# ETSI TS 103 745 V1.1.1 (2025-04)


**Requirements for the shared use of spectrum between Urban Rail and Road Intelligent Transport Systems (ITS) operating in the 5 875 MHz to 5 925 MHz frequency range**

Reference
DTS/RT-JTFIR-10

Keywords
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***ETSI***

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# Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Railway Telecommunications (RT).

# 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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# Introduction

In accordance with the regulation laid-out in EC Decision 2020/1426 [i.1], the frequency band 5 875 - 5 935 MHz is designated for intelligent transport systems on a on a non-exclusive basis and the frequency band 5 925 - 5 935 MHz is limited to Urban Rail ITS. Road ITS has priority in the frequency range 5 875 - 5 915 MHz denoted "Band R", while Urban Rail ITS has priority in the frequency range 5 915 - 5 925 MHz band denoted "Band U".

Protection is afforded to applications running on ITS-Ss that have priority. In the context of the present document, protection/priority of an application is interpreted to mean preservation of the application's proper functioning and availability while sharing the radio resources with other applications.

The present document is the output of the joint effort by the Urban Rail and Road ITS communities to develop sharing solutions for Band U and to address the use of Band R. The objective of the sharing solutions is to enable the shared use of Band U and Band R by both Urban Rail and Road ITS while respecting the priority assigned to each band. The prioritization of the ITS spectrum is summarized in Figure 1.

The present document takes into account the investigations of ETSI TR 103 580 [i.2].

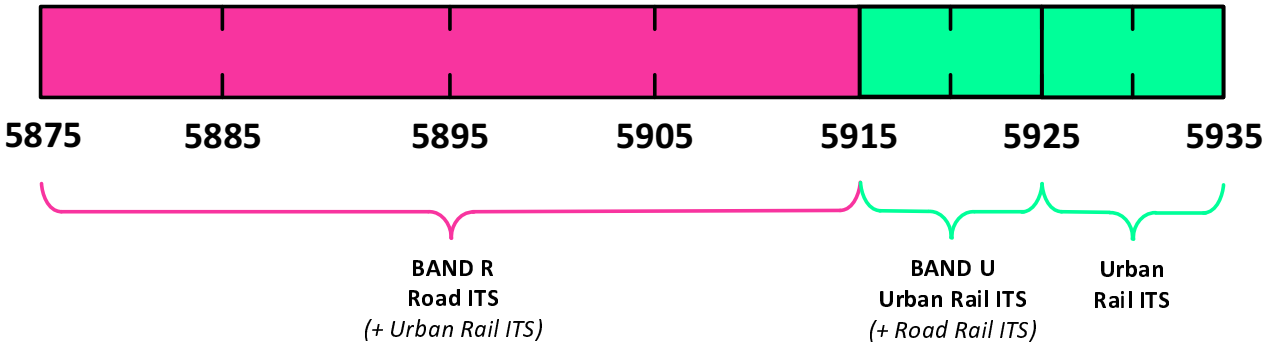


**Figure 1: Frequency bands designated for Road ITS and Urban Rail ITS applications**

In Figure 1, the system highlighted in bold has priority over the system in italics.

# 1 Scope

The present document specifies sharing solutions for use of the frequency band 5 915 - 5 925 MHz (Band U) by Urban Rail and Road ITS considering that Urban Rail has priority in that band. In addition, it addresses the shared use of the band 5 875 - 5 915 MHz (Band R) by Urban Rail ITS, where Road ITS has priority.

# 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 in the ETSI docbox.

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.

[1] ETSI TS 103 097 (V2.1.1) (2021-10): "Intelligent Transport Systems (ITS); Security; Security header and certificate formats; Release 2".

[2] ETSI TS 102 894-2: "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary; Release 2".

[3] ETSI TS 102 965 (V2.3.1): "Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration; Release 2".

## 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] Commission Implementing Decision (EU) 2020/1426 of 7 October 2020 on the harmonised use of radio spectrum in the 5 875-5 935 MHz frequency band for safety-related applications of intelligent transport systems (ITS) and repealing Decision 2008/671/EC.

