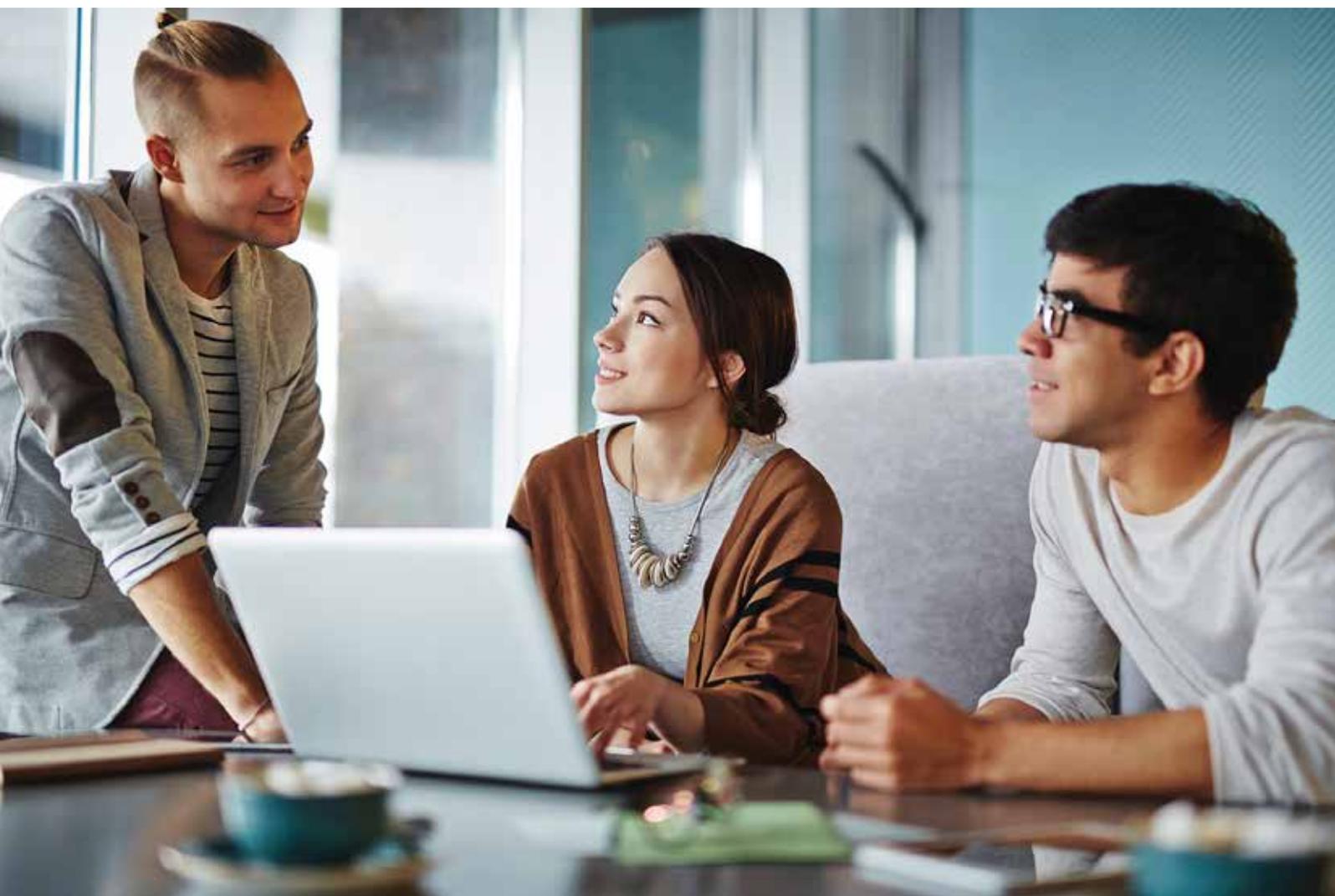


# Connected Nations 2015

Scotland



Published: 1 December 2015

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## Section 1

# Connected Nations – Across the UK

## Introduction

- 1.1 Under section 134A of the Communications Act 2003 ('the Act') Ofcom is required to submit a report to the Secretary of State every three years, describing the state of the electronic communications networks and services in the UK.
- 1.2 Full reports were published in 2011 and 2014 and this year we are publishing an update – The Connected Nations Report - focussing on those areas seeing the most rapid change, including the coverage of fixed, mobile and broadcast networks and the capacity of fixed and mobile broadband networks.
- 1.3 For the first time, we are also publishing individual reports for each of the constituent nations of the UK where availability of communications services varies and where devolved administrations play a leading role in public interventions.
- 1.4 The key developments across the nations are:
  - 1.4.1 Scotland and Wales have seen significant increases in next generation access and superfast broadband coverage. This increase has benefitted rural areas in particular. Northern Ireland has not seen such substantial increases but this reflects the early intervention that took place which realised increases in previous years;
  - 1.4.2 Households in Wales have not taken up superfast packages (where they are available) as readily as the rest of the UK and along with Northern Ireland use less data than the UK average; and
  - 1.4.3 The difference in speeds between urban and rural areas has stayed at a similar margin, largely due to the focus of intervention programmes in rural areas. The gap will ultimately increase as urban areas progress towards ultrafast speeds. Beyond the areas of public intervention or commercial roll out, consumers will continue to suffer low speeds. It is in these areas that the proposed 10Mbit/s Universal Service Obligation, announced by the UK Government in November 2015 (discussed in the main Connected Nations document) could make a real difference.
- 1.5 Access to high quality fixed and mobile internet services is vital to our increasingly online social and economic lives. In the last year, all nations across the UK have seen some increase in the coverage of these services. However, there are many areas of the UK where fast broadband services remain unavailable and where mobile coverage is poor.
- 1.6 It remains the case that the individual nations of Scotland, Wales and Northern Ireland as well as rural England see lower availability of communications services than the UK as a whole. The comparative lack of disruptive market forces and competition mean that the usual channels to create increased coverage in many of the more remote areas of the UK are absent and partly publicly funded intervention programmes have been used to help reach these areas.

