

# Hybrid Sharing in the Upper 6 GHz Band

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# Agenda

- **Introduction to Ofcom**
- **What Wi-Fi and cellular want to achieve**
- **Hybrid sharing in the upper 6 GHz band**
  - Emerging themes
  - UK and European processes
- **Looking forward...**

# Introduction to Ofcom

- Ofcom is the regulator and competition authority for **the UK communications industries**.
- We regulate the TV and radio sector, fixed line telecoms, the mobile sector, postal services, plus the airwaves over which wireless devices operate.

Getting the best from broadband, home phone and mobile services



Keeping an eye on TV and radio



Overseeing the postal service



We look after the airwaves used by wireless.



# Ofcom has a duty to secure the optimal use of the radio spectrum

*Making sure people and businesses have connectivity where and when they need it...*

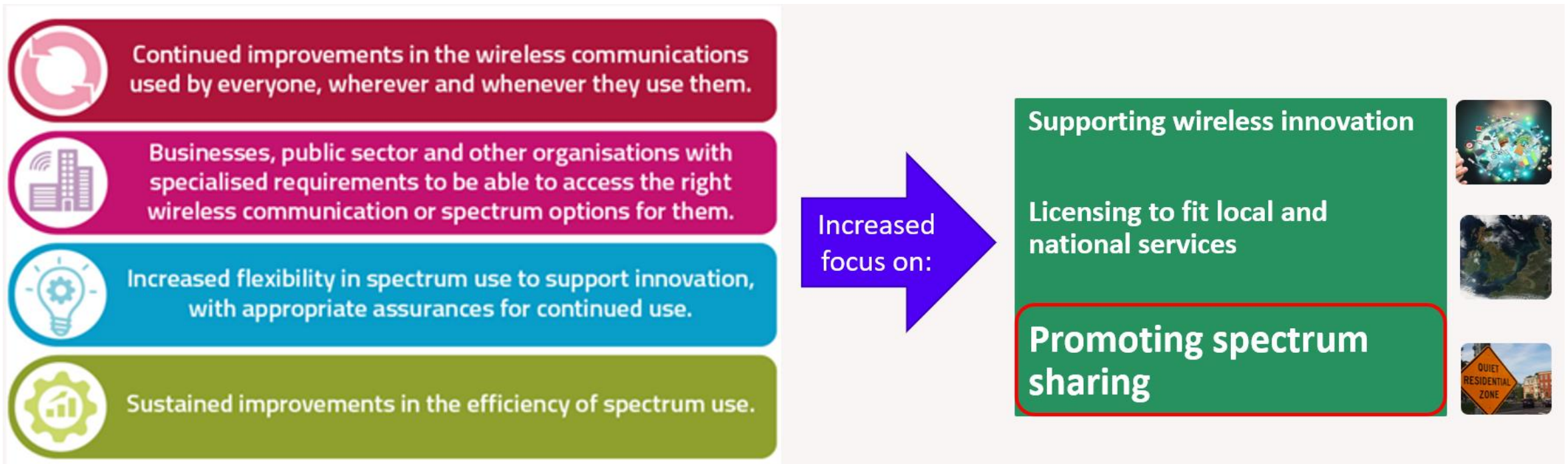


*Whilst considering the spectrum needs of a wide and varied number of wireless applications...*

