



The 5th UK Mobile Network

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April 2021

Who are we?



James Body



Peter Gradwell

What problem are we solving?

Global market for mobile connectivity is dominated by the large, incumbent operators who offer templated mobile services focused on consumer usage.

Telet is a new mobile operator focused on improving rural coverage and delivering 5G networks.

Not Spot Mobile Coverage

Deployment of improved not-spot coverage via small cells

Ideal for filling in connectivity in valleys & nooks that conventional macro sites do not cover

Multi-Operator Neutral Host (MONeH) - provides access for ALL networks via local roaming

Private 5G

Industrial Use Cases

Acting as a systems integrator for 5G radio & “core” software vendors

Contributing bespoke MNO capabilities, such as SIMs & public/private roaming

Tailoring network configuration to deliver custom performance

5G Fixed Wireless Access

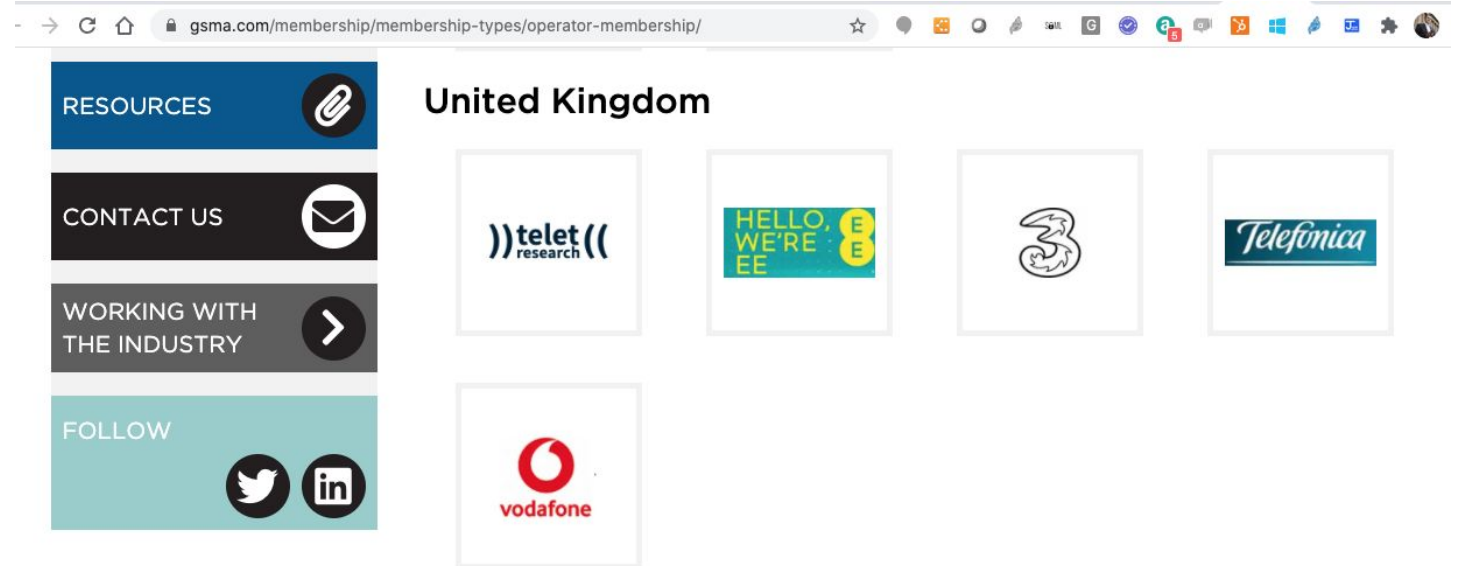
High Speed Internet Access for the “last 5%” of customers where fibre is not available, using N77 based 5G services

5G is complex to deploy, but offers greater range & resilience than licence free radio solutions (e.g. WiFi)

Telet will act as a wholesale mobile network enabler service to the ~120 Wireless ISPs to allow them to deploy their own 5G services

A 5TH UK MOBILE NETWORK OPERATOR

- Recognised as a full operator member by the GSMA
- Provides equivalence of access under GSMA rules
- Changes to UK Mobile Spectrum rules in 2019 enable new network operators & private deployments



Network Delivered by:

Utilising both Local (EE, Vodafone) and Shared access spectrum in Bands 3, 38 and n77

OFCOM Mobile Numbering & MNC Code

Network Core in Telehouse North, London

The Telet Network Deployment

Telet is building a Multi-Operator Neutral network, that permits inbound roaming for all subscribers, via standard GSMA roaming.

