

UK SPF events take place under Chatham House Rule

UK SPF Cluster 3
Friday 18 June 2021
Spectrum sharing

10:00 – 12:00 BST

Background

- Spectrum sharing was highlighted as a specific item in the 2014 Spectrum Strategy
- The 2018 FTIR identified spectrum sharing as a means of enabling the market expansion models for mobile
- It also figures in the Statement of Strategic Priorities (SSP) as a strategic item
- Various actions have since 2014 to promote the use of more sharing in the UK
- Now is the time to review how spectrum sharing is working
- DCMS has asked for a review to assess the extent to which shared spectrum access is creating the right conditions for new players to innovate around 5G
- Three workshops are planned to consider this:
 - Today – 5G use cases and spectrum access requirements
 - July – a review of the Local Access Licence and Shared Access regimes
 - September – Recommendations for the introduction and use of DSA in the UK
 - Work will take place between the workshops

Key issues

- What will demand for 5G services really look like and what proportion of supply will require shared spectrum?
- How well do the current measures work?
- Identification and assessment of barriers to sharing (and overcoming them)
- How does innovation play into this – users and spectrum technology
- Where does automation fit and how far does it go?

Workshop agenda

- Introduction (TL)
- Future of wireless networks (WW)
- 5G use cases and business models (TL)
- DCMS 5G trials (Tony Scales)
- Q&A – with a twist – we ask the questions! All input welcomed!
- Wrap up (TL&WW)



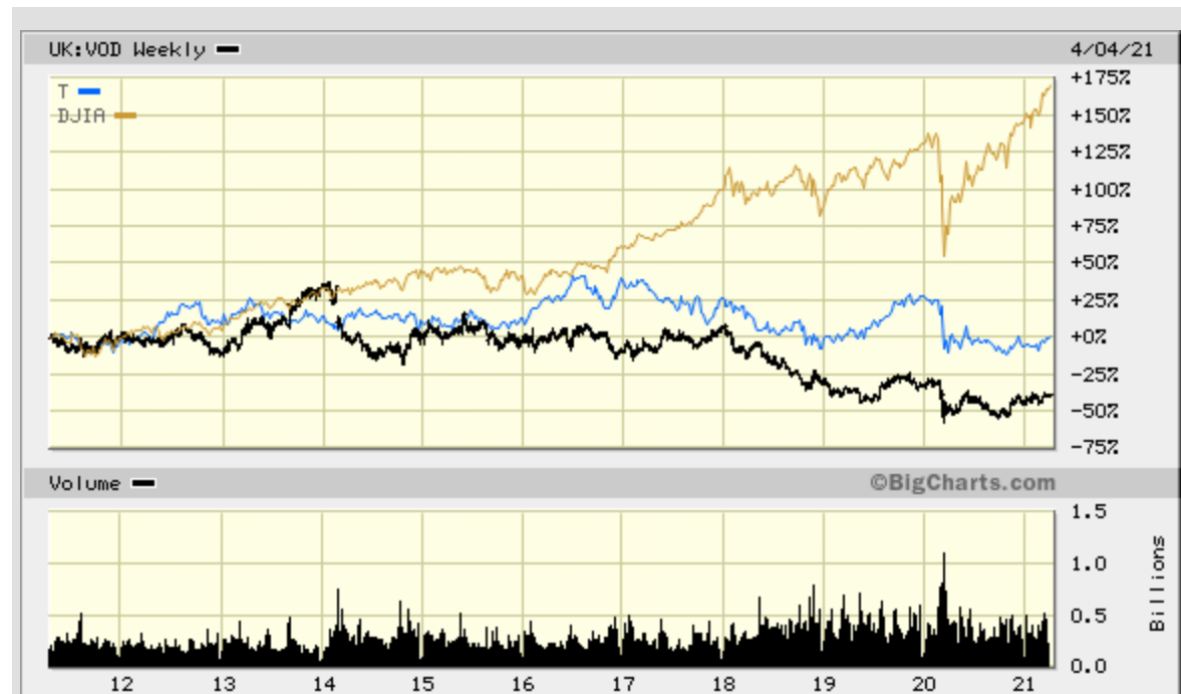
The future of wireless networks

Professor William Webb

June 2021

Operators do not have much financial leeway

- MNO revenues not growing, debt burden often heavy, investors getting frustrated
- Capex levels anticipated to remain flat...meaning supply industry not growing either



