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# Ofcom TV White Spaces Pilot Update

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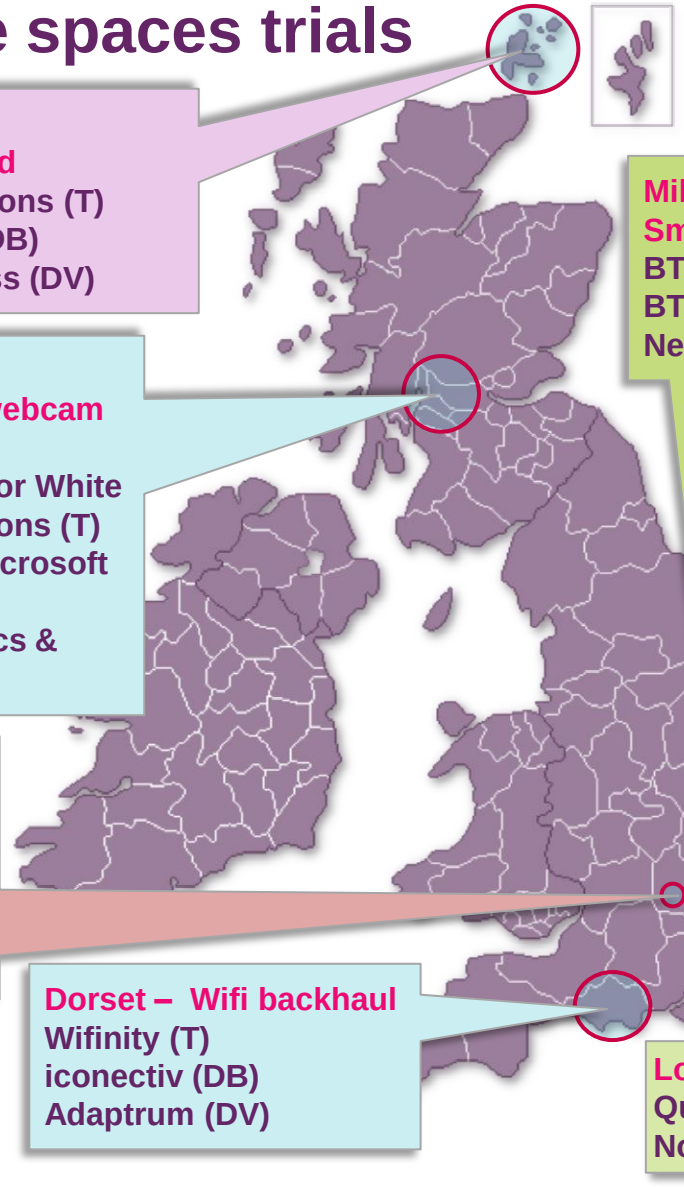
# Ofcom TV White Space Pilot – one year on

- 26 April 2013 Ofcom launched the idea of the pilot
- This received strong stakeholder support
- Pilot's objectives
  - to explore the potential benefits and issues of the new technology
  - to show if this model of spectrum sharing can be made to work
  - to generate new information on coexistence challenges
- Many months of work by Ofcom and stakeholders to make the pilot a reality

# TV white spaces trials



**Scotland**
**Rural broadband**
Cloudnet Solutions (T)
Fairspectrum (DB)
Carlson Wireless (DV)

**Glasgow**
**External Wi-Fi and webcam backhaul**
Microsoft & Centre for White Space Communications (T)
Spectrum Bridge, Microsoft (DB)
Mediatek/6 Harmonics & others (DV)

**Oxford – Remote sensor network (flood detection)**
Love Hz (T)
Nominet (DB)
Adaptrum (DV)

**Dorset – Wifi backhaul**
Wifinity (T)
iconectiv (DB)
Adaptrum (DV)

**Milton Keynes Smart City**
BT (T)
BT (DB)
Neul (DV)

**London – Academic Research**
Queen Mary University (T)
Nominet (DB) WSN Tech (DV)

**Watford**
**CCTV content distribution**
Sinecom (T)
Spectrum Bridge (DB)
Sinecom/KTS Wireless (DV)

**Watford – A/V distribution**
Peerless (T)
Spectrum Bridge (DB)
MELD (DV)

**London**
**Academic Research**
King's College & Joint Research Centre of the European Commission & NICT (T)
Fairspectrum / NICT (DB)
Sinecom/ KTS wireless, Carlson wireless, Eurecom (DV)

T: Trialist DB: Database DV: Device

# Pilot Databases

- Databases control the operation of devices and are the key innovation in the TVWS framework
- Databases  operation is regulated by Ofcom and a contract has been put in place to do this
- 9 companies have signed a contract for the pilot
- Spectrum Bridge, Fairspectrum, NICT and Nominet having successfully passed the qualification process and their databases are now discoverable by devices
- BT, iconectiv, Microsoft, Sony are going through the qualification process
- Qualification involves self-declaration against specific technical requirements; off-line tests and; simulated online tests

