho Furuichi | Sony |  |  | Sho.Furuichi@jp.sony.com |
| Naotaka Sato | Sony |  |  | naotaka.sato@ieee.org |

Abstract

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

6.4.3.8 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 |
| ***interferenceSet*** | ***InterferenceSet*** | List of network ID of GCOsthat belong to an interference set |
| ***operationCode*** | ***OperationCode*** | Shall be set to indicate that is new-request/update-request/stop-request. |

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 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. If there is potential interference from the low priority GCO to the high priority GCO, the high priority GCO labeled. Considering all the low priority GCOs we can find all the high priority GCOs that are labeled. The set of these GCOs are denoted as the interference set. In such procedure, the interference high priority GCO to low priority GCO can also be considered when stabling the interference set information.

The spectrum allocation shall allocation spectrum of high priority GCO in the interference set first in order to pack as many GCOs in the interference set into the spectrum while considering the interference among high priority GCOs. Once the high priority GCOs’ spectrum has been allocation, the spectrum can be allocated to the low priority GCOs based on the performance requirement of the high priority GCOs. Such spectrum allocation can also consider the interference from low priority GCOs as well as interference among the low priority GCOs together with the interference from the high priority GCOs to the low priority GCOs in order to predict the achievable performance of the low priority GCOs.



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 using procedure in 6.3.4.8.
* P#3
The 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**

## Data types for IEEE 802.19.1a

IEEE802191aDataType DEFINITIONS AUTOMATIC TAGS ::= BEGIN

**-----------------------------------------------------------**

**--Exported data types**

**-----------------------------------------------------------**

--Exported data types

EXPORTS

--Coexistence protocol entity ID

 CxID,

 --Status

 Status,

 --Cx Media status

 CxMediaStatus,

 --Coexistence service

 CoexistenceService,

 --Network technology

 NetworkTechnology,

 --Network type

 NetworkType,

 --Geolocation

 Geolocation,

 --Coverage area

 CoverageArea,

 --Installation parameters

 InstallationParameters,

 --Frequency range

 FrequencyRange,

 --List of available frequencies

 ListOfAvailableFrequencies,

 --List of operating frequencies

 ListOfOperatingFrequencies,

 --List of supported frequencies

ListOfSupportedFrequencies,

 --Required resource

RequiredResource,

 --Operation code for registration

 OperationCode,

 --Measurement capability

 MeasurementCapability,

 --CM registration

 CMRegistration,

 --CE registration

 CERegistration,

 --Coexistence report

 CoexistenceReport,

 --List of coexistence reports

 ListOfCoexistenceReports,

 --Mobility Information

 MobilityInformation,

 --Entity profile

 EntityProfile,

 --List of master CM candidates

 ListOfMasterCMCandidates,

 --List of neighbor CMs

 ListOfNeighborCMs,

 --List of GCOs

 ListOfGCOs,

--Coordinates

Coordinates,

--Antenna Characteristics

AntennaCharacteristics,

--Type of frequency

TypeOfFrequency,

--GCO Descriptor

GCODescriptor,

--Receiver information

ReceiverInfo,

--Modulation type

ModulationType,

--Filter characteristics

FilterCharacteristics,

--Energy detection information

EnergyDetectionInfo,

SpecRequestModification,

GraphLink,

InterferenceRelationshipGraph;

**-----------------------------------------------------------**

**--GraphLink**

**-----------------------------------------------------------**

--GraphLink parameters

GraphLink ::= SEQUENCE {

 --Head vertex of link

 head OCTET STRING,

 --tail vertex of link

 tail OCTET STRING,

 --weight of the link

 weight REAL}

}

**-----------------------------------------------------------**

**--Graph of interference relationship**

**-----------------------------------------------------------**

--Graph representation of interference relationship among GCOs

InterferenceRelationshipGraph ::= SEQUENCE {

 --GraphLink

 arc GraphLink

...

}

**Annex C** (normative) **Messages8**

--Response for coexistence set information

CoexistenceSetInformationResponse ::= SEQUENCE {

 --Network ID

 networkID OCTET STRING OPTIONAL,

 --List of neighbor CMs

 listOfNeighborCMs listOfNeighborCMs OPTIONAL,

 --List of master CM candidates

 listOfMasterCMCandidates ListOfMasterCMCandidates OPTIONAL,

 -- GCO IDs that are included in interference set

 interferenceSet SEQUENCE OF OCTET STRING OPTIONAL

}