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**Reconfigurable Radio Systems (RRS);
Enabling the operation of Cognitive Radio System (CRS) dependent for their use of radio spectrum on information obtained from Geo-location Databases (GLDBs);
Parameters and procedures for information exchange between different GLDBs**

Reference
DEN/RRS-01018

Keywords
control, CRS, GLDB, performance, white space

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Contents

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Reconfigurable Radio Systems (RRS), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document covers the parameters and procedures for information exchange between different Geolocation Databases (GLDB) the operation of Cognitive Radio System (CRS). The work is based on the system architecture for WSD GLDBs as defined in ETSI EN 303 145 [i.1] and ETSI EN 303 143 [i.2].

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI EN 303 145: "Reconfigurable Radio Systems (RRS); System Architecture and High Level Procedures for Coordinated and Uncoordinated Use of TV White Spaces".

[i.2] ETSI EN 303 143: "Reconfigurable Radio Systems (RRS); System architecture for information exchange between different Geo-location Databases (GLDBs) enabling the operation of White Space Devices (WSDs)".

[i.3] ISO/IEC 10731 (1994): "Information Technology - Open Systems Interconnection - Basic Reference Model: Conventions for the Definition of OSI Services".

[i.4] Recommendation ITU-T X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[i.5] ETSI EN 301 598: "White Space Devices (WSD); Wireless Access Systems operating in the 470 MHz to 790 MHz TV broadcast band; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

communication function: hardware/software module that provides communication services required by the interfaces between logical entities based on communications protocol stack

database function: software/hardware that stores necessary information provided by regulators for calculating available spectrum that a WSD in a CRS can operate on with protection to incumbent services as well as registration of the WSDs under regulatory requirements and for protecting incumbent services purposes

G-G Interface function: abstraction of the totality of those functional blocks inside a geo-location database realizing the G-G logical interface between GLDBs

G-G Logical interface: conceptual boundary between GLDBs for information exchange to enable the operation of a CRS with protection of the incumbent service

geo-location function: software/hardware that calculates location specific EIRP of a frequency band and that a WSD in a CRS can use based on the information on incumbents stored in database function

victim GLDB: GLDB whose incumbents can suffer interference from CRSs that are under the management of another GLDB (the querying GLDB)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACLR	Adjacent Channel Leakage Ratio
ACS	Adjacent Channel Selectivity
ASN	Abstract Syntax Notation
CRS	Cognitive Radio System
DB-SAP	DataBase Service Access Point
EIRP	Effective Isotropic Radiated Power
GLDB	Geo-Location DataBase
GL-SAP	Geolocation service access point
ID	IDentifier
IP	Internet Protocol
SAP	Service Access Point
SC	Spectrum Coordinator
WSD	White Space Device

4 Service access points

4.1 General

The following clauses describe the primitives related to the Service Access Points as identified in ETSI EN 303 143 [i.2] and also shown in figure 4.1.

Clause 4.2 describes the primitives associated to the geolocation function (GL-SAP in figure 4.1).

Clause 4.3 describes the primitives associated to the database function (DB-SAP in figure 4.1).

Clause 4.4 describes the primitives associated to the communication function (Com-SAP in figure 4.1).

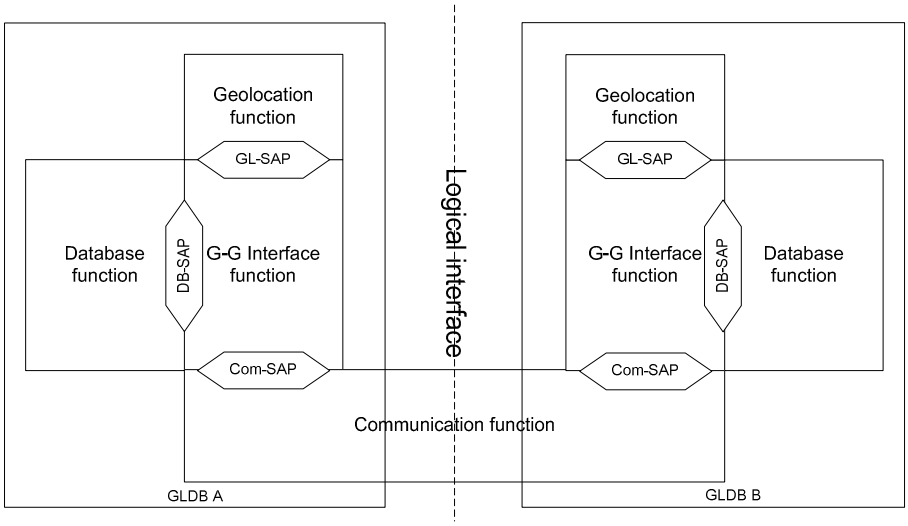

Figure 4.1: reference model for the information exchange between GLDBs using the G-G logical interface [i.2]

The terminology used for describing primitives at service access points for peer OSI-service-users follows the model described in ISO/IEC 10731 [i.3] and is shown in figure 4.2.

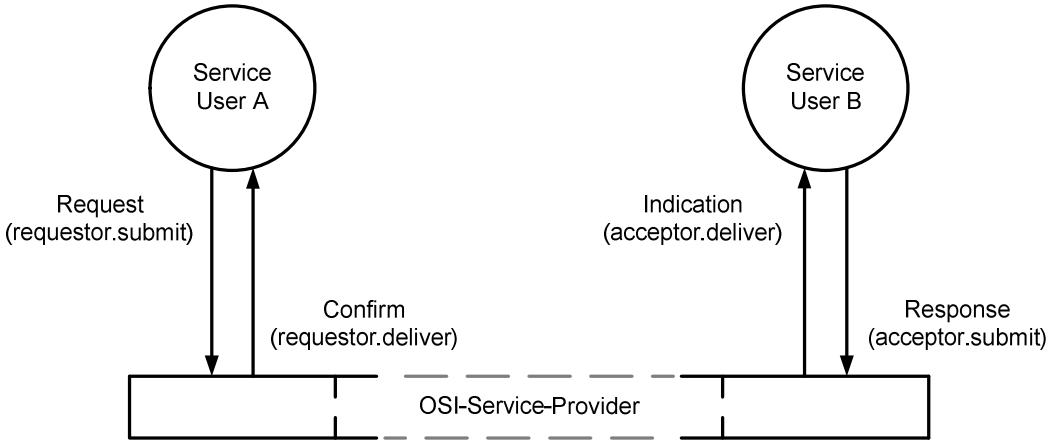

Figure 4.2: Example of a peer-to-peer connection-mode service

4.2 Geo-location function SAP

4.2.1 CRS operational parameter generation

The CRS operational parameter generation service provides a set of primitives or method through which the G-G interface function provides the device parameters of a CRS and obtains operational parameters of a CRS generated by the geo-location function. The service is used in the second variant of the procedure in clause 6.1.3 "CRS Spectrum Usage Modification Procedure" in ETSI EN 303 143 [i.2] where victim GLDB update the list of available channels and powers to protect incumbents in victim GLDB.

Get_CRS_Operation_Parameter.request

Function

This primitive is used by the G-G interface function to request operational parameters of a CRS.

Semantics of the service primitive

Get_CRS_Operational_Parameter.request (
operationalParameterRequestID,
deviceDescriptor,locationInfo
)

Parameters

Name	Type	Description
OperationalParameterRequestID	TransactionID	OperationalParameterRequestID uniquely identifies one transaction of requesting operational parameters for a CRS.
DeviceDescriptor	DeviceDescriptor	Device descriptor describes the physical profile of a CRS.
LocationInfo	LocationInfo	Geo-location information of CRS.

When used

This primitive shall be used by the G-G interface function when it needs to obtain the operational parameters of a CRS as described by the CRS device parameters.

Effect of receipt

The geo-location database function subsequently determines the operational parameters of the CRS based on the submitted device parameters and use the *Get_Operational_Parameter.response* primitive to reflect the result of the request.

Get_CRS_Operational_Parameter.response

Function

This primitive is used by the geo-location function to provide the operational parameters to the G-G interface function as a response to the Get_CRS_Operational_Parameter.request primitive.

Semantics of the service primitive

Get_CRS_Operational_Parameter.response(
operationalParameterRequestID,
status,
operationalParameters
)

Parameters

Name	Type	Description
OperationalParameterRequestID	TransactionID	OperationalParameterRequestID uniquely identifies one transaction of requesting operational parameters for a CRS.
Status	Status	Status of operation.
OperationalParameters	OperationalParameters	OperationalParameters is produced by the GLDB for the requesting CRS to configure its transmissions.

