

4 Telecoms and networks

4.1 Recent developments in Scotland

Commercial investment has made progress with some innovative EE and CityFibre investments

In March 2015, CityFibre announced that it was to invest in a pure-fibre network in Edinburgh, enabling speeds of up to 1Gbit/s. As part of CityFibre's 'Gigabit Cities' programme, 150km of fibre will be deployed in Edinburgh, the second city in Scotland to benefit from CityFibre investment, alongside Aberdeen.

In April 2016, EE launched a 'network-in-a-box', to help improve 4G network coverage in the Scottish Highlands.¹⁶ The software can be programmed to accommodate different types of wireless services, helping to reach areas where fibre deployment is difficult. The University of the Highlands and Islands will be the first to use the network development kits, and will participate actively in the project. This launch came after EE switched on its 4G network in Shetland, with support from the BT Group, and announced its ambition to increase 4G coverage from 60% of UK landmass to 95%.¹⁷

Reports demand better connectivity and advocate digital skills

The Federation of Small Businesses (FSB) published a report in December 2015 urging small businesses to assess how technology could help them grow and become more efficient. The report, *Digital Disruption and Small Businesses in Scotland*¹⁸, voiced concern that Scottish businesses could be swept away if they did not adapt to new ways of working.

The Glasgow Digital Ambassadors programme, a collaboration between seven organisations including Scottish Enterprise, is being trialled in Scotland as part of the Digital Tourism Scotland programme. It is the first pilot of its kind in Scotland. The aim of the programme is to develop a national group of digital ambassadors who will act as case studies for the tourism sector through sharing their experiences and by motivating other businesses to capitalise on the opportunities that digital has to offer.

A focused plan for members of the tourism industry, linked to the Tourism 2020 strategy, was launched, with the aim of improving and developing the digital knowledge and skills of tourism businesses in Scotland.

A number of public sector initiatives are driving infrastructure roll-out

The Scottish Government continues to lead the Digital Scotland Superfast Broadband Programme (DSSB). The programme met its initial target of 25 Mbit/s speeds for 85% of households across the whole of Scotland (including commercial coverage) and currently

¹⁶ <http://telecoms.com/472108/ee-launches-software-defined-basestation-in-uk-4g-coverage-expansion-effort/>

¹⁷ http://ee.co.uk/our-company/newsroom/2016/04/25/EE_launches_new_strategy_to_onshore_100_of_service_calls_and_expand_4G_coverage_to_95_of_UK

¹⁸ <http://www.fsb.org.uk/LegacySitePath/policy/rpu/scotland/assets/fsb%20scotland%20-%20disruption%20report%20-%20final.pdf>

covers 550,000 premises. It plans to give access to at least 95% of premises by the end of 2017¹⁹ and 100% by the end of Session 5 of the Parliament (2021)²⁰.

A second phase of public investment has been identified that will seek to build on the DSSB coverage footprint and the planned Community Broadband Scotland activity, with the aim of delivering 100% coverage by the end of 2021. DSSB is split into two projects: one for the Highlands and Islands and one for the Rest of Scotland. In the Highlands and Islands, around 122,500 premises now have access to fibre broadband. The Rest of Scotland project is now 66% of the way through its infrastructure deployment, and over 430,000 premises have access to fibre broadband.

Community Broadband Scotland (CBS), as part of Highlands and Islands Enterprise, is currently supporting 106 community organisations through project development, and has approved grant funding for 67 projects with a value of over £2.5m. In addition to the core offering from CBS, a £9m broadband scheme under the Scottish Rural Development Programme was launched in August 2015 and will be administered by CBS.

As part of the World Class Digital Infrastructure programme, the Scottish Government and Scottish Futures Trust (SFT) are collaborating on a programme of activity to scope what infrastructure is required to support delivery of world-class connectivity across Scotland, and investigate how the public sector can most effectively intervene to stimulate and accelerate the necessary private investment.

The Scottish Government has agreed a Mobile Action Plan²¹ with the major mobile operators to deliver improved coverage in Scotland. The proposals include commitments to introduce non-domestic rates relief for new mobile masts in non-commercial areas, to further reform the planning process for commercial investment, to introduce a data-sharing agreement between the mobile operators, the Scottish Government and Ofcom, and to hold a joint workshop to explore future-proofing sites for 5G-ready infrastructure.

The Scottish Government has continued to support the Rural Parliament with £200,000 allocated to support the Rural Action Plan. Two of its objectives relate to communications: to improve mobile phone signal significantly in rural areas over the next five years; and to ensure that broadband of sufficient speed reaches all rural communities as quickly as possible.

The Scotland Office announced that Inverness will benefit as part of a UK City Deal programme²² that will invest money in projects designed to help the economic growth of Inverness and the Highlands, including a city Wi-Fi scheme.

Nuisance calls

The Scottish Government held a nuisance calls summit in summer 2016, bringing together consumer groups, industry, regulators and government to tackle the issue.

¹⁹ Figures correct as of late March 2016.

²⁰ http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-57_Digital_Connectivity.pdf

²¹ <http://news.scotland.gov.uk/imagelibrary/downloadmedia.ashx?MediaDetailsID=4965&SizeId=-1>

²² <https://www.gov.uk/government/news/uk-city-deal-invests-315-million-in-inverness-and-the-highlands>

4.2 Availability of fixed broadband services

Basic broadband availability in Scotland is slightly lower than in the rest of the UK

Three main technologies are used to provide fixed broadband services in the UK: exchange-based ADSL, cable (over a hybrid fibre-coaxial network) and fibre to the cabinet (using VDSL from the street cabinet).²³ Of these three technologies, ADSL is the most widely available, partly because it is the cheapest to deploy as it uses the existing copper telephony network to transmit data to the end-user. In most cases it does not require an upgrade to the existing copper access network, and the only costs are associated with the installation of the new equipment in the local exchange and the end-user's premises. By comparison, cable and fibre roll-out both involve the deployment of new infrastructure to connect local exchanges/nodes to the end-user.

BT has around 5,600 local exchanges across the UK, and almost all of these have been upgraded to offer ADSL broadband services. Across the UK as a whole, 99.98% of premises (i.e. homes and offices) were connected to an ADSL-enabled exchange by the end of 2015 (Figure 4.1). In Northern Ireland and Wales, all the BT local exchanges had been upgraded to offer ADSL broadband services, while in England and Scotland there remain a small number of exchanges that are not ADSL-enabled.

It is important to note that some premises in ADSL-enabled areas may not be able to receive broadband services, or may only be able to access very low speeds. Potential reasons for this include the long length, or poor quality, of the copper telephone line from the premises to the local exchange.

What is local loop unbundling (LLU)?