1.7 Fixed broadband and 4G services have seen the largest increases in the number of premises now able to access services. In the case of 4G this has been as a result of commercial rollout. For fixed broadband, this has been a result of a blend of commercial and publicly supported rollout of services under the joint BDUK<sup>1</sup> and devolved government programmes in the nations.

1.8 The remainder of this section summarises the key information on coverage of fixed and mobile networks across the UK.

## Summary of fixed and mobile coverage in the UK

1.9 Figure 1 and Figure 2 below offer an ‘at a glance’ picture of connectivity in the nations of the UK.

**Figure 1: Coverage of Next Generation Access (NGA) and Superfast Broadband SFBB has increased between 2013 and 2015**

	2015 SFBB	2015 NGA	2014 SFBB	2014 NGA	2013 NGA
<b>UK</b>	83%	90%	75%	78%	73%
<b>England</b>	84%	90%	77%	80%	76%
<b>Scotland</b>	73%	85%	61%	63%	52%
<b>Wales</b>	79%	87%	55%	58%	48%
<b>NI</b>	77%	95%	77%	94%	96%

Source: Ofcom analysis of operator data

**Figure 2: Coverage of 2G and 3G networks across the UK**

	Premises where outdoor 2G (voice) coverage is available from all operators, %		Premises where outdoor 3G (voice and data) coverage is available from all operators, %	
	2015	2014	2015	2014
<b>UK</b>	97%	97%	88%	84%
<b>England</b>	98%	98%	91%	87%
<b>Northern Ireland</b>	92%	91%	73%	63%
<b>Scotland</b>	95%	95%	79%	75%
<b>Wales</b>	90%	90%	67%	65%

Source: Ofcom analysis of operator data

<sup>1</sup> Broadband Delivery UK administers a number of programmes on behalf of the UK government intended to increase the coverage of fixed and mobile broadband.

- 1.10 Coverage of NGA and SFBB has increased significantly in the past year in Scotland as the Digital Scotland Superfast Broadband programme rolls out. Coverage of data services have increased modestly in Scotland but basic voice service coverage remains unchanged.
- 1.11 A new, innovative measurement approach<sup>2</sup> commissioned by Ofcom has found that Wi-Fi performance and congestion, occurring outside the ISP network in the wider internet, can combine to affect the broadband experience of consumers with both low speed and superfast connections. In particular, we have found that the performance of in-home Wi-Fi networks plays a significant role in approximately 25% of households that experience problems with their broadband. We have launched an app for smartphones and tablets that tests Wi-Fi networks for performance issues. It will help consumers identify if their broadband is not performing as it should, and suggest simple troubleshooting steps to improve performance.

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<sup>2</sup> <http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2015/downloads/goe-analysis.pdf>  
[http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2015/downloads/goe\\_uk-analysis.pdf](http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2015/downloads/goe_uk-analysis.pdf)

## Section 2

# Fixed broadband in Scotland

## Scorecard for 2015

Fixed broadband networks	Scotland	UK
<b>Coverage of broadband faster than</b>		
<ul style="list-style-type: none"> <li>• 2 Mbit/s (% of premises)</li> <li>• 5 Mbit/s (% of premises)</li> <li>• 10 Mbit/s (% of premises)</li> </ul>	98%	98%
	96%	96%
	86%	91%
<b>Coverage of NGA (Next Generation Access) (% of premises)</b>	85%	90%
<b>Superfast broadband coverage (% of premises)</b>	73%	83%
<b>Superfast broadband coverage in rural areas (% of premises)</b>	31%	37%
<b>Fixed broadband take-up (% of residential premises)</b>	71%	78%
<b>Broadband take-up (fixed and mobile)</b>	73%	80%
<b>Superfast broadband take-up (% of premises)</b>	30%	33%
<b>Average broadband speed (download)</b>	27 Mbit/s	29.0 Mbit/s
<b>Average broadband speed (upload)</b>	3 Mbit/s	3.5 Mbit/s
<b>Average broadband download speeds by settlement type</b>	<b>Urban:</b> 31 Mbit/s	<b>Urban:</b> 31 Mbit/s
	<b>Rural:</b> 11 Mbit/s	<b>Rural:</b> 12 Mbit/s
<b>Premises that could receive less than 2Mbit/s</b>	2%	2%
<b>Data use (Average monthly)</b>	82GB	82GB

## Key points

- 2.1 In response to stakeholder interest, we have included a number of new metrics in this year's report, meaning that not all are comparable to the metrics given in the 2014 report. Along with the rest of the UK, Scotland has seen an overall improvement in the availability of communications services, with increases in both coverage and average speeds.
- 2.2 Any average figure may mask considerable local variations, and each year Ofcom's online mapping has looked in greater depth at a number of metrics which are available at postcode level at <http://maps.ofcom.org.uk/>. Our overview here offers headline improvements but the online mapping tool provides more granular detail.
- 2.3 Scotland has seen very strong increases in the following areas:
- 2.3.1 **Coverage of NGA (Next Generation Access) has risen 22 percentage points from 63% to 85%.** NGA is being delivered predominantly by Fibre to the Cabinet (FTTC) solutions both commercially and through the intervention programmes.
- 2.3.2 **Superfast broadband coverage in rural areas has risen from 8% in 2014 to 31% of premises.** This increase is larger than the overall UK increase of 15%.
- 2.3.3 **Average download speeds increased by 6.2 Mbit/s to an average headline speeds of 27.3 Mbit/s.** This represents a 29% increase. Ofcom has also reported on upload speeds this year and in Scotland average upload speeds are 3 Mbit/s compared to a UK average of 3.5 Mbit/s.
- 2.3.4 **Access to superfast broadband speeds has increased by 12% in Scotland, suggesting a 10% gap between Next Generation Access and Superfast Broadband.** There are a number of factors that can affect speeds to individual premises, in particular the line length from the cabinet to the building. However, in-home equipment can also affect performance and consumers are urged to check these to facilitate improvements in their service.
- 2.3.5 **The average amount of data (upload and download) used each month per line in Scotland is 82 GB.** This is in line with the UK average. Scotland and Northern Ireland have the highest percentage of premises that cannot receive a line speed of 10 Mbit/s or more. Ofcom analysis has suggested that lower speeds can impact how people use networks. In Scotland, lines with slower speeds are more concentrated in rural areas, where less than half of lines are currently capable of delivering speeds greater than or equal to 10 Mbit/s.
- 2.3.6 **While there is much to be positive about there are some areas of challenge which remain;**
- the number of premises unable to get 10Mbit/s or more is 14%
  - this is particularly prevalent in rural areas where the number rises to 57%

