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# Spectrum Sharing findings in Europe

**Spectrum Sharing Workshop at  
WInnComm-Europe 2015**

Erlangen, Germany, 6 October 2015



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- General regulatory aspects
- Spectrum sharing
- ECC activities in Licensed Shared Access (LSA)
- ECC activities in TV WSD (White Space Devices)
- Cognitive PMSE\*

\* Programme Making Special Events

GLOBAL

Recommendations  
Reports



Radio Regulations

REGIONAL



Decisions, Reports,  
Recommendations



Decisions  
Recommendations



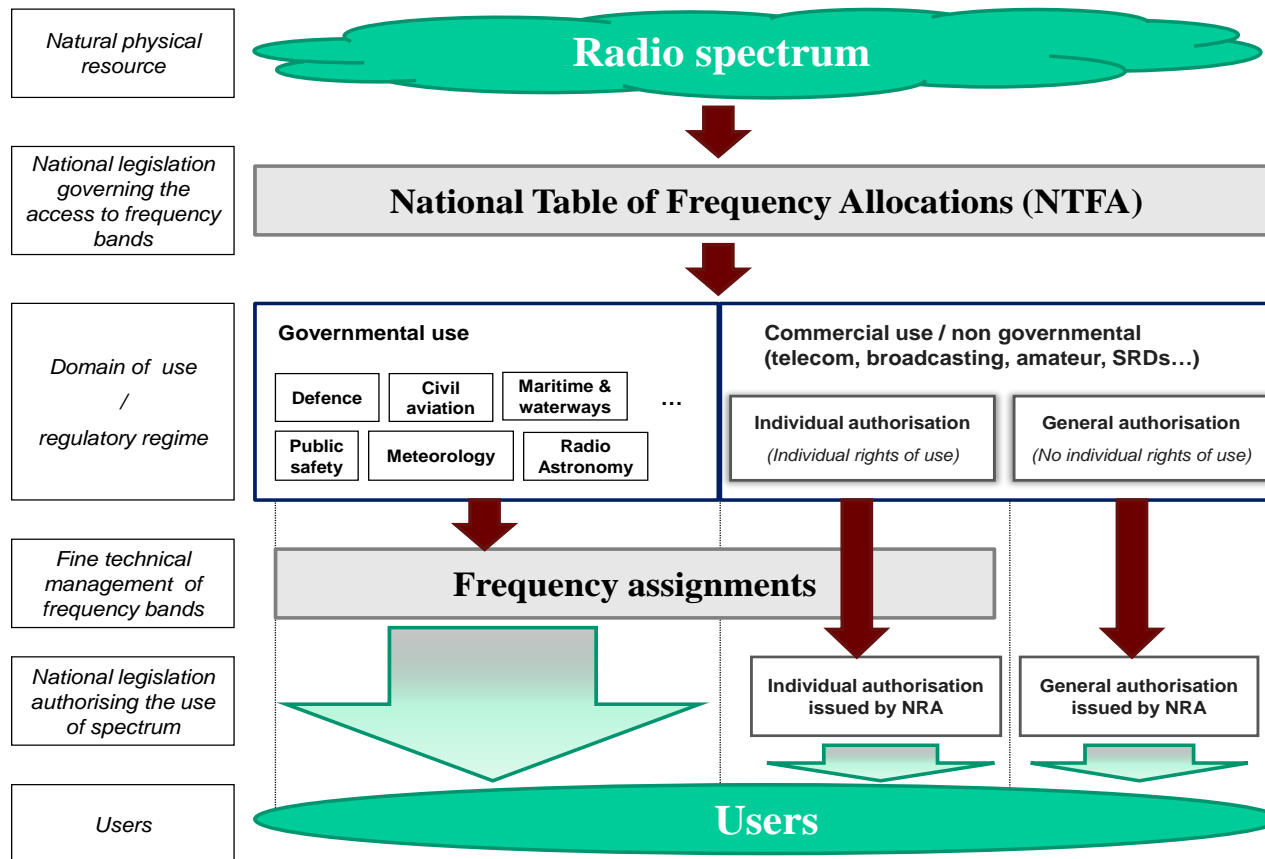
Standards  
Harmonised standards

NATIONAL

Government

National Frequency allocation  
table

General/Individual  
authorizations



## Principle of National legislation from the radio spectrum to users

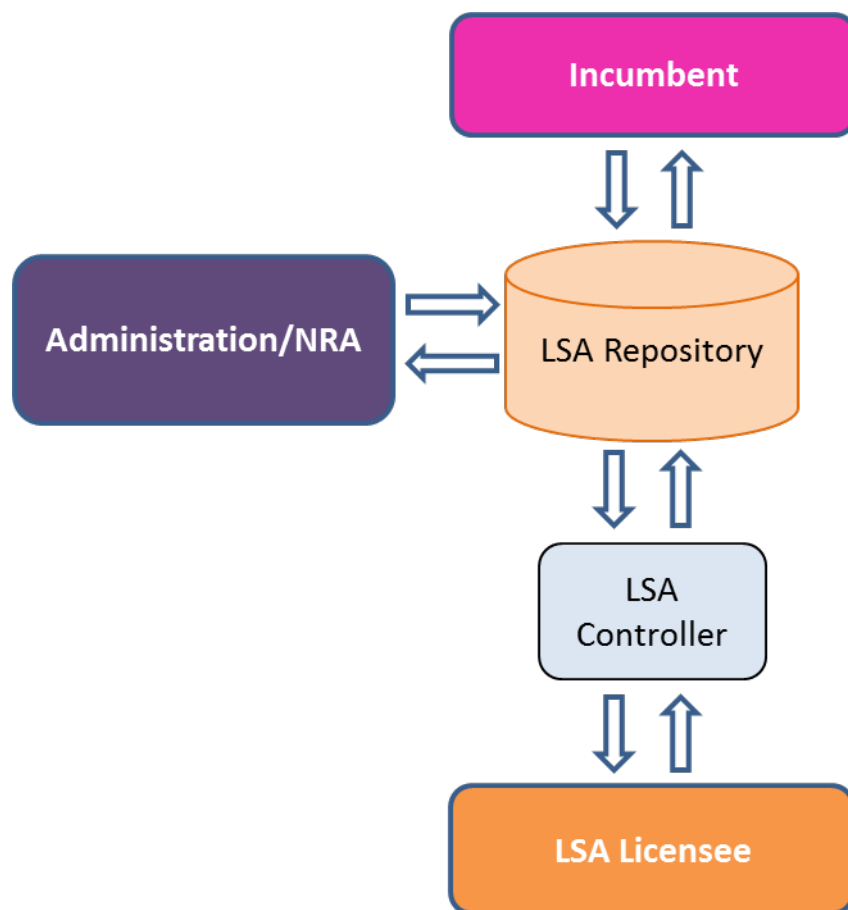


- Spectrum: scarce resource but more and more users
- Full harmonisation and exclusive use more and more difficult to achieve
- Current usage and spectrum demand may vary from country to country
- Need to find technical and regulatory ways to share common spectrum in a flexible way