Vod: Vodafone
T: AT&T

Despite telecoms being critical in the Covid era, telcos continue to disappoint

Average total shareholder return, February 17–December 15, 2020

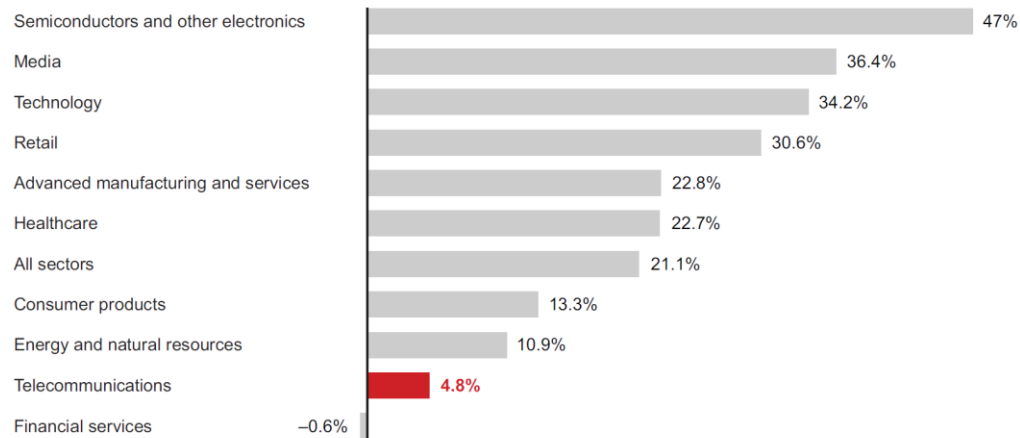
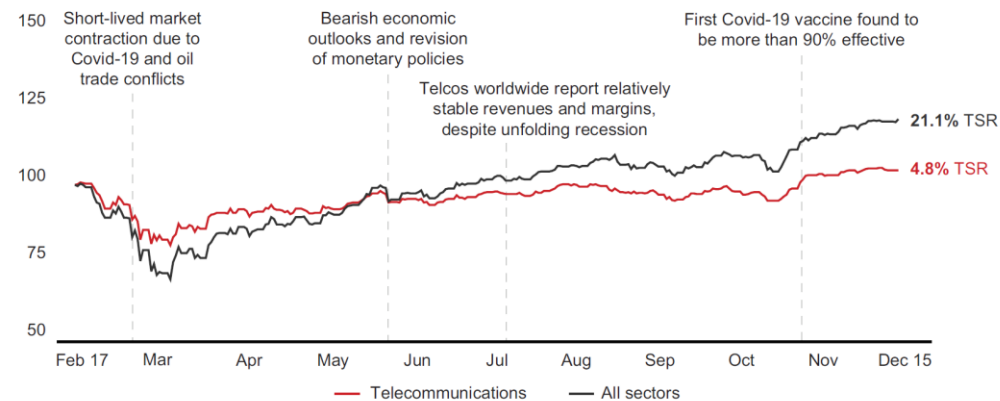


Figure 2: The gap in shareholder return between telecommunications and other sectors has widened since the pandemic began

Average total shareholder return, indexed to Feb. 17, 2020, share prices



Problems with the status quo of network deployment

- 5G is being deployed on existing macrocells that were designed for 800MHz/1.8GHz propagation
- But 5G uses 3.5GHz with much worse propagation
- As a result, SNR levels are low, and so spectrum efficiency is low
- In fact, 5G efficiency in such a deployment is little better than 4G
- Changing to a small cell grid would solve this problem – but MNOs cannot afford it

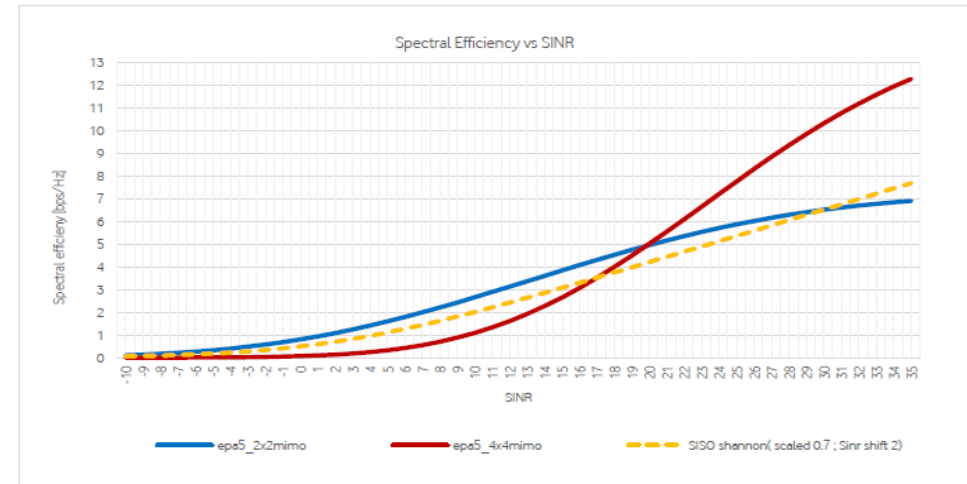


Figure 2 – SINR effect on spectrum efficiency



Red = 4x4 MIMO
Blue = 2x2 MIMO
Yellow = no MIMO

Working towards an optimal network

- Everything is connected wirelessly – that means we need wireless everywhere
- Wireless in-building *much much* better provided from within
 - Better signal level
 - Building fabric acts to reduce interference between cells
 - Wi-Fi must be provided, most laptops, tablets, etc only have Wi-Fi
 - Cellular is less necessary indoors but 5G important where URLLC or similar needed
- Wireless outdoors is cellular – but if indoor traffic moves to in-building networks then coverage simplified and data demands mostly off-loaded
- Excellent fixed broadband needed to every building