## Government targets and intervention

2.4 The intervention programme for Scotland is outlined below:

	Target
<b>Digital Scotland: Passing a total of 746 000 homes</b>	Fibre connectivity to 85% of premises by the end of 2015
	Fibre connectivity to 95% of premises by the end of 2017

- 2.5 Funding for the programme has come from UK Government, Scottish Government, BT, Highlands and Islands Enterprise and each of Scotland's 32 local authorities with some money also brought in from the European Regional Development Fund. The programme has faced specific challenges to reach Scotland's four main groups of islands and has included a number of subsea fibre installations.
- 2.6 The Digital Scotland Superfast programme is underway focusing on two delivery areas, one in the Highlands and Islands and another covering the Rest of Scotland. The full budget for the programme is £410 million. As of November 2015 the Scottish Government report that 455,000 premises have been connected through the Digital Scotland programme.
- 2.7 An additional £17.8 million has been made available to the project through the 'gain share' clause which allowed for a financial clawback if take-up exceeded agreed levels.
- 2.8 The project is over halfway to meeting its overall 750,000 premises level with the Highlands and Islands project completing by the end of 2016. This will see 84% of premises connected across the Highlands and Islands area. Commercial rollout was predicted to reach just 21% of the Highlands and Islands with no planned commercial coverage North of Dingwall or for Shetland, Orkney or the Outer Hebrides. In the Highlands and Islands, 98,500 premises will be covered by the DSSB programme and 46,500 through BT's own investment in commercially viable areas.
- 2.9 Community Broadband Scotland has a key role to play across Scotland as well as in connecting the remaining 16% of the premises in the Highlands and Islands. CBS are working with community groups to provide capital funding support to enable a further 16,000 premises to be connected. Projects supported by CBS are already completed or in progress in a number of areas including Argyll and the Isles, Applecross, Achmore, Locheil and Sleat with other projects in planning including one to deliver to the North Isles of Shetland and the Fair Isle.
- 2.10 Work is ongoing, supported by the UK and devolved Governments, to extend high quality broadband access to as many consumers as possible. In November 2015 the UK Government announced that work was commencing to introduce a universal service obligation (USO) of 10Mbit/s with a consultation planned for early 2016. Details of Ofcom's work in this area are available in the main Connected Nations Report.

## Fixed networks in urban and rural areas

Figure 3: Download, upload and data usage in urban and rural areas of Scotland

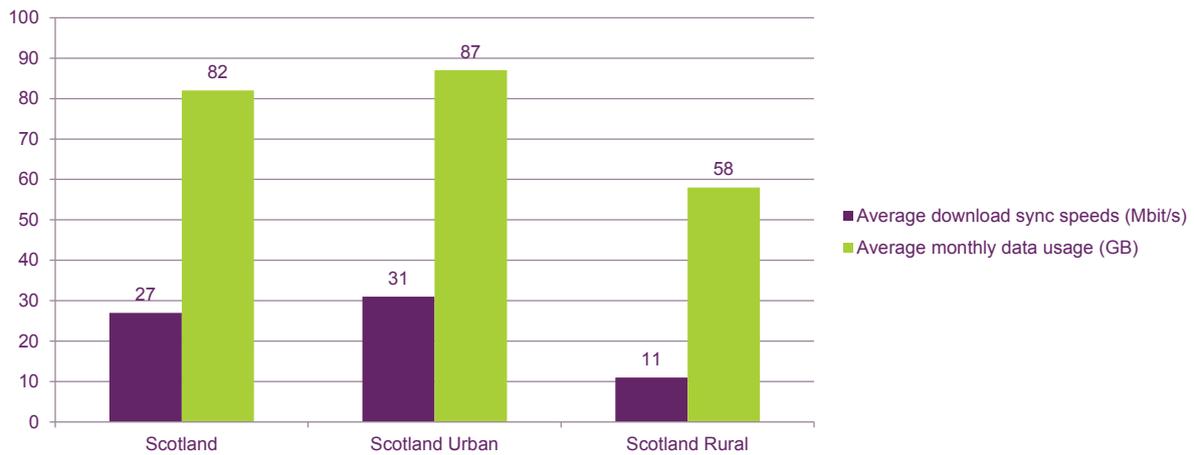
	Average download sync speeds (Mbit/s)	Average monthly data usage (GB)	Average upload speeds (Mbit/s)	Average data use during peak time (GB)
Scotland	27	82	3	25
Scotland Urban	31	87	3	26
Scotland Rural	11	58	2	12

Source: Ofcom analysis of operator data

### Data usage declines with sync speeds

2.11 The data shows the difference in consumer experience and use between the urban and rural areas of Scotland. Data use in urban areas is 1.5 times that of rural areas and peak data used in rural areas is less than half that in urban areas. Average download speeds in rural areas are just over a third of urban speeds. The overall trend is that slower speeds see reduced data usage.