[i.2] ETSI TR 103 580: "Urban Rail ITS and Road ITS applications in the 5,9 GHz band; Investigations for the shared use of spectrum".

[i.3] Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport.

[i.4] ETSI TS 103 724: "Intelligent Transport Systems (ITS); Facilities layer function; Interference Management Zone Message (IMZM); Release 2".

[i.5] ECC Decision (08)01: "The harmonised use of Safety-Related Intelligent Transport Systems (ITS) in the 5875-5935 MHz frequency band", 14 March 2008 (amended on March 7th 2025).

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

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

**Band R:** frequency band 5 875 - 5 915 MHz

**Band U:** frequency band 5 915 - 5 925 MHz

**Restricted Modes of Operation (RMO):** set of operational constraints that may be imposed on a specified set of devices under certain conditions

**RMO map:** data collection containing all RMO zones applicable to a given sharing situation at a given time

**RMO region:** geographic region in which one or more RMOs are imposed

**RMO zone:** component of an RMO map that contains a geographic region (RMO Region), a set of applicable RMOs and other relevant data as specified in clause 5

**Road ITS Station (RITS-S):** radio station used for intelligent transport systems applied to any kind of road-based transport that enable safety communications between vehicles, and between infrastructure and vehicles and allowed to operate in the frequency band 5 875 - 5 925 MHz by the regulation

NOTE: These include Vehicle ITS station Units (V-ITS-SUs), Roadside units (RSUs), Personal ITS station Units (P-ITS-SUs), and others.

**sharing situation:** situation in which non-interoperable devices share a common frequency band

NOTE: The use by Road ITS-Ss and Urban Rail ITS-Ss of the frequency band 5 875 - 5 925 MHz in the European Union is a sharing situation.

**Urban Rail ITS Equipment (URITS-E):** radio station used for intelligent transport systems applied to urban or suburban railway lines permanently guided by at least one control and management system, separated from road and pedestrian traffic and allowed by regulation to operate in the band 5 875 - 5 935 MHz.

NOTE 1: These include Communications-Based Train Control (CBTC) Base Stations installed along the tracks (CBTC BS) as well as CBTC train On Board Units (OBU).

NOTE 2: In the context of the present document, the term "Urban Rail ITS" refers to the terminology used in Commission Implementing Decision (EU) 2020/1426 [i.1] and does not refer to ITS stations as referred to in Directive 2010/40/EU [i.3].

## 3.2 Symbols

Void.

## 3.3 Abbreviations

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

| | |
|---|---|
| API | Application Programming Interface |
| ASN.1 | Abstract Syntax Notation One |
| CBTC BS | Communications-Based Train Control Base Station |
| CBTC | Communication Based Train Control |
| C-ITS | Cooperative Intelligent Transport Systems |
| EIRP | Equivalent Isotropic Radiated Power |
| EU-CCMS | European Union C-ITS Security Credential Management System |
| HTTP | HyperText Transfer Protocol |
| IAT | International Atomic Time |
| ITS | Intelligent Transport Systems |

| | |
|---|---|
| OBU | On Board Unit |
| OEM | Original Equipment Manufacturer |
| RITS-S | Road ITS Station |
| RMO | Restricted Mode of Operation |
| RSU | RoadSide Unit |
| URITS-E | Urban Rail ITS Equipment |
| URL | Uniform Resource Locator |
| V-ITS-SU | Vehicle ITS Station Unit |
| WGS 84 | World Geodetic System 1984 |

# 4 General overview

Existing CBTC systems operate in the frequency band 5 915 - 5 935 MHz. RITS-Ss operate in the 5 875 - 5 915 MHz band (Band R) and more spectrum is likely to be necessary in the future to enable all the envisaged services. To address this issue, the Commission made the decision to allow Road ITS use of the 5 915 - 5 925 MHz band (Band U) under the condition that Urban Rail would have "priority" in that band. Urban Rail was also allowed to use the Road ITS band 5 875 - 5 915 MHz (Band R) under the condition that Road ITS would have "priority" in that band (see Commission Implementing Decision (EU) 2020/1426 [i.1] and Figure 1).