Multi Operator Neutral Host provides “local roaming” for the “last 5%” of Not Spots via a **cost effective** and **sensitive** deployment of small cells that **support improved service for all** operators.

The initial deployment in 2020 for the Telet MONEH service is focused on five initial sites in support of the DCMS Rural Connected Communities and 5G Create programme.

Additional sites will roll out in 2021 and can be guided by demand (e.g. Operator Requests, SRN, Scottish Infill Programme, OFCOM NotSpot data)



Standard “big tower” deployment by MNOs is **unwelcome** in rural communities; **takes time** to gain planning & deploy; is **expensive** ~ £4000 per house.

Telet Small Cells are **quick** to deploy; **good value** (~£1000 per house); and **visually appealing**



MONeH: How good is UK Rural Coverage?

Figure 14: Indoor premises coverage of 4G data services in the UK

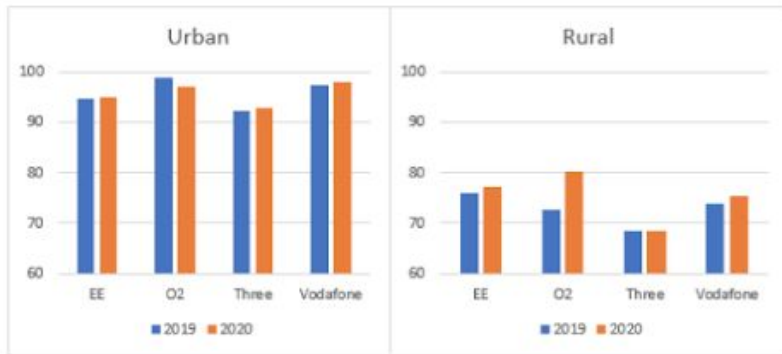
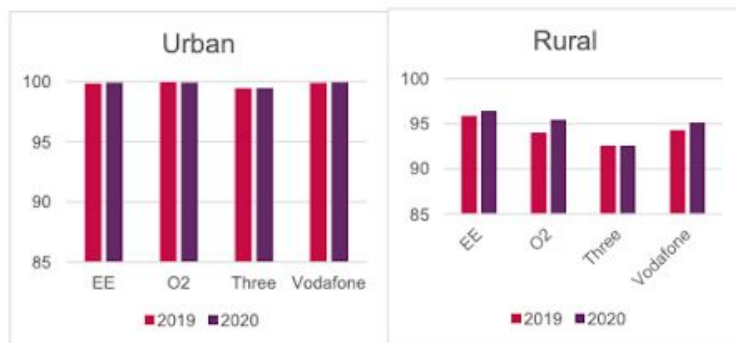


Figure 13: Outdoor premises coverage of 4G data services in the UK



Source: Ofcom analysis of operator data

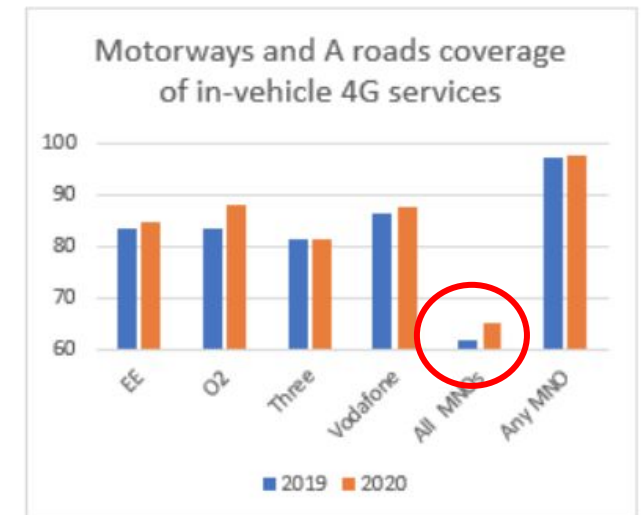


UK has many Not Spots - even in areas that MNOs claim as 'covered'