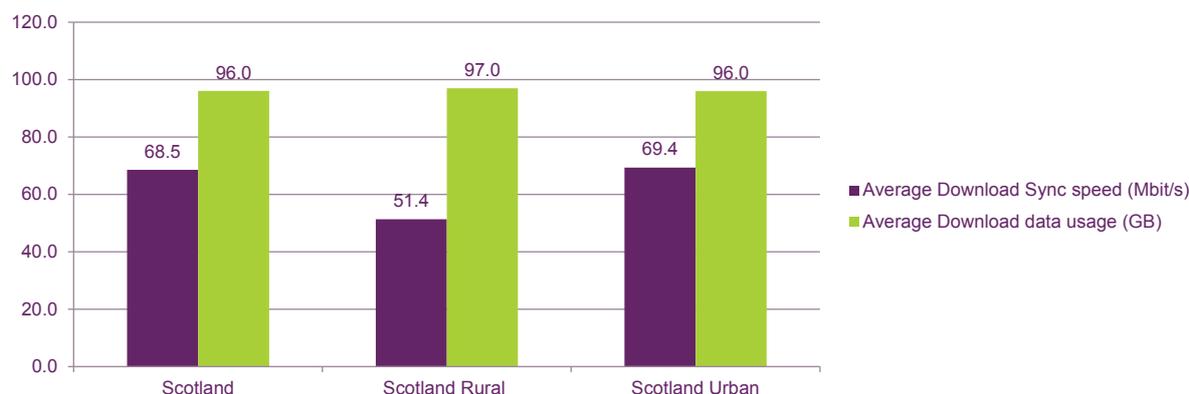
Figure 4: Download speeds and data use in urban and rural areas



Source: Ofcom analysis of operator data

2.12 The chart below shows areas where both SFBB and non-SFBB speeds are available. In areas where SFBB services are available, the usage differential is less marked as shown in Figure 5.

**Figure 5: Download speeds and data use in urban and rural areas with superfast availability**



Source: Ofcom analysis of operator data

2.13 People in rural areas see a greater deterioration in speeds due to longer line lengths. Figure 6 below also shows that rural consumers are served mainly by BT. There are some smaller operators who offer services in rural areas but they would not be of a scale that would see Ofcom routinely collect data from them. In this report we use new data gathered from the largest operators in each sector, as well as information already held by Ofcom. For fixed networks, we used input from the four largest networks and from KCOM for services in Hull. In the case of mobile networks we gathered data from all the network operators.

**Figure 6: NGA and superfast availability in urban and rural areas by operator**

	Virgin Media NGA availability	Virgin Media SFBB availability	BT NGA availability	BT SFBB availability
Scotland	36%	36%	75%	61%
Scotland Urban	44%	44%	77%	67%
Scotland Rural	2%	2%	63%	30%

Source: Ofcom analysis of operator data

2.14 In rural areas of Scotland some households and businesses use satellite broadband services which can offer rural and remote premises better services than they could achieve through fixed line options. Programmes such as the Broadband Reach programme have used satellite to enable connections to premises that could not be served by fixed technology at a reasonable cost, whereas others such as Connected Communities have used wireless options. Community Broadband Scotland are looking at all technology options as part of their aggregated programmes.

## Access to broadband for small businesses in Scotland

2.15 Businesses rely on telephone and internet services to sell goods and services, connect to customers, deal with suppliers and manage their workforce. Beyond this, many digital businesses rely on broadband services for the actual delivery of their products and services. Reliable and high quality broadband and mobile connections are becoming ever more important to commerce and to the wider economy.

- 2.16 Good connectivity is important for businesses of all sizes. In broad terms, larger enterprises are able to afford dedicated fibre based services to meet their needs so here we focus on provision for businesses with 249 or fewer employees – referred to as Small and Medium Enterprises (SMEs).
- 2.17 As at March 2014, there were 332,720 Small and Medium-sized Enterprises (SMEs) operating in Scotland, providing an estimated 1.1 million jobs. SMEs accounted for 99.3% of all private sector enterprises and accounted for 54.8% of private sector employment and 37.9% of private sector turnover.
- 2.18 Figure 7 shows that availability of superfast broadband to SMEs in Scotland has increased significantly in the past year, from 40% of SMEs in 2014 to 55% this year.

**Figure 7: Analysis of superfast broadband coverage for SMEs in Scotland**

	2014	2015
Total superfast coverage, premises	61%	73%
Superfast coverage for SMEs with 1 or more employees, premises	40%	55%

Source: Ofcom analysis of operator data

- 2.19 As expected, connectivity has increased for businesses when measured by size as well. The greatest increase in availability (by almost 50%) is for medium sized businesses which may reflect the areas that they locate to.

