



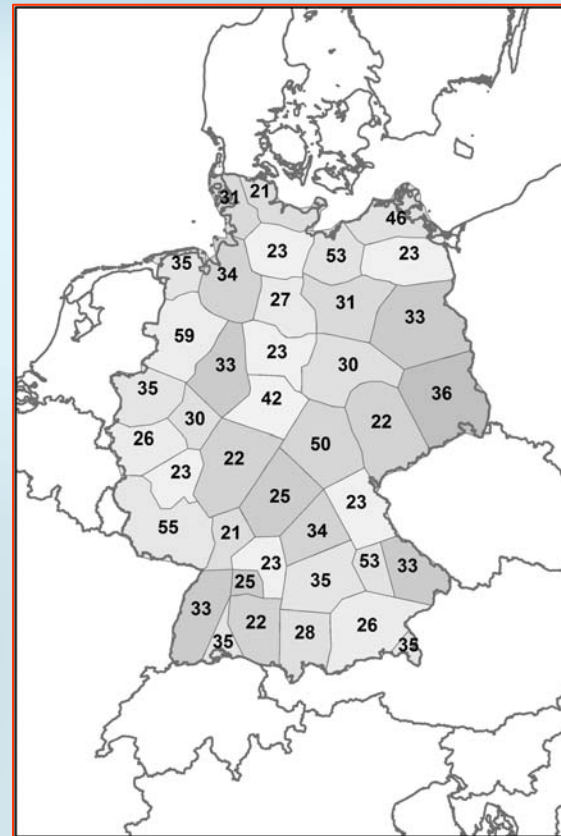
Introduction of WSD in the UHF Band in Europe from a Broadcaster's Perspective

Terrestrial Broadcasting in Europe

- **PSB have strong position in Europe (30% of audience)**
- **free-to-air content (PSB/comm.) & pay-TV**
- **PSB obligations**
 - full area coverage
 - 100% population
 - national, regional, local and community content

ITU-R GE06 Agreement and Plan

- frequency plan and regulatory framework in VHF and UHF for DVB-T and T-DAB
- allotment planning



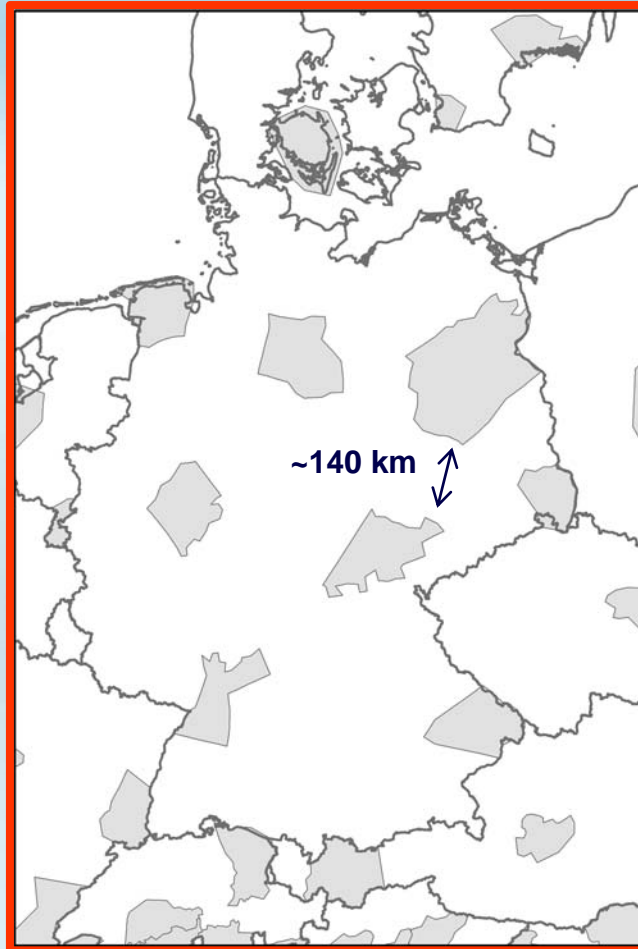
ITU-R GE06 Agreement and Plan

- frequency plan and regulatory framework for DVB-T and T-DAB (→ programme multiplexes)
- allotment planning
- planning parameters for fixed, portable (indoor/outdoor) and mobile
- high-power / high-tower networks
- SFN implementation



Reuse distance of ~140 km between coverage areas

ITU-R GE06 Agreement and Plan



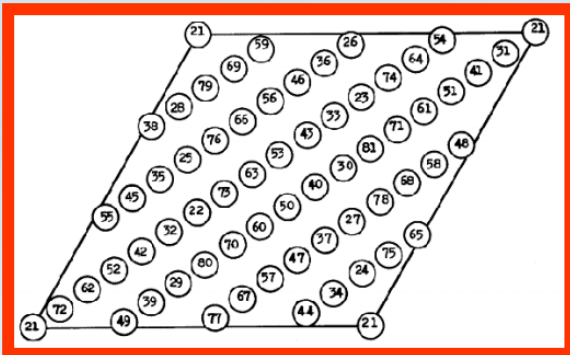
**UHF channel 27 allotments
for Germany**

Sharing Spectrum

- **Amount of white spaces for WSD ?**
- **Sharing conditions ?**
- **Data base and/or sensing ?**