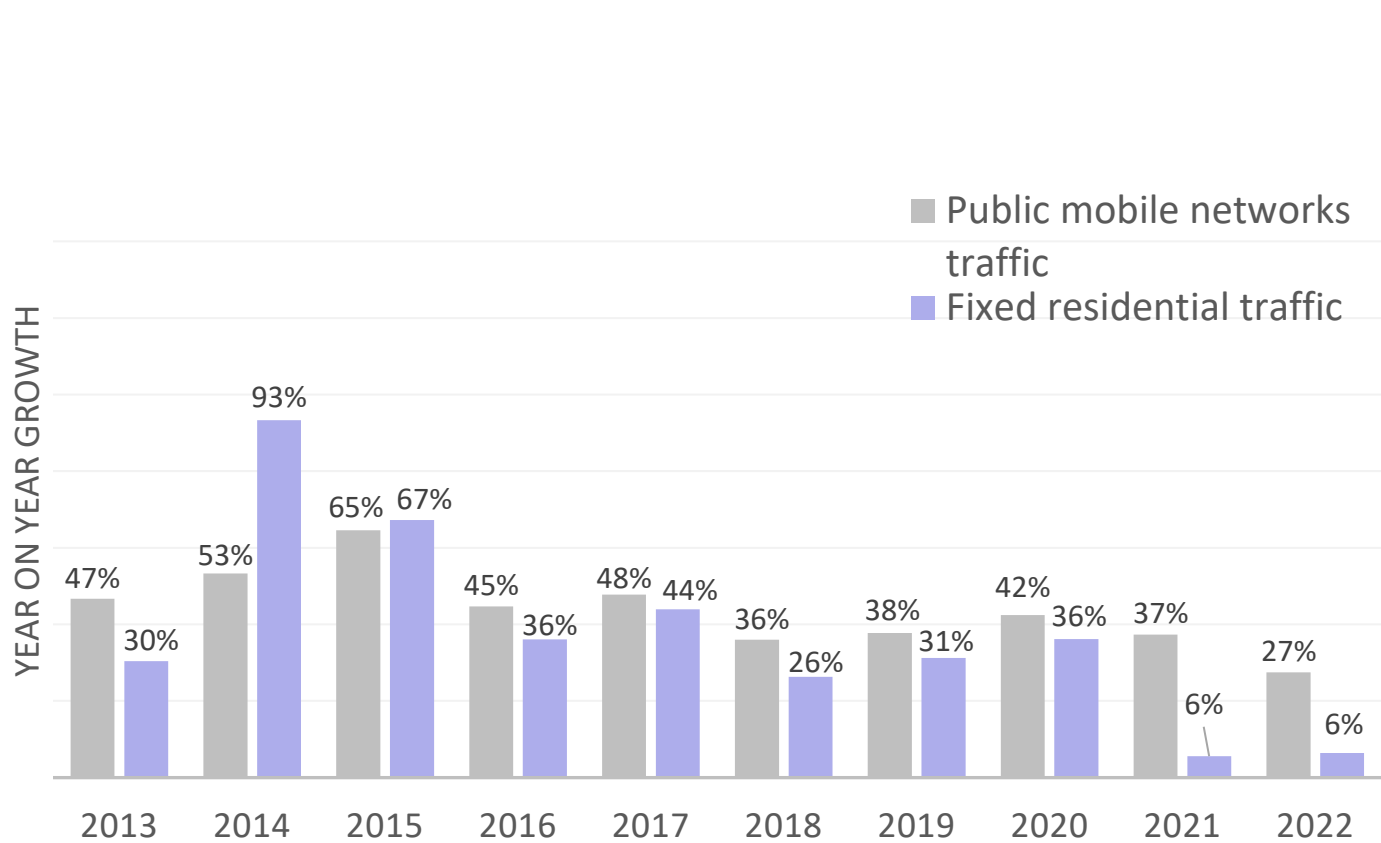


# Our Spectrum Management Approach

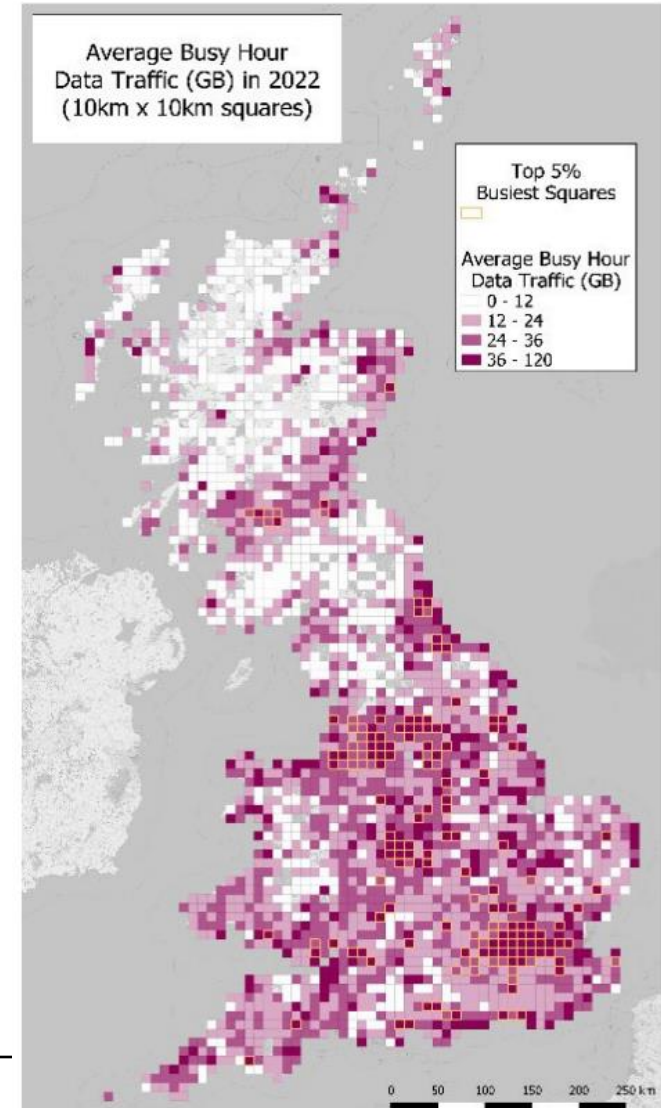
- Key elements of our