Local loop unbundling (LLU) operators are able to offer fixed broadband services by placing their own equipment in the incumbent provider's local exchange. This equipment is then connected to the LLU provider's backhaul network and ADSL broadband services are provided over the copper lines from the exchange to the end user; these lines are leased from the incumbent provider. LLU operators are able to benefit from economies of scale that are not available when purchasing wholesale services on a per-unit basis, and are better able to differentiate their services from those offered by their competitors. Similarly, consumers living in LLU-enabled exchange areas have a greater choice of ADSL broadband services and, typically, access to lower-cost (particularly bundled) broadband services.

By the end of 2015, 95% of UK premises were served by unbundled local exchanges (a small increase compared to the previous year). As there are a larger number of premises to be served in urban areas, roll-out of any fixed telecoms network tends to be concentrated there, at least initially. This is reflected in the fact that almost all premises in urban areas (over 99%) were connected to an unbundled local exchange at the end of 2015. In rural areas, 77% of premises were connected to an unbundled local exchange by the end of 2015. England had the highest proportion of premises connected to an unbundled local exchange at the end of 2015, at 96%, followed by Wales with 93% availability and then Scotland and Northern Ireland (both 90%).

²³ A small proportion of premises are also served by fibre to the premises (FTTP).

Figure 4.1 Proportion of premises connected to ADSL-enabled and unbundled exchanges



Source: Ofcom / BT, December 2015 data

Ninety-three per cent of premises in Scotland were able to receive broadband services with speeds of 10Mbit/s or higher in June 2016

In 2015, the UK Government announced its intention to establish a 10Mbit/s universal service obligation (USO) for fixed broadband services. Data provided to Ofcom by fixed broadband providers²⁴ show that by June 2016, 95% of UK premises were able to receive actual fixed broadband speeds of 10Mbit/s or higher, up from 92% a year previously. As with basic broadband services, availability was higher in urban areas, with 98% of urban premises able to receive speeds of 10Mbit/s and above, compared to 76% in rural areas. In Scotland, 93% of premises could receive broadband speeds of 10Mbit/s or higher by June 2016, the second highest proportion among the UK nations, after England, and up from 86% in June 2015.

²⁴ This analysis is a preliminary assessment of coverage and is based on data from a limited number of national and larger regional providers. We are continuing to analyse the data we have received, including integrating data from additional, smaller providers, and our final assessment of coverage will be published in the *Connected Nations Report* later this year.

Figure 4.2 Proportion of premises able to receive broadband services at 10Mbit/s speeds and above



Source: Ofcom / operators, June 2016 data

Note: UK urban and rural figures are not comparable to those published in the 2015 report due to a change in the urban/rural classifications.

Eighty-three per cent of premises in Scotland were able to receive superfast, or higher, broadband speeds in June 2016

When collecting data to inform its work in monitoring the UK's communications market infrastructure in 2016, Ofcom asked operators to provide data regarding the proportion of premises that could receive superfast, or higher, fixed broadband speeds,²⁵ i.e. a fixed broadband service with an actual speed of 30Mbit/s or higher.

It is important to note that not all cable and fibre broadband connections are capable of providing superfast broadband services. For example, the speed achievable on a fibre-to-the-cabinet (FTTC) line will depend on the length and quality of the copper connection from the street cabinet to the user's premises (as is the case with ADSL).

As shown in Figure 4.3 below, the proportion of premises that were able to receive superfast or higher broadband services in the UK was 88% in June 2016. This represented an increase of five percentage points compared to a year previously. Availability was much higher in urban areas, with 93% of urban premises able to receive superfast or higher broadband, compared to 58% in rural areas. Scotland, together with Northern Ireland, had the joint lowest proportion of premises that were able to receive superfast or higher broadband, at 83%, with availability in Scotland having increased from 73% in June 2015.

The UK Government defines superfast broadband as having download speeds of 24Mbit/s or higher. We would expect the coverage of services at these speeds to be higher than the 88% of UK premises that are able to receive speeds of 30Mbit/s or more.

²⁵ This analysis is a preliminary assessment of coverage and is based on data from a limited number of national and larger regional providers. We are continuing to analyse the data we have received, including integrating data from additional, smaller providers, and our final assessment of coverage will be published in the *Connected Nations Report* later this year.

Figure 4.3 Proportion of premises able to receive superfast or higher broadband services



Source: Ofcom / operators, June 2016 data

Note: UK urban and rural figures are not comparable to those published in the 2015 report due to a change in the urban/rural classifications.

4.3 Mobile network coverage

Overview

Mobile network availability varies across the UK, with some areas (known as ‘mobile not-spots’) having no mobile coverage. These areas are often characterised by low population density and/or hilly terrain, which present physical and economic obstacles, and deter mobile network operators (MNOs) from deploying mobile network infrastructure. Other areas (known as ‘partial not-spots’) have mobile coverage but only from some of the UK’s four operators.

How we measure the availability of mobile telephony for this report

The coverage information presented in Ofcom’s *Communications Market Reports* and the *Connected Nations* report is collected by Ofcom from the four UK mobile network operators (MNOs). Information on coverage is provided by each operator for each 100m x100m ‘pixel’ of landmass across the UK. This information is then correlated with maps of premises to give the premises’ coverage figures.

The signal strength thresholds used by Ofcom to determine where 2G, 3G and 4G mobile services are available differ from those used in last year’s reports. As such, the mobile coverage data in this report are not comparable to those published last year. These thresholds may also differ from those used by MNOs in their reporting. UK urban and rural figures are also not comparable to those published in the 2015 report due to a change in the urban/rural classifications.

The availability figures in this report all refer to outdoor coverage. Coverage figures for indoor reception are likely to be lower because radio signals are weakened as they pass through the fabric of buildings. Indoor reception is highly dependent on the building, as well as the user’s location in the building, making it difficult to calculate accurate indoor coverage figures.

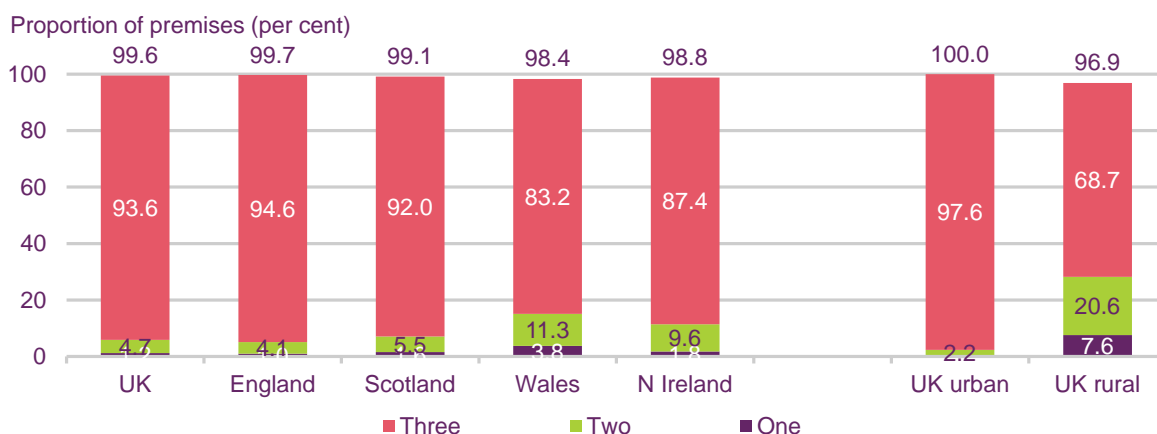
Figure 4.4, Figure 4.5 and Figure 4.6 show coverage levels for 2G, 3G and 4G mobile services respectively.²⁶ 2G is considered satisfactory for telephone calls and text messaging, while 3G is considered the minimum required to access mobile data services. 4G generally provides a better user experience than 3G when accessing mobile data, as it offers faster download and upload speeds.