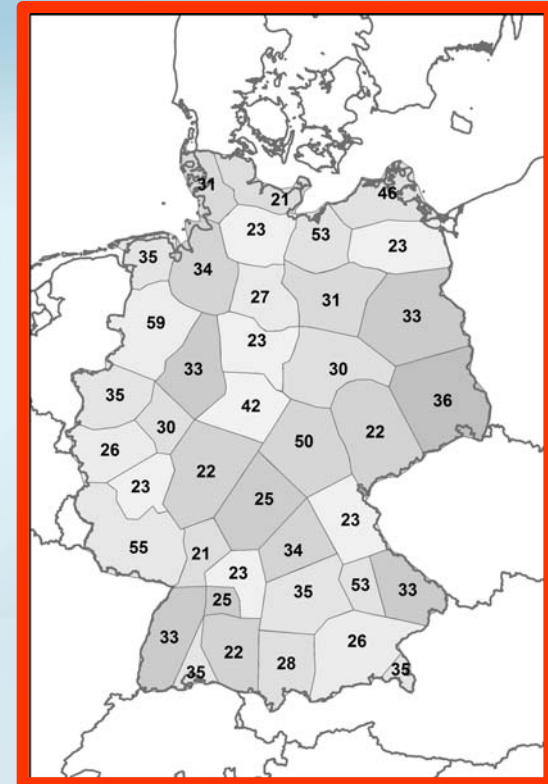
White Spaces

ST61



3 Coverages across Europe
(3 analogue TV programmes)

GE06



7 Layers across Europe
(~30 digital programmes)

Planning Principle:
**Equitable Access
to the
Spectrum**

ST61 White Spaces GE06

~20 programmes in Berlin

~25 programmes in Paris

~10 programmes in London

>35 programmes in Rome

...

→ White Spaces used for BC Services

→ WS always snap shot in time

→ Not to forget PMSE!

11+2 mux in France

12 mux in Italy as a start

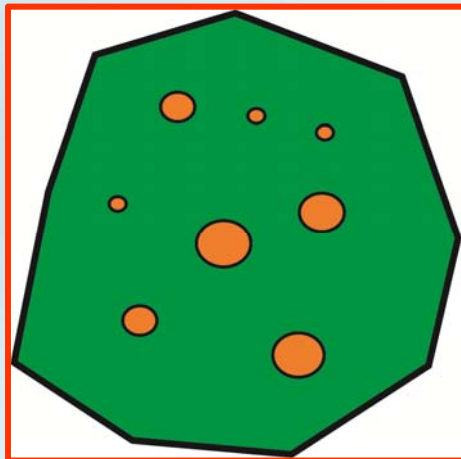
...

Sharing Conditions

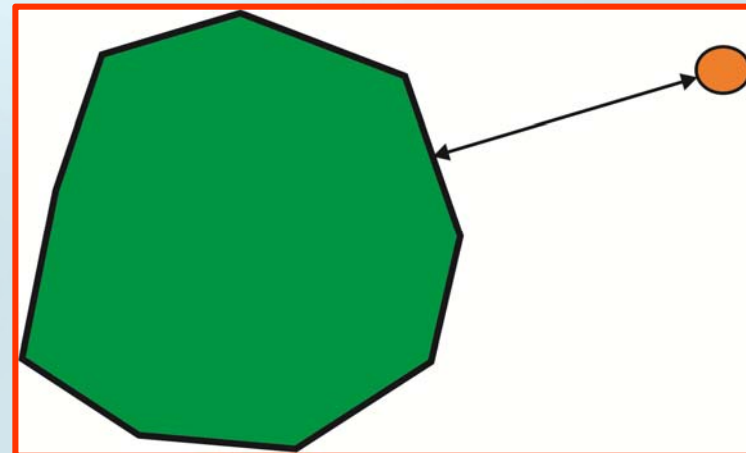


Adjacent Channel

Co-Channel



Hole Punching



Geographical Separation

Sharing Conditions

- **Determine protection ratios for co- and adjacent channel usage:**
 - **definition of technical characteristics of WSD?**
(multi carrier, single carrier, different bandwidth, ...)

Sharing Conditions

- **Determine protection ratios for co- and adjacent channel usage:**
 - **definition of technical characteristics of WSD?**
(multi carrier, single carrier, different bandwidth, ...)
- **Define methodology for interference assessment:**
 - **protection requirements of broadcasting?**
 - **treatment of fixed and portable/mobile WSD?**
(relevance of reference geometries)
 - **aggregation of several interfering sources?**
 - **wave propagation model?**

Sensing and Geo-Location Data Base

- **Sensing:**
 - How to avoid false decision on channel occupation?
 - How to determine detection threshold?

Sensing and Geo-Location Data Base

- **Sensing:**
 - How to avoid false decision on channel occupation?
 - How to determine detection threshold?
- **Geo-Location Data Base:**
 - Methodology to determine about channel availability?
 - Control of data base?
 - Maintenance of data base?

Sensing and Geo-Location Data Base

- **Sensing:**
 - How to avoid false decision on channel occupation?
 - How to determine detection threshold?
- **Geo-Location Data Base:**
 - Methodology to determine about channel availability?
 - Control of data base?
 - Maintenance of data base?
- **License Scheme for Channel Allocation to WSD:**
 - How to maintain access to WS for incumbent service?

Future Opportunities

- **New Broadcasting Paradigm:**
 - linear and non-linear content
 - selection of appropriate distribution technologies

Future Opportunities

- **New Broadcasting Paradigm:**
 - linear and non-linear content
 - selection of appropriate distribution technologies
- **Prospects for Broadcasting and WSD**
 - innovative solutions for indoor coverage (pick up and re-distribute)
 - WSD and CR for distribution of non-linear content
 - Broadband functionality and return channel

**Thank you for
your attention !**