

ETSI TS 103 154 V1.1.1 (2014-10)



**Reconfigurable Radio Systems (RRS);
System requirements for operation of Mobile Broadband
Systems in the 2 300 MHz - 2 400 MHz band under
Licensed Shared Access (LSA)**

PREVIEW
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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Reconfigurable Radio Systems (RRS).

Modal verbs terminology

In the present document "shall", "shall not", "should", "should not", "may", "may not", "need", "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 system requirements for operation of mobile broadband service in the 2 300 - 2 400 MHz band under Licensed Shared Access (LSA). This band is allocated to the Mobile Service and identified for IMT globally in the ITU Radio Regulations. The objective of LSA is to enable access to this band for mobile/fixed communication networks (MFCNs) in those CEPT countries where access to the band is complex due to Incumbent usage, as documented in ETSI TR 103 113 [i.1] (for example, when it is not viable to "refarm" the band in a timely manner [i.2]).

An LSA system comprises one or more Incumbents, one or more MFCNs (LSA Licensees), and the means to enable coordination between Incumbents and LSA Licensees, such that the latter may deploy their networks without harmful interference. The requirements in the present document are intended as a first step towards the definition of LSA System architecture specifications.

2 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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2.1 Normative references

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

Not applicable.

2.2 Informative references

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 TR 103 113 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference document (SRdoc); Mobile broadband services in the 2 300 MHz - 2 400 MHz frequency band under Licensed Shared Access regime".
- [i.2] ECC Report 205: "Licensed Shared Access (LSA)", February 2014.
- [i.3] RSPG Opinion on Licensed Shared Access, RSPG13-538, November 2013.

3 Definitions and abbreviations

3.1 Definitions

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

exclusion zone: geographical area within which LSA Licensees are not allowed to have active radio transmitters

NOTE: An exclusion zone is normally applicable for a defined frequency range and time period.

incumbent: current holder of spectrum rights of use

NOTE: This definition follows the RSPG opinion on LSA [i.3].

LSA licensee: entity operating a MFCN, which holds individual rights of use to an LSA spectrum resource

LSA spectrum resource: spectrum resource which is to be shared between an Incumbent and a LSA Licensee on a static or dynamic basis according to the Sharing Framework defined by the Administration/NRA

LSA system: system that enables and/or facilitates the realization of LSA, and which comprises the LSA-specific technical features, architecture, protocols, and interfaces

LSA system administrator: entity responsible for system administration aspects (e.g. implementing security access rights or executing system management tasks)

protection zone: geographical area within which Incumbent receivers will not be subject to harmful interference caused by LSA Licensees' transmissions

NOTE: A protection zone is defined using specific measurement quantities and thresholds (e.g. a mean field strength that does not exceed a defined value in dB μ V/m/MHz at a defined receiver antenna height above ground level). A protection zone is normally applicable for a defined frequency range and time period.

restriction zone: geographical area within which LSA Licensees are allowed to operate radio transmitters, under certain restrictive conditions (e.g. maximum EIRP limits and/or constraints on antenna parameters)

NOTE: A restriction zone is normally applicable for a defined frequency range and time period.

sharing arrangement: set of practical details for sharing an LSA spectrum resource

sharing framework: set of sharing rules or sharing conditions that will materialize the change, if any, in the spectrum rights of the Incumbent(s) and define the spectrum, with corresponding technical and operational conditions, that can be made available for alternative usage under LSA

NOTE: This definition follows ECC Report 205 [i.2].

spectrum resource: resource or set of resources defined in time, space and frequency domains

3.2 Abbreviations

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

3GPP	3 rd Generation Partnership Project
CEPT	Conférence des administrations Européennes des Postes et Télécommunications
ECC	Electronic Communications Committee of the CEPT
ECS	Electronic Communications Services
EIRP	Effective Isotropic Radiated Power
EU	European Union
IMT	International Mobile Telecommunications (also IMT- Advanced)
ITU	International Telecommunications Union
LSA	Licensed Shared Access
LTE	Long Term Evolution
MFCN	Mobile/Fixed Communications Network
MS	Mobile (subscriber) Station
NRA	National Regulatory Authority
PMSE	Programme Making and Special Events
RSPG	Radio Spectrum Policy Group
TOC	Table of Contents
TS	Terminal Station

4 Requirement Organization and Methodology

This clause contains a description of how the requirements are organized and the format of the requirement.

4.1 Requirement Organization

As shown in Figure 4.1, the requirements described in the present document belong to two different categories: the functional requirements and the performance requirements. Each category, in turn, is organized into groups.