For the use of Band U by RITS-Ss, a number of possible sharing solutions were investigated and the concept of a "map server" was introduced (see ETSI TR 103 580 [i.2]).

Clauses 5 of the present document specifies a solution based on a map server, which consists of a data repository containing geographic regions of Restricted Modes of Operations (RMOs) made available to all RITS-Ss that intend to use Band U. In more detail:

- Clause 5.1 describes the service which enables the use of Band U by Road ITS.
- Clause 5.2 defines the data structures involved in the service.
- Clause 5.3 defines the requirements.
- Clause 5.4 describes the Application Programming Interface that is used for downloading the data from the map server.
- Clause 5.5 specifies classes of restricted modes of operation that may be imposed on devices in a specified frequency band and a specified geographic region.

# 5 Use of Band U

## 5.1 RMO Service description

The RMO Service enables (possibly non-interoperable) devices to use a given frequency band under conditions that respect the devices that have priority in that frequency band.

In particular, this service is designed to enable use of Band U by RITS-Ss while avoiding interference to URITS-Es operating in that band.

The RMO service is based on dissemination of restrictions that apply to a class of devices from a server (RMO map server). An RMO map server is the repository for an RMO map dataset that contains RMO zones that in turn contain geographic regions of Restricted Modes of Operation (RMO regions) with associated Restricted Modes of Operation (RMOs). RITS-Ss located in an RMO region and operating in Band U should apply the corresponding RMOs.

The RMO map server or a proxy may be queried directly by the devices intending to use shared band, or the RMO map dataset may be relayed by intermediate servers, such as OEM's backend infrastructures.

The present document contains the data objects (in ASN.1) necessary to:

1) define geographic regions unambiguously;

2) prescribe restrictions on operations therein; and

3) enable version control/updating.

It also contains a description of Application Programming Interfaces (APIs) for securely retrieving the information from the map server. Communication means for accessing the map server are assumed to exist and are outside the scope of the present document. Various options are described in ETSI TR 103 580 [i.2]: "*in its simplest form, the Road ITS stations may send an HTTP query to the map server […]. The access network may be through users' LAN, cellular networks or RSUs acting as gateways to the Internet. […] As an alternative, carmakers or OEMs may choose to rely on a gateway or mirroring repository of their own. Another possibility would rely on removable storage, to update the maps*". Means for securing publish and subscribe functions are specified herein and rely on currently available standards and deployments of security functionality of the C-ITS Security Credential Management System, including the EU-CCMS (see ETSI TS 103 097 [1]).

## 5.2 Structure and content of the RMO Service.

The RMO service involves the definition of several structures that are elements of an RMO map that is distributed to devices subject to the requirements in the RMO map. An RMO map is composed of one or more RMO zones. An RMO zone contains a *rmoRegionIdentifier* that refers to a geographic region (RMO region), a set of applicable Restricted Modes of Operation (RMOs) and other relevant data. An RMO map includes all RMO zones applicable for a given sharing situation. An RMO map dataset is distributed through an RMO map server using the API described in clause 5.4.

An RMO map is defined as a structure of type RmoMap, as specified in Annex A.

An RMO region is defined as a structure of type RmoRegion, as specified in Annex A.

An RMO map structure includes the following component:

- **sequenceOfRmoZone**. The structure sequenceOfRmoZone contains a sequence of structure of type RmoZone. It consists in a list of all RMO zones applicable for a given sharing situation.

RMO zone structure is a sequence of the following components:

- **itsStationType**, optional. If present, the RMOs in the RMO zone are only applicable to the type of devices referred to by this *itsStationType* component. If absent, the RMOs apply to all type of devices.

- **interfererChannel**, optional. The structure *interfererChannel* restricts the application of the RMOs to only devices using the channel specified by this structure or an overlapping channel. If absent, there is no restriction to a specific channel.
  The *interfererChannel* may be absent if, e.g. the RMO(s) do not depend upon the channel used by the devices.

- **rmoRegionIdentifier**. The component *rmoRegionIdentifier* identifies the geographic region where the RMO(s) apply.

- **rmoActivationDate**. The component *rmoActivationDate* specifies the date after which the RMO(s) apply.

- **rmoExpiryDate,** optional. When present, specifies the date after which the RMOs do not longer apply.

