

*QOSMOS Dynamic Spectrum Sharing Seminar*

# **Whitespaces: TV band and beyond**

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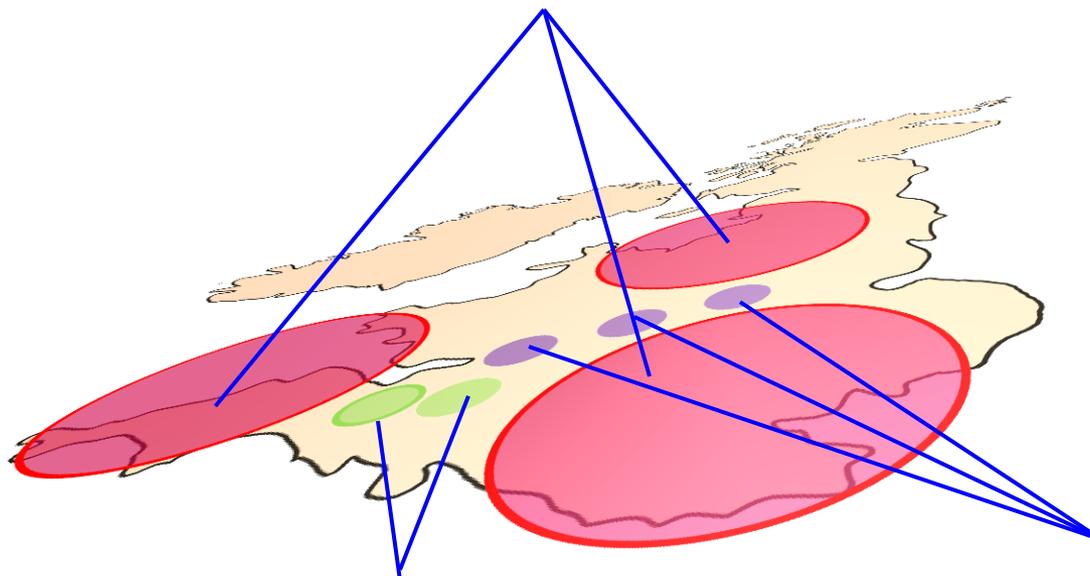
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# Outline

- TV white spaces: a stepping stone
- Beyond the TV band
- Conclusions

# White spaces in UHF TV band (470 - 790MHz)

*High power TV broadcasts using the **same frequency** need to leave spaces between their coverage areas to avoid interference.*

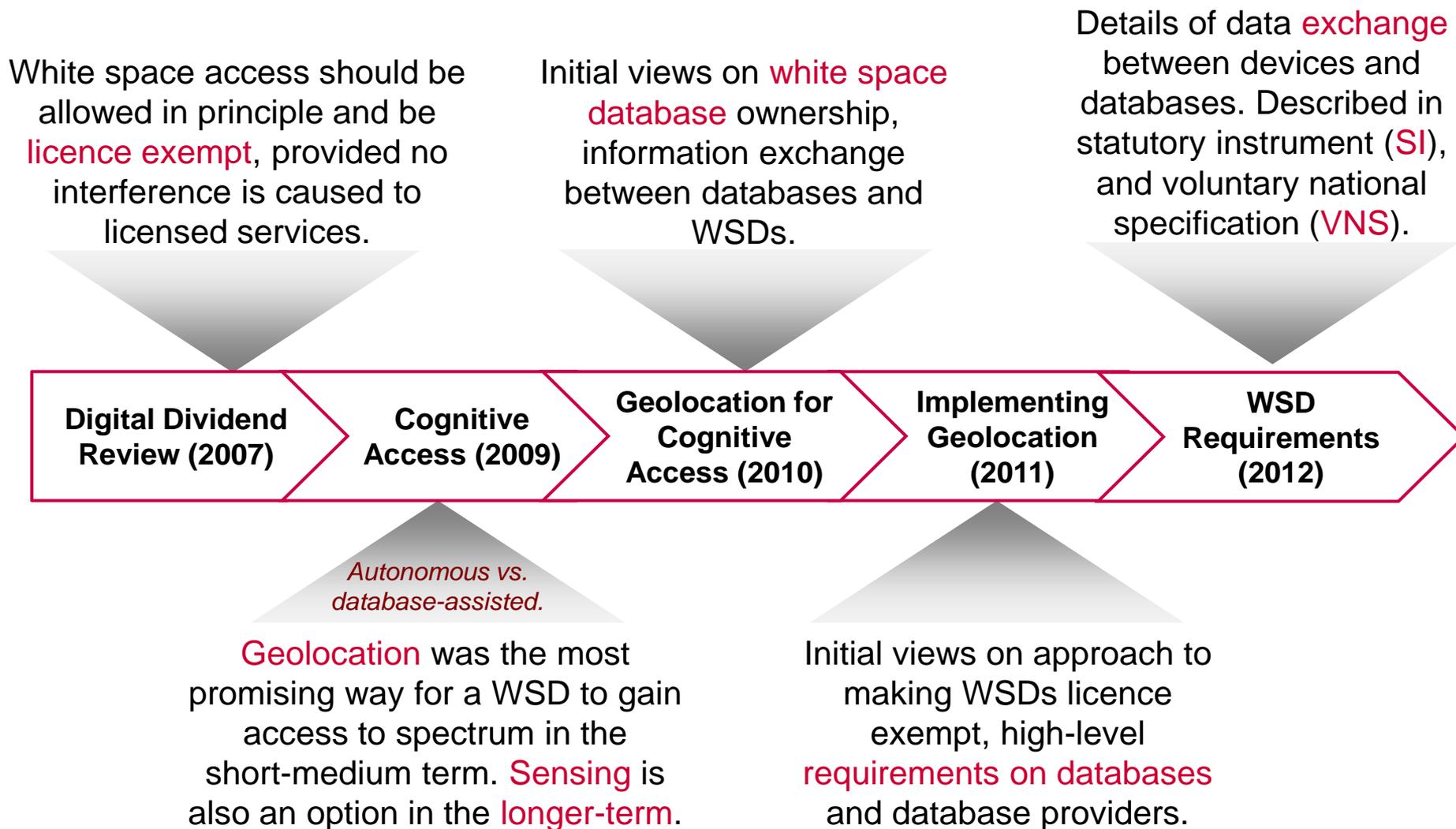


*These **frequencies** can be used in the "white spaces" in between by lower-power devices or **white space devices (WSD)***