“A regulatory approach aiming to facilitate the introduction of radiocommunication systems operated by a limited number of licensees under an individual licensing regime in a frequency band already assigned or expected to be assigned to one or more incumbent users. Under the Licensed Shared Access (LSA) approach, the additional users are authorised to use the spectrum (or part of the spectrum) in accordance with sharing rules included in their rights of use of spectrum, thereby allowing all the authorised users, including incumbents, to provide a certain Quality of Service (QoS)”

- ECC published ECC Report 205 on LSA (Feb 2014)
- The implementation of LSA relies on the concept of a “**sharing framework**” that is under the responsibility of Administration/NRA. Its development requires the involvement of all relevant stakeholders.
- Details of sharing framework decided at national level, depending upon incumbent use.
- Sharing can be done in the three dimensions: time, frequency and area.

An example of LSA functional blocks and interactions

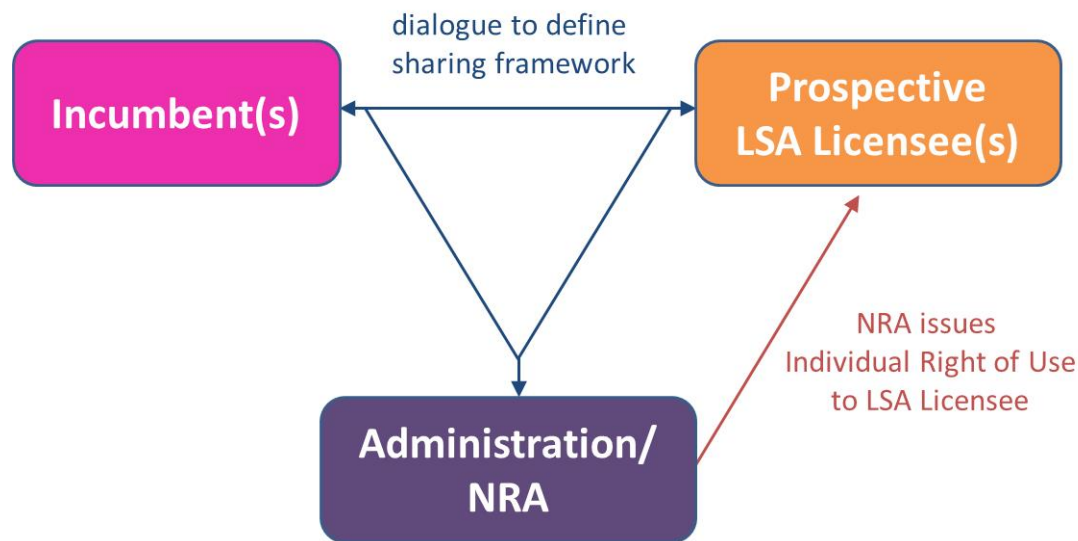


- LSA repository: deliver the information on spectrum availability and associated conditions
- LSA controller: manages the access to the spectrum made available to the LSA licensee
- Possible architectures defined by ETSI TC RRS

