

# **Economic Growth Overview & Scrutiny Committee**

## **Learning and Skills Focus Group**

**Dorset County Council**



**Mobile Phone Coverage in Dorset**

Date of Meeting	16 October 2017
Officer	Richard Pascoe, Head of ICT and Customer Services
<b>Subject of Report</b>	<b>Mobile Phone Coverage in Dorset</b>
Executive Summary	<p>Mobile digital communications has become an integral part of home and business life, essential for social integration and economic prosperity. Since its introduction in the 1990s, it has become an accepted and welcome additional means of communications, with 95% of UK adults owning a mobile phone. As the technology has improved and speeds increased greater functionality has been made available, more than two thirds of UK adults now regularly access the internet via smartphones.</p> <p>Lack of good mobile phone connectivity is a barrier to economic growth and social inclusion. Businesses rely on being able to connect anywhere. Rural communities and the younger generation face isolation without good mobile connectivity.</p> <p>Dorset is in a good position for fixed line broadband with over 94% (DCC area) having access to superfast speeds (24Mbps or greater), however the same cannot be currently said of mobile connectivity. The latest generation of signal known as 4G continues to be rolled out, however Dorset continues to lag significantly behind the national average coverage.</p> <p>Resource needs to be focussed on engaging with the Mobile Network Operators (MNOs) at a much higher level and with greater regularity, to support them in improving the 4G coverage across Dorset. Dorset needs to be seen as an easy place for them to increase coverage to support their national requirements.</p> <p>Industry and Ofcom collectively state 2020 is the earliest date for 5G deployment, the next generation technology, which will be commercially led into areas of highest demand first. Early and on-going engagement with the market leaders in 5G is essential as in infrastructure planning terms 5G requires immediate attention to ensure Dorset is part of future 5G activities and to avoid a similar coverage lag to that currently being experienced with 4G.</p> <p>This report sets out what mobile coverage there is, what can be done to improve this and by what means and to identify areas without a signal, what investment will be needed and how will this be provided.</p> <p>The Committee's Focus Group is asked to give this consideration in its deliberations.</p>
Impact Assessment:	<p><b>Equalities Impact Assessment:</b></p> <p>The Superfast Dorset Programme has been subject to an equalities impact assessment that confirmed the positive impact that improved digital infrastructure will have, and the Mobile</p>

	<p>Project forms part of the previously endorsed Digital Infrastructure Strategy. Some hard to reach areas may not achieve improvement - these will tend to be in the most rural parts of the county, where commercial, technical, geographic and topological issues have greater impact.</p> <p>Use of Evidence:</p> <p>Evidence in this report is sourced from publically available websites and central government reports listed in the background papers section below</p> <p>Budget:</p> <p>There is no capital provision to support the improvement of mobile phone coverage and this would likely be problematic in terms of state aid approval.</p> <p>The actions set out in this paper can be delivered from resources within the Superfast Dorset programme team for this financial year only.</p> <p>Risk Assessment:</p> <p>Current Risk: MEDIUM Residual Risk: LOW</p> <p>By fully realising the benefits of the Mobile Project, set out in the Appendix, economic growth priorities and sectors can be supported; communities and businesses can thrive and prosper and public sector transformation can be supported.</p> <p>Without realising the benefits risks Dorset continuing to lag behind the national level of coverage and be perceived as poorly connected, negatively impacting economic growth.</p> <p>Other Implications:</p> <p>Without access to functional mobile phone signal, lone or remote working practices within parts of the council/ wider public sector are hindered.</p> <p>Community safety can be impacted in certain scenarios where blue light support cannot be called due to a lack of mobile phone signal.</p>
<p>Recommendation</p>	<p>That the Committee's Focus Group be asked to consider the information included in this report and review actions set out in section 5 - to be managed as a workstream within the Superfast Dorset programme - with a view that any agreement of outcomes being made in principle, be endorsed by the Committee at its meeting on 16 October 2017.</p>
<p>Reason for Recommendation</p>	<p>To better understand mobile data coverage (4G) in Dorset and influence commercial plans for improved coverage of both 4G and, in time, 5G mobile data services.</p>

Appendices	<ol style="list-style-type: none"> <li>1. Mobile project work stream plan</li> <li>2. Mobile phone 1G to 5G infographic, European Commission, 2016</li> <li>3. 4G summary, Ofcom, December 2016</li> <li>4. Maps of 4G coverage across Dorset from late 2016</li> </ol>
Background Papers	<p>Links to coverage information:</p> <ul style="list-style-type: none"> <li>• <a href="#">Maps of 4G coverage, Which, January 2017</a></li> <li>• <a href="#">Maps of 4G coverage, Ofcom, January 2017</a></li> <li>• <a href="#">Current mobile coverage map, Vodafone</a></li> <li>• <a href="#">Current mobile coverage map, EE</a></li> <li>• <a href="#">Current mobile coverage map, O2</a></li> <li>• <a href="#">Current mobile coverage map, Three</a></li> </ul> <p>Links to background papers:</p> <ul style="list-style-type: none"> <li>• <a href="#">Communications Market Report, Ofcom, August 2016</a></li> <li>• <a href="#">Future use of Mobile Telecoms in the UK, NIC, October 2016</a></li> <li>• <a href="#">Rules for 5G spectrum sale, Ofcom, November 2016</a></li> <li>• <a href="#">Greater Connected, Strategic Connectivity in South West England, 2016</a></li> <li>• <a href="#">Connected Future, NIC, December 2016</a></li> <li>• <a href="#">5G infrastructure requirements for the UK, LS Telecoms for the NIC, December 2016</a></li> <li>• <a href="#">Incentives to invest in 5G, Frontier report for the NIC, December 2016</a></li> <li>• <a href="#">Exploring the Cost Coverage and Rollout Implications of 5G in Britain, Oughton and Frias report for the NIC, December 2016</a></li> <li>• <a href="#">Connected Nations Report, Ofcom, December 2016</a></li> <li>• <a href="#">House of Commons Briefing Paper on 5G February 2017</a></li> <li>• <a href="#">UK 5G Strategy, DCMS, March 2017</a></li> </ul>
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## 1. Purpose of report

