SLOVENSKI STANDARD
SIST EN 303 143 V1.2.1:2016

01-marec-2016

Radijski sistemi z možnostjo preoblikovanja (RRS) - Arhitektura sistema za izmenjavo informacij med različnimi geolokacijskimi podatkovnimi bazami (GLDBs), ki omogočajo delovanje naprav za kanalske presledke (WSDs)

Reconfigurable Radio Systems (RRS) - System architecture for information exchange between different Geo-location Databases (GLDBs) enabling the operation of White Space Devices (WSDs)

Ta slovenski standard je istoveten z: **EN 303 143 V1.2.1**

ICS:

33.060.99	Druga oprema za radijske komunikacije	Other equipment for radiocommunications

SIST EN 303 143 V1.2.1:2016 **en**

ETSI EN 303 143 V1.2.1 (2015-11)

Reconfigurable Radio Systems (RRS); System architecture for information exchange between different Geo-location Databases (GLDBs) enabling the operation of White Space Devices (WSDs)

Reference
REN/RRS-0145

Keywords
control, CRS, GLDB, performance, white space

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://ipr.etsi.org).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Reconfigurable Radio Systems (RRS).

National transposition dates	
Date of adoption of this EN:	6 November 2015
Date of latest announcement of this EN (doa):	29 February 2016
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2016
Date of withdrawal of any conflicting National Standard (dow):	31 August 2016

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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document defines the system architecture for the information exchange between different Geo-location Databases (GLDBs) enabling the operation of White Space Devices (WSDs) for the protection of the incumbent service. The architecture stems from the system requirements described in clause 7.1 of ETSI TS 102 946 [i.1].

System Architecture and High Level Procedures for Coordinated and Uncoordinated Use of TV White Spaces are described in ETSI TS 103 145 [i.4].

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 referenced 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.

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 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 referenced 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 TS 102 946 (V1.1.1): "Reconfigurable Radio Systems (RRS); System requirements for Operation in UHF TV Band White Spaces".

[i.2] ECC Report 186 (2013): "Technical and operational requirements for the operation of white space devices under geo-location approach".

[i.3] ETSI EN 301 598 (V1.1.1): "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".

[i.4] ETSI TS 103 145 (V1.1.1): "Reconfigurable Radio Systems (RRS); System Architecture and High Level Procedures for Coordinated and Uncoordinated Use of TV White Spaces".

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:

CEPT	Conférence Européenne des administrations des Postes et Télécommunications
CRS	Cognitive Radio System
DB-SAP	DataBase- Service Access Point
ECC	Electronic Communications Committee
EIRP	Effective Isotropic Radiated Power
GLDB	Geo-Location DataBase
GL-SAP	GeoLocation - Service Access Point
ID	IDentifier
IP	Internet Protocol
NRA	National Regulatory Authority
SAP	Service Access Point
TCP	Transmission Control Protocol
TV	TeleVision
UDP	User Datagram Protocol
WSD	White Space Device

4 Overview of WSD GLDBs architecture reference model

4.1 Introduction

This clause describes the general WSD GLDBs architecture as well as the reference model of the logical entity, the GLDB, involved in the scope. The architecture shows the relationship of logical entities and the logical interface as detailed in the following clauses. The reference model shows the abstract architecture of components of logical entities and the logical interface.

4.2 Architecture

Figure 4.1 shows the instance of the G-G logical interface. The interface is used for the information exchange between GLDBs for enabling the operation of White Space Devices (WSDs) for the protection of the incumbent service.

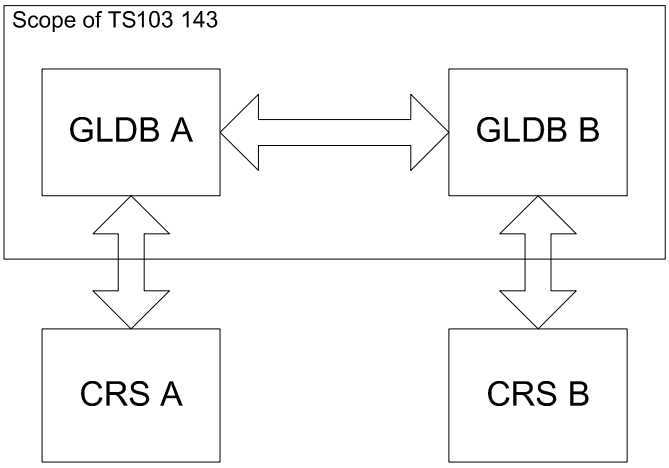

Figure 4.1: Architecture

4.3 Reference model of GLDB

Figure 4.2 shows an architectural view of a GLDB emphasizing the separation of GLDB into Database function, Geo-location function and G-G Interface function. A function can access the services provided by another function via a corresponding Service Access Point (SAP). A GLDB exchanges information with another GLDB by accessing communication services via the Com-SAP.

