Anatomy of white spaces

Over 90% of spectrum lies unused in most places for most of the time ….

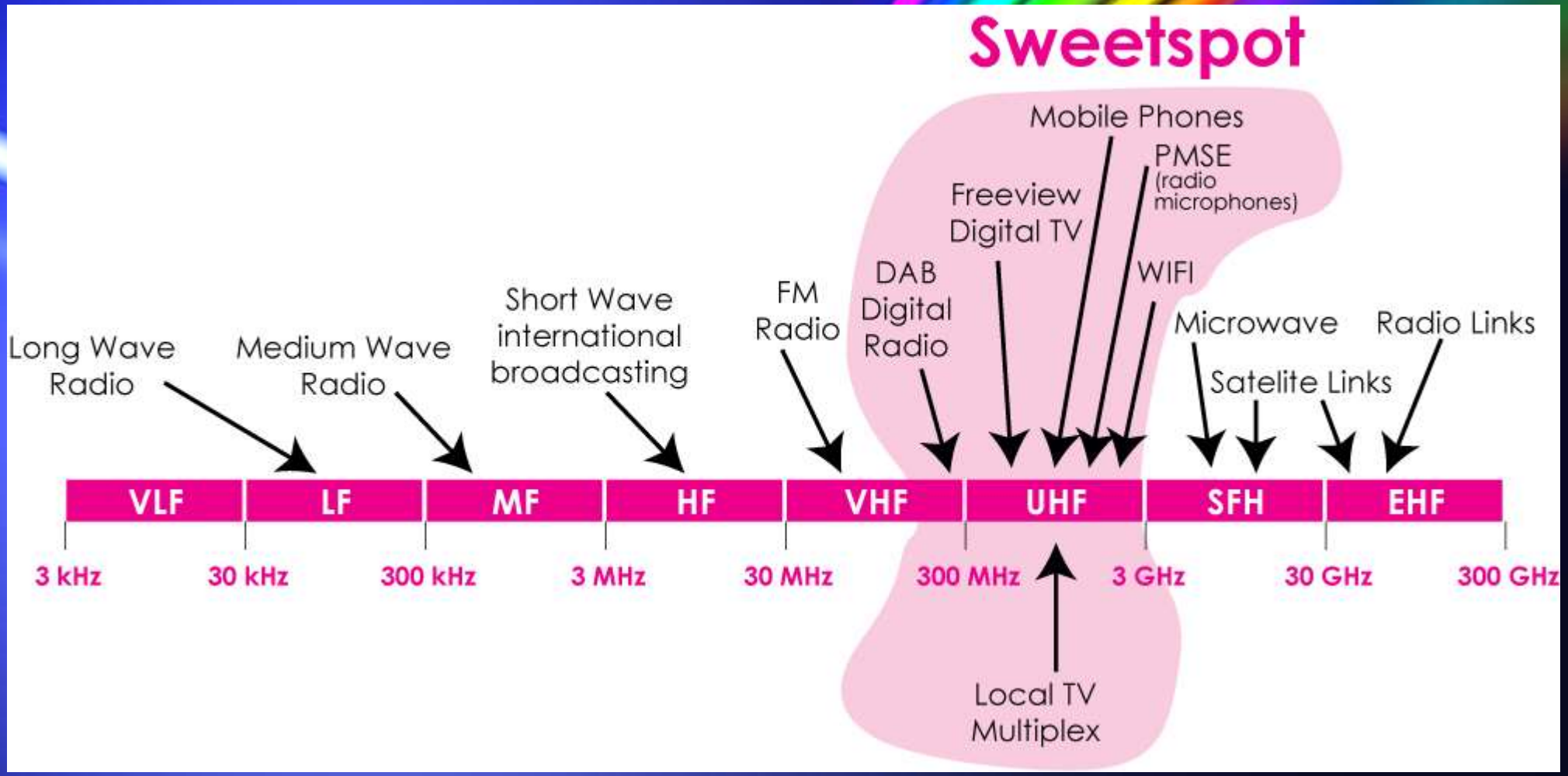
- White spaces are the ‘pockets’ of unused spectrum capacity
- Why do we care?
  - Many still lack decent broadband access
  - Internet of Things brings new connectivity needs
  - White spaces can provide vital flexibility to adapt to fast-changing market requirements

The vision – ubiquitous, affordable broadband

Anytime, anywhere on a mobile device ……

- Mobile devices are becoming the dominant means of access to a growing host of online services
- Tablets and smartphones have broadened Internet use
- As services use higher quality images & video, wireless network capacity needs to rise….
- Spectrum is a key input …

What is spectrum?