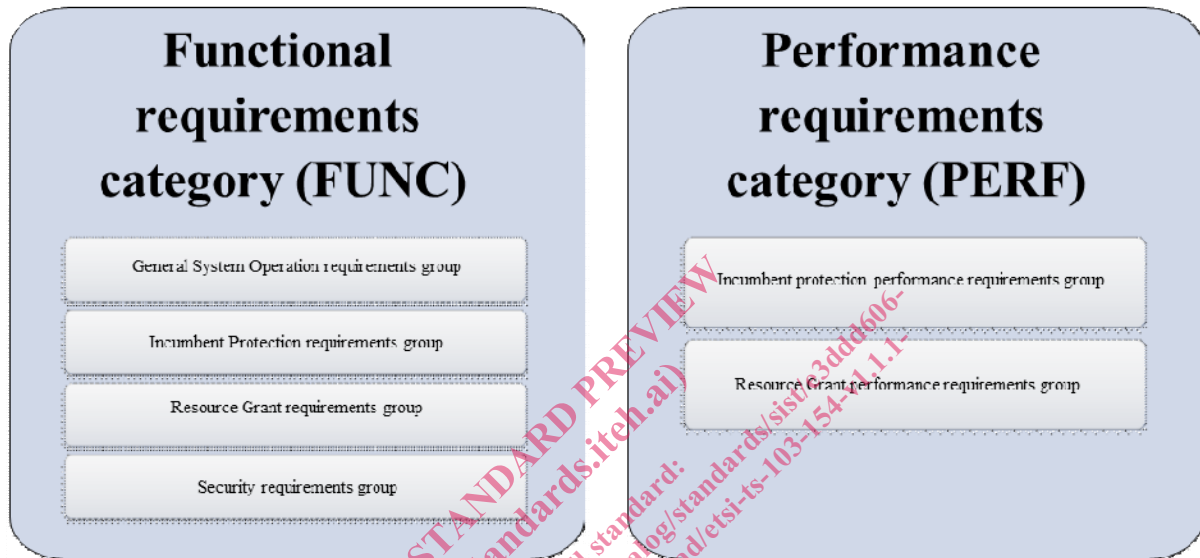


Figure 4.1: Requirements Organization

4.2 Requirement Format

A letter code system is defined which makes a unique identification of each requirement R-<CAT>-<GROUP>-<XX>. It should be constructed as follows:

- R- : Standard requirement prefix
- <CAT>:

Code	Category
FUNC	Functional aspects
PERF	Performance aspects

- <GROUP>: Requirement group identifier. A three-letter code will be used for this identifier.
- <XX> : Requirement identifier within requirement group; range 01 => 99.

EXAMPLE: R-FUNC-GEN-01.

4.3 Requirement Formulation

A requirement is formulated in such a way that it is uniquely defined. It is built as follows:

Title: <Title Description>

Description: the description of a requirement will be formulated using one of the following terms:

- "shall" is used to express mandatory requirements (i.e. provisions that have to be followed)
- "should" is used to express recommendations (provisions that an implementation is expected to follow unless there is a strong reason for not doing so)
- "may" is used to express permissible actions (provisions that an implementation is able to follow or not follow)

4.3.1 LSA Roles

Requirements are formulated in regards of the "LSA System" and make use of generic "LSA roles", as shown in Figure 4.2.