1.1. To explore, analyse, review and summarise the current position and potential future of mobile coverage across Dorset.

## 2. Background

2.1. Mobile phone network connections are broadly defined as either 2G, 3G or 4G, with 5G under development. Ofcom, the UK's communications regulator, manages access to the radio spectrum mobile network operators (MNO) use. Ofcom auctions spectrum space to avoid conflict in frequencies between operators or technology.

2.2. There is a lag between the sale of spectrum space and the deployment and commercial delivery of products and services by the MNOs. The table below provides an overview of this:

Summary of mobile technologies					
Technology	2G	3G	4G / 4GLTE	4G LTE A	5G
Ofcom spectrum sale	1991	2000	2012	2014/15	2017/18
Technology became available in UK	1992	2003	2012 (EE) 2013 (others)	2016/17	est. 2020-2025
Average 'real world' download speed	80Kbps	6.1Mbps	15Mbps	60Mbps	1Gbps
Theoretical 'real world' max download speed	100Kbps	7.2Mbps	150Mbps	300Mbps	10Gbps

2.3. The mobile network infrastructure operates in a similar way to the fixed line broadband sector, inasmuch that wholesale organisations provide platforms for retailers to offer products and services to end users. As well as each of the MNOs selling directly to the end user the table below gives an overview of the market:

Current (2017) 4G resellers	
Network provider	Resellers
EE	BT, Plusnet, Virgin Media, ASDA, The Phone Coop, Axis Mobile, Delight Mobile, Natterbox, Vectone Mobile
O2	Sky, Talk Talk, Tesco, Giffgaff, Lycamobile
Three	iD Mobile, Freedom Pop, TPO, Globalgig, Candy Telecom
Vodafone	Talk Mobile, Allpay Mobile, Cortel Telephone, Glemnet, Highnet, Lebra Mobile, Ownphone, Zext4 Mobile

### 3. The current position

- 3.1. By the end of 2016 mobile phone ownership in the UK had risen to 95% of the population, with over 75% owning a smartphone.
- 3.2. 4G network coverage continues to be expanded by each of the MNOs to reach their Ofcom licence required levels, 90% of the UK geography by the end of 2017. However individual MNO expansion plans are not publicly available.
- 3.3. The NIC (National Infrastructure Commission) is the central government department set up to provide expert advice on infrastructure challenges and has been critical of UK 4G coverage, ranking the UK 55<sup>th</sup> out of 80 countries.
- 3.4. Delivery of the £1.2bn 4G Emergency Service Network (ESN) contract awarded to EE in December 2015, with expected completion in 2020, will further improve coverage of EEs core network to 95% of the UK geography and 99.8% of the UK population.
- 3.5. Dorset County Council has no capital budget to influence the deployment of 4G infrastructure as it has for fixed line superfast Next Generation Access (NGA) broadband. There would be significant State Aid implications to overcome prior to any public subsidy of infrastructure. BDUK, and the Mobile Infrastructure Programme (MIP), with a £150m national budget it sought to subsidise publicly open access mobile infrastructure (masts) into areas of market failure. However, this programme's success was very limited and it only delivered 3 new sites in Dorset although a higher number were proposed.
- 3.6. The table below shows the current (Ofcom - December 2016) outdoor coverage levels of different spectrums by any provider's mobile network, taken from the Connected Nations report.

2G	Dorset	England	Difference to England
Combined	84%	95%	-9%
Urban	92%	98%	-6%
Rural	60%	71%	-11%
<b>3G</b>			
Combined	83%	95%	-12%
Urban	92%	98%	-6%
Rural	59%	71%	-12%
<b>4G</b>			
Combined	62%	90%	-28%
Urban	70%	94%	-34%
Rural	39%	61%	-22%