When used

This primitive shall be used by the geo-location function to generate a response to the operational parameter request.

Effect of receipt

The G-G interface function receives the result of the request for operational parameters of a CRS.

4.2.2 CRS operational parameter check

The CRS operational parameter check service provides a set of primitives or method through which the G-G interface function checks whether the usage of the provided operational parameters will cause interference to the incumbent. The service is used in clause 6.1.2 "Victim GLDB Discovery Procedure" in ETSI EN 303 143 [i.2].

CRS_Operational_Parameter_check.request

Function

This primitive is used by the G-G interface function to request the GLDB function to check whether the CRS using the provided operational parameters will cause interference to the incumbent.

Semantics of the service primitive

Check_CRS_Operational_Parameter.request(
operationalParameterCheckID,
operationalParameters,
checkMode,
replyMode
)

Parameters

Name	Type	Description
OperationalParameterCheckID	TransactionID	OperationalParameterCheckID uniquely identifies one transaction of requesting operational parameters check for a CRS.
OperationalParameters	OperationalParameters	operationalParameters is produced by the GLDB for the requesting CRS to configure its transmissions.
CheckMode	CheckMode	CheckMode parameter specifies the mode of operational parameters check.
ReplyMode	ReplyMode	ReplyMode parameter specifies the mode of replying the result of operational parameters check request.

When used

This primitive shall be used by the G-G interface function when it needs to check whether a CRS using the provided operational parameters will cause interference to the incumbent.

Effect of receipt

The geo-location database function subsequently checks whether the CRS described by the submitted device parameters will cause interference to the incumbent when using the provided operational parameters. Subsequently, the geo-location function uses the *CRS_Operational_Parameter_Check.response* primitive to reflect the result of the request in a format specified by the mode of reply.

CRS_Operational_Parameter_Check.response

Function

This primitive is used by the geo-location function to provide the operational parameters check result to the G-G interface function as a response to the CRS_Operational_Parameter_Check.request primitive.

Semantics of the service primitive

CRS_Operational_Parameter_Check.response(
operationalParameterCheckID,
status,
checkResult
)

Parameters

Name	Type	Description
OperationalParameterCheckID	TransactionID	OperationalParameterCheckID uniquely identifies one transaction of requesting operational parameters check for a CRS.
Status	Status	Status of operation.
CheckResult	CheckResult	Results of the operational parameters check. The format of the result depends on the reply mode as specified in the checkMode parameter given in the CRS_Operational_Parameter_Check.request primitive.

When used

This primitive shall be used by the geo-location function to generate a response to *CRS_Operational_Parameter_check.request*.

Effect of receipt

The G-G interface function receives the result of the request for operational parameter check for a CRS.

4.3 Database SAP

4.3.1 Incumbent information read

The incumbent information read service provides a set of primitives or method through which the G-G interface function read information of incumbents stored at the database function via the DB-SAP. The service is used in clause 6.1.1 "Incumbents Information Sharing Procedure" in ETSI EN 303 143 [i.2].

Incumbent_Info_Read.request

Function

This primitive is used by the G-G interface function to read the information of incumbent stored at the database function.

Semantics of the service primitive

```
Incumbent_Info_Read.request(
                    incumbentInfoReadID
                    )
```

Parameters

Name	Type	Description
IncumbentInfoReadID	TransactionID	IncumbentInfoReadID uniquely identifies one transaction of incumbent information read request.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to read the incumbent information stored at the database function.

Effect of receipt

The database function uses the Incumbent_Info_Read.response to reflect the result.

Incumbent_Info_Read.response

Function

This primitive is used by the database function to provide the result to the G-G interface function as a response to the Incumbent_Info_Read.request primitive.

Semantics of the service primitive

Incumbent_Info_Sharing.response(
incumbentInfoSharingID,
status,
incumbentInfo
)

Parameters

Name	Type	Description
IncumbentInfoSharingID	TransactionID	IncumbentInfoSharingID uniquely identifies one transaction of incumbent information sharing request.
Status	Status	Status of operation.
IncumbentInfo	IncumbentInfo	Information of the incumbent.

When used

This primitive shall be used by the database function to generate a response to the *Incumbent_Info_Read.Request*.

Effect of receipt

The G-G interface function receives the result of the request for reading information of incumbent stored at the database function.

4.3.2 Incumbent information write

The incumbent information write service provides a set of primitives or method through which the G-G interface function write information of incumbents to the database function via the DB-SAP. The service is used in clause 6.1.1 "Incumbents Information Sharing Procedure" in ETSI EN 303 143 [i.2].

Incumbent_Info_Write.request

Function

This primitive is used by the G-G interface function to write the incumbent information to the database function.

Semantics of the service primitive

Incumbent_Info_Write.request(
incumbentInfoWriteID,
incumbentInfo
)

Parameters

Name	Type	Description
IncumbentInfoWriteID	TransactionID	IncumbentInfoWriteID uniquely identifies one transaction of incumbent information write request.
IncumbentInfo	IncumbentInfo	incumbent information.

When used

This primitive shall be used by the G-G interface function when it needs to write the incumbent information to the database function.

Effect of receipt

The database function uses the *Incumbent_Info_Write.response* to reflect the result.

Incumbent_Info_Write.response

Function

This primitive is used by the database function to provide the result to the G-G interface function as a response to the Incumbent_Info_Write.request primitive.

Semantics of the service primitive

Incumbent_Info_Write.response(
incumbentInfoWriteID,
status
)

Parameters

Name	Type	Description
IncumbentInfoSharingID	TransactionID	IncumbentInfoSharingID uniquely identifies one transaction of incumbent information sharing request.
Status	Status	Status of operation.

When used

This primitive shall be used by the database function to generate a response to the Incumbent_Info_Write.Request.

Effect of receipt

The G-G interface function receives the result of the request for writing incumbent information to the database function.

4.3.3 CRS channel usage information read

The CRS channel usage information read service provides a set of primitives or method through which the G-G interface function read information of CRS channel usage stored at the database function via the DB-SAP. The service is used in clause 6.1.4 "CRS Operating Parameters Checking Procedure" in ETSI EN 303 143 [i.2].

CRS_ChUsage_Info_Read.request

Function

This primitive is used by the G-G interface function to read information of CRS channel usage stored at the database function.

Semantics of the service primitive

CRS_ChUsage_Info_Read.request(
cRSChUsageReadID,
deviceID
)

Parameters

Name	Type	Description
cRSChUsageReadID	TransactionID	cRSChUsageReadID uniquely identifies one transaction of CRS channel usage information read request.
deviceID	DeviceID	deviceID defines the CRS that the channel usage information is to be read.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to read the CRS channel usage information stored at the database function.

Effect of receipt

The database function uses the *CRS_ChUsage_Info_Read.response* to reflect the result.

CRS_ChUsage_Info_Read.response

Function

This primitive is used by the database function to provide the result to the G-G interface function as a response to the CRS_ChUsage_Info_Read.request primitive.

Semantics of the service primitive

CRS_ChUsage_Info_Read.response(
cRSChUsageReadID,
status,
cRSChUsageInfo
)

Parameters

Name	Type	Description
cRSChUsageReadID	TransactionID	cRSChUsageReadID uniquely identifies one transaction of CRS channel usage information read request.
status	Status	Status of operation.
cRSChUsageInfo	Operation	cRSChUsageInfo, be composed of deviceDescriptor, geolocation and operationalParameters, describes the spectrum usage by one a CRS.

When used

This primitive shall be used by the database function to generate a response to the cRSChUsageRead.Request.

Effect of receipt

The G-G interface function receives the result of the request for reading information of CRS channel usage stored at the database function.

4.3.4 CRS channel usage information write

The CRS channel usage information write service provides a set of primitives or method through which the G-G interface function write information of CRS channel usage to the database function via the DB-SAP. The service is used in clause 6.1.4 CRS Operating Parameters Registration Procedure in ETSI EN 303 143 [i.2].

CRS_ChUsage_Info_Write.request

Function

This primitive is used by the G-G interface function to write information of CRS channel usage to the database function.