- **sequenceOfRmo**. The structure *sequenceOfRmo* contains a sequence of structure of type *Rmo*. It consists of a list of RMOs. Devices targeted by the RMO zone shall apply at least one of the listed RMO.

- **interferenceManagementZoneType**, optional. The component defines the type of an interference management zone.

The RMO structure is a sequence of the following components:

- **rmoClass**. This component defines the nature of the restriction. *rmoClass* are specified in clause 5.5.
  A restriction class may represent a single technical characteristic to be limited, such as "the eirp", or a complex definition, enabling, for instance, multi-valued constraints.

- **restrictedChannel**, optional. The structure *restrictedChannel* restricts the application of the RMO to only the frequency range specified by this structure. If absent, the restriction applies to all channels.

- **limit**, optional. This component specifies a limit for RMOs using valued restriction class (e.g. an eirp limit). If absent, all parameters relevant to the restriction class shall be as specified in clause 5.5.

The RMO Region structure is a sequence of following components:

- **rmoRegionIdentifier**. This component uniquely identifies the *RmoRegion*.
- **sequenceOfGeographicRegion**. This structure lists geographic regions, the union of which represents the whole region of the Rmo Zone. The *sequenceOfGeographicRegion* shall not include more than 10 *GeographicRegion* components. A *GeographicRegion* of type *PolygonalRegion* shall have a maximum of 100 vertices.

An RMO Region is uniquely identified by the value of the component rmoRegionIdentifier and should not change during the lifetime of the map server. RMO zones may be removed from the RMO map, and the related RMO region may no longer be available from the server. Newly created RMO regions shall not reuse the identifier of a previously deleted RMO Region.

*CircularRegion* and *PolygonalRegion* structures are defined, which include locations specified using Latitude and Longitude elements. They contain geodetic latitude and longitude in the WGS 84 G2296 coordinate system.

## 5.3 Requirements

An RITS-S intending to transmit in any portion of Band U and which is subject to the present document shall comply with the conditions for use of that band as specified in clause 5.5. These conditions are contained in the RMO map available on an RMO map server.

The validity of an RMO map, including the RMO zones, and RMO regions contained therein, is checked using electronic signatures. A signed RMO map and a signed RMO region use the EtsiTs103097Data-Signed structure as defined in ETSI TS 103 097 [1].

For an RMO map or an RMO region dataset to be valid, it shall be embedded as the ToBeSignedDataContent parameter of the EtsiTs103097Data-Signed type defined in accordance with ETSI TS 103 097 [1] with the following constraints:

- The *signedData.hashId* field is set to any value permitted by ETSI TS 103 097 [1].
- The *signedData.headerInfo.psid* field is set in accordance with ETSI TS 102 965 [3].
- The *signedData.headerInfo.generationTime* field is set to the time of generation of the signature.
- The *signedData.headerInfo.expiryTime* field is set to a time after the *generationTime* field, no less than an hour and no more than a year but otherwise at the discretion of the signer.
- The *signedData.headerInfo.encryptionKey* field is absent.
- The *signedData.headerInfo.inlineP2pcdRequest* field is absent.
- The *signedData.headerInfo.requestedCertificate* field is absent.
- The *signedData.headerInfo.contributedExtensions* field is absent.
- The *signedData.signer* shall be of type certificate.

NOTE: The present document does not mandate specific expiration time periods for certificates used for signing datagrams of the RMO map server.

Without a valid RMO map applicable to the given sharing situation, RITS-Ss that are subject to the present document shall not use Band U.

In absence of knowledge of all valid RMO regions contained in all RMO zones composing the valid RMO Map, RITS-Ss that are subject to the present document shall not use Band U.

RMO region identifiers are unique and the downloadable content will never change. An RITS-S shall not attempt to retrieve an RMO region from the RMO map server again if it has already successfully stored this RMO region with the same RMO region identifier.

A given RMO zone is said to be "applicable" for a given location if this location is within one or more of the *GeographicRegion* boundaries contained in the RMO region of this RMO zone.

In order to use any part of Band U, an RITS-S shall estimate its position and determine all applicable RMO zones, according to a valid RmoMap.