- 3.7. Dorset continues to lag significantly behind the average coverage in England. Disappointingly, the reality of connections often differs from the positive headline statistics published by the MNO's and Ofcom, a recent Which survey showed 4G coverage from all 4 networks was only available in 40% of the Country.
- 3.8. Good 4G coverage is essential to enable public sector transformation, as poor coverage in areas prevents flexible working while it increasingly depends on fast, reliable connections to our systems and data.
- 3.9. Good 4G coverage is essential to support key sectors grow, agriculture, advanced engineering and tourism are sectors which would be directly improved with better 4G coverage. Agriculture now embraces technology and automated vehicles and milking parlours etc. require good 4G coverage. Tourism is supported by enabling the digital 'word of mouth' to sell Dorset as a destination to a visitor's friends and connections via social media.
- 3.10. Good 4G coverage is essential to make Dorset a business destination. Business is something you do, not somewhere you go and being disconnected prevents business transactions from taking place. Without 4G coverage to match coverage levels of fixed line broadband the benefits of the significant investment made to fixed line superfast broadband are diluted as the perception in the business community is that Dorset has a poor digital landscape simply by looking at mobile phone signal – everyone has a gauge for this in their pockets.
- 3.11. Current mobile coverage on primary transport routes into and through Dorset need significant improvement. Public transport providers need to be engaged as it is now expected that connectivity is available on trains or buses which are either significantly below average or not available in Dorset.

#### **4. The future – 5G**

- 4.1. 5G networks are expected to enable 1000x the data volume transit of current mobile networks. As mobile technology advances greater bandwidth will be needed by each device, currently the iPhone7+ can download data at 500+Mbps.
- 4.2. 5G networks differ significantly to those which came before. Current 4G networks operate from 'traditional' large base station masts providing coverage to a wide area. 5G has a much shorter range and will require a far higher number of small cell base stations across an area to enable a strong signal.
- 4.3. 5G auction update from Ofcom <https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2016/ofcom-outlines-rules-for-mobile-spectrum-auction>
- 4.4. Bournemouth BC is progressing pilot activity for the mapping systems required to model 5G network coverage, an essential precursor to any UK 5G roll out. Ordnance Survey have been working with Bournemouth Borough Council to complete their survey and modelling work over the last year.
- 4.5. Ofcom are not setting coverage requirements within the auction of 5G spectrum space, because the frequencies being sold are best suited for delivering greater network capacity, not achieving wide geographic coverage

- 4.6. 5G will create the environment required for a mobile eco-system harnessing the social and economic potential mobile phones alone have failed to deliver. The often mentioned Internet of Things (IoT)<sup>1</sup> will become a reality with broad availability of low latency high data capacity mobile networks. 5G is more about billions of simultaneous devices communicating with each other than the download speed improvement it will offer individual users.

## 5. Superfast Dorset's Mobile Project

- 5.1. Within the Digital Infrastructure Strategy, requirements to improve mobile coverage have been identified. The work plan contained in Appendix 1 has been designed to support the delivery of improved mobile coverage.
- 5.2. Long term commitment to working with Mobile Network Operators (MNO) needs to be demonstrated by Dorset County Council to build positive relationships to be able to influence commercial network expansion.
- 5.3. The Mobile Project in summary:

### Objective

To understand, influence and improve current and future mobile network coverage, speed and capacity across Dorset.

### Outputs

Improved working relationships with all the 4 major MNOs  
Detailed and geospatial coverage data of current (4G) networks  
Identified Not-spots / areas of need  
Committed resource to a public sector working group focussed on improving mobile network demand and coverage  
Coordinated management of relevant data within the Superfast Dorset programme of mobile coverage information  
Early and comprehensive strategic economic growth site coverage

### Outcomes

Improved mobile coverage levels across Dorset  
Closure of the gap between Dorset coverage and coverage across England

- 5.4. Commitment and resource needs to be focussed on the mobile digital sector to replicate the understanding, influence and success achieved in the fixed line digital sector.
- 5.5. Dorset County Council is best placed to support the continued improvement of 4G network coverage and access speeds in the short to medium term, whilst simultaneously supporting early 5G pilots and commercial trials

### Actions:

- 5.6. Areas of need of mobile signal improvement (not spots) need to be tracked across Dorset, this intelligence is an essential prerequisite to be bid for future Government funding in this area.

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<sup>1</sup> the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data



- 5.7. Greater work needs to be done to understand the passive infrastructure (ducts, masts, tall buildings etc.) owned by the public sector across Dorset which could be beneficial to digital infrastructure providers.
- 5.8. Opportunities to steer or influence the £1.2bn Government investment in the Emergency Service Network (ESN) provided over the EE 4G network should be maximised.
- 5.9. A pan Dorset digital forum should be created, collating and identifying areas of need or commercial opportunity from both public and private sectors to the Mobile Network Operators.
- 5.10. Further opportunities should be explored to maximise the benefit of Dorset's high level of fixed line superfast broadband coverage, by utilising the core fibre optic network to provide 4G coverage into areas previously unviable for commercial deployment.
- 5.11. Public transport and physical infrastructure providers along the primary road and rail routes in Dorset need to be engaged with and support improvement of mobile or Wi-Fi coverage.

The Committee's Focus Group is asked to give this consideration in its deliberations, with a view to the endorsement of any outcomes which are made in principle, by the Committee at its meeting on 16 October 2017.

**Mike Harries**  
**Corporate Director for Economy and Environment**  
June 2017

## **Appendix 1** – *Superfast Dorset Mobile Project Work Plan*

1.1. Within the Digital Infrastructure Strategy, mobile coverage improvement is referenced. The following work plan has been designed to support the delivery or improved mobile coverage:

### Objective

To understand, influence and improve current and future mobile network coverage, speed and capacity across Dorset.

