White Spaces and Sharing

White Spaces, Sharing and the Radio Equipment Directive
We have largely completed our work to enable TV Whitespaces in UK

- Statement published February 2015
- Sets out our decision to enable devices to access unused TV spectrum
- Anticipate making Licence Exemption regulations Summer 2015
- Ofcom is a major supporter of RED. We think it is critical to spectrum sharing and efficient use.
Much of the spectrum is allocated and licensed ...
But it is not necessarily all used ...
Enabling access to white spaces

• Immediate term
  • We have a duty to secure optimum use of the spectrum. Spectrum in white spaces is (by definition) unused.
  • We have a duty to remove barriers to innovation.

• Longer term
  • We think sharing is going to play a bigger and bigger part, not just in TV bands.
  • Access to TV white spaces is a stepping stone for future access to white spaces in other bands. This may satisfy some of the huge demand for spectrum for wireless data applications.
  • Enabling technologies are in place. Regulation and Business Models appear to be the barrier.
    – Internet, Computing and Radio technologies have advanced to the extent that dynamic and opportunistic spectrum sharing is viable.
TV White Spaces Trials

- **Glasgow**: External Wi-Fi and webcam backhaul
- **Oxford**: Community sensor network (flood detection) & TVWS communication testing
- **Orkneys**: Land - ferry broadband
- **Manchester + others**: Sports venue A/V distribution
- **Isle of Wight**: Land - private boat broadband
- **Aberdeen**: Land - Shipping broadband
- **North Yorkshire**: Rural broadband
- **Milton Keynes**: M2M Sensor network (Smart City)
- **Chesham**: A/V distribution
- **Watford**: CCTV content distribution & Digital Signage
- **London**: A/V distribution
- **Shepperton**: Digital signage
- **London**: Research & development
- **Isle of Wight**: Land - private boat broadband

Additional locations and technologies mentioned:
- **London**: A/V distribution
- **Manchester + others**: Sports venue A/V distribution
- **Isle of Wight**: Land - private boat broadband
- **Shepperton**: Digital signage
- **London**: Research & development

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Orkney Islands trial

This trial is using white spaces to provide internet connectivity and communications to ferries travelling between the Orkney Islands and to land locations in the islands

- 4 Base stations
- 3 land based CPEs, 3 ship mounted CPEs

Cloudnet has achieved a 30 km link to a ship
London Zoo live video streaming

- A TV white space network to stream live video of the Zoo’s meerkats, Asian otters and giant Galapagos tortoises to YouTube.
- One base station and three terminal stations using the 802.11af standard.
- ZSL will test the viability of the technology to monitor and protect endangered animals in the wild.
Requirements for wireless service are likely to increase for many spectrum uses. This will lead to growing competing demands for key spectrum resources. Adapting technologies that enable more efficient use of spectrum will be crucial. There will still be increased pressures on spectrum, especially in concentrated geographical locations.

Competing demands will need to be addressed by a mix of spectrum repurposing to higher value uses and greater use of spectrum sharing.

The context of future spectrum management continues to combine the use of market mechanisms possible and effective and regulatory action where necessary. We will place a growing emphasis on four aspects of how we manage spectrum:

1. Exploring new forms of spectrum sharing and extending sharing across new bands
2. Maintaining our increased focus on understanding the coexistence challenges associated with changes in spectrum use
3. Promoting improvements in radio performance standards to reduce future coexistence issues
4. Increasing the quantity and quality of information on spectrum use we make available

When we do take action we seek to retain flexibility in order to create options, rather than dictate solutions. We will also continue to play a leading role in international spectrum debates where this is most relevant to good outcomes in the UK.

Our key objective is to secure optimal use of spectrum in the UK, i.e., the use that delivers the greatest value to UK citizens and consumers.

Ofcom strategy: Enabling White Spaces Access & Sharing
Why is coexistence a priority?

Enable efficient access to radio spectrum
Protect existing users & equipment
Enable access to new services & better sharing

What are we doing?

• **Greater focus on receivers and RF performance**
  - Radio Equipment Directive & more strategic engagement with key bodies

• **Ensure coexistence is well understood & conditions are well set**
  - Improving theoretical analysis where possible e.g. improving UK planning model for DTT
  - Much greater & earlier use of trials where possible e.g. Radars, White Space Devices, Wifi
  - Closer working with key stakeholders on technical issues & trials e.g. BBC, Arqiva, Sky, BT
Coexistence cases Ofcom has faced recently

- 4G / TV
- 4G / Radars
- 4G / Fire Services
- 4G / Social Alarms
- 4G / SRDs
- 4G / WiFi
- 4G / ALDs
- WSD / TV / PMSE
RED is critically important to Ofcom

• Key changes in RED essential requirements
  – Use the spectrum efficiently – Receive as well as Transmit
  – Spectrum is an increasingly crowded place – take account in radio design

• We think this is essential
  – We run into coexistence issues frequently when enabling access to spectrum

  – Without high quality devices, there is less WS and sharing opportunities

• Ofcom has made sharing and robust radio devices a key part of our spectrum strategy for this reason.

• We see benefit in standardisation as a key enabler in spectrum sharing & efficient access
RED – what Ofcom is trying to achieve

• We see RED as a significant opportunity to ensure robust & efficient devices.

• We are putting much resource into it.

• We will be engaging with other NRAs & stakeholders as necessary to ensure standards are appropriate.

• We are taking a prioritised approach to our engagement
  – Facilitating and sponsoring new work items where necessary
  – Engaging in some standards discussions
  – Ensuring standards meet the essential requirements of the directive
RED – Some key priority areas for Ofcom

**High Priority Engagement**

- Broadcast Receivers - DTT Receivers and Amplifiers
- Aeronautical Primary Surveillance Radar
- 2.4GHz Wi-Fi, Bluetooth and Zig Bee

**Medium Priority Engagement**

- 5 GHz Wi-Fi
- 5 GHz Metrological Radar
- Audio Short Range Devices
- Mobile Satellite Service (MSS) and Very Small Aperture Terminals (VSAT)
- Non-Specific short range devices

- Ofcom is sponsoring new work items:
  - TV Receivers
  - TV Aerial amplifiers
  - Primary Surveillance Radars
  - Metrological Radar
Thank you

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Questions