Over 99% of premises in Scotland were in areas with outdoor 2G coverage in May 2016

Data provided to Ofcom by the UK's three national 2G mobile network operators (Vodafone, O2 and EE) show that by May 2016, 99.6% of UK premises were in areas with 2G coverage from at least one network, while around 0.4% of UK premises were in areas without any 2G coverage at all. The data show that most UK premises (93.6%) were in areas with outdoor 2G coverage from all three providers. The proportion of UK premises in areas with outdoor 2G mobile coverage in May 2016 was higher in urban locations (100.0%) than in rural ones (96.9%).

In Scotland, the proportion of premises in areas with outdoor 2G coverage from at least one network in May 2016 was 99.1%, the second highest proportion across the UK nations, after England. Similarly, the proportion of premises with outdoor coverage from all three national 2G networks was 92.0% in May 2016.

Figure 4.4 Outdoor 2G premises mobile coverage, by number of operators



Source: Ofcom / operators, May 2016 data

Note: Coverage is based on 100m² pixels covering the UK

Scotland had the lowest proportion of premises with outdoor 3G coverage in 2016

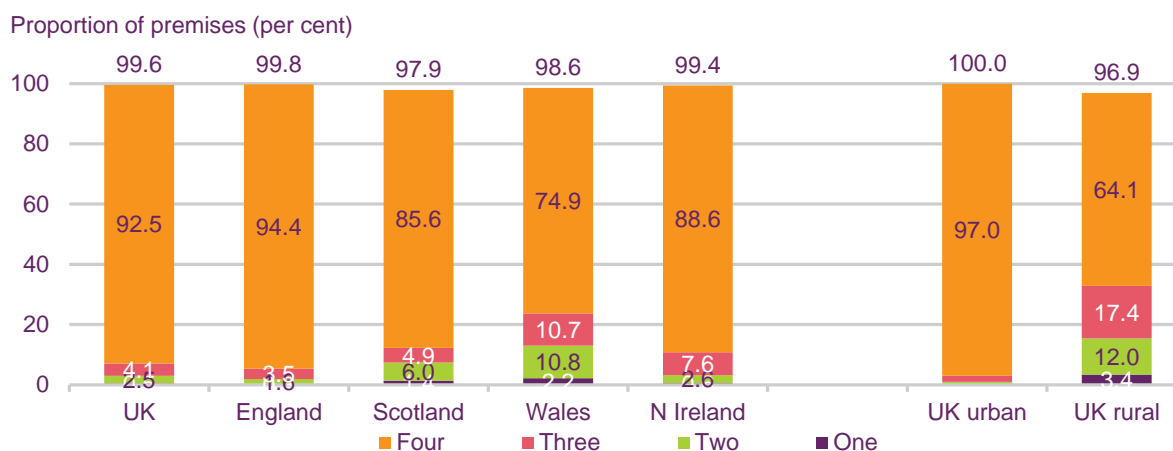
Data provided to Ofcom by the UK's four national 3G mobile network operators (the three national 2G providers plus Three) show that 99.6% of UK premises had outdoor coverage from at least one 3G network in May 2016, while 92.5% had outdoor coverage from all four 3G providers. The proportion of premises in areas with outdoor 3G coverage was higher in urban areas of the UK (100%) than in rural areas (96.9%).

Scotland had the lowest proportion of premises with outdoor 3G coverage from at least one mobile network, across the UK nations, in May 2016, at 97.9%. Similarly, 85.6% of premises

²⁶ The availability data provided by the MNOs are taken from network planning tools, which are subject to a margin of error. Local factors such as tall buildings or trees can also affect signal strength.

were in areas with 3G coverage from all four networks, the second lowest proportion after Wales.

Figure 4.5 Outdoor 3G premises mobile coverage, by number of operators



Source: Ofcom / operators, May 2016 data

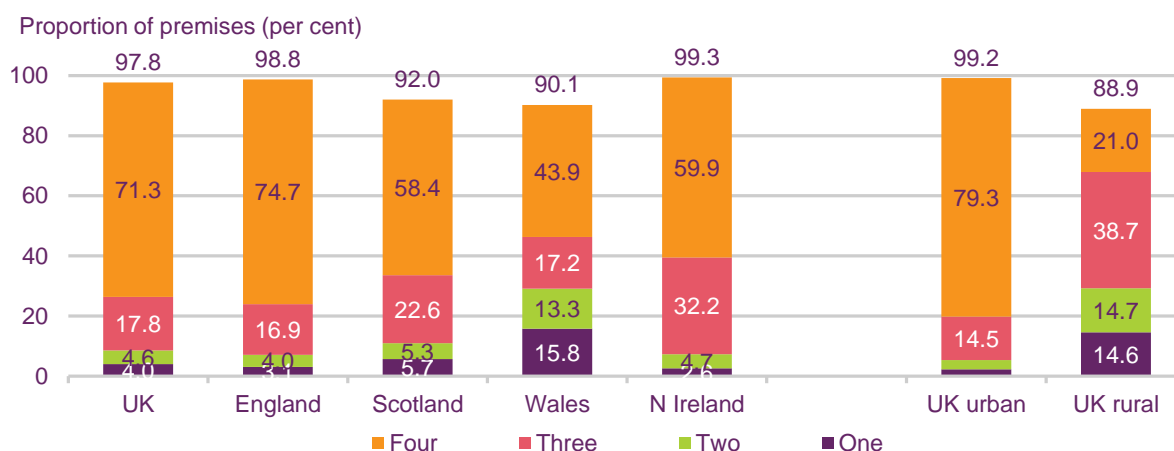
Note: Coverage is based on 100m² pixels covering the UK

92% of premises in Scotland were in areas with outdoor 4G coverage in May 2016

The deployment of 4G mobile services has progressed rapidly in recent years, and 97.8% of UK premises were in areas with outdoor 4G mobile coverage from at least one national mobile network operator in May 2016. Similarly, the proportion of UK premises able to receive outdoor coverage from all four national MNOs was 71.3%. The difference between urban and rural 4G coverage was much more marked for 4G services than for 2G and 3G, with 99.2% of urban premises having outdoor 4G coverage, compared to 88.9% of those in rural areas.