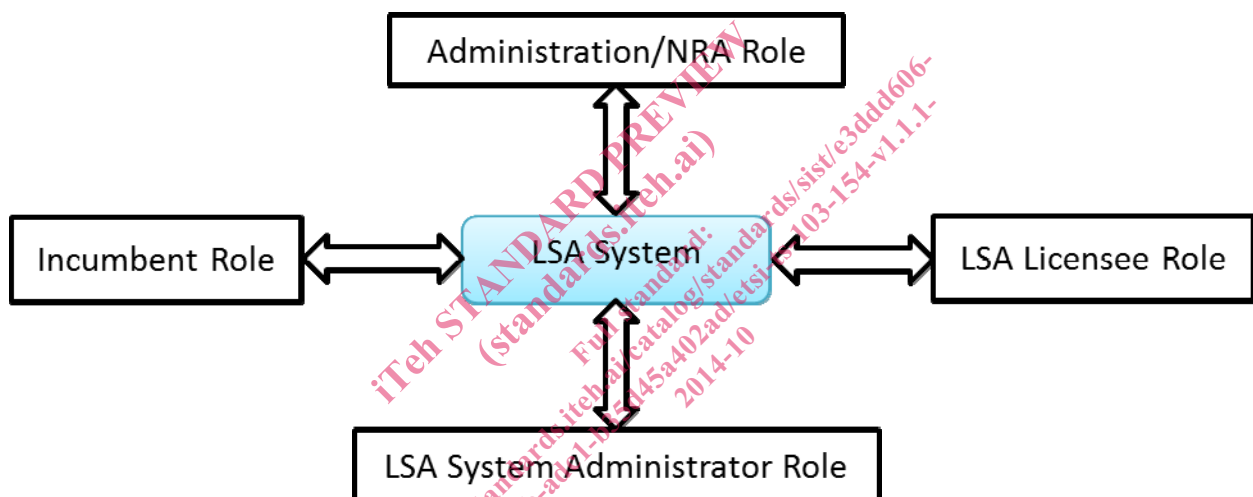


Figure 4.2: LSA Roles

Roles are abstracted concepts defined for requirement formulation; in specific deployments, roles will be performed by specific entities (e.g. the LSA Licensee role would be performed by a MFCN operator in the 2 300 - 2 400 MHz band). In addition, multiple roles may be performed by the same entity (e.g. the Administration/NRA may perform also the LSA System Administrator role).

Each of the roles may interact with the LSA System, and may also interact with each other via the LSA System.

There may be multiple instances of a given role in respect of a particular requirement.

5 Working Assumptions

The working assumptions described below are based on ETSI TR 103 113 [i.1], and particularly the use case "Bandwidth Expansion for Mobile Network Operator" in clause 7.1.2 of [i.1], as well as the ECC Report 205 [i.2] and the RSPG opinion on LSA [i.3].

5.1 Regulatory Background

It is assumed that, prior to implementation of LSA, the 2 300 - 2 400 MHz frequency band (or a sub-band) is used by one or more non-IMT services, provided by current holder(s) of spectrum rights of use. LSA provides for some administrations a solution to enable access to the 2 300 - 2 400 MHz frequency band for MFCN and impacts the national allocation of a frequency band.

The Sharing Framework is the central piece for the implementation of LSA at national level. It will define for a given frequency band the spectrum, with corresponding technical and operational conditions, that can be made available for LSA. National administrations should decide which existing applications need to be considered as Incumbents within the Sharing Framework and maintained in the long term according to national policy objectives, and taking into account international obligations and community law in the case of EU Member States.

It is further assumed that one or more MFCN operators ("LSA Licensees") are subsequently granted individual rights to use distinct portions of the Incumbent's spectrum resource (authorizations) [i.2]. Sharing rules should be part of the corresponding licenses granted by the Administration/NRA, thus reinforcing the legal certainty to the parties, and in particular to the Incumbents. The LSA Licensees are allowed to use the spectrum resource in accordance with such rules included in their rights of use, thereby allowing all the authorized users, including Incumbents, to provide a certain QoS [i.3].

The Sharing Framework [i.2] would be established under the responsibility of the Administration/NRA (following consultations involving key stakeholders); the Administration/NRA is further expected to issue the individual authorizations to LSA Licensees, and may have a role in monitoring spectrum use, and validating that such use is compliant with the individual right of use, including the Sharing Framework.

5.2 Spectrum Sharing Arrangement

The set of practical details for a given LSA spectrum resource is referred to in the present document as a Sharing Arrangement. A Sharing Arrangement may be subject to change, but it should remain consistent with the Sharing Framework defined by the Administration/NRA and the obligations placed in the "Authorization" Directive for assigning spectrum resource for the delivery of Electronic Communication Services (ECS).

LSA spectrum resource sharing may in general be dynamic, i.e. the requirements of the Incumbent may be such that some portions of the spectrum are not permanently available to the LSA Licensee in any given location. However, a particular Spectrum Sharing Arrangement may include constraints on the potential variations of resource availability (e.g. to facilitate implementation or operability). Examples of such constraints are given below, noting that a particular Sharing Arrangement may include a combination of multiple constraints:

- Changes in the spectrum resource availability may only occur at pre-set times (e.g. periodic)
- There may be minimum allowed intervals between successive changes (in general or affecting a given area)
- Spectrum resource availability may be pre-configured (only a finite set of possible combinations in space/frequency is allowed)
- Changes may not be allowed if they violate certain statistical criteria (e.g. overall availability of a certain resource in a given time frame)

It is assumed that an LSA Licensee is granted individual rights of use by the relevant NRA. This implies that the LSA System will provide means to guarantee coexistence between Incumbents and LSA Licensees in general, but there is no special need to handle coexistence between LSA Licensees beyond normal deployment requirements (such as deployment of adjacent band users in same area, or same-band users in adjacent areas).

It is assumed that Incumbents and LSA Licensees not involved in a particular Sharing Arrangement will not get access permission to the respective LSA spectrum resource and will not receive information on the designated LSA spectrum resource.

5.3 LSA System Administration by Trusted 3rd Party Users

It is assumed that the LSA System or part(s) thereof may be administered by trusted 3rd party user(s) with defined access rights.