spectrum management strategy for this decade



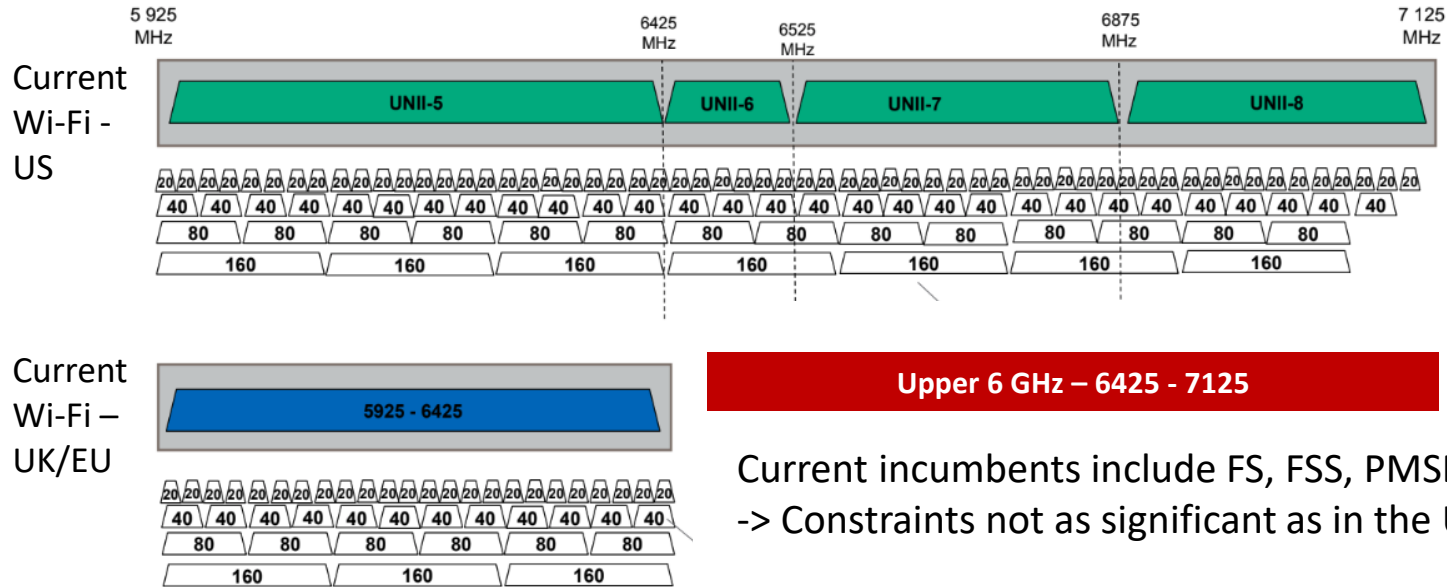
# Demand for Wi-Fi and cellular continues to grow...