In Scotland, 92.0% of premises were in areas with outdoor 4G coverage from at least one mobile network in May 2016. More than half (58.4%) of premises in Scotland had outdoor coverage from all four 4G networks, the second lowest proportion across the UK nations. Scotland experienced the slowest increase in 4G coverage by all four 4G networks across the UK nations, up by 21.4 percentage points compared to last year.

Figure 4.6 Outdoor 4G premises mobile coverage, by number of operators



Source: Ofcom / operators, May 2016 data

Note: Coverage is based on 100m² pixels covering the UK

4.4 Service take-up

Household computer ownership in Scotland remains lower than the UK average

As shown in Figure 4.7, while take-up levels for landlines and mobile phones in Scotland in 2016 were in line with the UK averages, ownership of any type of computer was below the UK average (79% vs. 84%). This was also true in 2015. Take-up of a 4G service was also lower in Scotland than in the UK as a whole (40% vs. 48%)

Adults in urban areas of Scotland were more likely than those in rural areas to own a smartphone (72% vs. 63%) or to have fixed broadband at home (80% vs. 69%). They were, therefore, also more likely to have any type of internet connection (86% vs. 78%). Take-up of a 4G service was also lower in rural areas, at 31%, compared to 42% in urban areas.

Figure 4.7 Take-up of communications services: 2016

		UK	Scotland	England	Wales	N Ireland	Scotland urban	Scotland rural
Individual								
Voice telephony	Fixed Line	86%	86%	86%	85%	86%	87%	84%
	Mobile phone	93%	91%	94%	91%	92%	91%	91%
	Smartphone	71%	70%	71%	65%	72%	72% ↑	63%
Internet	Computer (any type)	84%	79% ↓	85%	85%	80%	80%	74%
	Tablet computer	59%	56%	59%	67%	60%	56%	54%
	Total Internet ¹	86%	84%	87%	84%	83%	86% ↑	78%
	Broadband (fixed and mobile) ²	81%	79%	81%	79%	78%	81% ↑	70%
	Fixed Broadband	79%	78%	79%	77%	77%	80% ↑	69%
	Mobile Broadband (via dongle/SIM) ³	4%	3%	5%	4%	3%	3%	3%
	Web access on mobile phone ⁴	66%	63%	66%	61%	69%	64%	59%
	4G service	48%	40% ↓	48%	44%	54%	42%	31% ↓

Source: Ofcom Technology Tracker, H1 2016

Notes: 1 Households with an internet connection of any description; 2 Households with a fixed broadband and/or dedicated mobile broadband (dongle/SIM) data connection (excludes households that solely use a mobile handset/s to access the internet); 3 HHGH households that use a dedicated mobile broadband (dongle/SIM) data connection to access the internet (excludes households that solely use a mobile handset/s to access the internet); 4 Households that use a mobile handset/s to access the internet (may also have any other type of internet access).

Base: All adults aged 16+ (n = 3737 UK, 502 Scotland, 2239 England, 489 Wales, 507 Northern Ireland, 251 Scotland urban, 251 Scotland rural)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016 and between Scotland urban and rural in 2016.

QC1: Is there a landline phone in your home that can be used to make and receive calls?/ QD2: Do you personally use a mobile phone?/ QD4: Do you personally use a smartphone?/ QD6: Do you have a 4G service?/ QE1: Does your household have a PC or laptop computer?/ QE2: Do you or does anyone in your household have access to the internet at home?/ QE9: Which of these methods does your household use to connect to the Internet at home?/ QD28A: Which if any, of the following activities, other than making and receiving voice calls, do you use your mobile for?

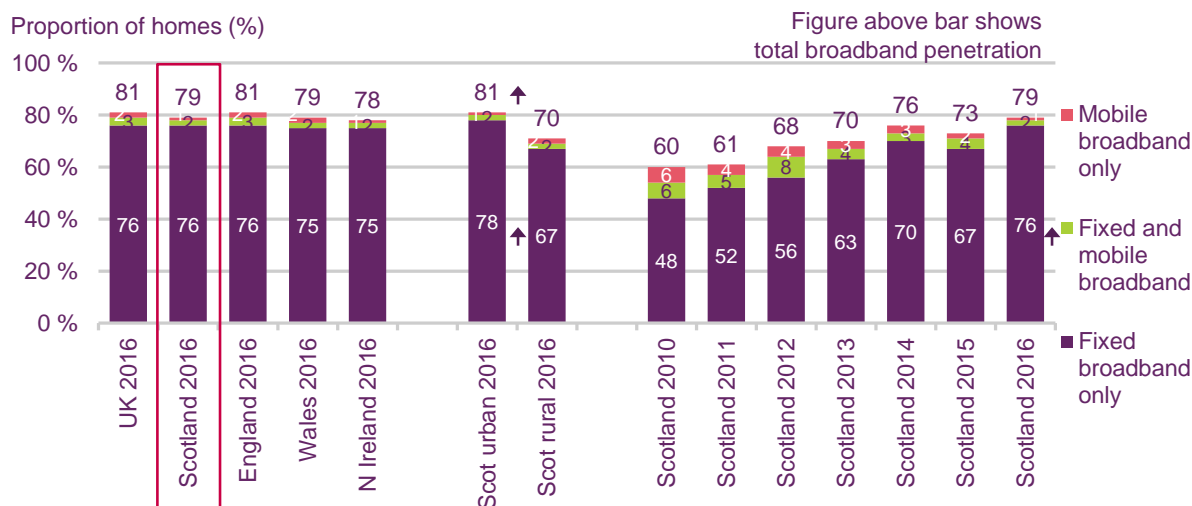
Total broadband penetration remains unchanged in Scotland since 2015

Total broadband penetration for households in Scotland was in line with that for the UK as a whole, and there has been no significant change in the total measure for Scotland since

2015. Conversely, the proportion of households in Scotland using solely a fixed broadband service has increased by 9 percentage points since 2015.

In 2016, households in urban areas of Scotland were more likely than those in rural areas to have any type of broadband at home (81% vs. 70%). This difference appears to be mainly driven by urban households being more likely than rural households to have fixed broadband (80% vs. 69% for rural households).

Figure 4.8 Overall household broadband take-up, by connection type



Source: Ofcom Technology Tracker, H1 2016

Base: All adults aged 16+ (n = 3737 UK, 502 Scotland, 2239 England, 489 Wales, 507 Northern Ireland, 251 Scotland urban, 251 Scotland rural, 1468 Scotland 2010, 487 Scotland 2011, 500 Scotland 2012, 501 Scotland 2013, 501 Scotland 2014, 492 Scotland 2015, 502 Scotland 2016)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016, between Scotland urban and rural in 2016 and between Scotland 2015 and 2016.