The DB-SAP is used by the G-G Interface function to access the services provided by the Database function such as registration of CRS and provision of incumbent information.

The GL-SAP is used by the G-G Interface function to access the services provided by the Geo-location function such as the calculation of location specific EIRP that a WSD in a CRS can use in a frequency band.

The Com-SAP is used by the G-G Interface function to access communication services provided by communication function for the information exchange with another G-G interface function.

Note that the G-G interface function inside the GLDB uses the services provided at the above three SAPs to realize the logical interface between different GLDBs.

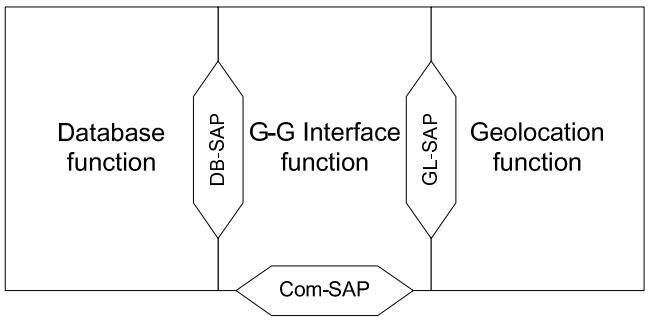

Figure 4.2: Reference model of GLDB

4.4 Reference model between GLDBs

Figure 4.3 shows an alternative view of the reference model for the information exchange between two GLDBs. A communication function is a hardware/software module that provides the communication services required by the interfaces between logical entities based on a communications protocol stack.

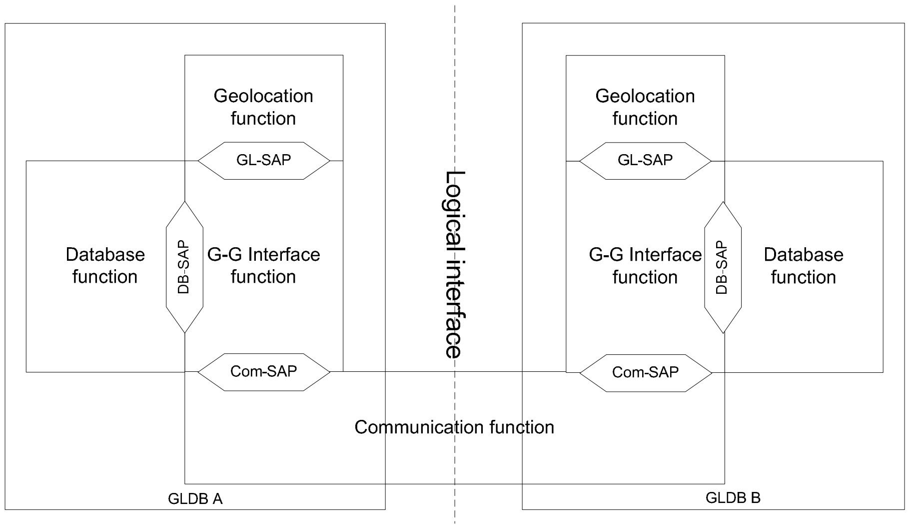

Figure 4.3: View of reference model for the information exchange between GLDBs using the G-G logical interface

5 Reference Points

5.1 Reference point: Logical interface between GLDBs

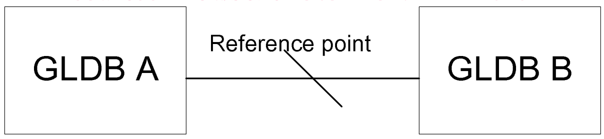

Figure 5.1: Reference point for information exchange between GLDBs

Figure 5.1 shows the reference point between GLDBs which is the G-G logical interface between the GLDBs for enabling the operation of White Space Devices (WSDs) for the protection of the incumbent service. Specifically, the reference point enables one GLDB to interface with other GLDBs in order to guaranty that the operations of CRS managed by one GLDB satisfy the protection requirements of incumbents such as the Terrestrial Broadcasting Service registered in different GLDBs as specified by respective regulations.