Semantics of the service primitive

CRS_ChUsage_Info_Write.request(
cRSChUsageWriteID,
deviceID,
cRSUsageInfo
)

Parameters

Name	Type	Description
cRSChUsageWriteID	TransactionID	cRSChUsageWriteID uniquely identifies one transaction of CRS channel usage information write request.
deviceID	DeviceID	deviceID defines the CRS that the channel usage information is to be written.
cRSChUsageInfo	Operation	cRSChUsageInfo, be composed of deviceDescriptor, geolocation and operationalParameters, describes the spectrum usage by one a CRS.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to write the CRS channel usage information to the database function.

Effect of receipt

The database function uses the CRS_ChUsage_Info_Write.response to reflect the result.

CRS_ChUsage_Info_Write.response

Function

This primitive is used by the database function to provide the result to the G-G interface function as a response to the CRS_ChUsage_Info_Write.request primitive.

Semantics of the service primitive

CRS_ChUsage_Info_Write.response(
cRSChUsageWriteID,
status
)

Parameters

Name	Type	Description
cRSChUsageWriteID	TransactionID	cRSChUsageWriteID uniquely identifies one transaction of CRS channel usage information write request.
status	Status	Status of operation.

When used

This primitive shall be used by the database function to generate a response to the cRSChUsageWrite.Request.

Effect of receipt

The G-G interface function receives the result of the request for writing information of CRS channel usage stored at the database function.

4.4 Communication SAP

4.4.1 Incumbent information sharing

The incumbent information sharing service provides a set of primitives or methods through which the G-G interface function writes information of incumbents to another G-G interface function via the communication SAP. The service is used in clause 6.1.1 "Incumbents Information Sharing Procedure" in ETSI EN 303 143 [i.2].

Incumbent_Info_Sharing.request

Function

This primitive is used by the G-G interface function of a GLDB to share incumbent information with another GLDB.

Semantics of the service primitive

Incumbent_Info_Sharing.request(
incumbentInfoSharingID,
destinationID,
portNumber,
IncumbentInfo
)

Parameters

Name	Type	Description
incumbentInfoSharingID	TransactionID	incumbentInfoSharingID uniquely identifies one transaction of incumbent information sharing request.
destinationID	IPAddress	Destination of a GLDB to which the incumbent information will be write to.
portNumber	Integer	Port number of the destination GLDB.
IncumbentInfo	IncumbentInfo	Information of the incumbent.

When used

This primitive will be used by the G-G interface function of a GLDB when it needs to write incumbent information to another GLDB.

Effect of receipt

The Communication function uses the *Incumbent_Info_Sharing.response* to reflect the result.

Incumbent_Info_Sharing.confirm

Function

This primitive shall be used by the communication function to provide the result to the G-G interface function as a confirm to the Incumbent_Info_Sharing.request primitive.

Semantics of the service primitive

Incumbent_Info_Sharing.confirm(
incumbentInfoSharingID,
status
)

Parameters

Name	Type	Description
incumbentInfoSharingID	TransactionID	incumbentInfoSharingID uniquely identifies one transaction of incumbent information sharing request.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a confirm to the *Incumbent_Info_Sharing.Request*.

Effect of receipt

The G-G interface function receives the result of the request for sharing incumbent information registered at its GLDB with another GLDB.

Incumbent_Info_Sharing.indication

Function

This primitive shall be used by the communication function to indicate to the G-G interface function that incumbent information sharing request is received.

Semantics of the service primitive

Incumbent_Info_Sharing.indication(
incumbentInfoSharingID,
sourceID,
IncumbentInfo
)

Parameters

Name	Type	Description
incumbentInfoSharingID	TransactionID	incumbentInfoSharingID uniquely identifies one transaction of incumbent information sharing request.
sourceID	IPAddress	Source GLDB from which the incumbent information is received.
IncumbentInfo	IncumbentInfo	Information of the incumbent.

When used

This primitive shall be used by the communication function to indicate to the G-G function that incumbent information sharing request is received.

Effect of receipt

The G-G function uses the Incumbent_Info_Sharing.response to reflect the result.

Incumbent_Info_Sharing.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the Incumbent_Info_Sharing.indication primitive.

Semantics of the service primitive

Incumbent_Info_Sharing.confirm(
incumbentInfoSharingID,
status
)

Parameters

Name	Type	Description
incumbentInfoSharingID	TransactionID	incumbentInfoSharingID uniquely identifies one transaction of incumbent information sharing request.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a response to the *Incumbent_Info_Sharing.indication*.

Effect of receipt

The communication function receives the result of the indication that an incumbent information sharing request is received.

4.4.2 CRS count query

The CRS number count query service provides a set of primitives or method through which the G-G interface function provides information on the number of CRSs over a region to another G-G interface function via the communication SAP. The service is used in clause 6.1.6 "Exchange the Number of CRSs over a Certain Region" in ETSI EN 303 143 [i.2].

CRS_Count_Query.request

Function

This primitive is used by the G-G interface function of a GLDB to obtain the number of CRSs over a region managed by another GLDB.

Semantics of the service primitive

```
CRS_Count_Query.request(
                    cRSCountQueryID,
                    sourceID,
                    destinationID,
                    region
                    )
```

Parameters

Name	Type	Description
cRSCountQueryID	TransactionID	cRSCountQueryID uniquely identifies one transaction of CRS count query request.
sourceID	IPAddress	Source of a GLDB to which the information on the number of CRSs within a region is requested.
destinationID	IPAddress	Destination of a GLDB from which the information on the number of CRSs within a region is requested.
Region	Region	Area in which the number of CRSs are counted.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to request the number of CRSs within a region managed by another GLDB.

Effect of receipt

The Communication function uses the CRS_Count_Query.confirm to reflect the result.

CRS_Count_Query.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the CRS_Count_Query.request primitive.

Semantics of the service primitive

```
CRS_Count_Query.confirm(
                    cRSCountQueryID,
                    status,
                    numberOfCRSs
                    )
```

Parameters

Name	Type	Description
cRSCountQueryID	TransactionID	cRSCountQueryID uniquely identifies one transaction of CRS count query request.
Status	Status	Status of operation.
numberOfCRSs	Integer	The number of CRSs over a given region managed by a neighbour GLDB.

When used

This primitive shall be used by the communication function to generate a confirmation to the CRS_Count_Query.Request.

Effect of receipt

The G-G interface function receives the result of the request for the number of CRSs within a region managed by another GLDB.

CRS_Count_Query.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function that a CRS count query is received from another GLDB.

Semantics of the service primitive

CRS_Count_Query.indication(
cRSCountQueryID,
sourceID,
region
)

Parameters

Name	Type	Description
cRSCountQueryID	TransactionID	cRSCountQueryID uniquely identifies one transaction of CRS count query request.
sourceID	IPAddress	Source GLDB from which the CRS countquery is received.
region	Region	Area in which the number of CRSs are counted.

When used

This primitive shall be used by the communication function to indicate to the G-G function that CRS count query is received from another GLDB.

Effect of receipt

The G-G function uses the CRS_Count_Query.response to reflect the result.

CRS_Count_Query.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the CRS_Count_Query.indication primitive.

Semantics of the service primitive

CRS_Count_Query.response(
cRSCountQueryID,
status,
numberOfCRSs
)

Parameters

Name	Type	Description
cRSCountQueryID	TransactionID	cRSCountQueryID uniquely identifies one transaction of CRS count query request.
status	Status	Status of operation.
numberOfCRSs	Integer	The number of CRSs over a given region managed by a neighbour GLDB.

When used

This primitive shall be used by the communication function to generate a response to the CRS_Count_Query.request.

Effect of receipt

The communication function receives the result of the indication that a CRS count query is received.

4.4.3 CRS count update

The CRS number count update service provides a set of primitives or method through which the G-G interface function updates information on the number of CRSs over a region to another G-G interface function via the communication SAP. The service is used in clause 6.1.7 "Update the Number of CRSs over a Certain" in ETSI EN 303 143 [i.2].

CRS_Count_Update.request

Function

This primitive is used by the G-G interface function of a GLDB to update the number of CRSs by the GLDB over a region managed to another GLDB.

Semantics of the service primitive

CRS_Count_Update.request(
cRSCountUpdateID,
sourceID,
destinationID,
region,
numberOfCRSs
)

Parameters

Name	Type	Description
cRSCountUpdateID	TransactionID	cRSCountUpdateID uniquely identifies one transaction of CRS count update request.
sourceID	IPAddress	Source of a GLDB to which the information on the number of CRSs within a region is to be updated.
destinationID	IPAddress	Destination of a GLDB from which the information on the number of CRSs within a region is to be updated to the other GLDB.
Region	Region	Area in which the number of CRSs are counted.
numberOfCRSs	Integer	The number of CRSs over a given region managed by the GLDB.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to update the number of CRSs managed by the GLDB within a region to another GLDB.