QE9: Which of these methods does your household use to connect to the internet at home?

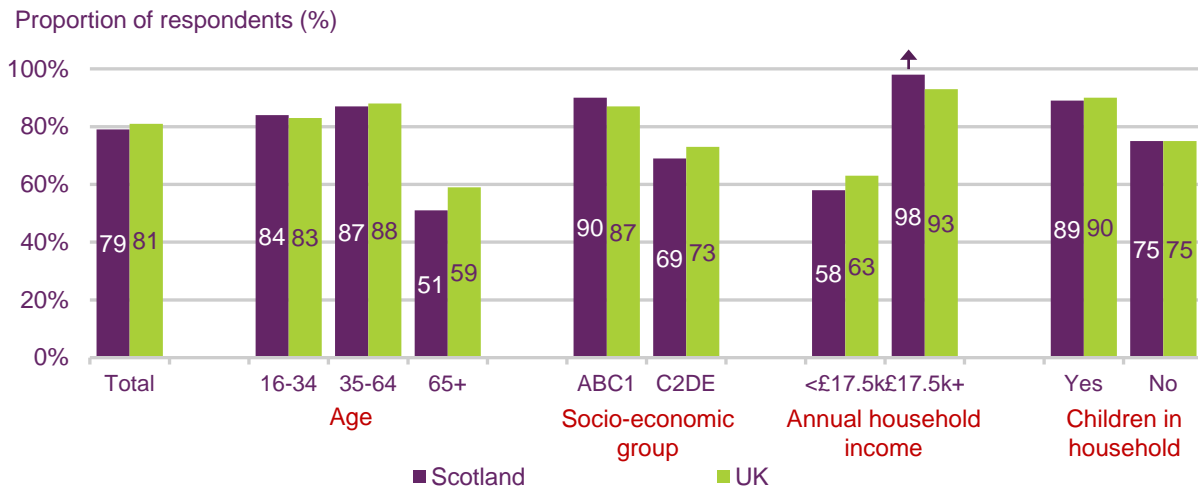
Take-up of broadband in Scotland is comparable to the UK as a whole

Household broadband take-up²⁷ in Scotland (79%) was comparable to the UK average (81%) in 2016. There was one difference between adults in Scotland and the UK overall: among those with a household income above £17.5k, respondents in Scotland were more likely than those in the UK overall to have broadband at home (98% vs. 93%).

As was the case across the UK, there were differences in broadband take-up in Scotland by age, socio-economic group and household income in 2016. Adults aged 65 and over were less likely than younger age groups to have broadband. Broadband take-up in Scotland was 21 percentage points higher among adults in the ABC1 socio-economic groups than among those in the C2DE groups (at 90% and 69% respectively). Similarly, there was a 40 percentage point difference in household broadband take-up between those with a household income below £17.5k (58%) and those with a household income above £17.5k (98%). Households with children were more likely than those without children to have broadband.

²⁷ This figure includes fixed and dedicated mobile broadband (via dongle/SIM) access, but excludes access on mobile handsets.

Figure 4.9 Overall broadband take-up in Scotland, by demographic



Source: Ofcom Technology Tracker, H1 2016

Base: All adults aged 16+ (n = 502 Scotland, 152 16-34s, 225 35-64s, 125 65+, 239 ABC1, 263 C2DE, 168 <£17.5k income, 140 £17.5k+, 143 children in home, 359 no children in home)

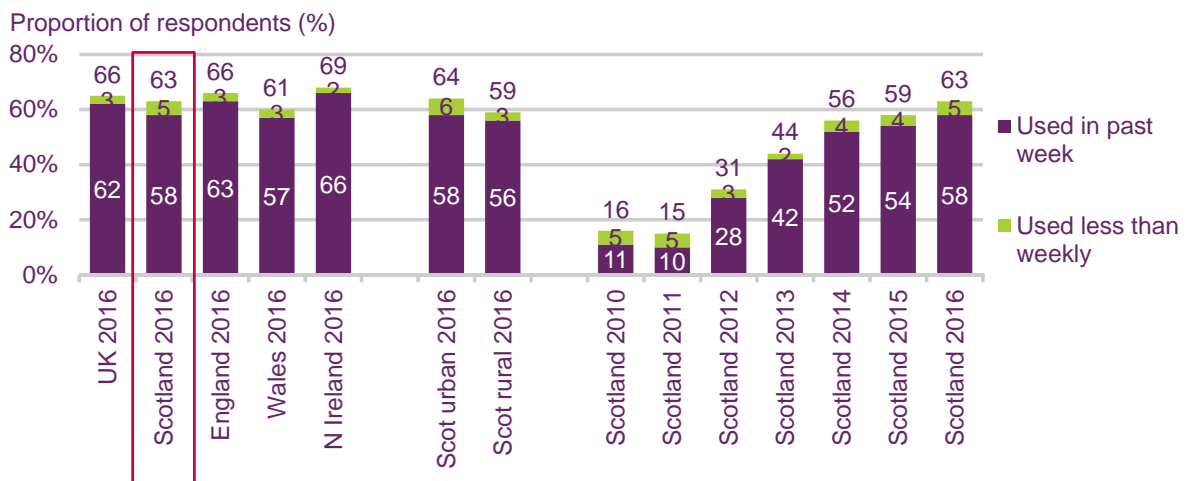
Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016 for each measure.

QE9: Which of these methods does your household use to connect to the internet at home?

Six in ten adults in Scotland had been online using their mobile phone in the previous week

In 2016, more than six in ten adults in Scotland said they used their mobile phone to access the internet, with almost all of these respondents saying they had done so in the previous week. These figures were consistent with those for the UK as a whole. There was no significant change in the level of mobile phone use to access the internet in Scotland compared to a year previously.