### Outputs

- Improved working relationships with all the 4 major MNOs
- Detailed and geospatial coverage data of current (4G) networks
- Identified Not-spots / areas of need
- Committed resource to a public sector working group focussed on improving mobile network demand and coverage
- Coordinated management of relevant data within the Superfast Dorset programme of mobile coverage information
- Early and comprehensive strategic economic growth site coverage

### Outcomes

- Improved mobile coverage levels across Dorset
- Closure of the gap between Dorset coverage and coverage across England

### Benefits

- Dorset's external perception as a digital county is reinforced
- Economic growth priorities are supported
- Economic growth sectors are supported
- Public sector transformation via mobile working is supported
- Communities are supported to be independent and prosperous

1.2. The threads to the Mobile Project are briefly described below. These integrate and interrelate with other work streams within the Superfast Dorset Programme.

1.3. Understanding the picture

- Actively engaging with MNOs to receive regular and detailed updates
- Build detailed and coherent data sets to clarify coverage levels and areas of need
- Local planning department input, new mast sites and future premises growth
- Public sector assets (Dorset Property, Dorset Highways, partner sites) suitable to site masts and infrastructure
- Public sector demand / commercial opportunity

1.4. Meeting the need

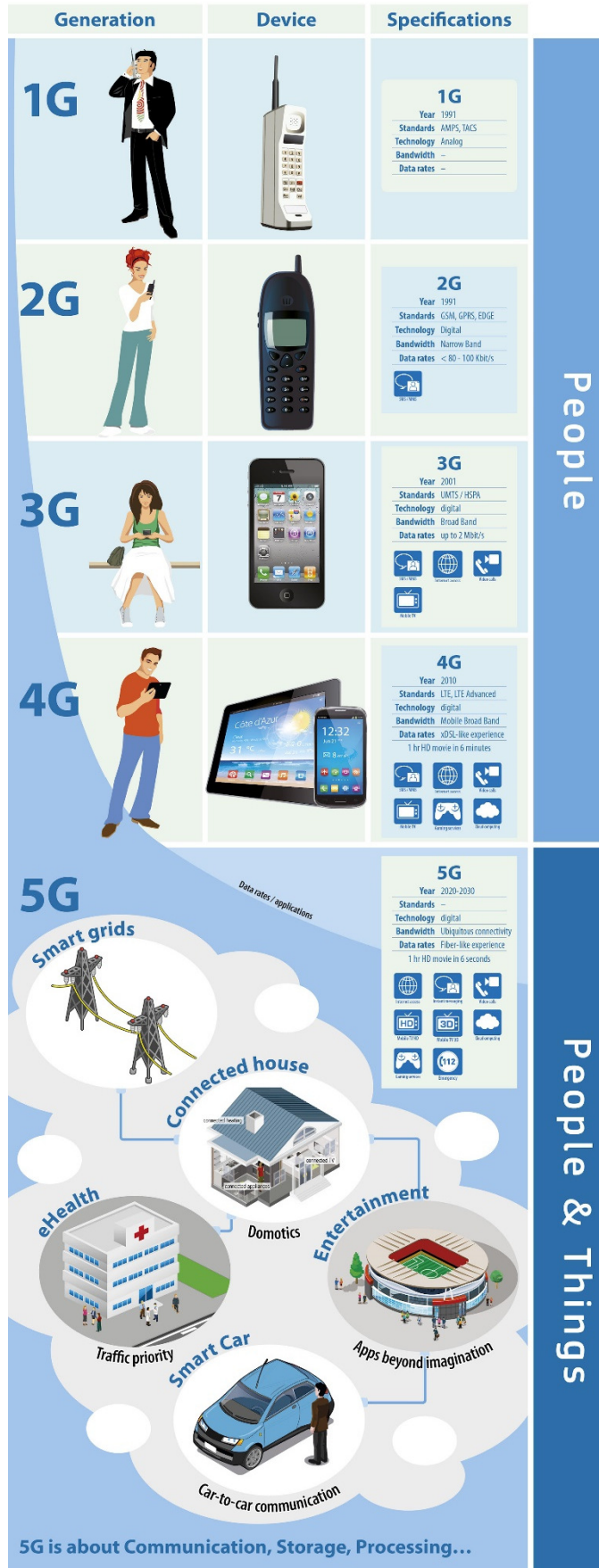
- Early Enterprise Zone; BIG programme and Western Dorset Growth Corridor focus
- Identify and prioritise 'not spot' coverage by areas of business density
- Work with Government to maximise opportunities for early 5g activity
- Work with Government on the 'blurring of lines' between mobile signal and in home Wi-Fi

- 1.5. Selling the success of Digital Dorset through:
  - Economic Development Officers
  - Inward Investment
  - Dorset LEP engagement and support
  - Communications team
  
- 1.6. Although Dorset County Council cannot directly influence MNO network expansion we bring the following elements to the table:
  - Access to public sector land and assets to locate mobile network infrastructure
  - Engagement with our partners and stakeholders
  - Support for expansion plans
  - Community engagement routes
  - Community led / focussed deployment initiatives
  - Identification of commercial opportunities to MNOs, such as growth in public sector demand / site rationalisation e.g.LGR
  
- 1.7. Areas of need of mobile signal improvement (not spots) need to be tracked across Dorset, this intelligence is an essential prerequisite to improve the situation.
  