Effect of receipt

The Communication function uses the CRS_Count_Update.confirm to reflect the result.

CRS_Count_Update.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the CRS_Count_Update.request primitive.

Semantics of the service primitive

CRS_Count_Update.confirm(
cRSCountUpdateID,
status
)

Parameters

Name	Type	Description
cRSCountUpdateID	TransactionID	cRSCountUpdateID uniquely identifies one transaction of CRS count update request.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a confirmation to the CRS_Count_Update.Request.

Effect of receipt

The G-G interface function receives the result of the updating the the number of CRSs within a region managed by the GLDB.

CRS_Count_Update.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function that a CRS count update is received from another GLDB.

Semantics of the service primitive

CRS_Count_Update.indication(
cRSCountUpdateID,
sourceID,
region,
numberOfCRSs
)

Parameters

Name	Type	Description
cRSCountUpdateID	TransactionID	cRSCountUpdateID uniquely identifies one transaction of CRS count update request.
sourceID	IPAddress	Source GLDB from which the CRS count update request is received.
region	Region	Area in which the number of CRSs are counted.
numberOfCRSs	Integer	The number of CRSs over a given region managed by the GLDB.

When used

This primitive shall be used by the communication function to indicate to the G-G function that CRS count update is received from another GLDB.

Effect of receipt

The G-G function uses the CRS_Count_Update.response to reflect the result.

CRS_Count_Update.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the CRS_Count_Update.indication primitive.

Semantics of the service primitive

CRS_Count_Update.response(
cRSCountUpdateID,
status
)

Parameters

Name	Type	Description
cRSCountUpdateID	TransactionID	cRSCountUpdateID uniquely identifies one transaction of CRS count update request.
status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a response to the CRS_Count_Update.request.

Effect of receipt

The communication function receives the result of the indication that a CRS count update is received.

4.4.4 Victim GLDB discovery

The victim GLDB discovery service provides a set of primitives or method through which the G-G interface function exchange information with another G-G interface function via the communication SAP to discover the victim GLDB. The service is used in clause 6.1.2 "Victim GLDB Discovery Procedure" in ETSI EN 303 143 [i.2].

Victim_GLDB_Discovery.request

Function

This primitive is used by the G-G interface function of a GLDB to discover victim GLDBs.

Semantics of the service primitive

Victim_GLDB_Discovery.request(
victimGLDBDiscoveryID,
sourceID,
destinationID,
intendedSpectrumUsage
)

Parameters

Name	Type	Description
victimGLDBDiscoveryID	TransactionID	victimGLDBDiscoveryID uniquely identifies one transaction to discover victim GLDB.
sourceID	IPAddress	Source of a GLDB from which the victim discovery request is generated.
destinationID	IPAddress	Destination of a GLDB to which the victim GLDB discovery request is received.
intendedSpectrumUsage	Operation	intendedSpectrumUsage, be composed of deviceDescriptor, geolocation and operationalParameters, describes spectrum usage one CRS or one presumed CRS who interference effect is equivalent to that of multiple closely located CRSs' aggregate interference over a region.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to discover victim GLDBs.

Effect of receipt

The Communication function uses the Victim_GLDB_Discovery.confirm to reflect the result.

Victim_GLDB_Discovery.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the victimGLDBDiscoveryID.request primitive.

Semantics of the service primitive

Victim_GLDB_Discovery.confirm(
victimGLDBDiscoveryID,
status,
discoveryResult
)

Parameters

Name	Type	Description
victimGLDBDiscoveryID	TransactionID	victimGLDBDiscoveryID uniquely identifies one transaction to discover victim GLDB.
Status	Status	Status of operation.
discoveryResult	Enumeration	0: destination GLDB is not a victim neighbour. 1: destination GLDB is a victim neighbour.

When used

This primitive shall be used by the communication function to generate a confirmation to the Victim_GLDB_Discovery.Request.

Effect of receipt

The G-G interface function receives the result of the victim GLDB discovery request.

Victim_GLDB_Discovery.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function that a victim GLDB discovery request is received from another GLDB.

Semantics of the service primitive

Victim_GLDB_Discovery.indication(
victimGLDBDiscoveryID,
sourceID,
intendedSpectrumUsage
)

Parameters

Name	Type	Description
victimGLDBDiscoveryID	TransactionID	victimGLDBDiscoveryID uniquely identifies one transaction to discover victim GLDB.
sourceID	IPAddress	Source GLDB from which the victim GLDB discovery request is received.
intendedSpectrumUsage	Operation	intendedSpectrumUsage, be composed of deviceDescriptor, geolocation and operationalParameters, describes spectrum usage one CRS or one presumed CRS who interference effect is equivalent to that of multiple CRSs' aggregate interference over a region.

When used

This primitive shall be used by the communication function to indicate to the G-G function that victim GLDB discovery request is received from another GLDB.

Effect of receipt

The G-G function uses the Victim_GLDB_Discovery.response to reflect the result.

Victim_GLDB_Discovery.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the Victim_GLDB_Discovery.indication primitive.

Semantics of the service primitive

Victim_GLDB_Discovery.response(
cRSCountQueryID,
status,
discoveryResult
)

Parameters

Name	Type	Description
victimGLDBDiscoveryID	TransactionID	victimGLDBDiscoveryID uniquely identifies one transaction to discover victim GLDB.
status	Status	Status of operation.
discoveryResult	Enumeration	0: destination GLDB is not a victim neighbour. 1: destination GLDB is a victim neighbour.

When used

This primitive shall be used by the communication function to generate a response to the Victim_GLDB_Discovery.request.

Effect of receipt

The communication function receives the result of the indication that victim GLDB discovery result is received.

4.4.5 Affected incumbent Information acquisition

The affected incumbent Information acquisition service provides a set of primitives or method through which the G-G interface function of a GLDB acquires information of the affected incumbent of the victim GLDB. The service is used in the first variant of clause 6.1.3 "CRS Spectrum Usage Modification Procedure" in ETSI EN 303 143 [i.2].

Affected_Incumbent_Info_Acquisition.request

Function

This primitive is used by the G-G interface function of a GLDB to obtain the information of the affected incumbent of a victim GLDB.

Semantics of the service primitive

Affected_Incumbent_Info_Acqusition.request(
affectedIncumbentInfoAcquisitionID,
sourceID,
destinationID
)

Parameters

Name	Type	Description
affectedIncumbentInfoAcquisitionID	TransactionID	affectedIncumbentInfoAcquisitionID uniquely identifies one transaction of acquiring information of affected incumbent in victim GLDB.
sourceID	IPAddress	Source of a GLDB from which the affected incumbent information acquisition request is generated.
destinationID	IPAddress	Destination from which the information of the affected incumbent is requested.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to acquire the information of the affected incumbent of the victim GLDBs.

Effect of receipt

The Communication function uses the Affected_Incumbent_Info_Acqusition.confirm to reflect the result.

Affected_Incumbent_Info_Acquisition.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the Affected_Incumbent_Info_Acqusition.request primitive.

Semantics of the service primitive

Affected_Incumbent_Info_Acqusition.confirm(
affectedIncumbentInfoAcquisitionID,
status,
affectedIncumbent
)

Parameters

Name	Type	Description
affectedIncumbentInfoAcquisitionID	TransactionID	affectedIncumbentInfoAcquisitionID uniquely identifies one transaction of acquiring information of affected incumbent in victim GLDB.
status	Status	Status of operation.
affectedIncumbent	AffectedIncumbent	affectedIncumbent parameter describes the location of reference points of the affected incumbent, incubment information such as desired protection ratio, received signal level, interference levels and source of interference.

When used

This primitive shall beused by the communication function to generate a confirmation to the Affected_Incumbent_Info_Acqusition.Request.

Effect of receipt

The G-G interface function receives the result of the affected incumbent information acquisition request.

Affected_incumbent_Info_Acqusition.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function that an affected incumbent information acquisition request is received from another GLDB.

Semantics of the service primitive

Affected_Incumbent_Info_Acqusition.indication(
affectedIncumbentInfoAcquisitionID,
sourceID
)

Parameters

Name	Type	Description
affectedIncumbentInfoAcquisitionID	TransactionID	affectedIncumbentInfoAcquisitionID uniquely identifies one transaction of acquiring information of affected incumbent in victim GLDB.
sourceID	IPAddress	Source GLDB from which affected incumbent information acquisition request is received.