Figure 4.10 Proportion of adults who have used a mobile phone to access the internet



Source: Ofcom Technology Tracker, H1 2016

Base: All adults aged 16+ (n = 3737 UK, 502 Scotland, 2239 England, 489 Wales, 507 Northern Ireland, 251 Scotland urban, 251 Scotland rural, 1468 Scotland 2010, 487 Scotland 2011, 500 Scotland 2012, 501 Scotland 2013, 501 Scotland 2014, 492 Scotland 2015, 502 Scotland 2016)

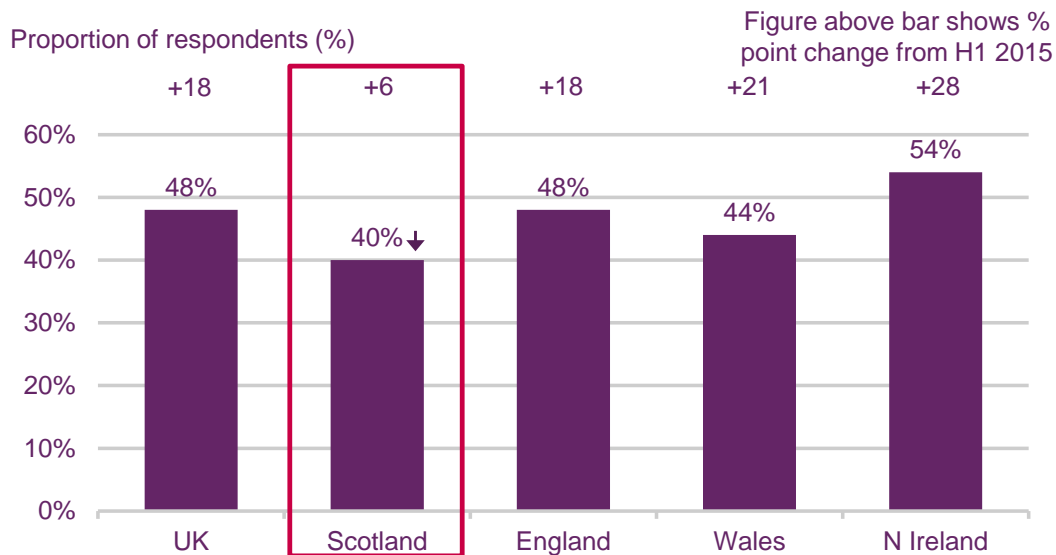
Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016, between Scotland urban and rural in 2016 and between Scotland 2015 and 2016.

QD28A: Which, if any, of the following activities, other than making and receiving calls, do you use your mobile for? / QD28B: And, which of these activities have you used your mobile for in the last week?

4G take-up in Scotland is lower than the UK average

In Scotland two in five adults (40%) reported that they had a 4G mobile service in 2016, below the UK average of 48%. The proportion of adults with a 4G service in Scotland has not changed significantly since 2015, following an increase of 15 percentage points (to 34%) between 2014 and 2015.

Figure 4.11 4G take-up, by nation



Source: Ofcom Technology Tracker, H1 2016

Base: All adults aged 16+ (n = 3737 UK, 502 Scotland, 2239 England, 489 Wales, 507 Northern Ireland)

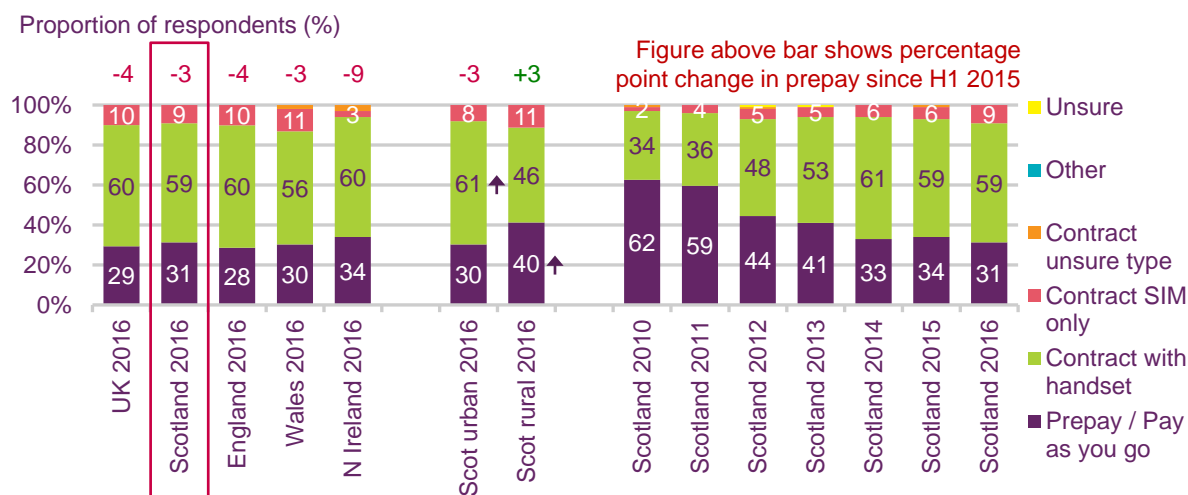
Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016. A circle around the +/- figure above the chart indicates any significant difference between 2015 and 2016 for Scotland.

QD41. Do you have a 4G service? This is a service that enables faster mobile internet access

Take-up of pre-pay and pay-monthly mobile services in Scotland remains in line with the UK average

In 2016, three in ten mobile phone users in Scotland had a pre-pay mobile phone service, unchanged since 2015 and in line with the UK average. Most mobile phone users in Scotland (68%) continued to have a pay-monthly mobile phone contract, as was the case for the UK overall (70%). The majority of these (59% of mobile phone users) had a contract including a handset, while 9% had a SIM-only contract. Mobile users in urban areas of Scotland in 2016 were more likely than users in rural areas to have a pay-monthly mobile phone contract (70% vs. 57%).

Figure 4.12 Type of mobile subscription



Source: Ofcom Technology Tracker, H1 2016

Base: Adults aged 16+ who personally use a mobile phone (n = 3425 UK, 451 Scotland, 2083 England, 445 Wales, 446 Northern Ireland, 226 Scotland urban, 225 Scotland rural, 1237 Scotland 2010, 425 Scotland 2011, 430 Scotland 2012, 464 Scotland 2013, 447 Scotland 2014, 450 Scotland 2015, 451 Scotland 2016)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016, between Scotland urban and rural in 2016 and between Scotland 2015 and 2016. Circles around the +/- figures above the chart indicate any significant difference between 2015 and 2016 for Scotland, urban and rural.

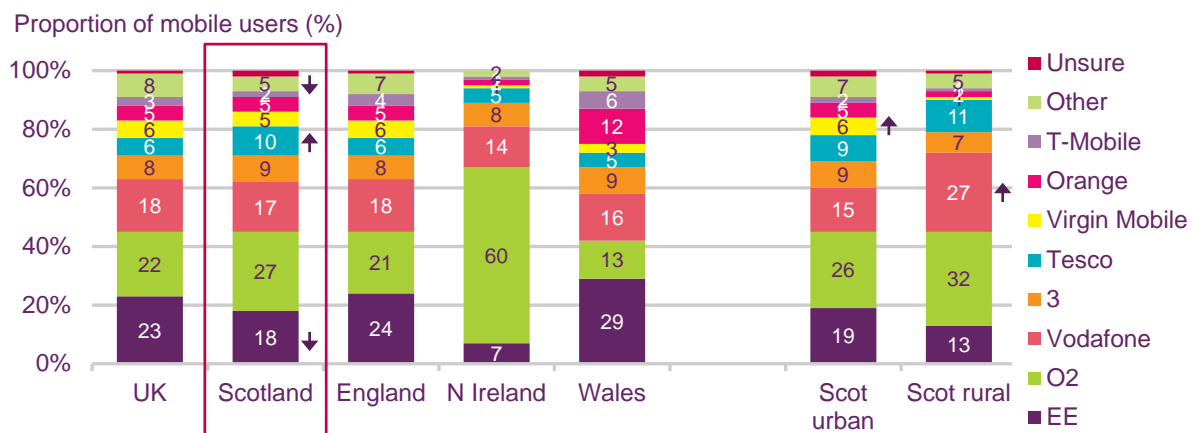
QD11: Which of these best describes the mobile package you personally use most often?