- 1.8. Greater work needs to be done to understand the passive infrastructure (ducts, masts, tall buildings etc.) owned across the public sector in Dorset which could be beneficial to digital infrastructure providers
  
- 1.9. Opportunities to steer or influence the £1.2bn Government investment in the Emergency Service Network (ESN) provided over the EE 4G network should be maximised.
  
- 1.10. A pan Dorset digital forum should be created, collating and identifying areas of need or commercial opportunity from both public and private sectors to the Mobile Network Operators.
  
- 1.11. Long term commitment to working with Mobile Network Operators (MNO) needs to be demonstrated by Dorset County Council to build positive relationships to be able to influence commercial network expansion.

Objective	Description	Tasks	Timescale
Engage with Mobile Network Operators to understand and influence coverage across Dorset	National 4G coverage targets set by Ofcom, what does this mean for Dorset?	<p>Arrange meetings with senior officers and elected members / portfolio holder with each of the MNO:</p> <ul style="list-style-type: none"> <li>- Vodafone</li> <li>- EE</li> <li>- Three</li> <li>- O2</li> </ul> <p>Follow up meetings with regular correspondence to build positive relationships</p> <p>Support MNOs with access to internal resource</p>	Quarterly - ongoing
Collate a single view of current mobile coverage across Dorset, identifying 'not spots'	Carry out an OMR (Open Market Review) style consultation with the MNOs to accurately build the positive picture of coverage, and therefore be able to provide the negative view and identify areas in need of support.	Seek data sets from each MNO identifying mast locations, frequencies used on each site, range and know not spots, future expansion plans etc.	Annually - ongoing

Understand opportunities and constraints of emerging convergence of mobile and fixed line technology	The fibre optic network coverage has increased, as have mobile phone speeds and coverage, What are the possibilities to ensure everyone in Dorset has access to something?	Ensure all MNO understand and have access to the latest coverage dataSupport pilot schemes from MNOs e.g. Worth Matravers 4G with EE,	Quarterly - ongoing
Make local authority assets and land available for siting telecommunications equipment	Local authority assets (buildings, land and roads) could be used in areas to improve mobile coverage	Work with asset management teams to understand the potential and identify options / suitable assets  Work with MNO to understand their requirements	By end 2017
Expand EE's ESN network improvement into areas to benefit communities in need	Meet with all blue light and public sector users of the EE Emergency Service Network (ESN) to influence the deployment of additional infrastructure (required to meet license obligations) into areas of need in Dorset	Identify areas of need / not spots  Set up a pan Dorset forum to collate public sector demand  Engage with the EE ESN deployment team directly to influence plans	By end 2019

# Mobile communications: from 1G to 5G



People

People & Things

5G is about Communication, Storage, Processing...

### Appendix 3 - 4G summary, Ofcom, December 2016

Mobile services are playing an increasingly important role in our daily lives. This means consumers increasingly expect their mobile devices to work reliably wherever they are, whether at home, at work, or on the move. In this section we provide an update on the levels of mobile voice and data coverage achieved in different parts of the UK as of June 2016, and the total amount of mobile data being consumed. We also discuss the minimum levels of mobile signal needed to make a good quality voice call and how these relate to the mobile operators' geographic coverage targets for voice call services.