**Figure 8: Analysis of superfast coverage for SMEs in Scotland by business size**

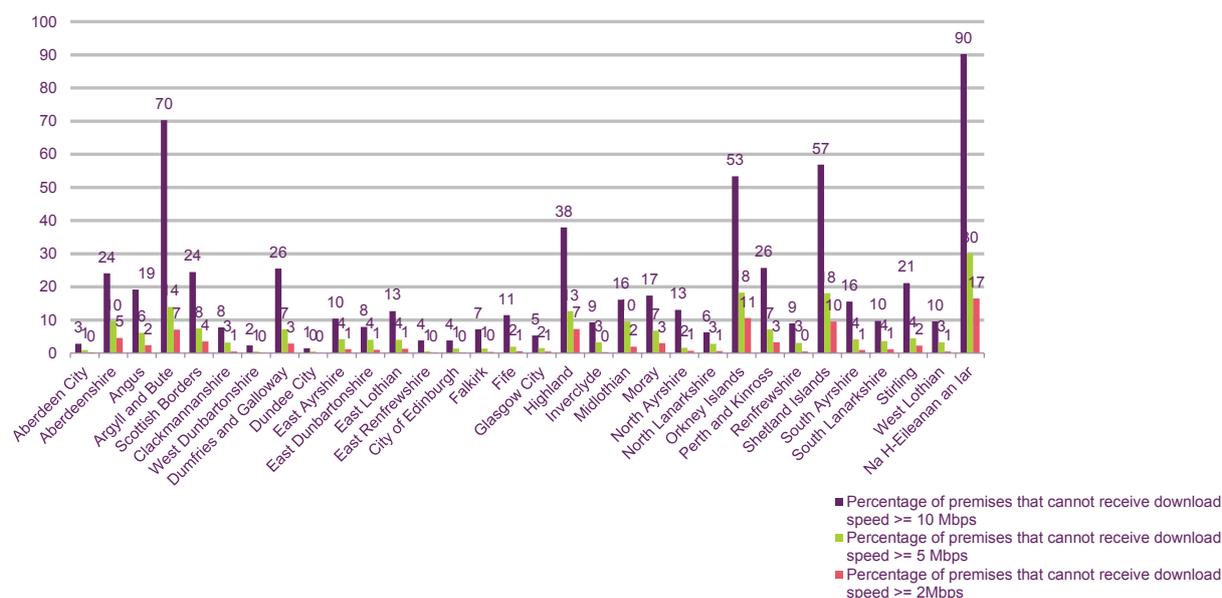
	2014	2015
Superfast coverage for SMEs with 1 or more employees, premises	40%	55%
Micro (excluding sole traders) 33	42%	56%
Small 39	38%	53%
Medium 47	34%	50%

Source: Ofcom analysis of operator data

## Data at Local Authority level in Scotland

- 2.20 This section provides an overview of some of the data available at local authority level in Scotland. Maps which cover more data at a local authority level are here <http://maps.ofcom.org.uk/>
- 2.21 We focus in this section on fixed networks as local authorities across the UK have been instrumental in assisting with the rollout of UK and devolved government programmes, and many have also contributed financially. One of the measures we consider to be of interest to local authorities is how far each area could be from reaching the 10Mbit/s universal service obligation recently confirmed by UK Government.

**Figure 9: The percentage of premises unable to get 2, 5 and 10 Mbit/s by local authority area**



Source: Ofcom analysis of operator data

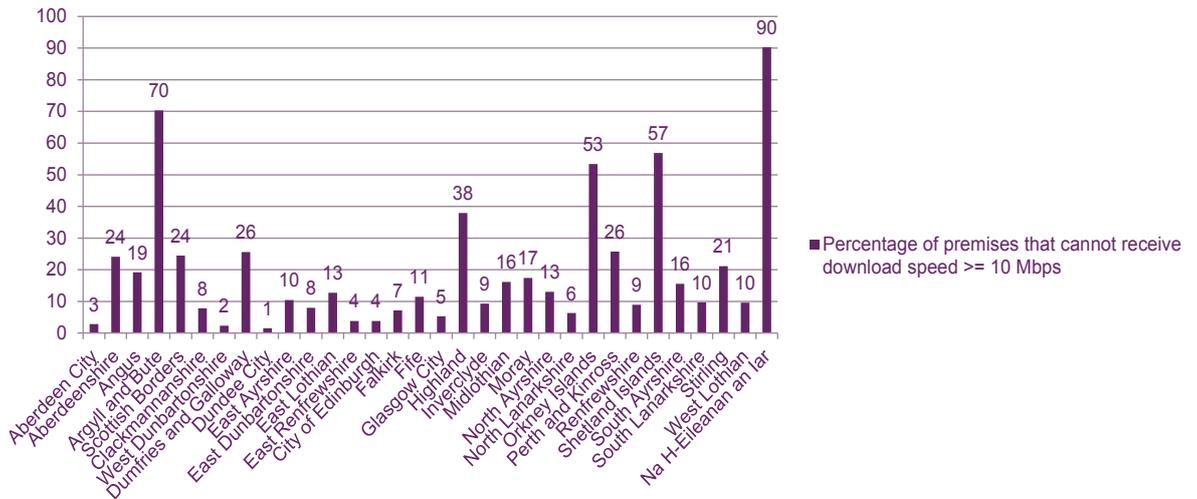
2.22 Looking in more detail at those locations which would need service enhancements to reach the proposed USO level of 10Mbit/s, it should be noted that the superfast broadband rollout programme is at a midpoint and some of the premises included in these figures will see improvements as the phased rollouts continue.

2.23 Na H-Eileanan an Iar, Argyll and Bute and the Shetland Islands see the greatest deficits in coverage at speeds that would fulfil the USO. In these areas just over 40% to 90% of premises would need to see speed enhancements to reach the proposed USO level. The costs associated with this will vary depending on topography, available backhaul and other essential connection needs.

2.24 Highlands and Islands Enterprise via Community Broadband Scotland (CBS) have approved an aggregated procurement covering Argyll and the Isles. GigaPlus Argyll is a project which CBS has developed in collaboration with eight island and mainland communities on the west coast of Scotland to develop and establish a community-led wireless broadband network that will extend Next Generation Access (NGA) at market prices to communities that would not benefit, either from a commercial solution or from the Digital Scotland Superfast Broadband programme.

2.25 The project will be managed by community-owned GigaPlus Argyll Ltd, which has been created by communities representing some of the hardest to reach broadband areas on Colonsay, Mull, Iona, Jura, Lismore, Islay, Luing and the peninsula of Craignish. These communities currently receive speeds of below 2Mbit/s. The project should see those speeds rise to up to 50Mbit/s. The project is expected to be completed in June 2016 and will extend NGA to 1,439 premises and approximately 2,000 people.