Respondents in Scotland say that O2 was the mobile network provider they use most often

Twenty-seven per cent of mobile users in Scotland said O2 was the network they used most often. This was followed by EE (18%) and Vodafone (17%). While mobile users in Scotland were as likely as mobile users across the UK to use O2, they were less likely to use EE (18% vs. 23%). Conversely, while only 6% of mobile users in the UK overall said they used Tesco Mobile most often, this was higher for users in Scotland, at 10%.

There were two major differences by location in Scotland in 2016: while O2 was the most-used network in both urban and rural areas, rural users were more likely than urban users to say they mostly used Vodafone (27% vs. 15%) and urban users were more likely than rural users to say they mostly used Virgin Mobile (6% vs. 0%).

Figure 4.13 Mobile network provider used most often



Source: Ofcom Technology Tracker, H1 2016

Base: Adults aged 16+ who personally use a mobile phone (n = 3425 UK, 451 Scotland, 2083 England, 445 Wales, 446 Northern Ireland, 226 Scotland urban, 225 Scotland rural)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016 and between Scotland urban and rural in 2016.

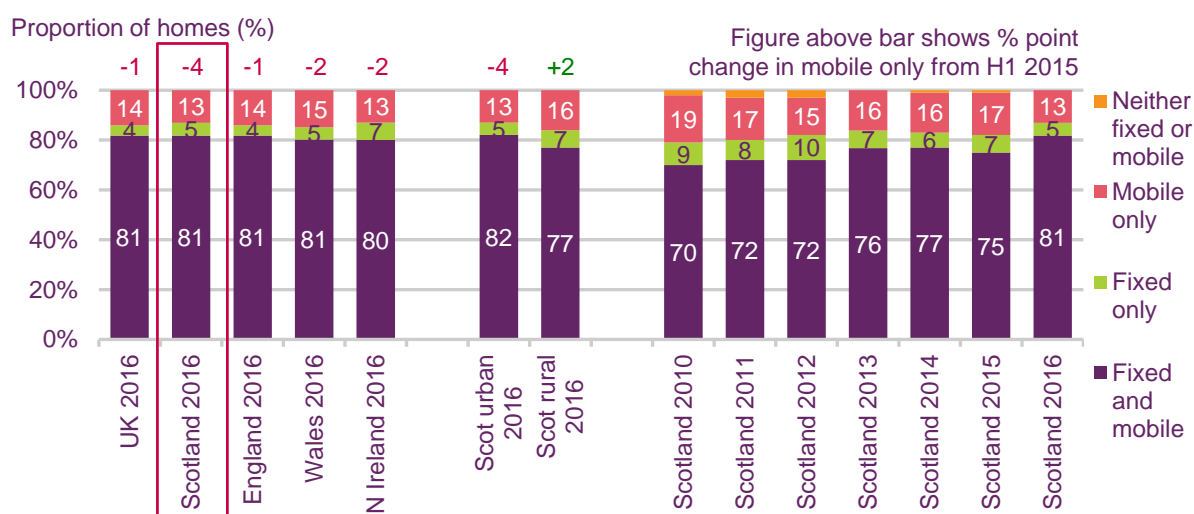
QD10: Which mobile network do you use most often?

Around one in eight households in Scotland are mobile-only

As shown in Figure 4.14, in 2016 around one in eight households in Scotland (13%) used mobile as their only form of telephony. Five per cent of households in Scotland had access to a fixed line only, and four in five had access to both fixed and mobile telephone services. Each of these figures were in line with the UK average.

Since 2015 there has been no significant change in any of these measures for households in Scotland, and there were no differences in ownership of household telephony services by urban or rural location.

Figure 4.14 Cross-ownership of household telephony services



Source: Ofcom Technology Tracker, H1 2016

Base: All adults aged 16+ (n = 3737 UK, 502 Scotland, 2239 England, 489 Wales, 507 Northern Ireland, 251 Scotland urban, 251 Scotland rural, 1468 Scotland 2010, 487 Scotland 2011, 500 Scotland 2012, 501 Scotland 2013, 501 Scotland 2014, 492 Scotland 2015, 502 Scotland 2016)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016, between Scotland urban and rural in 2016 and between Scotland 2015 and 2016. Circles around the +/- figures above the chart indicate any significant difference between 2015 and 2016 for Scotland, urban and rural.

QC1: Is there a landline phone in your home that can be used to make and receive calls? / QD1: How many mobile phones in total do you and members of your household use?

4.5 Satisfaction with telecoms services

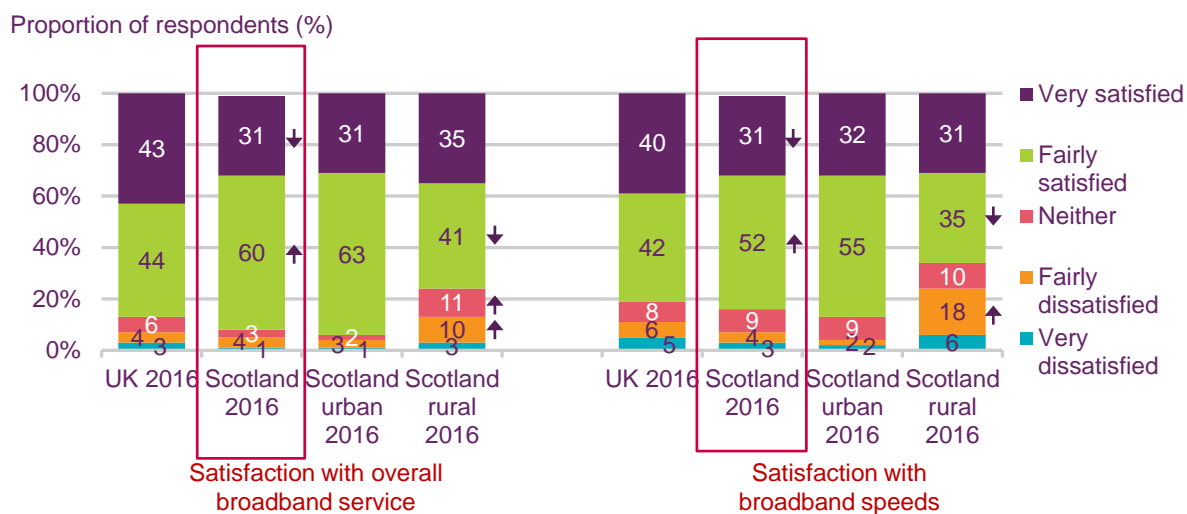
Fixed broadband users in Scotland are more likely than in 2015 to say they are satisfied with their broadband service