Implications for spectrum

- In-building becomes key
 - Home and office
 - Verticals
- MNOs will not deploy except in high footfall locations – history has demonstrated this and their financials prevent it
- Hence it will be self-deployment or neutral host networks
 - Either need access to spectrum not tied to an MNO that all handsets can use
 - Some can be unlicensed but also a need for some that can deliver 5G services

This is not nice-to-have spectrum in addition to the MNOs, it is the critical spectrum that carries 80%+ of the traffic and is deployed on 95%+ of the cells

5G use cases and business models

18 June 2021

Tony Lavender

Today – focus on demand and business models

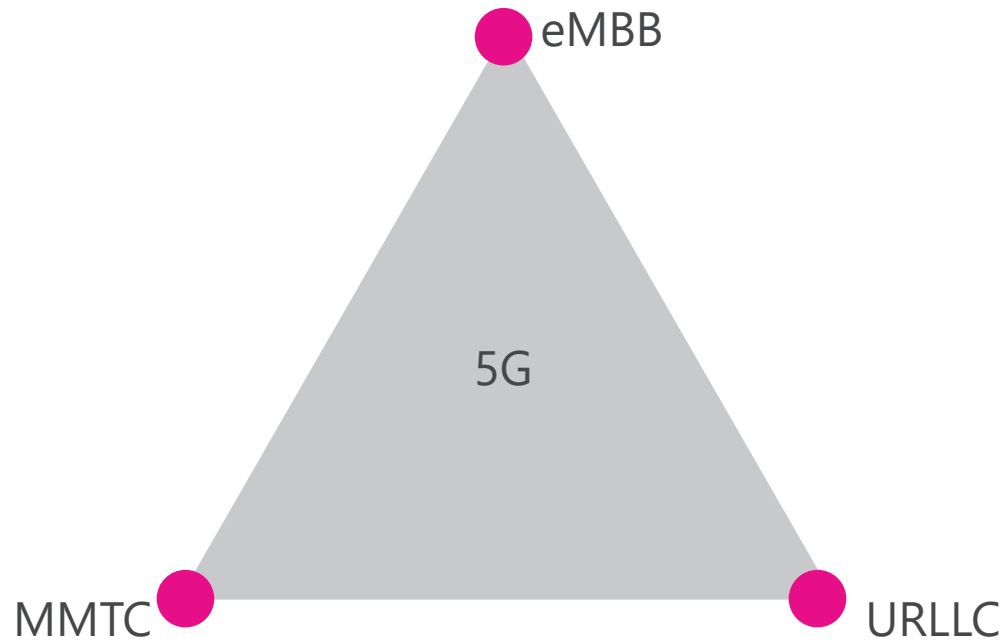
- Some recent research (mainly around 26 GHz) undertaken by Plum identified:
 - There is a lot of interest in 5G use cases (see next slide)
 - There is uncertainty about how the use cases can be realised
 - Key areas of concern are:

Access to the eco-
system

Access to suitable
spectrum

Impact of the above on the
business case

Use cases



- 5G was defined to support a wide variety of use cases
- The predominant use so far is in non-standalone mode for eMBB
- Development is still happening on mMTC and URLLC features
 - Release 16 (frozen) – latency and reliability improvements to support mMTC and URLLC implementations for (industrial) IoT
 - Release 17 (being worked on) – support for growth, XR and more IoT capability
- “Full” 5G support is still evolving, which will influence the timing of spectrum demand

Use cases that may require localised spectrum supply

- Industrial – factory / manufacturing campus
- Sea and airports
- Transport and logistics hubs
- Mining / resource extraction
- Agriculture
- Stadium / entertainment
- Video production

Location

Traffic profile

Traffic density

Resilience and security

Which cases could operate with shared spectrum access?
What are the parameters driving this decision?

Options for spectrum supply

- Good practice suggests moving from the minimum applicable conditions to deliver the desired outcome (through a general authorisation) to the addition of justified and proportionate additional conditions (individual authorisation)
- Three options:
 - Licence exempt – subject to technical conditions
 - Light licensed – registration / agreement between spectrum users for it to work / authorised with specific conditions
 - Individual authorisation – specific authorisation / licence

Sharing

Static

Dynamic

Geo-location database(s)

Dynamic Shared
Access (DSA)

Trading

Trading
(Transfer or lease)

Questions

- What use cases are likely to emerge and when?
- What are their spectrum requirements (bands, amount of spectrum)?
- What security of access is needed?
- What flexibility is possible for the demand case?
- Will shared access work and under what conditions?