For each RMO zone applicable at the RITS-S location, the RITS-S shall apply at least one RMO specified for that RMO zone (see clause B.1).

## 5.4 Application Programming Interface

In order to provide a machine-readable interface, the distribution of signed RMO map and RMO Region structures shall be done via a defined web-endpoint distribution centre of the map server. End-points are available as plain http, reachable at the following URL: http://<HOST>.

<HOST> is the map server URL defined by a relevant body, as described in the Annex C. The definition of <HOST> shall be done once and should not change during the lifetime of the map server.

The most up to date signed RMO Map dataset may be downloaded through the following HTTP request:

GET http://<HOST>/1

- Return value:
  - Content-type: application/octet-stream.
  - Content: The latest valid Map Message, UPER-encoded of type EtsiTs103097Data-Signed.

The signed RMO Region dataset, containing the RMO Geometry having the rmoRegionIdentifier equal to <i> may be downloaded through the following HTTP request:

GET http://<HOST>/<i>

- Parameters:
  - <i>: The rmoRegionIdentifier of the requested RMO Region structure.
- Return value:
  - Content-type: application/octet-stream.
  - Content: RMO Region structure, UPER-encoded of type EtsiTs103097Data-Signed.

## 5.5 Restricted Modes of Operation applicable to RITS-Ss

### 5.5.1 Description

Clauses 5.5.2 to 5.5.3 describe three restricted modes of operation.

NOTE: Additional restricted modes of operation may be added in the future. Since RITS-Ss apply at least one RMO listed in a "sequenceOfRmo", adding a RMO to a sequenceOfRmo does not impose additional restrictions on RITS-Ss that can use the band without that additional RMO. This may be used in the future to enable dynamic sharing using e.g. Interference Management Zone Message (see ETSI TS 103 724 [i.4]) leveraging an existing network of RSUs.

### 5.5.2 Class noTx(0)

The NoTransmission class (noTx) in a region is a prohibition on transmission by RITS-Ss in the channel set out by the parameter restrictedChannel of the RMO structure. When located in a RmoRegion having a RmoClass of type noTx, i.e. equal to 0, the RITS-S shall not transmit in the restrictedChannel.

### 5.5.3 Class eirp(1)

When located in an RmoRegion having an RmoClass of type eirp, i.e. equal to 1, the RITS-S shall limit its EIRP to the maximum value defined by the parameter "limit" set out in the RMO structure and expressed in dBm.

This limit applies to the power radiated by the RITS-S in the frequency band contained in the parameter restrictedChannel of the RMO structure.

The EIRP limit ranges from 6 dBm, up to the maximum EIRP allowed by the regulation.

### 5.5.4 Class allowedOnPeriods(2)

The purpose of the "AllowedOnPeriod" RMO is to provide RITS-S with an opportunity to send packets during a short period of time on a regular basis while URITS-E have access to the channel majority of the time without RITS-S transmission.

When located in a RmoRegion having a RmoClass of type allowedOnPeriods, i.e. equal to 2, the RITS-S is allowed to transmit only during "on periods" of time as follows:

On periods start when mod (x, y) = 0, where x is the current time in ms, y = 100 and mod (x, y) = x - y × floor (x/ y). On periods last 10 ms.

The reference for the time is International Atomic Time (IAT). Indeed, International Atomic Time is the time reference coordinate based on the readings of atomic clocks, which is operated in accordance with the definition of the second, the unit of time of the International System of Units. (see ETSI TS 102 894-2 [2]).

## 6 Use of Band R

The use of Band R is regulated by Commission Implementing Decision (EU) 2020/1426 [i.1] and by ECC Decision (08)01 [i.5]. Road ITS shall have priority below 5 915 MHz and Urban Rail ITS shall have priority above 5 915 MHz, so that protection is afforded to the application having priority.

# Annex A (normative): ASN.1 Modules

This clause provides the normative ASN.1 modules containing the syntactical definitions of the data types defined in the present document. The ASN.1 modules import data types from the ASN.1 modules defined in ETSI TS 102 894-2 [2].