SRN/ESN Focus is on Single Operator Coverage - not cost effective to deploy 4x

MNO coverage maps do not show the many dips and valleys that harbour not spots

Indoor - coverage remains poor

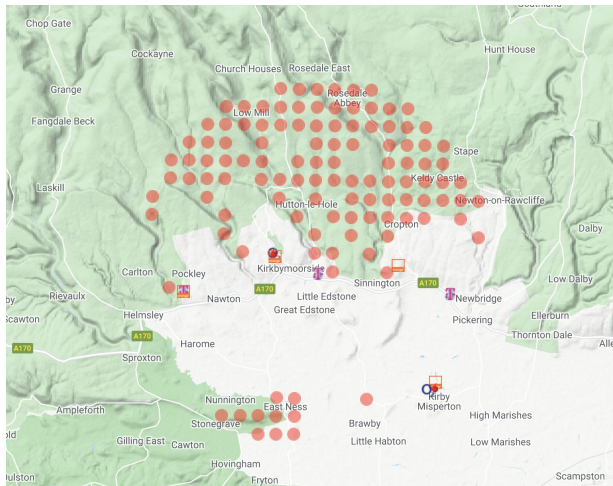


MONeH: How bad is coverage? How big is the not-spot demand?

1.7m houses with 1 or no providers (2G); 80k with no signal

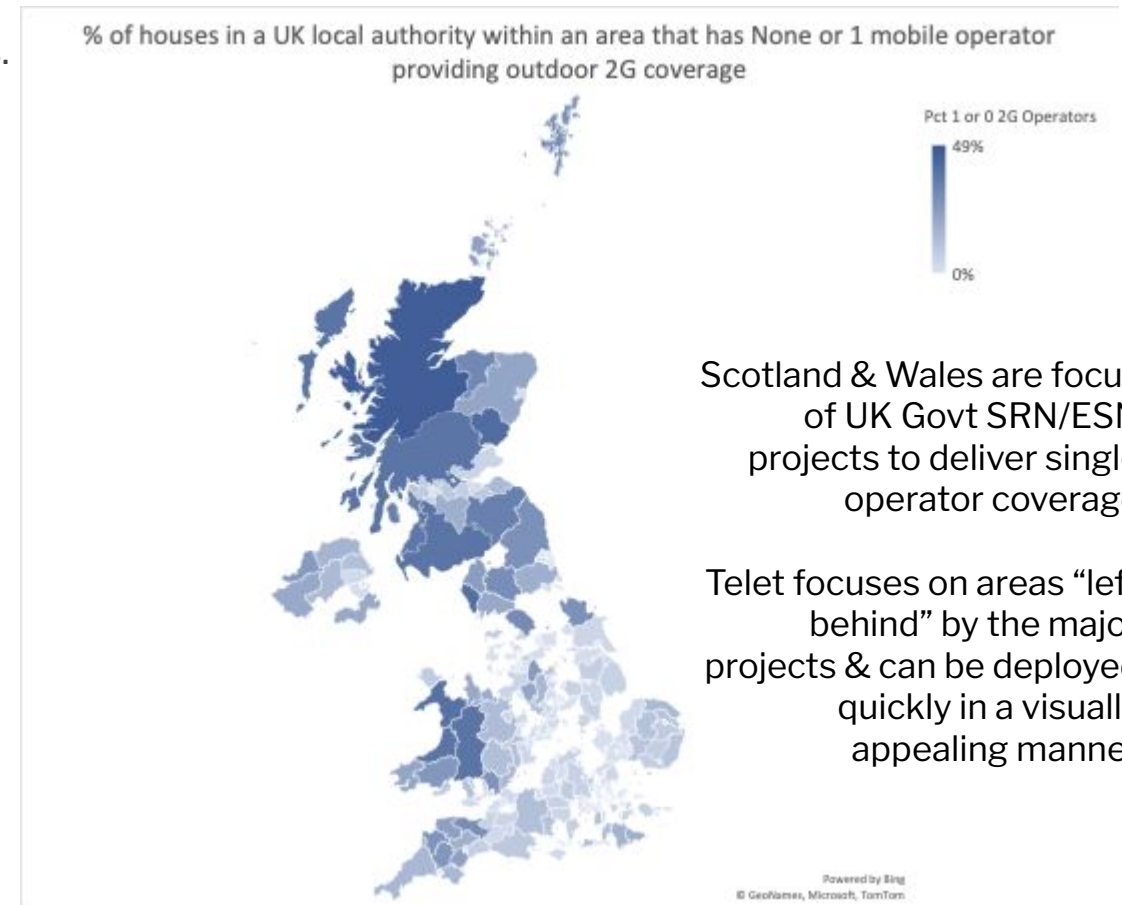
UK focus on coverage by one operator (the current DCMS/SRN objective) hides the coverage challenges for tourism, visitors & business.