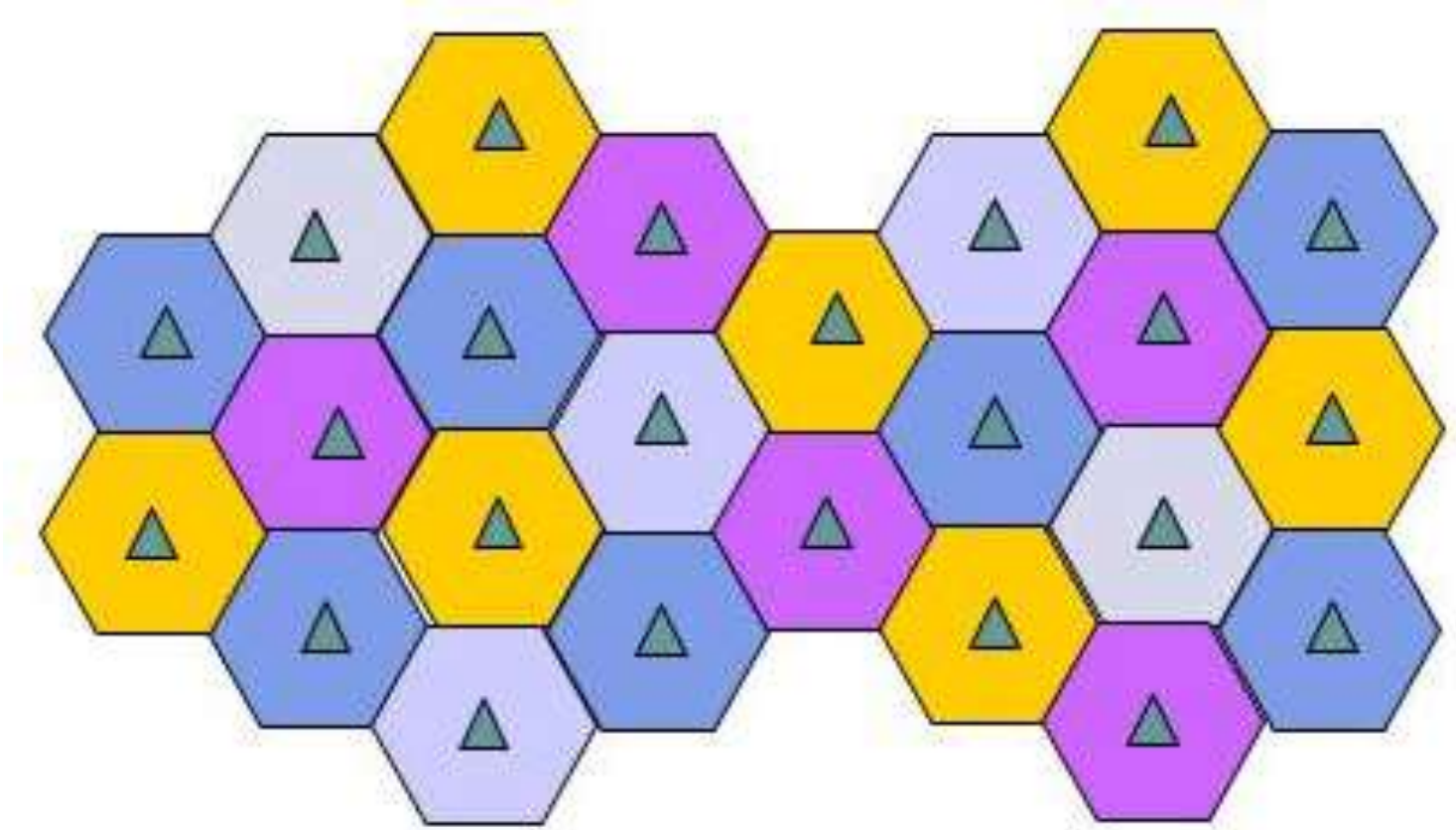
What are white spaces?