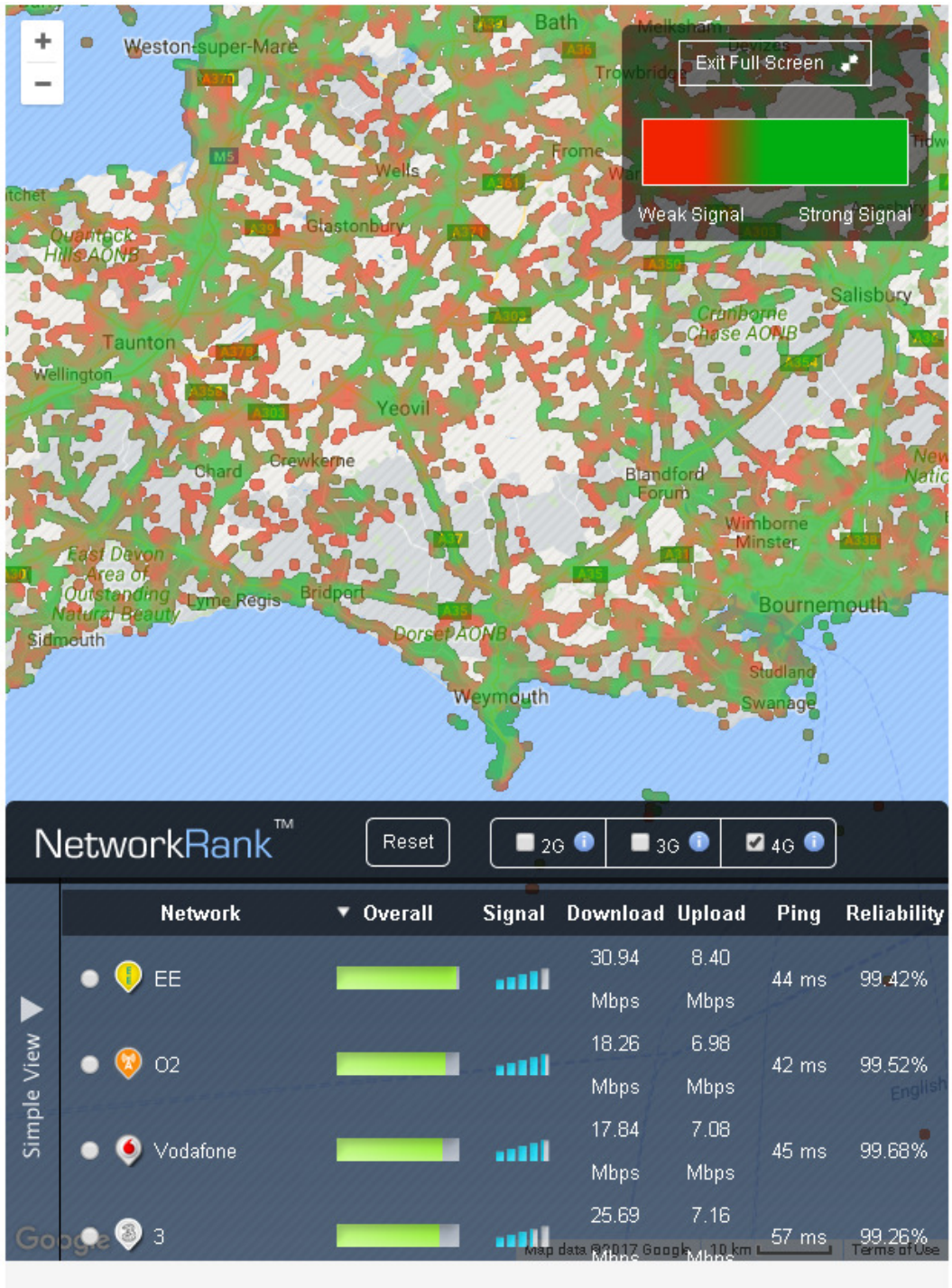
The key highlights are:

- **4G roll-out:** All four operators are in the middle of a major 4G roll-out programme, which provides, in some locations, similar connection speeds to those of fixed networks. To date, the roll-out of 4G services has primarily focused on providing higher-speed services to users in cities and towns. As it progresses, it is likely that 4G landmass coverage will continue to increase to at least match the coverage of earlier-generation 2G and 3G services. Some operators have also enabled voice calling on their 4G networks, which, together with voice over Wi-Fi, are helping to increase the number of places where consumers can make and receive voice calls.
- **Mobile data growth:** In the past year, mobile data consumption per subscriber has grown at a rate of 49%. Although still growing, this is less than last year's growth rate of 64%. It is almost identical to the data growth rate on fixed networks. The volume of data carried over mobile networks remains a small proportion (around 4%) of data carried over all networks.
- **More needs to be done to extend mobile coverage to all of the locations consumers want to use their mobile devices.** There are two main reasons why additional steps are likely to be needed to meet future consumer expectations on mobile coverage.
  - Firstly, the additional coverage improvements resulting from commercial investments by mobile operators in new network infrastructure will reach a plateau.
  - Secondly, the existing geographic voice call coverage targets in licences, requiring 90% landmass coverage by the end of 2017, are based on lower mobile signal levels than those we have found to be necessary from our field testing work to deliver a good consumer experience. This means that when these targets are met, good geographic landmass coverage is likely to be below 90%.