When used

This primitive shall be used by the communication function to indicate to the G-G function that affected incumbent information acquisition request is received from another GLDB.

Effect of receipt

The G-G function uses the Affected_Incumbent_Info_Acqusition.response to reflect the result.

Affected_Incumbent_Info_Acqusition.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the Affected_Incumbent_Info_Acqusition.indication primitive.

Semantics of the service primitive

Affected_Incumbent_Info_Acqusition.response(
affectedIncumbentInfoAcquisionID,
status,
affectedIncumbent
)

Parameters

Name	Type	Description
affectedIncumbentInfoAcquisionID	TransactionID	affectedIncumbentInfoAcquisionID uniquely identifies one transaction of acquiring information of affected incumbent in victim GLDB.
status	Status	Status of operation.
affectedIncumbent	AffectedIncumbent	affectedIncumbent parameter describes the location of reference points of the affected incumbent, incubment information such as desired protection ratio, received signal level, interference levels and source of interference.

When used

This primitive shall be used by the communication function to generate a response to the Affected_Incumbent_Info_Acqusition.request.

Effect of receipt

The communication function receives the result of the indication that affected incumbent information is received.

4.4.6 Affected incumbent information providing service

The affected incumbent information providing service provides a set of primitives or method through which the G-G interface function of a victim GLDB provides information of the affected incumbent to the affecting GLDB. The service is used in the first variant of clause 6.1.3 "CRS Spectrum Usage Modification Procedure" in ETSI EN 303 143 [i.2].

Affected_Incumbent_Info_Providing.request

Function

This primitive is used by the G-G interface function of a victim GLDB to provide the information of the affected incumbent to the affecting GLDB.

Semantics of the service primitive

Affected_Incumbent_Info_Providing.request(
affectedIncumbentInfoProvidingD,
sourceID,
destinationID,
affectedIncumbent
)

Parameters

Name	Type	Description
affectedIncumbentInfoProvidingID	TransactionID	affectedIncumbentInfoProvidingID uniquely identifies one transaction of providing information of affected incumbent in victim GLDB to the affecting GLDB.
sourceID	IPAddress	Source of a GLDB from which the affected incumbent information provision request is generated.
destinationID	IPAddress	Destination to which the affected incumbent information provision is requested.
affectedIncumbent	AffectedIncumbent	affectedIncumbent parameter describes the location of reference points of the affected incumbent, incubment information such as desired protection ratio, received signal level, interference levels and source of interference.

When used

This primitive shall be used by the G-G interface function of a victim GLDB when it needs to provide the information of the affected incumbent of the victim GLDB to the affecting GLDBs.

Effect of receipt

The Communication function uses the Affected_Incumbent_Info_Providing.confirm to reflect the result.

Affected_Incumbent_Info_Providing.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as confirmation to the Affected_Incumbent_Info_Providing.request primitive.

Semantics of the service primitive

Affected_Incumbent_Info_Providing.confirm(
affectedIncumbentInfoProvidingID,
status,
)

Parameters

Name	Type	Description
affectedIncumbentInfoProvidingID	TransactionID	affectedIncumbentInfoProvidingID uniquely identifies one transaction of providing information of affected incumbent in victim GLDB to the affecting GLDB.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a confirmation to the Affected_Incumbent_Info_Providing.Request.

Effect of receipt

The G-G interface function receives the result of the affected incumbent information provision request.

Affected_Incumbent_Info_Providing.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function that an affected incumbent information provision request is received from another GLDB.

Semantics of the service primitive

Affected_Incumebnt_Info_Providing.indication(
affectedIncumbentInfoProvidingID,
sourceID,
affectedIncumbent
)

Parameters

Name	Type	Description
affectedIncumbentInfoProvidingID	TransactionID	affectedIncumbentInfoProvidingID uniquely identifies one transaction of providing information of affected incumbent in victim GLDB to the affecting GLDB.
sourceID	IPAddress	Source GLDB from which the victim GLDB discovery request is received.
affectedIncumbent	AffectedIncumbent	affectedIncumbent parameter describes the location of reference points of the affected incumbent, incubment information such as desired protection ratio, received signal level, interference levels and source of interference.

When used

This primitive shall be used by the communication function to indicate to the G-G function that affected incumbent information providing request is received from another GLDB.

Effect of receipt

The G-G function uses the Affected_Incumbent_Info_Providing.response to reflect the result.

Affected_Incumbent_Info_Providing.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the Affected_Incumbent_Info_Providing.indication primitive.

Semantics of the service primitive

Affected_Incumbent_Info_Providing.response(
affectedIncumbentInfoProvidingID,
status
)

Parameters

Name	Type	Description
affectedIncumbentInfoProvidingID	TransactionID	affectedIncumbentInfoProvidingID uniquely identifies one transaction of providing information of affected incumbent in victim GLDB to the affecting GLDB.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a response to the Affected_incumbent_Info_Providing.request.

Effect of receipt

The communication function receives the result of the indication that affected incumbent information is received.

4.4.7 CRS spectrum usage modification

The spectrum usage modification service provides a set of primitives or method through which the G-G interface function of a GLDB obtains the spectrum usage modification information for its managed CRS in order to protect the incumbent registered in the victim GLDB. The service is used in the second variant of clause 6.1.3 CRS Spectrum Usage Modification Procedure in ETSI EN 303 143 [i.2].

CRS_Spectrum_Usage_Modification.request

Function

This primitive is used by the G-G interface function of a GLDB to obtain the spectrum usage modification information for its managed CRS in order to protect incumbent registered in the victim GLDB.

Semantics of the service primitive

```
CRS_Spectrum_Usage_Modification.request(
                    cRSSpectrumUsageModicationID,
                    sourceID,
                    destinationID,
                    intendedSpectrumUsage
                    )
```

Parameters

Name	Type	Description
cRSSpectrumUsageModicationID	TransactionID	cRSSpectrumUsageModicationID uniquely identifies one transaction of a GLDB obtaining the spectrum usage modification information for its managed CRS in order to protect incumbent registered in the victim GLDB.
sourceID	IPAddress	Source of a GLDB from which CRS spectrum usage modification request is generated.
destinationID	IPAddress	Destination victim GLDB from which the CRS spectrum usage modification information is requested.
intendedSpectrumUsage	Operation	intendedSpectrumUsage, be composed of deviceDescriptor, geolocation and operationalParameters, describes spectrum usage one CRS or one presumed CRS who interference effect is equivalent to that of multiple CRSs' aggregate interference over a region.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to obtain the spectrum usage modification information for its managed CRS in order to protect incumbent registered in the victim GLDB.

Effect of receipt

The Communication function uses the CRS_Spectrum_Usage_Modification.confirm to reflect the result.

CRS_Spectrum_Usage_Modification.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the CRS_Spectrum_Usage_Modification.request primitive.

Semantics of the service primitive

CRS_Spectrum_Usage_Modification.confirm(
cRSSpectrumUsageModicationID,
status,
modifiedSpectrumUsage
)

Parameters

Name	Type	Description
cRSSpectrumUsageModicationID	TransactionID	cRSSpectrumUsageModicationID uniquely identifies one transaction of a GLDB obtaining the spectrum usage modification information for its managed CRS in order to protect incumbent registered in the victim GLDB.
Status	Status	Status of operation.
modifiedSpectrumUsage	Operation	modifiedSpectrumUsage parameters describe the modified spectrum usage in order to protect the incumbent in the victim GLDB.

When used

This primitive shall be used by the communication function to generate a confirmation to the CRS_Spectrum_Usage_Modification.request.

Effect of receipt

The G-G interface function receives the result of the CRS_Spectrum_Usage_Modification.request.

CRS_Spectrum_Usage_Modification.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function of the victim GLDB that an CRS_Spectrum_Usage_Modification request is received from another GLDB.

Semantics of the service primitive

cRS_Spectrum_Usage_Modification.indication(
cRSSpectrumUsageModicationID,
sourceID,
intendedSpectrumUsage
)

Parameters

Name	Type	Description
cRSSpectrumUsageModicationID	TransactionID	cRSSpectrumUsageModicationID uniquely identifies one transaction of a GLDB obtaining the spectrum usage modification information for its managed CRS in order to protect incumbent registered in the victim GLDB.
sourceID	IPAddress	Source GLDB from which the CRS spectrum usage modification request is received.
intendedSpectrumUsage	Operation	intendedSpectrumUsage, be composed of deviceDescriptor, geolocation and operationalParameters, describes spectrum usage one CRS or one presumed CRS who interference effect is equivalent to that of multiple CRSs' aggregate interference over a region.