- White spaces are unused fragments/pockets spectrum–which may be defined in terms of frequency, location and time
- Spectrum is like oxygen for the digital economy
- Looking at usable RF spectrum – over 90% is unused in most places for most of the time
- **White spaces are primarily a regulatory matter**
  - Technology to exploit white spaces exists and can be adapted as white spaces in new bands are opened up

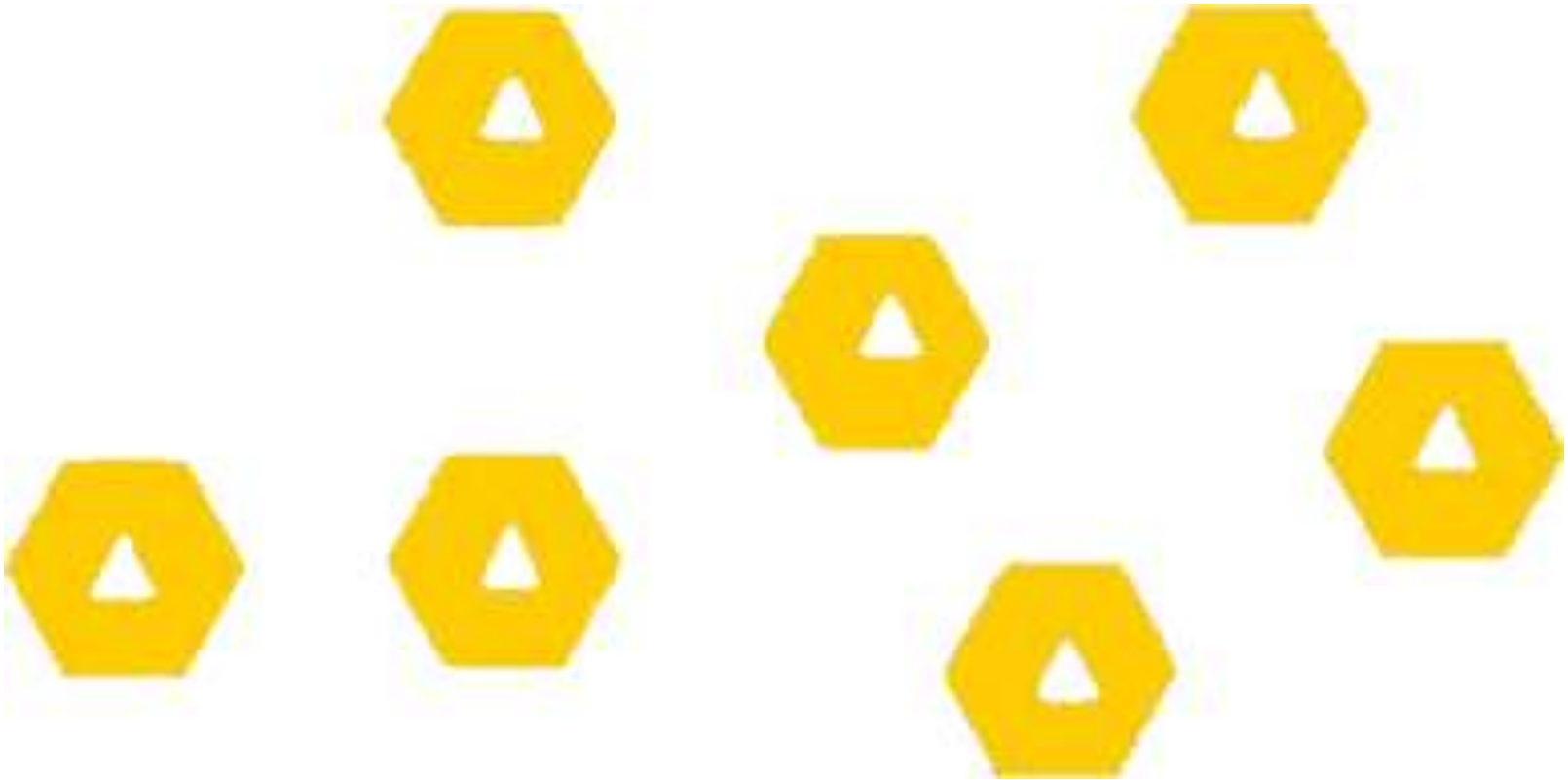
Why do they matter?