## Appendix 4 - Maps of 4G coverage January 2017

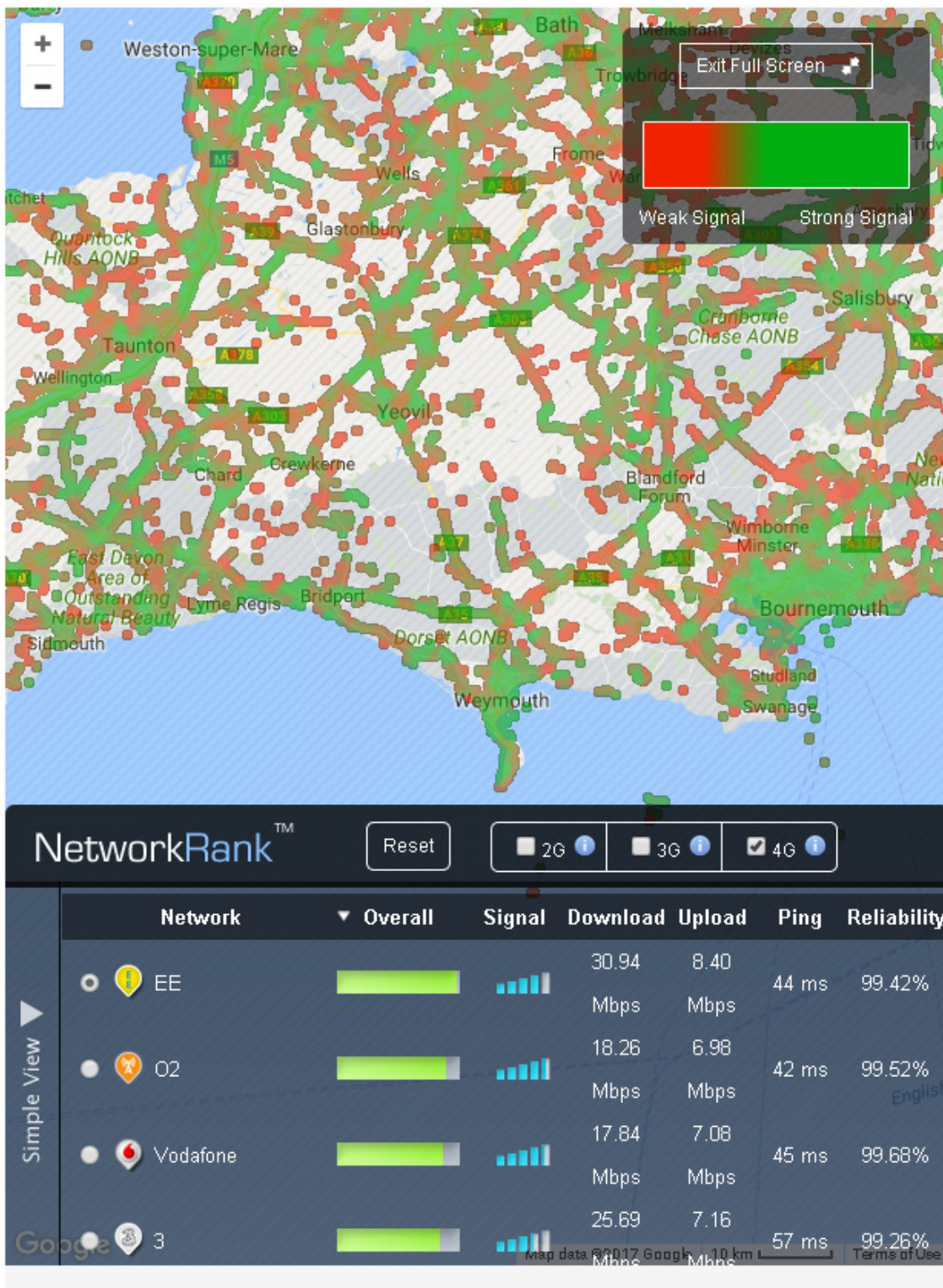
<http://www.which.co.uk/reviews/mobile-phone-providers/article/mobile-phone-coverage-map>