... but uncertainty on growth rate and location



# Regulatory status – US v UK/Europe



- Identified the upper 6 GHz band for IMT, whilst also recognising Wi-Fi use of the band.
- Agreed on EIRP levels to protect satellites; commissioned studies for new spectrum for sea surface temperature measurements.

**UK and Europe (CEPT) are now considering hybrid sharing in upper 6 GHz**



# Cellular and Wi-Fi demand can complement each other – to an extent

Carry most of the **indoor** data traffic, via millions of Wi-Fi Access Points



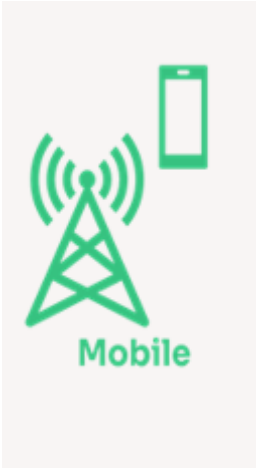
## Wi-Fi Industry requests

- Increased numbers of wide channels
- But don't want significant standard developments as it will create delay

Carry almost all **outdoor** data traffic but with significant proportions indoors

## Cellular Industry requests

- Re-use of existing macros sites is the most important
- Want to match 3.x GHz coverage and provide indoor cellular coverage



## Dealing with uncertainty

A **sharing framework** can respond to a range of demand scenarios. For example, if cellular does not deploy in certain locations or channels, Wi-Fi should be able to sense this and use those channels in those locations as required.



# UK process is proceeding in parallel with Europe, engaging well with industry

## July 2023 consultation, on hybrid sharing

- 1) Consensus on high value of Upper 6 GHz to support wireless broadband applications for consumers and industry
- 2) Hybrid mechanisms should be developed via industry collaboration and international harmonisation (enables economies of scale)
- 3) Incumbents favoured Wi-Fi, other stakeholders backed their own industry for exclusive access

Ofcom held two **Workshops**, exploring solutions

- Pushing that sharing should be fair for both systems
- Really good engagement from industry and European regulators e.g. chipset manufacturers looking at integrated solutions

## May 2024 Vision document

- Set out our vision for how Wi-Fi and cellular could share the band in May 2024 with two main themes
- We have been driving progress on this at CEPT level, in collaboration with industry and other regulators



# CEPT Process



European Conference of Postal  
and Telecommunications Administrations  
– 46 European countries cooperating to regulate posts,  
radio spectrum and communications networks

Work is progressing in PT1 to study **technical feasibility** of Wi-Fi/IMT sharing (UK chairing the correspondence group driving the work)

- Narrative is slowly moving from “pick my technology only” to more open to how sharing could work
- No consensus among administrations – some want to prioritise cellular, others Wi-Fi or a hybrid
- Currently considering possible options for sharing mechanisms following consideration of studies but the long list is narrowing down to the two main themes in Ofcom’s Vision document

European Commission pushing for **new regulatory harmonisation decisions**

- This will pull together coexistence with incumbents
- And options for hybrid sharing of the band
- But full cycle of decision making at European Union level **likely to run for 2-3 years.**

# Two broad categories of sharing mechanisms are emerging

Industry and administrations proposed a wide range of mechanisms, many of them fall into these categories:

## 1 – Indoor/Outdoors split

- cellular outdoors with **restricted cellular power**
- Wi-Fi indoors with some small enhancements to energy detection (cellular tx of Wi-Fi signal preference compares to Wi-Fi detecting SSB)

## 2 – Dynamic band split

- Allows cellular coverage indoors from **high power base stations**
- Indoor Wi-Fi enabled in other parts of the band
- We provide more detail on these over the next few slides