5.2 Reference point requirements

The following requirements do not mandate that GLDB implements any specific calculation methods.

- The reference point shall support information exchange between GLDB A and GLDB B to allow GLDB A to discover its affecting/neighbouring GLDB B.
- The reference point shall support information exchange between GLDB A and GLDB B to allow GLDB A to obtain necessary information to determine the available spectrum for a CRS managed by GLDB A while satisfying the protection requirements of incumbents registered in GLDB B under the regulatory domain of GLDB B.
- The reference point shall support information exchange between GLDB A and GLDB B to allow GLDB A to provide information about a CRS under its management to GLDB B to allow GLDB B to calculate the interference to incumbents registered in GLDB B.

- The reference point shall support information exchange between GLDB A and GLDB B to allow GLDB A to obtain information about the CRSs that are managed by GLDB B that affect the interference to incumbents registered in GLDB A. Those CRSs may create interference below the interference reference field strength at a given location probability of the incumbents that are registered in GLDB A. However, they may still contribute adversely when considering aggregate/cumulative interference (see also section A11.1.1.4 of ECC report 186 [i.2]).

6 High Level Procedures: Overview of information exchange between different GLDBs related Architecture

6.1 Basic Procedures

6.1.1 Incumbents information sharing procedure

Subject to regulatory agreements, a GLDB can send the information related to its registered incumbents to other GLDBs. This procedure populates the incumbent's information among GLDBs so that each GLDB can determine the available channels of CRSs independently of other GLDBs and protect the incumbents registered in different GLDBs. The procedure is shown in figure 6.1 and shall be as follows:

1) GLDB A sends an "Incumbent_Info_Update_Request" message to GLDB B, containing information of incumbents registered in GLDB A, to request GLDB B to update its information by including the incumbent information from GLDB A.

2) The GLDB B that receives the "Incumbent_Info_Update_Request" message shall update its incumbents' information by including the incumbents' information from GLDB A.

3) The GLDB B sends an "Incumbent_Info_Update_Response" message to inform the result of information update.

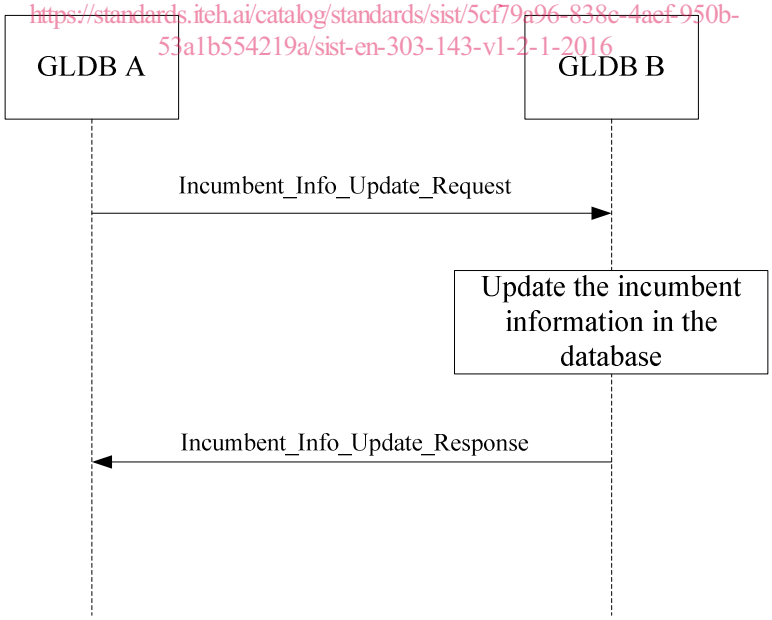

Figure 6.1: Incumbents information sharing procedure

This procedure is used for sharing information of all incumbents among GLDBs. The procedure for sharing information limited to the incumbents that can be subject to interference by CRSs managed by different GLDBs is given in clause 6.1.3. The procedure for discovering such GLDBs is given in clause 6.1.2.