*These **frequencies** are also used by **PMSE** users.*

# The path towards access to TV white spaces

## Ofcom's consultations



# Why TV white spaces?



- Context
  - Strong **industry** interest to deploy **new** services in the TV white spaces.
  - Huge estimated **demand** for spectrum for wireless data applications.
- Duty to secure **optimum** use of the spectrum
  - TV white spaces are (by definition) **unused**.
  - **Database approach** allows WSD to operate without causing harmful interference to existing licensees by consulting a database to obtain its technical operating parameters.
  - This can result in **increased efficiencies** in spectrum use.
- Desire to promote **innovation**
  - Licence exempt use of spectrum has facilitated many innovative uses.
  - Access to TV white spaces is a **stepping stone** to facilitate future **dynamic** access to white spaces in **other bands**.



# Technical challenges

- Amount of white space available depends on **detailed knowledge** of incumbent spectrum usage
  - We are fortunate that we have a good **understanding** of the nation-wide DTT **coverage**.
  - **PMSE** use in the TV band is **licensed** and **coordinated**.
- **Amount** and **quality** of white space spectrum is **uncertain**. This depends on
  - the extent of **protection** afforded to incumbent services.
  - potential future licensed use of the spectrum.
- Despite these challenges, **industry** is keen for Ofcom to proceed.
- Note:
  - It is not the role of the regulator to **predict** whether (or when) access to TV white spaces will be a **success** story.
  - It is the role of the regulator to ensure white spaces can be accessed without causing harmful interference to existing licensees and to remove **barriers** to **innovation**.

# Regulatory challenges

- Database model is **untested**
  - Current UK regulatory framework<sup>1</sup> does not include database regulation as such.
- We need to come up with **individual arrangements** to authorise operations of database provider.
- Consequently, WSD and database provider will be **authorized separately**.
- **International standardization** on the interface between WSD and database is key to ensure correct functioning of the device.

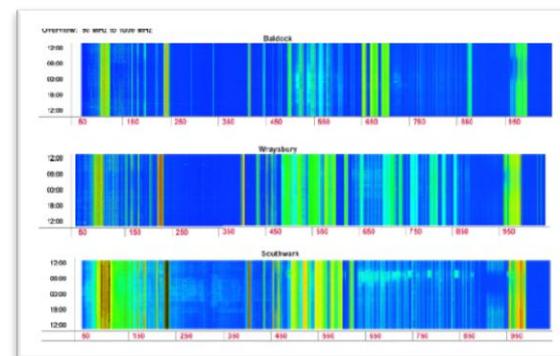
<sup>1</sup> Wireless Telegraphy Act 2006 and Communications Act 2003

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# What's next?

- Even cautious estimates suggest that **demand** for spectrum will **outstrip supply** over the next decade.
- The shortage is partly an artefact of the **historical approach** to spectrum management: **static** service based allocations.
- There is clear evidence that while much of the spectrum is allocated, not all of it is used **everywhere** and **all of the time**: Large amounts of **untapped** white spaces exist.
- **Opportunistic** and **dynamic** spectrum sharing via access to white spaces across bands can **unlock** unused spectrum resource, and satisfy some of the future demand.



# Access to white spaces – market mechanism

- The **tools exist** in the UK for certain private sector licence holders and the public sector to essentially “trade or lease<sup>2</sup>” their **white spaces** to 3<sup>rd</sup> parties.
- The licensees may use the full array of **database** and **cognitive** technologies to **dynamically manage** mutual interference with 3<sup>rd</sup> parties.
- However, market mechanism works less well where
  - there exists **mismatch** between needs of **new users** (including ability to negotiate access with incumbents) and willingness of **incumbents** to share (lack of **incentive**).



<sup>2</sup> The extent of the ability of licensees to sub-licence to 3<sup>rd</sup> parties for alternative use depends on the bands under consideration and technical conditions of the licence.

## A question of policy...

- Regulator has a role to remove **regulatory barriers** and **facilitate sharing**
- Recognising
  - the need for industry to have **regulatory certainty** in availability of spectrum for **dynamic sharing** to promote technological investment and innovation.
  - in the European context, a **harmonised** approach to identifying and making spectrum available on a shared basis is desirable.



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# Conclusions

- We believe that access to **TV white spaces** is an important **test case**
  - in teasing out technological, legal, and regulatory **challenges**,
  - to enable **dynamic** and **opportunistic** spectrum sharing, and
  - to create a framework for white space access in **other bands**.
- Depending on the nature of the band, access to white spaces may be via **licensing** or **licence-exemption**.
- Existing UK regulations for **tradable** licences and spectrum **leasing** is a first step towards enabling dynamic access to private- and public-sector **white spaces**.
- The use of **databases** is a key technology in the short to medium term to enable dynamic sharing with existing users, to be complemented in due course with device-distributed **cognitive** and sensing technologies.

# Thank you!

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