The module can be downloaded as a file as indicated in Table A.1. The associated SHA-256 cryptographic hash digest of the referenced file offers a means to verify the integrity of that file.

**Table A.1: ETSI TS 103 745 ASN.1 module for Band U information**

| Module name | EtsiTs103745Module |
|---|---|
| OID | itu-t (0) identified-organization (4) etsi (0) itsDomain (5) rtJtfir (9) rmoGeofencing (103745) major-version-1 (1) minor-version-1 (1) |
| Link | https://forge.etsi.org/rep/ITS/asn1/rmo_ts103745/-/blob/v1.1.1/EtsiTs103745Module.asn |
| SHA-256 hash | b3a3506afb7027b29e8cd6cf7f86e660a18b6063881060c2ed2dc771720e8530 |

# Annex B (informative): Description of structures of RMO zone and RMO region

## B.1 Example of the content of the structures

This clause illustrates what the content of the various asn.1 structures may be for the example illustrated by Figure B.1 and extracted from ETSI TR 103 580 [i.2].


**Figure B.1: RMO zones**
**(Source: © OpenStreetMap contributors - www.openstreetmap.org/copyright)**

It is assumed that the three zones shown in Figure B.1 are the only relevant areas for the sharing situation considered. Under this assumption an RMO map would contain only these three RMO zones.

Figure B.2 shows an overview of the RMO map for this example.