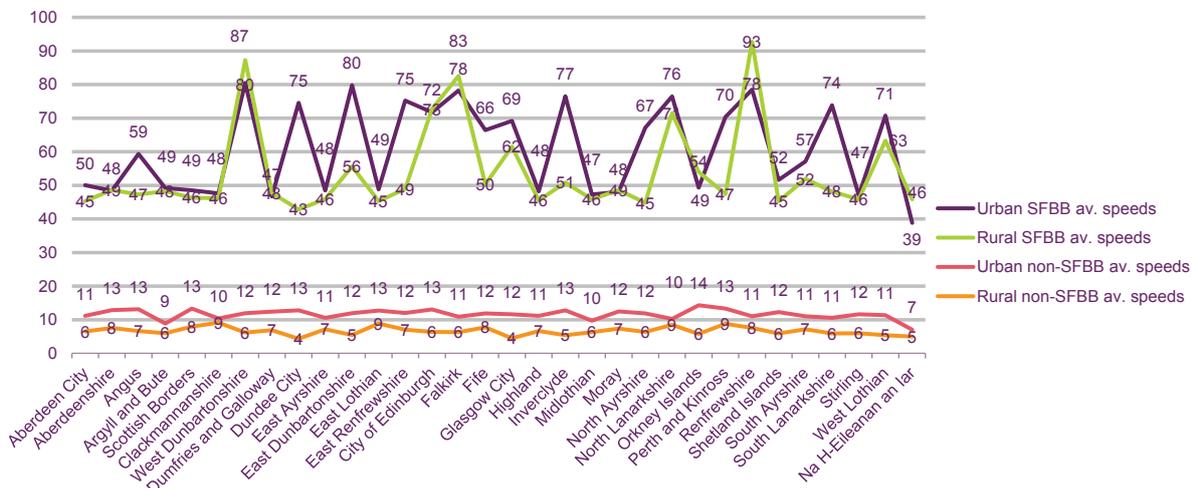
**Figure 10: The percentage of premises that cannot receive a download speed greater than 10 Mbit/s**



Source: Ofcom analysis of operator data

2.26 Ofcom, operators and governments have been aware of and reporting on the differential between speeds in urban and rural areas for some time. Even where superfast speeds are available in rural areas they tend to be slower than in urban areas due to the dispersion of premises and the distance of premises from cabinets with a FTTC solution. The graph below outlines this speed differential for both SFBB and non-SFBB connections, and for urban and rural areas.

**Figure 11: Superfast speeds and non-superfast speeds by urban and rural settlement types**



Source: Ofcom analysis of operator data

### Fixed Broadband

2.27 Due to the nature of the Digital Subscriber Line (DSL) technologies commonly used to support broadband services on traditional telecoms networks, the distance between the consumers' premises and exchange or street cabinet will affect the

speeds that the connection can support; longer lines cannot support speeds as high as shorter lines.

- 2.28 Given the geography and population densities of different areas of the UK it is clear that there will be locations where the length of the line to individual premises will mean that delivery of even 10Mbit/s<sup>3</sup> becomes very difficult, if not impossible via fixed means. Alternative technologies such as satellite and wireless deployments could ultimately form part of the solutions in the nations to connect these premises. As detailed in the main report, we consider 10Mbit/s the effective threshold for what constitutes an acceptable level of broadband service to meet current consumer expectations and use.
- 2.29 The actual number of premises that may benefit from the USO is yet to be determined. As rollouts progress and technology develops, more is being learned about the possibilities of extending the reach of services in a sustainable and cost-effective way.

### **Superfast Broadband**

- 2.30 Each of the devolved governments in the nations has added funds to the UK Government BDUK programme to support additional rollout of superfast broadband beyond commercial deployments. Ofcom fulfils an advisory role to governments on these projects, providing information and data on current service availability and the structure of the relevant markets.
- 2.31 The funding for all of these projects has come from a variety of sources but is largely based on contributions from the UK Government, devolved governments and assemblies, local authorities in the relevant areas and private investment from BT and other delivery contractors. There are also some projects which utilise European Union funding. In total, across the UK over £1.7 billion has been invested to support and extend coverage of superfast broadband.<sup>4</sup>
- 2.32 A major challenge to the rollout of superfast broadband services is the longer line lengths in the access network across the nations of the UK. The distances between exchanges and premises reflect the lower population densities and disparate nature of dwellings in the nations and rural areas of England such as Northumberland, Cumbria, Devon and Cornwall compared to the UK average. These distances cause serious deterioration of the physical properties of the broadband signal resulting in slower data speeds, meaning that even when fibre-connected cabinets are built, superfast speeds are not always available to the end user.
- 2.33 As projects have rolled out the geographic and topographic challenges of the different areas of the UK have become evident. On top of the issues already understood with reaching universal availability across the UK, the population spread and density as well as geographic features have presented additional factors to overcome in order to roll out as high a quality of service possible to as many premises as possible at a reasonable cost per connection.

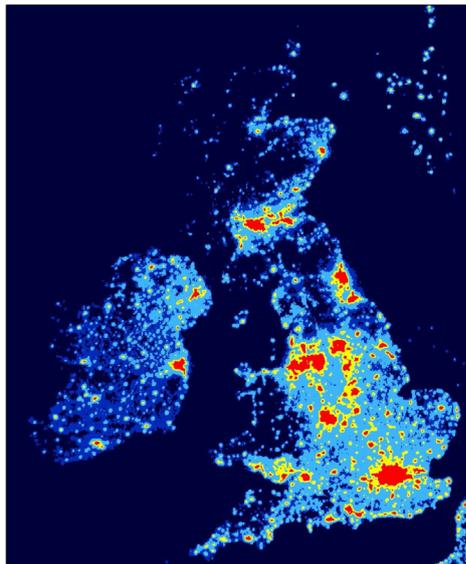
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<sup>3</sup> As detailed in the main report, we consider 10 Mbit/s the effective threshold for what constitutes an acceptable level of broadband service to meet current consumer expectations and use.

<sup>4</sup> PQ220396 [on broadband], 12 January 2015

- 2.34 The map in Figure 12 was used in the Ofcom publication, ‘The availability of communications services in the UK’, published in 2013. It is reproduced again here as it offers a useful insight into why availability and rollout is not uniform across the UK.