### Combined network providers 4G coverage map

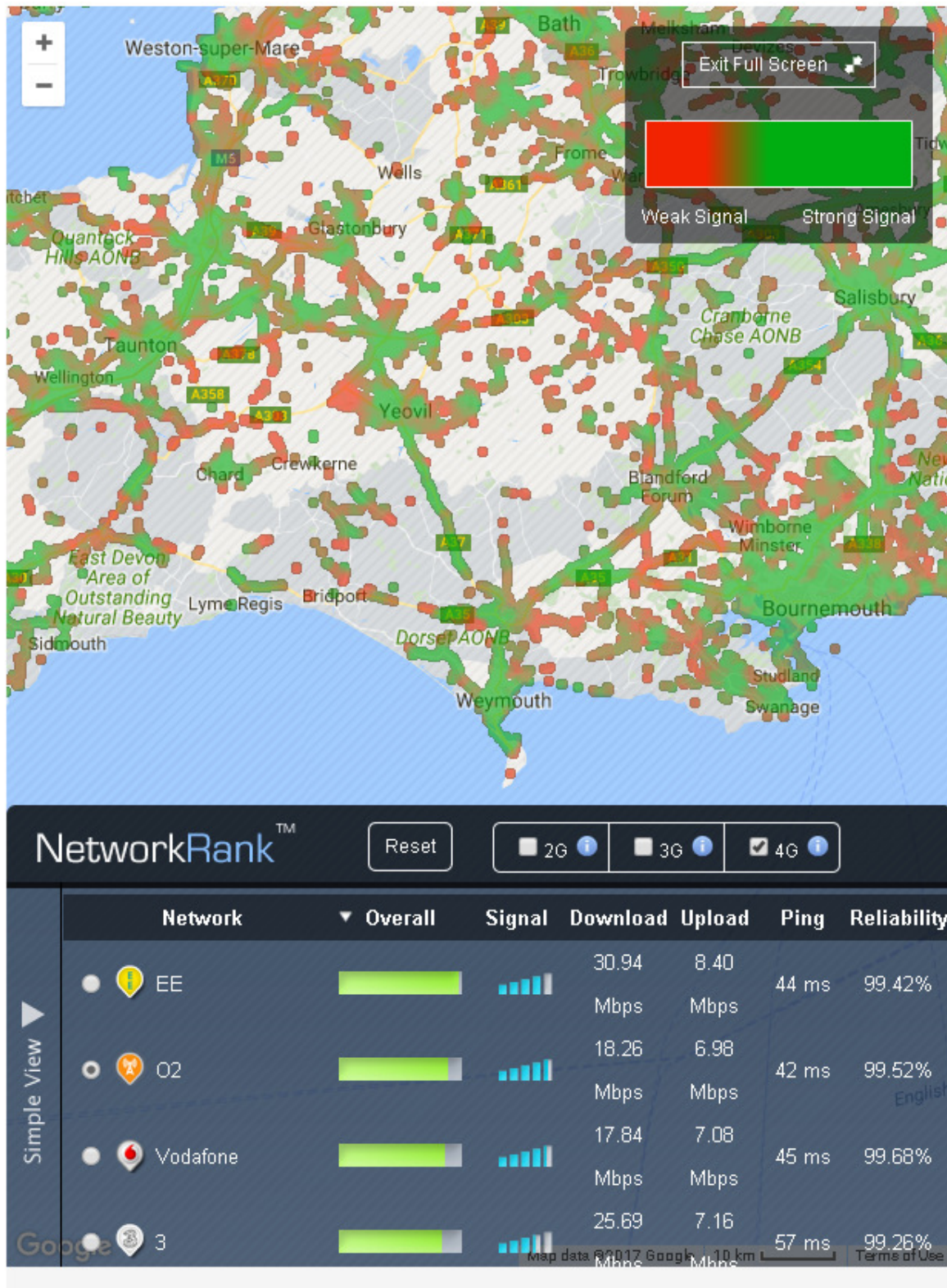




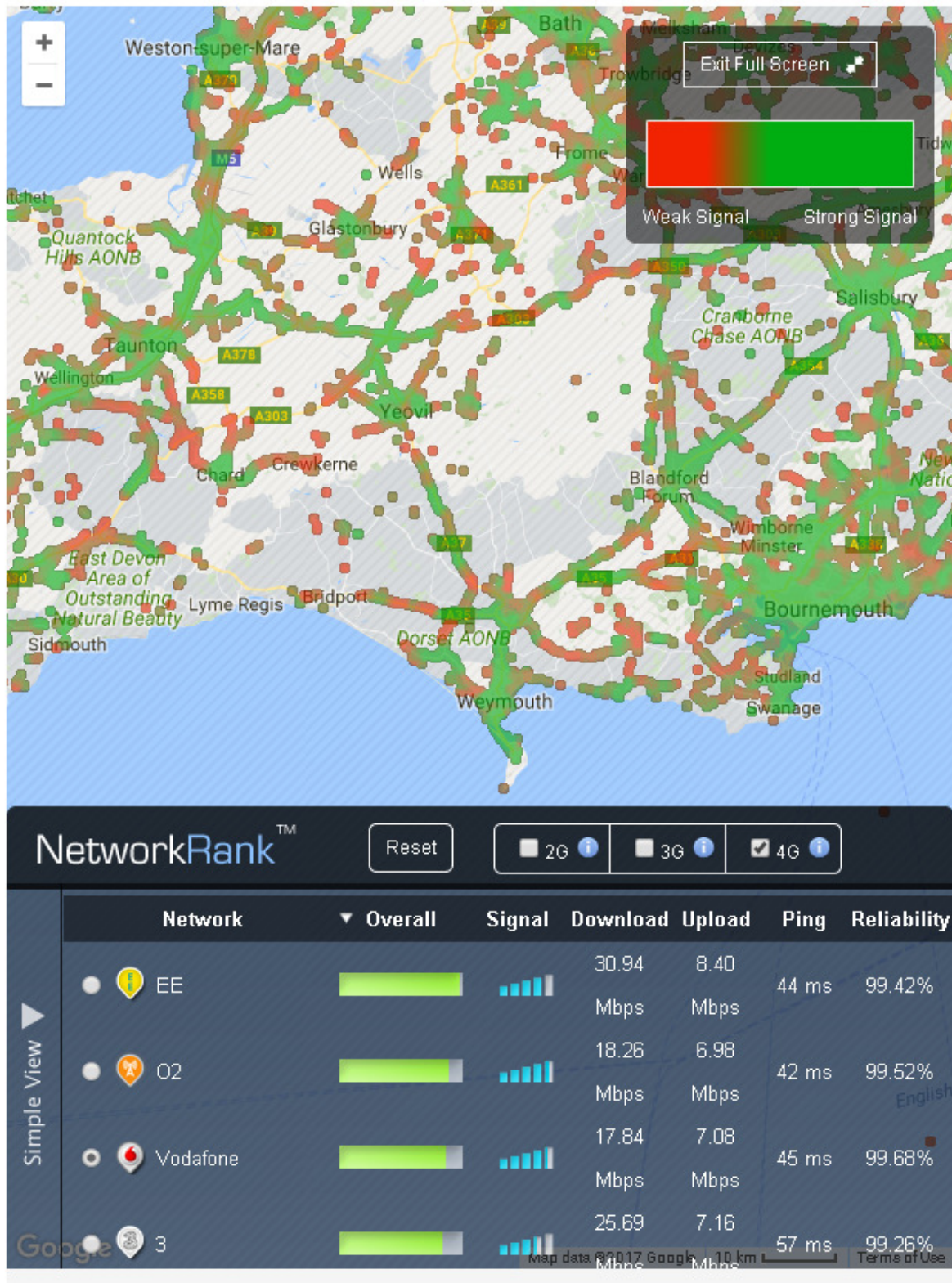
# EE's 4G network coverage map



## O2's 4G network coverage map



# Vodafone's 4G network coverage map



# Three's 4G network coverage map