When used

This primitive shall be used by the communication function to indicate to the G-G function that CRS spectrum usage modification request is received from another GLDB.

Effect of receipt

The G-G function uses the CRS_Spectrum_Usage_Modification.response to reflect the result.

CRS_Spectrum_Usage_Modification.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the CRS_Spectrum_Usage_Modification.indication primitive.

Semantics of the service primitive

CRS_Spectrum_Usage_Modification.response(
cRSSpectrumUsageModicationID,
status,
modifiedSpectrumUsage
)

Parameters

Name	Type	Description
cRSSpectrumUsageModicationID	TransactionID	cRSSpectrumUsageModicationID uniquely identifies one transaction of a GLDB obtaining the spectrum usage modification information for its managed CRS in order to protect incumbent registered in the victim GLDB.
Status	Status	Status of operation.
modifiedSpectrumUsage	Operation	modifiedSpectrumUsage parameters describe the modified spectrum usage in order to protect the incumbent in the victim GLDB.

When used

This primitive shall be used by the communication function to generate a response to the CRS_Spectrum_Usage_Modification.request.

Effect of receipt

The communication function receives the result of the CRS spectrum usage modification indication is received.

4.4.8 CRS Channel usage query

The CRS channel usage query service provides a set of primitives or method through which the G-G interface function of a GLDB obtains the channel usage information of CRS managed by other GLDBs. The service is used in clause 6.1.4 "CRS Operating Parameters Checking Procedure" in ETSI EN 303 143 [i.2].

CRS_Channel_Usage_Query.request

Function

This primitive is used by the G-G interface function of a GLDB to query the channel usage of CRSs registered in other GLDBs.

Semantics of the service primitive

CRS_Channel_Usage_Query.request(
cRSChannelUsageQueryID,
sourceID,
destinationID,
deviceID
)

Parameters

Name	Type	Description
cRSChannelUsageQueryID	TransactionID	cRSChannelUsageQueryID uniquely identifies one transaction of a GLDB to query the channel usage of CRSs registered in other GLDBs.
sourceID	IPAddress	Source of a GLDB from which CRS channel usage query is generated.
destinationID	IPAddress	Destination of GLDB to which CRS channel usage query is requested.
deviceID	DeviceID	deviceID represents the CRS of which the channel usage is queried.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to obtain channel usage information of CRSs registered in other GLDB.

Effect of receipt

The Communication function uses the CRS_Channel_Usage_Query.confirm to reflect the result.

CRS_Channel_Usage_Query.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the CRS_Channel_Usage_Query.request primitive.

Semantics of the service primitive

CRS_Channel_Usage_Query.confirm(
cRSChannelUsageQueryID,
status,
modifiedSpectrumUsagecRSChUsageInfo
)

Parameters

Name	Type	Description
cRSChannelUsageQueryID	TransactionID	cRSChannelUsageQueryID uniquely identifies one transaction of a GLDB to query the channel usage of CRSs registered in other GLDBs.
Status	Status	Status of operation.
cRSChUsageInfo	Operation	cRSChUsageInfo, be composed of deviceDescriptor, geolocation and operationalParameters, describes the spectrum usage by the queried CRS.

When used

This primitive shall be used by the communication function to generate a confirmation to the CRS_Channel_Usage_Query.request.

Effect of receipt

The G-G interface function receives the result of the CRS_Channel_Usage_Query.request.

CRS_Channel_Usage_Query.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function of the responding GLDB that a CRS_Channel_Usage_Query request is received from another GLDB.

Semantics of the service primitive

CRS_Channel_Usage_Query.indication(
cRSChannelUsageQueryID,
sourceID,
deviceID
)

Parameters

Name	Type	Description
cRSChannelUsageQueryID	TransactionID	cRSChannelUsageQueryID uniquely identifies one transaction of a GLDB to query the channel usage of CRSs registered in other GLDBs.
sourceID	IPAddress	Source GLDB from which the CRS spectrum usage modification request is received.
deviceID	DeviceID	deviceID represents the CRS of which the channel usage is queried.

When used

This primitive shall be used by the communication function to indicate to the G-G function that CRS channel usage query request is received from another GLDB.

Effect of receipt

The G-G function uses the CRS_Channel_Usage_Query.response to reflect the result.

CRS_Channel_Usage_Query.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the CRS_Channel_Usage_Query.indication primitive.

Semantics of the service primitive

CRS_Channel_Usage_Query.response(
cRSChannelUsageQueryID,
status,
modifiedSpectrumUsagecRSChUsageInfo
)

Parameters

Name	Type	Description
cRSChannelUsageQueryID	TransactionID	cRSChannelUsageQueryID uniquely identifies one transaction of a GLDB to query the channel usage of CRSs registered in other GLDBs.
Status	Status	Status of operation.
cRSChUsageInfo	Operation	cRSChUsageInfo, be composed of deviceDescriptor, geolocation and operationalParameters, describes the spectrum usage by the queried CRS.

When used

This primitive shall be used by the communication function to generate a response to the CRS_Channel_Usage_Query.request.

Effect of receipt

The communication function receives the result of the CRS Channel usage query indication is received.

4.4.9 CRS Channel usage registration

The CRS channel usage registration service provides a set of primitives or method through which the G-G interface function of a GLDB registers the channel usage information of CRS to other GLDBs. The service is used in clause 6.1.5 "CRS Spectrum Usage Registration Procedure" in ETSI EN 303 143 [i.2].

CRS_Channel_Usage_Registration.request

Function

This primitive is used by the G-G interface function of a GLDB to query the channel usage of CRSs registered in other GLDBs.

Semantics of the service primitive

CRS_Channel_Usage_Registration.request(
cRSChannelUsageRegistrationID,
sourceID,
destinationID,
cRSChUsageInfo
)

Parameters

Name	Type	Description
cRSChannelUsageRegistrationID	TransactionID	cRSChannelUsageRegistrationID uniquely identifies one transaction of a GLDB to register the channel usage of CRSs to other GLDBs.
sourceID	IPAddress	Source of a GLDB from which CRS channel usage registration is generated.
destinationID	IPAddress	Destination of GLDB to which CRS channel usage registration is requested.
cRSChUsageInfo	Operation	cRSChUsageInfo, be composed of deviceDescriptor, geolocation and operationalParameters, describes the spectrum usage by the CRS to be registered.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to register channel usage information of CRSs in other GLDB.

Effect of receipt

The Communication function uses the CRS_Channel_Usage_Registration.confirm to reflect the result.

CRS_Channel_Usage_Registration.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the CRS_Channel_Usage_Registration.request primitive.

Semantics of the service primitive

CRS_Channel_Usage_Registration.confirm(
cRSChannelUsageRegistrationID,
status
)

Parameters

Name	Type	Description
cRSChannelUsageRegistrationID	TransactionID	cRSChannelUsageRegistrationID uniquely identifies one transaction of a GLDB to register the channel usage of CRSs to other GLDBs.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a confirmation to the CRS_Channel_Usage_Registration.request.

Effect of receipt

The G-G interface function receives the result of the CRS_Channel_Usage_Registration.request.

CRS_Channel_Usage_Registration.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function of the responding GLDB that a CRS_Channel_Usage_Registration request is received from another GLDB.

Semantics of the service primitive

CRS_Channel_Usage_Registration.indication(
cRSChannelUsageRegistrationID,
sourceID,
cRSChUsageInfo
)

Parameters

Name	Type	Description
cRSChannelUsageRegistrationID	TransactionID	cRSChannelUsageRegistrationID uniquely identifies one transaction of a GLDB to register the channel usage of CRSs to other GLDBs.
sourceID	IPAddress	Source GLDB from which the CRS spectrum usage modification request is received.
cRSChUsageInfo	Operation	cRSChUsageInfo, be composed of deviceDescriptor, geolocation and operationalParameters, describes the spectrum usage by the CRS to be registered.

When used

This primitive shall be used by the communication function to indicate to the G-G function that CRS channel usage registration request is received from another GLDB.

Effect of receipt

The G-G function uses the CRS_Channel_Usage_Registration.response to reflect the result.

CRS_Channel_Usage_Registration.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the CRS_Channel_Usage_Registration.indication primitive.