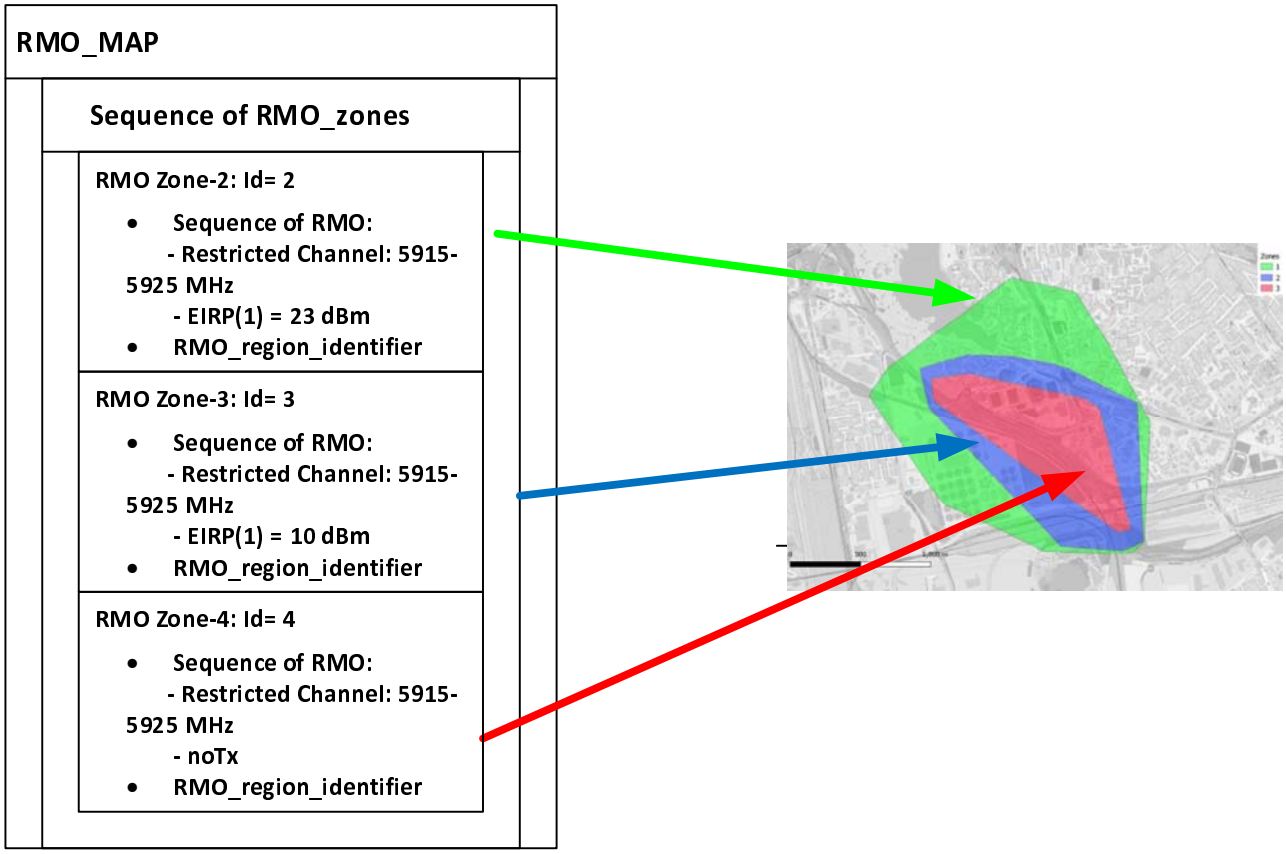


**Figure B.2: Example of an RMO map**
**(Source: © OpenStreetMap contributors - www.openstreetmap.org/copyright)**

The parameters used for the RMO zone coloured green are given below. The same logic applies for the other two zones.

The RMO zone for the green zone includes the following components:

- **itsStationType**, may be absent. The EIRP limit therefore applies to all type of RITS-S.
- **interfererChannel**, may be set to 5 915 - 5 925 MHz. Only RITS-S using that channel or an overlapping channel are subject to the EIRP limit.
- **rmoRegionIdentifier**. For the sake of this example, it is (arbitrarily) assumed that the rmoRegionIdentifier is equal to 2.
- **rmoActivationDate**. It is assumed that the Urban Rail line started operation on the first of January 2020. The rmoActivationDate is set to the 1st of January 2020.
- **rmoExpiryDate**. It is assumed that there is no foreseen date to stop operation of the protected Urban Rail line. The rmoExpiryDate is therefore absent.
- **sequenceOfRmo**. The sequence of RMOs include a single RMO, as described below.
- **interferenceManagementZoneType**. This parameter may be set to "urbanRail", corresponding to the integer 3, in accordance with ETSI TS 102 894-2 [2].

The only RMO structure present in the sequenceOfRmo of the parent RMO zone include the following components:

- **rmoClass**. This parameter may be set to "eirp", corresponding to the integer 1, in accordance with clause 5.5.
- **restrictedChannel** is set to 5 915 - 5 925 MHz. The EIRP limit only applies to that channel.
- **limit**. This parameter is set to the integer 23, as the EIRP is limited to 23 dBm in the green region.

The server also includes three RMO Regions, corresponding to each of the three coloured polygons. The content of the RMO Region for the green region is as follows:

- **rmoRegionIdentifier**. The identifier matches the value of the rmoRegionIdentifier component of the corresponding RMO zone, i.e. it is equal to 2.

- **sequenceOfGeographicRegion**. This sequence of GeographicRegion elements contains a single GeographicRegion of type PolygonalRegion. This polygonalRegion contains a sequence of GeoPositionWoAltitude corresponding to the coordinates of the green polygon.

In this example, the three overlapping RMO zones allow to specify progressive level of restrictions:

- The green overlapping RMO zone requires all RITS-S to limit the EIRP density level to 23 dBm/10 MHz in 5 915 MHz - 5 925 MHz

- The blue RMO zone overlapping RMO zone requires all RITS-S to limit the EIRP density level to 10 dBm/10 MHz in 5 915 MHz - 5 925 MHz.

- The red RMO zone requires all RITS-S to stop transmissions in 5 915 MHz - 5 925 MHz.

Hence, when travelling from outside of these three zones up to the red zone, the RITS-Ss should apply successively:

- no restriction, then

- EIRP < 23 dBm/10 MHz, then

- EIRP < 23 dBm/10 MHz AND EIRP < 10 dBm/10 MHz, i.e. EIRP < 10 dBm/10 MHz and then

- EIRP < 23 dBm/10 MHz AND EIRP < 10 dBm/10 MHz AND noTx, i.e. noTx.

If an RMO zone includes a sequence of several RMOs, the implementer can choose between these options. Usually, the one that imposes the less stringent restrictions will be chosen.