- The first practical use case of LSA is access to additional spectrum for mobile broadband services (MFCN) in 2.3-2.4 GHz.
- In CEPT countries, the band 2.3-2.4 GHz is currently used by the following systems/services:
  - Programme making and special events (PMSE) applications (SAP/SAB video links);
  - Telemetry (both terrestrial and aeronautical telemetry);
  - Fixed links
  - Other governmental use (e.g. Unmanned Aircraft Systems (UAS));
  - Amateur, as a secondary service.
- The CEPT has recognised the importance of the availability of common and minimal (least restrictive) technical conditions for the band 2.3-2.4 GHz as well as the need to ensure a long term possibility for incumbent usage (ECC Dec 14/02)



## Regulatory process required before the introduction of MFCN in a band under LSA



## Available CEPT Documents on LSA(2.3-3.4 GHz Band)

- ECC Report 205 Licensed Shared access (LSA)
- ECC Decision (14) 02
  - Harmonised technical and regulatory conditions for the use of the band 2300-2400 MHz for Mobile/Fixed Communications Networks (MFCN)
- ECC Recommendation (14) 04
  - Cross-border coordination for mobile/fixed communications networks (MFCN) and between MFCN and other systems in the frequency band 2300-2400 MHz
- ECC Recommendation (15) 04
  - Guidance for the implementation of a sharing framework between MFCN and PMSE within 2300-2400 MHz

## CEPT responses to

EC Mandate on “Harmonised technical conditions for the 2300-2400 MHz (‘2.3 GHz’) frequency band in the EU for the provision of wireless broadband electronic communications services”

### ■ CEPT Report 55

- Technical conditions for wireless broadband usage of the 2300-2400 MHz frequency band.

### ■ CEPT Report 56

- Technological and regulatory options facilitating sharing between Wireless broadband applications (WBB) and the relevant incumbent service/application

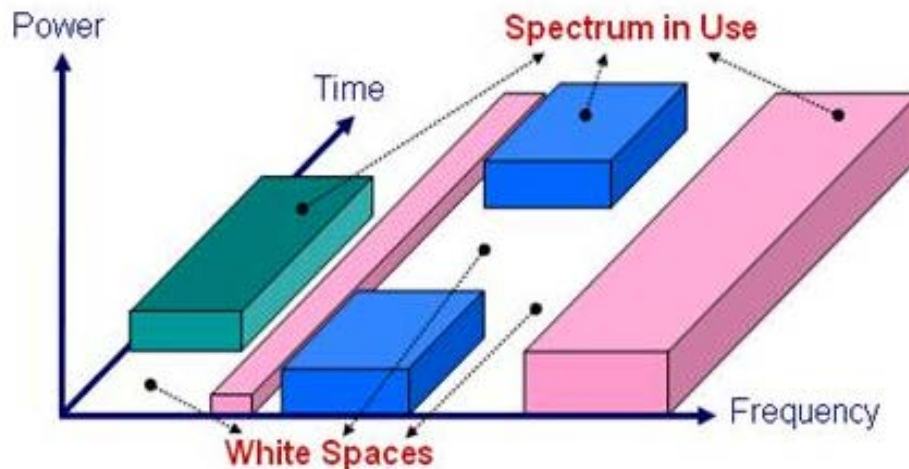
### ■ CEPT Report 58

- Technical sharing solutions for the shared use of the 2300-2400 MHz band for WBB and PMSE

## Examples

- LSA impacts the national allocation of a frequency band, which is a sovereign decision on the destination of this public resource.
- LSA is to be implemented by administrations on a voluntary basis
- National administrations decide which existing applications need to be considered as incumbent uses 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.
- Some administrations may not make available all frequencies in the band 2300-2400 MHz for MFCN;
- that the introduction of MFCN in the 2300-2400 MHz band in one country can have an impact on incumbent usage in neighbouring countries and thus may require the need for cross-border agreement;
- that under LSA, spectrum is used by either the incumbent(s) or the LSA licensee(s), so that the latter has individual spectrum rights of use / access where and when the spectrum is made available by the incumbent(s), in accordance with the sharing framework defined beforehand;
- From technical point: A flexible architecture with the relevant interfaces for LSA
  - The current work in ETSI TC-RRS looks quite promising to cover the needs