Semantics of the service primitive

CRS_Channel_Usage_Query.response(
cRSChannelUsageQueryID,
status
)

Parameters

Name	Type	Description
cRSChannelUsageRegistrationID	TransactionID	cRSChannelUsageRegistrationID uniquely identifies one transaction of a GLDB to register the channel usage of CRSs to other GLDBs.
Status	Status	Status of operation.

When used

This primitive shall be used by the communication function to generate a response to the CRS_Channel_Usage_Registration.request.

Effect of receipt

The communication function receives the result of the CRS Channel usage registration indication is received.

4.4.10 CRS transfer between GLDBs

The CRS transfer between GLDBs service provides a set of primitives or method through which the G-G interface function transfer the registration information of a CRS to another G-G interface function via the communication SAP. The service is used in clause 6.1.9 CRS Transfer Between GLDBs in ETSI EN 303 143 [i.2].

CRS_Transfer.request

Function

This primitive is used by the G-G interface function of a GLDB to transfer the registration information of a CRS managed by the GLDB to another GLDB.

Semantics of the service primitive

CRS_Transfer.request(
cRSTransferID,
sourceID,
destinationID,
deviceDescriptor,
geolocation,
deviceCharacteristics,
subscriptionRequest,
deviceUsageRequirements
)

Parameters

Name	Type	Description
cRSTransferID	TransactionID	cRSTransferID uniquely identifies one transaction of CRS transfer request.
sourceID	IPAddress	Source of a GLDB to which the information on the number of CRSs within a region is to be updated.
destinationID	IPAddress	Destination of a GLDB from which the information on the number of CRSs within a region is to be transferred to the other GLDB.
deviceDescriptor	DeviceDescriptor	Device descriptor describes the physical profile of a CRS.
geolocation	Geolocation	Geo-location information of CRS.
deviceCharacteristics	DeviceCharacteristics	Device characteristics provide CRS's device information (e.g. antenna, installation etc.).
subscriptionRequest	SubscriptionRequest	CRS subscription to coordination service (management or information).
deviceUsageRequirements	DeviceUsageRequirements	deviceUsageRequirements provides the information that be used by CRS to provide additional information to the SC and/or GLDB that can help it to determine operational parameters.

When used

This primitive shall be used by the G-G interface function of a GLDB when it needs to transfer the registration information of a CRS managed by the GLDB within a region to another GLDB.

Effect of receipt

The Communication function uses the CRS_Transfer.confirm to reflect the result.

CRS_Transfer.confirm

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a confirmation to the CRS_Transfer.request primitive.

Semantics of the service primitive

```
CRS_Transfer.confirm(
                    cRSTransferID,
                    status,
                    rulesetInformation
                    )
```

Parameters

Name	Type	Description
cRSTransferID	TransactionID	cRSTransferID uniquely identifies one transaction of CRS transfer request.
Status	Status	Status of operation.
rulesetInformation	RulesetInformation	Ruleset Information contains parameters for the ruleset of a regulatory domain.

When used

This primitive shall be used by the communication function to generate a confirmation to the CRS_Transfer.Request.

Effect of receipt

The G-G interface function receives the result of the transferring the registration information of a CRS within a region managed by the GLDB to another GLDB.

CRS_Transfer.indication

Function

This primitive is used by the communication function to indicate to the G-G interface function that a CRS transfer request is received from another GLDB.

Semantics of the service primitive

CRS_Transfer.indication(
cRSTransferID,
sourceID,
destinationID,
deviceDescriptor,
geolocation,
deviceCharacteristics,
subscriptionRequest,
deviceUsageRequirements
)

Parameters

Name	Type	Description
cRSTransferID	TransactionID	cRSTransferID uniquely identifies one transaction of CRS transfer request.
sourceID	IPAddress	Source of a GLDB to which the information on the number of CRSs within a region is to be updated.
destinationID	IPAddress	Destination of a GLDB from which the information on the number of CRSs within a region is to be transferred to the other GLDB.
deviceDescriptor	DeviceDescriptor	Device descriptor describes the physical profile of a CRS.
geolocation	Geolocation	Geo-location information of CRS.
deviceCharacteristics	DeviceCharacteristics	Device characteristics provide CRS's device information (e.g. antenna, installation etc.).
subscriptionRequest	SubscriptionRequest	CRS subscription to coordination service (management or information).
deviceUsageRequirements	DeviceUsageRequirements	deviceUsageRequirements provides the information that be used by CRS to provide additional information to the SC and/or GLDB that can help it to determine operational parameters.

When used

This primitive shall be used by the communication function to indicate to the G-G function that CRS transfer request is received from another GLDB.

Effect of receipt

The G-G function uses the CRS_Transfer.response to reflect the result.

CRS_Transfer.response

Function

This primitive is used by the communication function to provide the result to the G-G interface function as a response to the CRS_Transfer.indication primitive.

Semantics of the service primitive

CRS_Transfer.response(
cRSTransferID,
status,
rulesetInformation
)

Parameters

Name	Type	Description
cRSTransferID	TransactionID	cRSTransferID uniquely identifies one transaction of CRS transfer request.
status	Status	Status of operation.
rulesetInformation	RulesetInformation	Ruleset Information contains parameters for the ruleset of a regulatory domain.

When used

This primitive shall be used by the communication function to generate a response to the CRS_Transfer.request.

Effect of receipt

The communication function receives the result of the indication that a CRS transfer request is received.

5 Information elements

5.1 General

Clause 5.2 describes the data types as defined in the SAP primitives described in clause 4. Data types are described using ASN.1 [i.4] but alternative ways are possible and are not excluded.

5.2 Data format

ACLR

```
--ASN1START

ACLR ::= SEQUENCE{
    --ACLR on 1st adjacent channel [dB]
    aclrRatio1          REAL,
    --ACLR on 2nd adjacent channel [dB]
    aclrRatio2          REAL        OPTIONAL,
    ...
}

--ASN1STOP
```

ACS

```
--ASN1START

ACS ::= SEQUENCE{
    --ACS on 1st adjacent channel [dB]
    acsRatio1           REAL,
    --ACS on 2nd adjacent channel [dB]
    acsRatio2           REAL,
    --ACS on 3rd adjacent channel [dB]
    acsRatio3           REAL,
    --ACS on 4th adjacent channel [dB]
    acsRatio4           REAL,
    --ACS on 5th adjacent channel [dB]
    acsRatio5           REAL,
    --ACS on 6th adjacent channel [dB]
    acsRatio6           REAL,
    --ACS on 7th adjacent channel [dB]
    acsRatio7           REAL,
    --ACS on 8th adjacent channel [dB]
    acsRatio8           REAL,
    ...
}

--ASN1STOP
```

AffectedIncumbent

```
--ASN1START

--Affected incumbent information of a victim GLDB

AffectedIncumbent ::= SEQUENCE{
    --Critical point where incumbent is interfered with most severely.
    criticalPoint1  IncumbentInfoBlock,
--Critical point closest to the managing area of the other GLDB
    criticalPoint2  IncumbentInfoBlock,
    --Incumbent information of all affected region described by the reference point of protected
incumbent area overlapped by the coverage area of a CRS.
    affectedRegion  IncumbentInfo
}

--ASN1STOP
```

AvailableFrequency

```
--ASN1START

AvailableFrequency ::= SEQUENCE{
    --DTT channel edge frequency pair start edge frequency [MHz]
    startFreq       REAL,
    --DTT channel edge frequency pair stop edge frequency [MHz]
    stopFreq        REAL,
    --Maximum in-block RF EIRP spectrum density [dBm/0.1MHz]
    maximumEIRPDensity  REAL,
    --Maximum in-block RF EIRP [dBm]
    maximumEIRP     REAL
}

--ASN1STOP
```

CheckMode

```
--ASN1START

CheckMode ::= ENUMERATED{
    --Check the direct interference from the CRS
    directInterferenceCheck,
    --Check the interference considering accumulated interference effect
    accumulatedInterferenceCheck
}

--ASN1STOP
```

CheckResult

```
--ASN1START

CheckResult ::= CHOICE{
    --Operational parameters that are modified to satisfied the incumbent protection criteria
    operationalParameters   OperationalParameters,
    --Information on the incumbent of the interfered area
    incumbentInfo   IncumbentInfo
}

--ASN1STOP
```