In the above example, if the green zone were to include both EIRP limitation to 23 dBm/10 MHz and "allowedOnPeriods", then the RITS-S should apply one of these two restrictions when in the green zone. If the RITS-S is also in another overlapping zone (e.g. the blue zone), the RITS-S should apply also the restriction of this overlapping zone (EIRP < 10 dBm/10 MHz for the blue zone).

## B.2 Use of activation date in RMO zones

The activation date allows to distribute new RMO zones prior to the date from which on the protection is required and RMO needs to be applied. Figure B.3 shows an example of this use case with Zone x, where the activation date is already passed, e.g. when a new line was commissioned in 2020. Assuming the expiry date in in the RMO zone is absent, the RMO applies "forever", unless the RMO zone is removed from the RMO map. In such a case, an RITS-S would need to acquire the newer version of the RMO map to discard the currently applied RMO.

In a second use case, administrations and/or operators can define RMO zones, which regions cover potential locations of future CBTC systems, e.g. whole countries and/or cities, with an activation date well in the future and the RMO class noTX. These RMO Zones need to be updated regularly in the RMO map with an adapted activation date further in the future until CBTC projects materializes. All RITS-S updating the RMO map before the activation date will not need to apply noTX RMO as the activation date is postponed in the newest RMO map. Thus, activation date here defines the latest date until an RITS-S needs to retrieve an updated RMO Map to further utilize the restricted channel. Figure B.3 shows an example of this use case with Zone y, where updating the RMO map before 2040 is desirable.

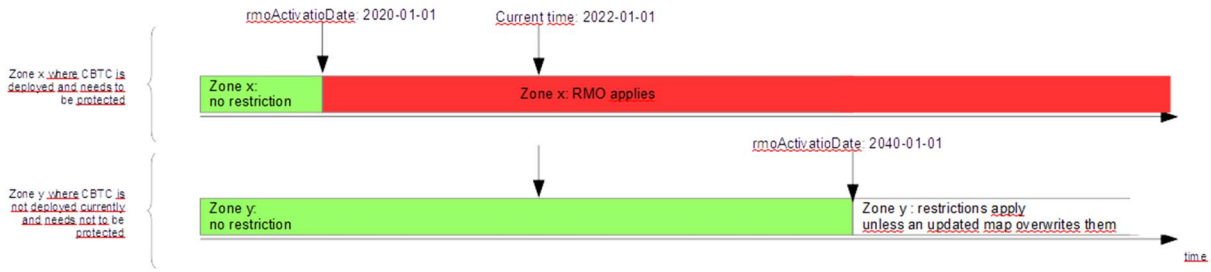


**Figure B.3: Illustrative, incentive for a RITS-S to update the Rmo Map (Source: © OpenStreetMap contributors - www.openstreetmap.org/copyright)**

# Annex C (informative): Guidelines on the implementation of the map server

## C.1 URL of the map server

The data required to implement the sharing solution should be available on an RMO map server through the API specified in clause 5.4. The server should be reachable from a URL, which may be defined by a relevant regulation.

The responsibility to deploy, host, operate and maintain an RMO map server may fall on CBTC stakeholders, e.g. through a volunteer stakeholder or association of stakeholders.

## C.2 Responsibilities amongst stakeholders and link to the regulatory framework

The specification of RMO zones is a matter for national coordination which may involve representatives from Road and Urban Rail national stakeholders and national spectrum authorities.

Because the outcome of these national coordination procedures would form the regulatory basis for RITS-Ss to use Band U, this information should be available in plaintext format in a relevant regulatory document. RITS-Ss may use Band U subject to restrictions set out in a published version of the relevant regulatory document. The RMO zones defined in the latest version of that regulatory document should then be securely collected and made available on the RMO map server. The responsibility to update the RMO zones on the map server may fall on the entity responsible for operating the RMO map server (see clause C.1). Updates of RMO zones in the regulatory document should be reflected on the RMO map server within a reasonable time period, e.g. 100 days.

The plaintext format of the RMO zones is in accordance with the "XML Encoding Rules" of the ASN.1 specification of the RmoZone type, as specified in clause 5.2.

# History

| Document history | | |
|---|---|---|
| V1.1.1 | April 2025 | Publication |
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