White space is a part of the spectrum, which is available for a radiocommunication application at a given time in a given geographical area on a non-interfering / non-protected basis with regard to primary services and other services with a higher priority on a national basis

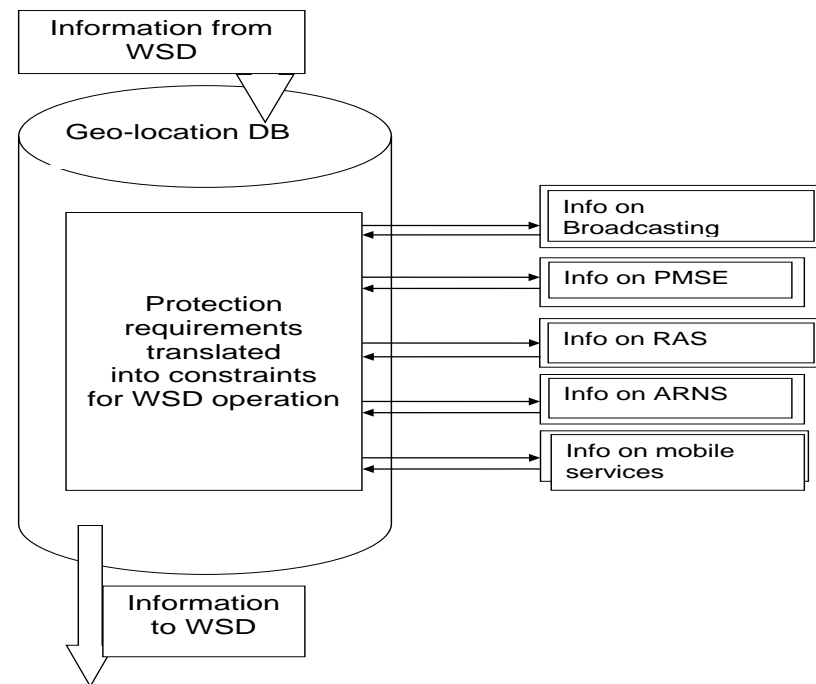


Technical conditions for WSD defined to provide protection to primary services



- **ECC Report 159 (2011) complemented by ECC Report 185 (2013): define technical and operational requirements for the possible operation of WSD in the band 470-790 MHz**
  - Focusses mainly on protection of broadcasting (DTT) and PMSE
  - Identify three potential techniques:
    - Sensing: conduct a measurement within a channel, to determine whether any protected service is present
    - Geo-location: CR systems to define their location and consult a “geo-location” database to determine which frequencies they can use at their location
    - Beacons: signals to indicate that particular channels are either in use by protected services or vacant
- First assessment:
  - Geolocation most promising approach. Requires further consideration.

- **ECC Report 186 “Technical and operational requirements for the operation of white space devices under geo-location approach”**
  - Guidance to administrations on algorithms to translate the protection requirements of primary use.



- **ECC Report 186 “Technical and operational requirements for the operation of white space devices under geo-location approach”**
- Guidance to administrations and ETSI (ETSI EN 301 598) on
  - data elements that would need to be exchanged between a WSD and a geo-location database
  - basic operational requirements.
- Introduces the distinction between master WSD and associated slave(s)
- Initial considerations on issues related to database management
- Some general aspects may be applicable to geolocation database use in other scenarios and other bands



- **ECC Report 236: Guidance for national implementation of a regulatory framework for TV WSD using geo-location databases**
  - Describes the overall regulatory framework for TV WSD using geo-location databases and guidance for national implementation
  - Identifies and discusses options for database policy and provision (role of NRA)
  - One key feature of European regulatory developments on TVWS is that a WSD may only transmit in the territory of a country if it has successfully discovered a geo-location database approved by the National Regulatory Authority (NRA).

## ECC Report 204: Spectrum Use and Future Requirements for PMSE

Initial research activities on cognitive PMSE systems have been initiated in ETSI STF 386 and in a German research project funded by BMWi (German Federal Ministry of Economic Affairs and Energy) called C-PMSE.

### *Great Potential:*

- Features several in-operation audio PMSE links can be transferred to less impaired spectrum when necessary – without noticeable interruptions;
- Can lead to more robust and more efficient use of spectrum, especially in UHF bands, including duplex band operations;
- It's cognitive because operation frequencies are "monitored" constantly / service quality checked all the time. Existing audio PMSE systems check only before the event;
- A reaction to the changes in the UHF terrestrial broadcast spectrum;
- ETSI Technical Specifications as well as first demonstrator hardware available.

THANKS FOR YOUR  
ATTENTION