DatabaseAccessTIming

```
--ASN1START

DatabaseAccessTiming ::= SEQUENCE{

    --Start time of GLDB in UTC
    startTime       UTCTime,
    --Update timer [seconds]
    updateTimer     REAL,
...
}

--ASN1STOP
```

DeviceCharacteristics

DeviceCharacteristics provide CRS's device information.

```
--ASN1START

DeviceCharacteristics ::= SEQUENCE{

    --Antenna height above ground level of master device [m]
    masterAntennaHeight         REAL,
    --Antenna gain of master device [dBi]
    masterAntennaGain               REAL,
    --The maximum transmission power level of master device [dBm]
    txPower                 REAL        OPTIONAL,
    --Antenna height above ground level of slave device [m]
    slaveAntennaHeight          REAL        OPTIONAL,
    --Antenna gain of slave device [dBi]
    slaveAntennaGain                REAL        OPTIONAL,
    --Adjacent channel selectivity
    aCS                         ACS     OPTIONAL,
    --Adjacent channel leakage ratio
    aCLR                        ACLR        OPTIONAL,
    --Guaranteed QoS of backhaul connection
    guaranteedQoSOfBackhaulConnection   GuaranteedQoSOfBackhaulConnection   OPTIONAL,
    ...
}

--ASN1STOP
```

DeviceDescriptor

DeviceDescriptor is specified in ETSI EN 301 598 [i.5].

```
--ASN1START

DeviceDescriptor ::= SEQUENCE {
    --Device type
deviceType  ENUMERATED{
                                typeA,
                                typeB},
    --Device category
    deviceCategory      ENUMERATED{
                                master,
                                slave},
    --Unique device ID
    deviceID    DeviceID,
    --Technology identifier
    technologyIdentifier    OCTET STRING,
    --Device emission class
    deviceEmissionClass INTEGER(1..5)
}

--ASN1STOP
```

DeviceID

```
-- ASN1START

DeviceID ::= SEQUENCE{
    --Manufacturer identifier
    manufacturerIdentifier      OCTET STRING,
    --Model identifier
    modelIdentifier             OCTET STRING,
    --Serial number
    serialNumber                OCTET STRING}
--ASN1STOP
```

DeviceUsageRequirements

DeviceUsageRequirements provide the information that be used by CRS to provide additional information to the SC and/or GLDB that can help it to determine operational parameters.

```
--ASN1START

DeviceUsageRequirements ::= SEQUENCE{

       --Minimum required SNR [dB]
       minReqSNR  REAL          OPTIONAL,
       ...
}
--ASN1STOP
```

Geolocation

Geolocation includes location information of one CRS.

```
--ASN1START

Geolocation ::= SEQUENCE {
    --Longitude [degree]
    longitude       REAL,
    --Latitude [degree]
    latitude        REAL,
    --Altitude [m]
    altitude        REAL
}

--ASN1STOP
```

IncumbentInfo

```
--ASN1START

IncumbentInfo ::= SEQUENCE OF IncumbentInfoBlock

--ASN1STOP
```

IncumbentInfoBlock

```
--ASN1START

--Incumbent information block for a particular band and particular duration

IncumbentInfoBlock ::= SEQUENCE{
    --Reference point ID to be protected of incumbent area
    referencePointID        OCTET STRING,
    --Geolocation information of the reference point
    geolocation         Geolocation,
    --Duration of incumbent spectrum usage
    duration            TimeValidity,
    --Incumbent spectrum usage start edge frequency [MHz]
    startFreq           REAL,
    --Incumbent spectrum usage stop edge frequency [MHz]
    stopFreq            REAL,
    --Antenna height above ground level of the reception to be protected in the reference point [m]
    antennaHeight       REAL,
    --Antenna gain of the reception to be protected in the reference point [dBi]
    antennaGain         REAL,
```

```
    --Protection ratio of the reception to be protected at the reference point for the frequency
[dB]
    protectionRatio         REAL,
    --Adjacent channel selectivity of the incumbent
    aCS                 ACS,
    --Acceptable interference level [mW] that is used to determine/adjust the available spectrum for
a CRS.
    acceptInterferenceLevel REAL        OPTIONAL,
    --List of interference CRSs
    InterferringCRSs        SEQUENCE OF InterferringCRS
}

--ASN1STOP
```

Interferring CRS

```
--ASN1START

--Information of a CRS contributing interference to a certain reference point
InterferringCRS ::= SEQUENCE{
--Id of the CRS's managing database
    databaseID          OCTET STRING,
    --ID of the CRS
    deviceID            DeviceID,
    --Contributed interference level [mW]
    interferenceLevel   REAL,
    --Time validity
    timeValidity        TimeValidity
}
--ANS1STOP
```

IPAddress

```
--ASN1START

IPAddress ::= OCTET STRING

--ASN1STOP
```

ListOfAvailableFrequencies

```
--ASN1START

ListOfAvailableFrequencies  ::= SEQUENCE OF AvailableFrequency

--ASN1STOP
```

LocationInfo

LocationInfo includes a set of location information of multiple CRSs or a region where a CRS is active.

```
--ASN1START

LocationInfo ::= CHOICE{
--Geolocations of one or multiple CRSs
    geolocations    SEQUENCE OF Geolocation,
    --Region where a CRS is active represented by an area defined by multiple geolocations
Region      Region,
    --Region where a CRS is active represented by a rectangular
    rectangularRegion       RectangularRegion

}

--ASN1STOP
```

Operation

```
--ASN1START

--Operation information includes a list of spectrum usage information of CRSs or presumed CRSs.

Operation ::= SEQUENCE OF SEQUENCE{
    --CRS device ID
    deviceID                DeciceID,
    --OperationalParameters
    operationalParameters   OperationalParameters
}

--ASN1STOP
```

OperationalParameters

```
--ASN1START

OperationalParameters ::= SEQUENCE{
    --List of available frequencies
    listOfavailabelFrequencis   ListOfAvailableFrequencies,
    --Time validity
    timeValidity    TimeValidity,
    --Location validity [m]
    locationValidity    REAL,
    --GLDB access timing information
databaseAccessTiming        DatabaseAccessTiming
}

--ASN1STOP
```

RectangularRegion

RectangularRegion is the information represented by a rectangular.

```
--ASN1START

RectangularRegion ::= SEQUENCE{
    --Geolocation of the upper-left point of the rectangular
    geolocationUpper            Geolocation,
    --Geolocation of the lower-right point of the rectangular
    geolocationLower            Geolocation
}

--ASN1STOP
```

Region

Region includes multiple location information of a CRS where the CRS is active.

```
--ASN1START

--Information of the bounded area defined by the multiple geolocations
minNumGeolocInfo    INTEGER ::= 3

Region ::= SEQUENCE{
        numGeolocInfo   INTEGER,
geolocation     Geolocation(SIZE(minNumGeolocInfo..numGeolocInfo))
}

--ASN1STOP
```

ReplyMode

```
--ASN1START

ReplyMode ::= ENUMERATED{
    --Reply the information on the interfered incumbent area
    interferedArea,
    --Reply the modified operational parameters for protecting incumbents
    modificationOfOperationalParameters
}
```

```
--ASN1STOP
```

Rulesetinformation

Rulesetinformation contains parameters for the ruleset of a regulatory domain.

```
--ASN1START

RulesetInformation ::= SEQUENCE{

    authority           OCTET STRING,
    rulesetId           OCTET STRING,
    maxLocationChange       REAL,
    maxPollingSecs      INTEGER,
    ...
}

--ASN1STOP
```

Status

```
--ASN1START

Status ::= ENUMERATED {
    --Operation is successful
    success,
    --Operation has encountered unspecified failure
    unspecifiedFailure,
    --Operation has been rejected
    rejection,
    --Operation has failed due to authentication failure
authenticationFailure
}

--ASN1STOP
```

SubscriptionRequest

```
--ASN1START

SubscriptionRequest ::= ENUMERATED{

    -- Management Service
    management,
    -- Information Service
    information,
    -- No Service
    noService
}

--ASN1STOP
```

TimeValidity

```
--ASN1START

TimeValidity ::= SEQUENCE{
    --Time validity start in UTC
    startTime       UTCTime,
    --Time validity end in UTC
    stopTime        UTCTime
}

--ASN1STOP
```

TransactionID

```
--ASN1START

TransactionID ::= OCTET STRING

--ASN1STOP
```

History

Document history			
V1.0.1	July 2015	EN Approval Procedure	AP 20151106: 2015-07-09 to 2015-11-06