# Devices to be deployed in the Pilot

| |
|---|
| Adaptrum |
| Carlson Wireless |
| Eurecom |
| 6Harmonics |
| KTS Wireless / Sinecom |
| Mediatek |
| MELD |
| Neul |
| NICT |
| Wuxi SensingNet Industrialization Research Institute (WSN) |

# Testing during the pilot

## Framework testing with Databases and Trialists

- We will test the overall framework for accessing TVWS including:
  - End-to-end interactions between devices, Ofcom and Databases
  - Ofcom's business processes for operating the framework

## Coexistence testing

- Ofcom is not doing coexistence tests at stakeholder trials
- Separate programme of coexistence testing
  - DTT tests:
    - Subjective observation of video quality in DTT consumer households
    - Measurements of wanted /unwanted power levels in DTT consumer households
    - Laboratory measurements of protection ratios (DTT receiver susceptibility)
  - PMSE tests:
    - We are taking measurements at existing PMSE installations, with a range of WSD technologies.
    - We attempt to replicate PMSE failure modes that we reasonably expect to occur in the presence of WSDs

## Pilot next steps

- More licences issued to trialists
- Framework tests scheduled & undertaken
- Finish qualification for remaining databases
- More coexistence tests for DTT & PMSE

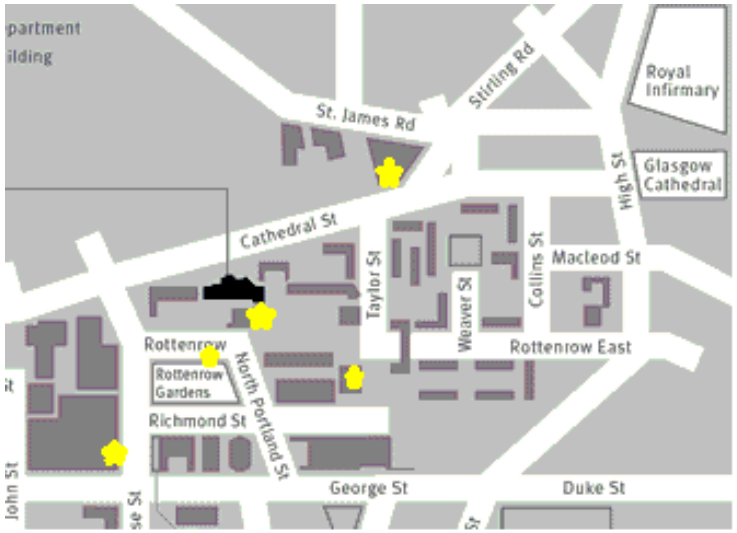
## After the pilot

- This autumn Ofcom will take stock on what we have learnt from our testing and the pilot more broadly.
- We plan to publish our decisions on the way forward around the end of the year.

# SOME OF THE TRIALS

# Glasgow White Spaces Pilot

- 5 sites across the University of Strathclyde campus, with a total of 8 radios from 6Harmonics
- 4 triple-band Wi-Fi devices – including TV white spaces
- These latter units are compliant with the IEEE 802.11af standard
- The trial will to span the campus, including links between buildings which have no line of sight




*University of Strathclyde City Centre Campus*

The Scottish Government

Centre for White Space Communications

University of Strathclyde Glasgow

Microsoft

sky

MEDIATEK

6harmonics Inc.

# Orkney Islands Pilot

**Trial applications**

- Marine Services – Inter Island Ferries
  - Travel between islands range from 20 minutes to 3hrs travel.
  - Currently  TV only on the boats
- Rural Locations Islands – Broadband

**Network deployment**

- 4 Base stations
- 3 CPEs in vessels
  - Offering Back Office Integration – Crew, Wi-Fi for Ships Crew, and Public Services
- 3 Land Based CPEs -  Baseline Service delivery and QoS
  - Faroese Telecoms Radar: Relay Radar/ AIS Data of Marine Traffic of ships movement around North Scotland to Shetland monitoring the sub-sea fibre cables
  - Two residential locations

# Orkney Islands Pilot

# Oxford flood network

- community sensor network
- TVWS for Backhaul to sensor gateway
- 433 MHz ISM for the link between sensor and gateway
- RaspberryPi & Arduino used for the gateway and the sensor

# Some other trials

wifinity

Backhaul to remote locations


NiCT 独立行政法人 情報通信研究機構
National Institute of Information and Communications Technology

Verification of databases, devices and performance evaluation

- IEEE 802.11af and LTE devices

ACROPOLIS

To test communications systems and scenarios that may be implemented in TV WS

- Tests with Eurecom, Carlson, KTS and NICT devices

BT

Bringing it all together

MK: Smart Project at Milton Keynes

- Objective is to put in place an city wide data infrastructure to support a range of use cases across several sectors

MK:SMART

# More information

For information about Ofcom's TV White Spaces Pilot please visit our dedicated pilot webpages http://stakeholders.ofcom.org.uk/spectrum/tv-white-spaces/white-spaces-pilot/