When we “zoom in” we can often find localised not-spots which are hidden in dips or valleys, for example as shown in North Yorkshire (red dots):



According to OFCOM Connected Nations 2020, there are ~1.7m houses across multiple local authorities, with either none or one provider giving outdoor 2G coverage. RAND Research (for OFCOM) said that in 2015, there was 80,000 households with no mobile signal. https://www.rand.org/pubs/research_reports/RR641.html

Mapping the Not Spots



Scotland & Wales are focus of UK Govt SRN/ESN projects to deliver single operator coverage

Telet focuses on areas “left behind” by the major projects & can be deployed quickly in a visually appealing manner

MONeH - The Solution

National Roaming

- Broad sharing of networks is unpopular
- Network differentiation is a key selling point.
- Very difficult to implement - drives congestion
- MNOs accepted Coverage Obligations as part of Sajid Javid's efforts in 2014, which have ultimately lead to SRN

Local Roaming

- Only operates in region where there is no coverage
- Neutral party, so not competitive & grant fundable
- Commercially viable - can run all operator customers on one infrastructure

How we built it & the challenges we faced

James Body



Building the network

5G Non Stand Alone (NSA) vs 5G Stand Alone

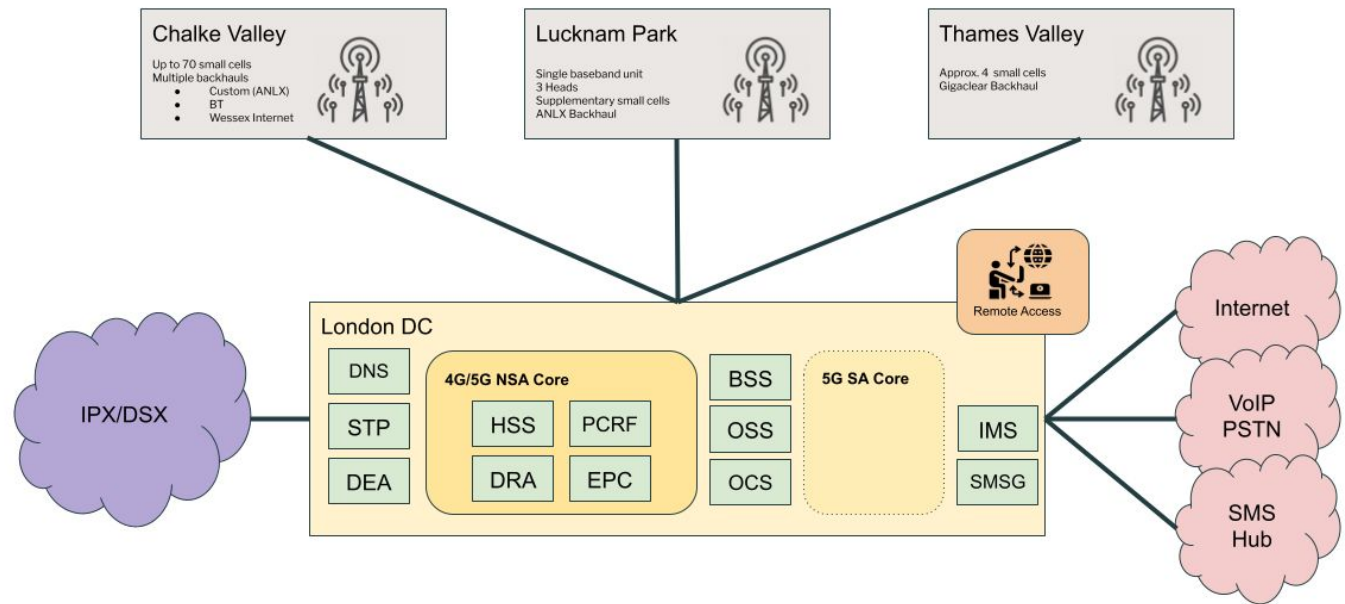
- NSA - 4G core (DIAMETER signalling) with 4G anchor and 5G secondary channels (using CA)
- SA - 5G core (HTML/2 signalling)
- All current live UK MNO deployments are 5G NSA
- MONEH on NSA only until 2023+

