

Considerations regarding location-based spectrum sharing standardization

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Introduction

- Fast-paced technological evolution, and global penetration of radio devices in many activity domains create radio spectrum scarcity requiring innovative solutions to be applied on the same global scale
- Location-based spectrum sharing is one of the viable options being examined by the radio-communications stakeholder community
- Spectrum management regulatory bodies and authorities have a duty to protect the radio spectrum users from interference
- Currently, national regulators in any of the EU Member State restrict the use of a frequency band in the entire country to protect specific radio services

Introduction

- Producing a successful harmonised European standard (EN) that shows radio equipment developers a set of requirements that ensure location-based spectrum sharing in a technology neutral manner, may contribute to opening new markets where the IoT radio devices are not allowed to use specific frequency bands in a whole country, due to requirements of protection of existing technologies

Needs and benefits of standardization

- protection of existing / incumbent services, often associated with existing infrastructure services and ensuring the stability of certain functionality
- regulating the use of spectrum with a view to encourage efficient use of spectrum and a stable evolution through innovative means, without harm of existing network functionality
- penetration of modern technologies that respond better to the needs of contemporary markets and the creation of new functionality

Needs and benefits of standardization

- existing functionality is to be preserved and enhanced in order to satisfy increased demand of spectrum usage, note that this is not necessarily backwards compatibility
- networks are deployed and have specific performance relative to each other and to a defined location
- a common set of requirements to be followed by all radio equipment regardless of the technology

Standardization as a tool for European regulators and national administrations

- During the past several years, the European radio-communications ecosystem started to change with the evolution of the European legal framework and its regulatory application, and by the evolution of practical application of technology on a local scale
- Radio Equipment Directive: “In cases of restrictions on putting into service or of requirements for authorisation of use, information available on the packaging shall allow the identification of the Member States or the geographical area within a Member State where restrictions on putting into service or requirements for authorisation of use exist

Standardization as a tool for European regulators and national administrations

- The evolution of the legal framework and its regulatory application may be examined in Commission Implementing Decisions
 - 2018/1538 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands, also
 - 2019/1345 amending Decision 2006/771/EC updating harmonised technical conditions in the area of radio spectrum use for short-range devices
- In these legal texts, the EU single market is seen as the continuous spatial environment for deployment of radio systems that share the spectrum, taking into account the locally imposed restrictions
- Locally, the national or regional spectrum authority manages the utilisation of the spectrum according to the legal restrictions and within the legal framework

The concept of the sufficient set of requirements

- The location-based compliant RE shall be designed so that the RE shall by default be placed in receive only mode for a fixed period of time
 - upon power-up
 - or after commissioning
 - or after reconfiguration
 - or if the policy requires it, at fixed time intervals
- This fixed period shall be greater than the time normally necessary for determining its location, i.e. the determination period
- The LB RE shall not enable transmission mode if the location of the RE cannot be determined
- The LB RE shall not determine its location if two geographically relevant coordinates cannot be determined within its determination period
- The LB RE shall not determine its location if the determination period cannot be determined using reliable and accurate time-stamps

The concept of the sufficient set of requirements

- The LB RE shall not determine its location if the accuracy of the determination is not reliably verified and is not compliant with the policy rules
- The LB RE shall not determine its location if it cannot verify that its policy rules are updated and valid

The concept of the sufficient set of requirements

- is this set of requirements sufficient for defining the location of the radio equipment in an unambiguous manner?
- can the implemented features be tested and the parameters resulting from measurements of the capabilities of the radio equipment define the conformity of the set of requirements?
- can the interference be kept under the acceptable threshold in a defined location by implementing the set of requirements as defined above?

Conclusion

- Further studies are needed in order to produce a standard
- Such studies are currently under way in ETSI TC RRS, aimed at documenting use cases, with possible use case scenarios, and the possibilities of incorporating the set of requirements in the functionality of the radio interface engine
- Also, the RRS work may demonstrate that the set of requirements can be or are already implemented in the radio equipment in features that result in testable capabilities with measurable parameters