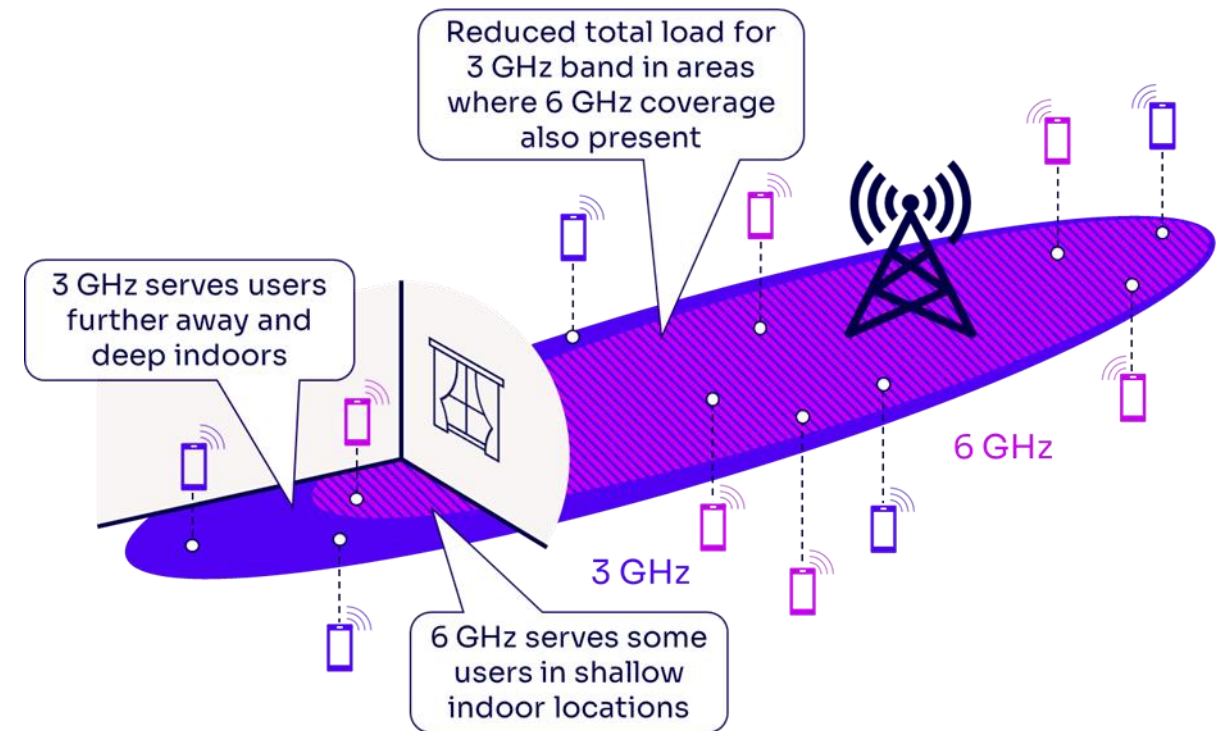
Databases are not getting significant traction though

- in part due to complexity of needing 40+ to cover CEPT region
- likely to be opportunities to leverage AFC for geographic split if desired but not current focus of discussions