**Figure 12: Light pollution in the UK**



*Source: Campaign to Protect Rural England*

- 2.35 The map shows light pollution in the UK, which offers an insight into where premises are located. It shows that in each of the component nations the spread of premises can be different, which affects how communications services are rolled out and the costs associated with doing this.
- 2.36 Scotland’s population is concentrated in a “J” shape that runs across the Central Belt (Glasgow and Edinburgh), up the east coast (Dundee and Aberdeen) and then along the Moray Firth (to Inverness). There are other reasonably dense centres of population across the rest of Scotland, but these are small and widely spaced. Wales presents a similar pattern of highly concentrated population centres with smaller and more widely spaced conurbations across the landmass. Northern Ireland has a different pattern with what is described as ‘a house in every field’, referencing the relatively large plot sizes around premises in the country. This was the result of a historic localised difference in planning requirements. These contrast with much of England, where there is much more of a “grid” distribution with large centres of population and gradually diminishing population densities between them. There are, of course, also a number of areas in England that are very rural and share a commonality of issues with the rural areas of the nations.

### Section 3

## Mobile services in Scotland

### Scorecard for 2015

2015	Scotland	UK
Indoor voice premises (coverage by all 4 operators)	79%	85%
Outdoor voice premises (coverage by all 4 operators)	93%	96%
Indoor data premises (coverage by all 4 operators)	70%	77%
Outdoor data premises (coverage by all 4 operators)	79%	88%
Indoor voice premises (complete not-spots)	3%	2%
Outdoor voice premises (complete not-spots)	<1%	<1%
Indoor data (complete not-spots)	6%	3%
Outdoor data (complete not-spots)	3%	<1%
Geographic voice (coverage by all 4 operators)	29%	58%
Geographic data (coverage by all 4 operators)	10%	38%
Geographic voice (Complete not-spots)	29%	13%
Geographic data (Complete not-spots)	48%	21%

- 3.1 It is recognised that mobile coverage varies across the UK and is generally less good in rural than in urban areas. The decision to offer mobile coverage in a particular area is essentially a commercial judgement by the mobile network operators. Profitability will depend on the likely demand for mobile services as well as the costs of providing these services. The main drivers of local availability are likely to be differences in the density and composition of the local population and the topography of the local area. The UK Government is seeking to address geographic coverage via the deal brokered with the mobile network operators late in 2014 to secure 90% voice coverage across the UK landmass by the end of 2017.
- 3.2 Earlier in 2015, Ofcom created and published a set of interactive maps which provide searchable data of 2G, 3G and 4G mobile coverage at postcode level across the UK. We have raised the thresholds at which we assess the quality of mobile coverage and have further developed the metric which illustrates what type of service will be available to consumers in their area.
- 3.3 The data presented here offers a snapshot at the national level in Scotland but more granular analyses are available using the online mapping tool which is available on the Ofcom website at <http://maps.ofcom.org.uk/>. The site allows consumers to provide feedback in order to make improvements to the maps so that they reflect consumers' experience across the UK as accurately as possible.

### **Mobile coverage (premises) in Scotland 2014-2015 by operator**

- 3.4 There are some variations between the coverage provided by the individual operators, consumers can seek to assess their own usage patterns and compare this with Ofcom or operator assessments of coverage.
- 3.5 This year we have presented the data on coverage in a way that is intended to better reflect what people actually want to use their mobile service for; so rather than reporting on 2G, 3G and 4G services separately the measures of these services are provided in an integrated way, as they are on the devices which are used to access them. Devices enable use of either voice services (to make calls and send texts) or data services (which would enable internet use or web applications). In reporting on voice services we have looked more closely at the real signal strength required to offer an adequate consumer experience. This gives a more tangible measure of customers' experience, but limits the comparability of data between 2014 and 2015 on voice coverage. The 2014 figures in the table below have been re-analysed to reflect our new, 'experience-led' measurement, so will not match coverage data in previous Ofcom reports.
- 3.6 Overall, EE provide the most comprehensive voice and data coverage in Scotland. However this is subject to local variation and other performance issues of handsets outlined earlier in our main document.

**Figure 13: Premises coverage of voice and data networks in Scotland by operator**

	EE		H3		O2		Vodafone	
	2015	2014	2015	2014	2015	2014	2015	2014
<b>Indoor Voice (2G/3G)</b>	92%	92%	89%	89%	89%	89%	89%	87%
<b>Outdoor Voice (2G/3G)</b>	97%	97%	95%	95%	97%	94%	97%	93%
<b>Indoor Data (3G/4G)</b>	90%	90%	89%	89%	77%	73%	76%	70%
<b>Outdoor Data (3G/4G)</b>	96%	96%	95%	95%	83%	80%	82%	78%

Source: Ofcom analysis of operator data

### Mobile coverage (geographic) in Scotland 2015 by operator

- 3.7 The coverage data allows us to make an assessment of which operator has the most geographically widespread network in Scotland with the same constraints on interpretation as before over handset performance and the issues presented by some geographic features such as valleys and dense forestation.
- 3.8 The data suggests that Vodafone currently have the widest geographic voice coverage in Scotland, with some operators below this level. EE have the widest data coverage across the geography of Scotland, although this covers less than half of the landmass, with coverage by O2, at below 20% of landmass.
- 3.9 It should be noted that the UK Government’s geographic coverage target of 90% applies across the UK and is not a Scotland-specific target, and that while O2 hold the coverage obligation for data on the 4G network to cover 95% of each of the nations by the end of 2017, this obligation applies only to premises coverage rather than geographic coverage.