Central core combination of

- Commercial - Polaris, Attocore
- Open source - Kamailio IMS

Radio Selection for 5G:

- Nokia
- Cablefree
- Airspan
- Benetel / Accelleran



Spectrum Options

The UK leads the World with two new ways of gaining licenced access to mobile spectrum for commercial utilisation. Shared licencing, whilst more limited, is much quicker & more reliable to access.

Local Licencing

- Allows a user to make an application to OFCOM, for a licence to use some spectrum that is already allocated to an MNO.
- Licence duration is typically 3 years, up to 10 year max.
- £950 application fee per site
- Need to evidence why the spectrum is not in use, usually via survey with typical cost ~£7000
- Some MNOs may charge an admin fee, as it is a difficult & manual process for them to agree to release spectrum.
- Time frames for licence grants are highly variable & dependent on OFCOM and MNO workload.
- Where available, EE & Vodafone (going to O2) are known to grant access to 2600MHz (Band 7 [FDD] and Band 38 [TDD]) which are widely supported and offer very good performance characteristics.

Shared Licencing

12 month licence fee for low (50m) or medium power licences.

1800Mhz LTE B3 £80 per year	1781.7 to 1785 MHz paired with 1876.7 to 1880 MHz	2-3 Kilometres of low speed 4G service (~20Mbps), calls & texts. Widely supported. NB this is 3.3Mhz, not 5Mhz which is the normal channel bandwidth in equipment
2300Mhz LTE B40 £80 per year	2390 to 2400 Mhz	10Mhz, but less equipment supports this band Indoor only
5G band N77 100Mhz £800 per year	3800-4200Mhz	Gigabit capable, 5G spectrum Ideal for FWA



Most useful spectrum



Key Challenges (and Solutions)

<p>Regulatory</p> <p>OFCOM & Mobile Network Codes Security</p>	<p>SIMs</p> <p>Difficult to source in small quantities Complex to configure Multi-profiles</p>
<p>GSMA</p> <p>Full Operator Network Status Access to MNO info and procedures</p>	<p>Traffic Settlement</p> <p>Complex and difficult to implement 5G Billing and Charging Evolution (BCE)</p>

Commercial Model

Rural ISP / WISP owns & operates the radios, providing power, mast and backhaul

Telet delivers the backend, roaming, settlement & SIMs

UK Government investigating support for **MONeH** services (serving ALL networks) - including the radios, providing power, mast and backhaul

Rural ISP can now deliver:
Improved mobile coverage
and
5G based Fixed Wireless Access

Conclusions

There is a wide UK demand for improved mobile coverage which will not be met by the large operator & UK Government initiatives.

Geography of the UK lends itself to small cell deployment, with many pockets of land to infill

Telet's strategy of delivering improved rural coverage combined with niche mobile operator services makes a positive & profitable contribution to one of societies great challenges.

Interested in working with UKNOF members to expand our footprint.

Thank you

Any Questions?

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