- Pressing demand for extra capacity
- More spectrum, please!

How TV white spaces arise

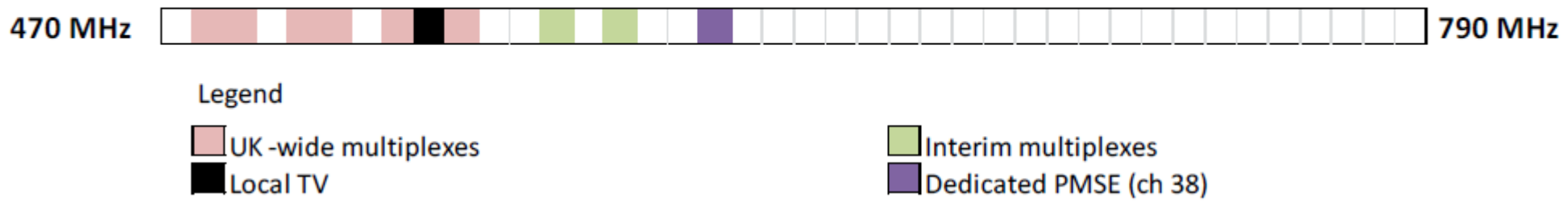


How TV white spaces arise (continued)



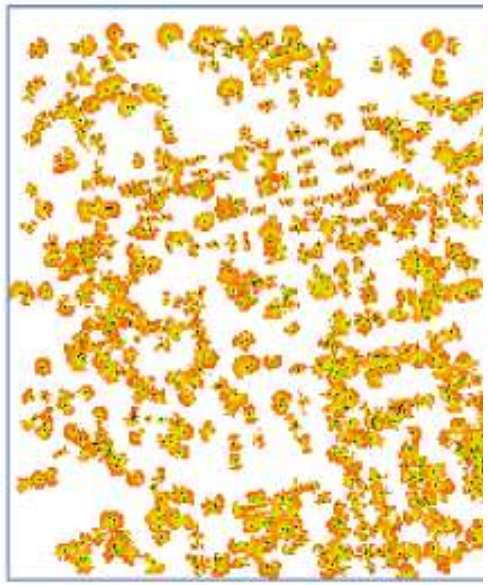
Other ways of looking at white spaces

Figure 2.2 - Illustration of White Space spectrum in London

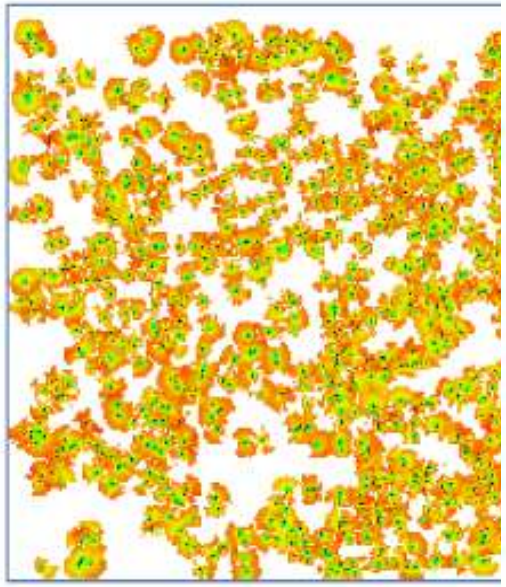


Signals in the TV band (UHF frequencies) can go a long way

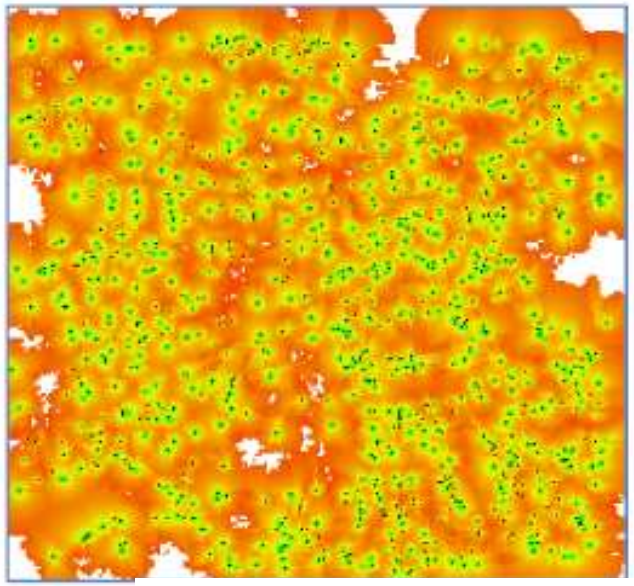
Lower frequencies help fill gaps and enhance capacity, with triple band Wi-Fi



Wi-Fi , 5 GHz



Wi-Fi , 2.4 GHz



TV White Spaces – 600 MHz

Source: BT R&D

Where does dynamic spectrum access enter?

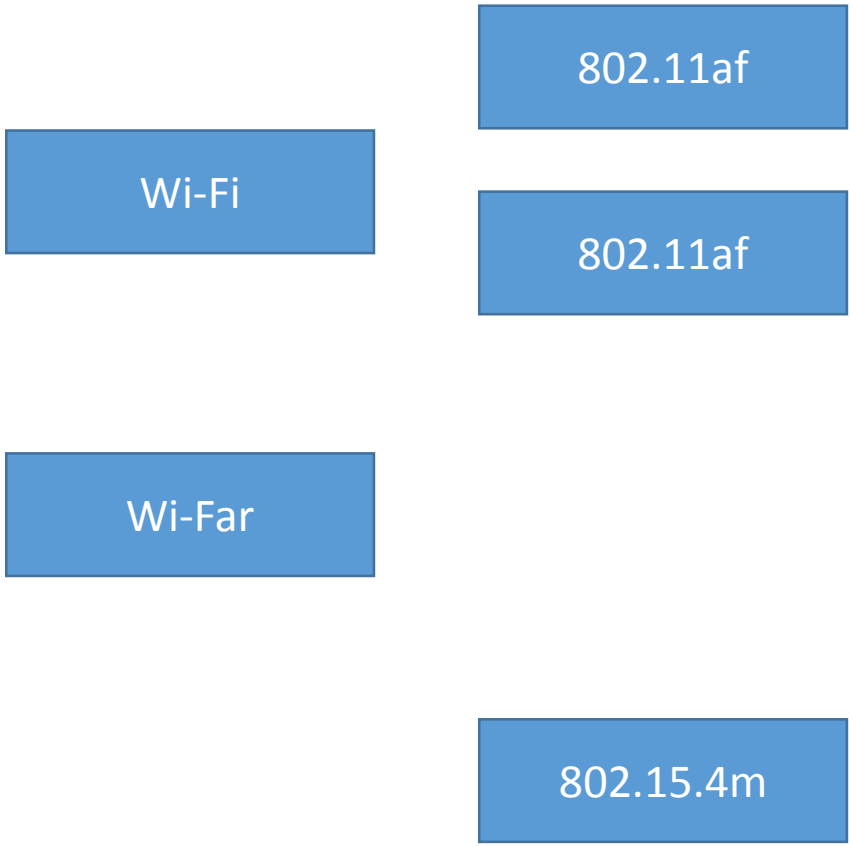
- DSA is needed to enable licence-exempt use of a band shared with licensed services
- In making use of the white spaces, it is important to prevent harmful interference to TV reception (and wireless microphone applications

What other bands might be included in DSA?

What applications

- Rural bro
- adband
- Smart community

White Spaces - standards



Capacity has been a major focus for the industry, but there are other factors to consider

Coverage

Flexibility

Resilience

References

- Ofcom – green lighting TV white spaces, press release
- Ofcom statement on implementing the regulations
- Dynamic Spectrum Alliance

How TV white spaces arise (continued)

- Terrestrial broadcasting has moved on a bit since the Eiffel tower was built….