**Figure 14: Geographic coverage of voice and data networks in Scotland by operator**

Geographic coverage	EE	H3	O2	Vodafone
<b>Voice (2G+3G)</b>	56%	36%	52%	60%
<b>Data (3G+4G)</b>	48%	36%	13%	16%

Source: Ofcom analysis of operator data

### Mobile Not-Spots in Scotland

- 3.10 There remain some areas of Scotland not covered by all four operators and many geographic areas with no mobile communications coverage at all. Mobile communications have been very dynamic in the UK, due to the rollout of major infrastructure sharing programmes between the operators, UK Government intervention including the £5 billion geographic coverage commitment from operators, and consolidation within the industry. The rollout of new data services using 4G technology has seen extensive upgrades to the operators’ mast networks that, whilst creating overall improvements, have seen pockets of fluctuation in coverage across the different voice and data technologies in some areas.

- 3.11 The cost dynamics associated with network rollout and the need for a critical mass of customer and revenue base to offset infrastructure capital investment contribute to the differential between premises and geographic coverage across the whole of the UK.
- 3.12 In geographic terms Scotland has the most voice 'not spots' at 29% of landmass than anywhere in the UK where the average level of geographic not-spots is 13%. A not-spot is defined as an area not covered by any operator. Wales sees the next poorest level of coverage with 15% of the geography in a complete not-spot, but with half as many not-spots as Scotland. A similar pattern can be seen when looking at data coverage. Scotland has more than twice as many geographic data not-spots as the UK overall, with 48% of the landmass not covered by a data service from any operator, compared to 21% of the UK landmass without any data signal at all
- 3.13 These figures reflect the population density of Scotland which, at 97%, has the highest percentage of landmass classified as rural<sup>5</sup>: this impacts the overall coverage figures for Scotland as a whole.

**Figure 15: Partial and complete not-spots, coverage by all operators**

	2015					
	Indoor Voice (premises)	Outdoor Voice (premises)	Indoor Data (premises)	Outdoor Data (premises)	Voice (geog.)	Data (geog.)
<b>Partial Not-Spots</b>	18%	7%	24%	18%	42%	42%
<b>Complete Not-Spots</b>	3%	<1%	6%	3%	29%	48%
<b>Premises covered by all operators</b>	79%	93%	70%	79%	29%	10%

Source: Ofcom analysis of operator data

- 3.14 A community mast project has been pioneered in the Isle of Coll on the west coast of Scotland. In April 2015 voice and data services were made available on the island for the first time. This model is supported by community ownership of the mast with services provided by Vodafone. Vodafone are also supporting the community of Tarbert on the Isle of Harris through their Rural Open Sure Signal programme to plug rural not-spots. The unit is said to be taking on average 235 calls and handling 10 000 data sessions per day.

<sup>5</sup> There are more categories within Scottish Government classifications than Urban, Semi-urban and Rural. These figures were derived by Ofcom from UK Geographics' LOCALE classifications.

## Mobile networks in urban and rural areas

3.14 Complete and partial not spots are more prevalent in rural areas. This reflects the relative population densities in these areas.

**Figure 3:16: Urban and rural premises voice coverage**

		Indoor Voice (2G + 3G)	Outdoor Voice (2G + 3G)
<b>Partial Not-Spots</b>	Urban	9%	1%
	Rural	55%	32%
<b>Complete Not-Spots</b>	Urban	<1%	0%
	Rural	17%	4%
<b>Premises covered by all operators</b>	Urban	91%	99%
	Rural	27%	64%

Source: Ofcom analysis of operator data

## Mobile networks on roads in Scotland

3.16 Motorway coverage across Scotland for all operators is good, however coverage of voice and data on roads in Scotland drops. Scotland has motorways concentrated on the central belt, but the key cities outside this area are served by A&B roads which see high volumes of traffic as they are the only routes available.

**Figure 17: Road coverage in Scotland across all operators**

	EE		H3		O2		Vodafone	
	Voice (2G+3G)	Data (3G+4G)	Voice (2G+3G)	Data (3G+4G)	Voice (2G+3G)	Data (3G+4G)	Voice (2G+3G)	Data (3G+4G)
<b>Motorways</b>	99%	99%	97%	97%	95%	73%	98%	71%
<b>A&amp;B Roads</b>	62%	57%	48%	48%	48%	21%	59%	23%

Source: Ofcom analysis of operator data

## Basic voice and text services - 2G

3.15 2G services have seen slow incremental growth reflecting their maturity in the market. However, we expect the UK Government's agreement with the MNOs, announced in December 2014, to secure investment to take geographic coverage to 90% of the UK landmass will lead to further availability of voice and text services in the nations of the UK.

- 3.16 The agreement does not specify individual targets for each nation of the UK. Across the UK a relatively low number of premises - 4% - remain unable to access voice services from all operators.

### **Voice, text and data services - 3G**

- 3.17 3G services offering access to data have lower premises and geographic coverage across all areas of the UK. Mobile network operators offering 3G services have coverage obligations built into their licences to cover 90% of premises in the UK. This figure was increased in 2013 from 80%, in exchange for changes to duration of licences.
- 3.18 Because of the need for access to information via the internet on the move and the popularity of smartphones, 3G services are valued by consumers and are in demand from those consumers who cannot access them.

### **High speed data services - 4G**

- 3.19 In 2013, Ofcom conducted the first auction of its kind – the auction of spectrum to support high speed 4G mobile broadband services. 4G licences in the UK are subject to the highest coverage obligation ever placed upon a mobile operator in this country requiring operators to reach:
- 98% indoor coverage across the UK by the end of 2017, and;
  - 95% indoor coverage in each of the nations of the UK by the end of 2017.
- 3.20 Rollout has been rapid in highly populated areas and 77% of premises across the UK can access high-speed mobile data services via either the 3G or 4G network. Operators are now beginning to upgrade their 4G networks to support voice calling, as well as high speed data services.
- 3.21 Coverage of both fixed and mobile networks is very dynamic as government intervention programmes and consolidation within the mobile market presents new opportunities to enhance coverage. This report forms part of an update to the UK Government on the current state of infrastructure across the UK. Ofcom provides data on coverage, take-up and of communications services use through a number of research and analysis publications throughout the year which can be found on the Ofcom website.