# Implementation example:

## 1. Indoor/outdoor split via **restricted cellular power**

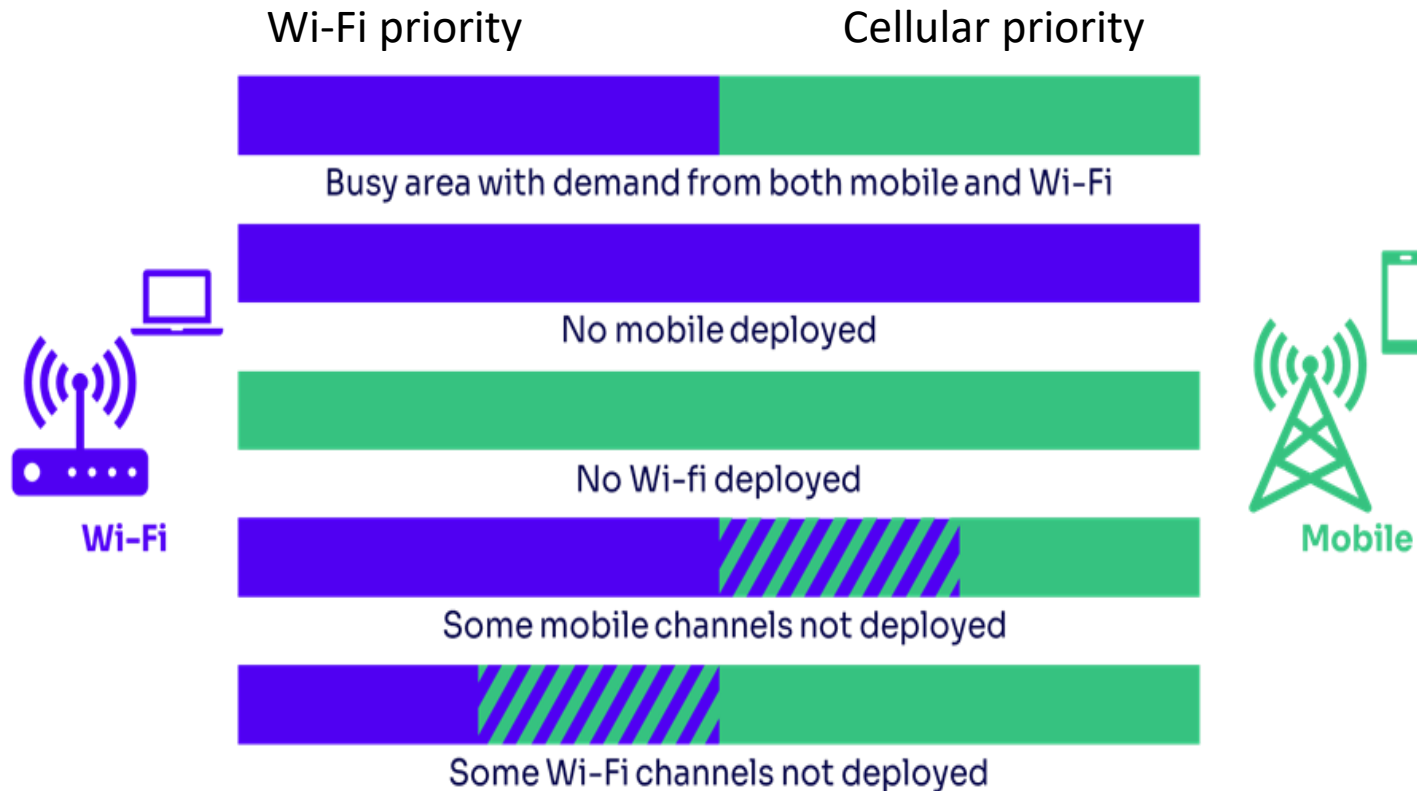
- Good outdoor coverage and capacity at relatively low power levels (55-60dBm/100 MHz) using 3.4 GHz macro grid
- High building losses mean outdoor-in coverage inefficient in U6. Likely to get worse as buildings become more thermal efficient
- Leaves indoor spaces for Wi-Fi use with minimal indoor interference
- Wi-Fi would need to “sense and avoid” in some areas e.g. near windows
- Restricted power eases compatibility with incumbents (e.g. fixed links)



# Implementation example:

## 2. **Dynamic band split** enabling higher mobile power

“Wi-Fi priority” in lower part of U6 band.  
 No need to “sense and avoid” cellular.  
 Cellular could use “Wi-Fi priority” channels where Wi-Fi is not present.



“Cellular priority” in upper part of U6 band.  
 Cellular deploy with usual macro cell power levels.  
 Wi-Fi could use “cellular priority” channels if cellular is not present locally  
 Cellular broadcast a Wi-Fi preamble to ensure Wi-Fi clears the channel.

# This is all still work in progress

## Wrestling with:

- Should we facilitate outdoor-in cellular coverage
  - what are the energy considerations
  - what could the benefits be if we allow indoor mobile?
- When should UK move forward with solutions (taking account of ongoing CEPT process)
  - Opportunity for Wi-Fi to leverage existing equipment and use the band now
  - Should we opt for a phased approach, and allow Wi-Fi to access the band early while ensuring mobile can be added later?
  - But is an initial UK-only approach viable in the short term if it influences other admins?
- How can we improve integration between mobile and Wi-Fi?

## You can help

- With input on the above questions
- Engage with our next UK consultation where we hope to make firmer proposals

# Looking to the future...



## Sharing native solutions are needed to maximise spectrum supply

- “Sharing by design” built into future equipment standards
- Standardised and harmonised solutions to drive ecosystem economies of scale
- Better technology integration / handoff will be essential in the future. e.g. **seamless handover from outdoor cellular to indoor Wi-Fi.**