While overall satisfaction with a fixed broadband service in 2016 was higher in Scotland compared to the UK average (91% vs. 87%), this was mainly because users in Scotland were more likely to say they were 'fairly' satisfied (60% vs. 44%). By contrast, users in Scotland were less likely to say they were 'very' satisfied compared to the UK overall (31% vs. 43%). Compared to 2015, fixed broadband users in Scotland were more likely to say they were satisfied with their broadband service (91% vs. 85%).

As in the UK overall, fixed broadband users in Scotland were less likely to be satisfied with their broadband speed than with their overall broadband service. Overall levels of satisfaction with fixed broadband speeds in Scotland were comparable to those for the UK as a whole in 2016 (84% vs. 82%). Fixed broadband users in Scotland were, however, less likely to say they were 'very' satisfied (31% vs. 40% in the UK overall).

Fixed broadband users in urban Scotland were more likely than rural users to say they were satisfied with their overall service (94% vs. 76%) and with the speed of their connection (87% vs. 66%). The difference of approximately 20 percentage points between urban and rural users is attributable to rural users being less likely to say they were 'fairly' satisfied. Users in rural areas were more likely than those in urban areas to be dissatisfied with both their overall broadband service (14% vs. 4%) and broadband speeds (24% vs. 5%).

Figure 4.15 Satisfaction with overall service and speed of fixed broadband connection



Source: Ofcom Technology Tracker, H1 2016

Base: Adults aged 16+ with broadband connection at home (n = 2774 UK, 357 Scotland, 193 Scotland urban, 164 Scotland rural)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016 and between Scotland urban and rural in 2016.

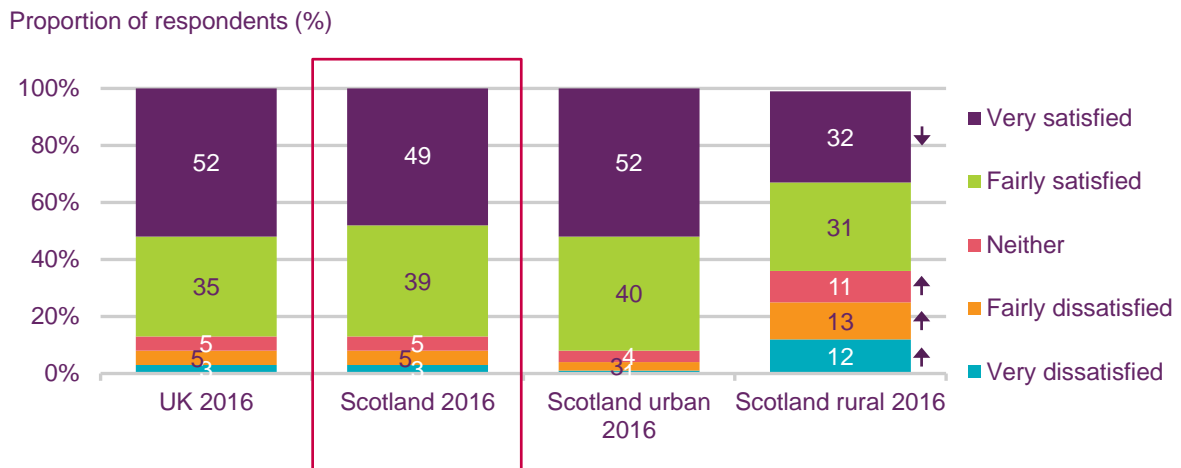
QE8A/B: Thinking about your fixed broadband internet service, how satisfied are you with (main supplier) for the overall service/ for the speed of your service while online (not just the connection)?

Mobile phone users in rural Scotland are less satisfied than in 2015 with their mobile phone reception

Around nine in ten (88%) mobile phone users in Scotland were 'very' or 'fairly' satisfied with their mobile reception in 2016, in line with the UK average (87%). Conversely, a significantly lower proportion of mobile users were either 'very' or 'fairly' dissatisfied, 8% in both Scotland and the UK as a whole.

Mobile phone users in urban areas of Scotland were more likely than those in rural areas to say they were satisfied with their mobile reception (93% vs. 63%). Compared to 2015, users in rural areas of Scotland were less likely to be satisfied (63% vs. 75% in 2015), and more likely to be dissatisfied (26% vs 4%) or neutral (11% vs. 4%).

Figure 4.16 Satisfaction with reception of mobile service



Source: Ofcom Technology Tracker, H1 2016

Base: Adults aged 16+ who personally use a mobile phone (n = 3425 UK, 451 Scotland, 226 Scotland urban, 225 Scotland rural)

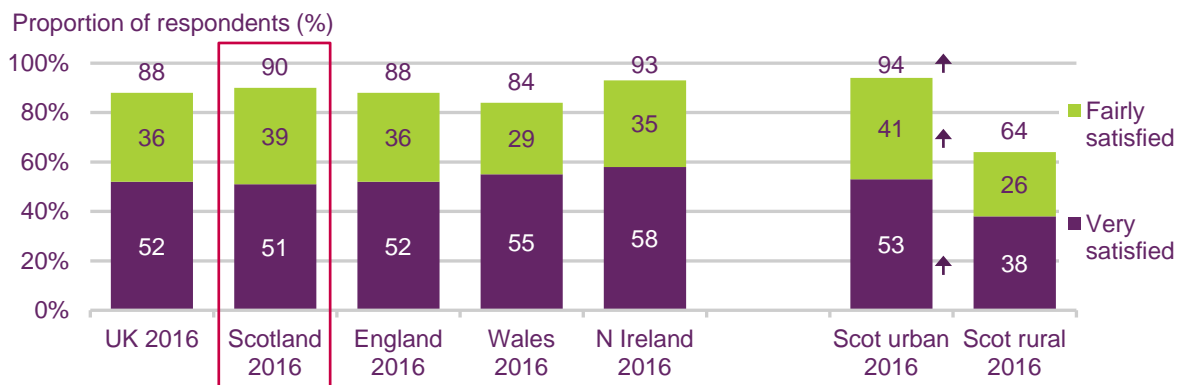
Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016, between Scotland urban and rural in 2016.

QD21J: Thinking about your mobile phone service only, how satisfied are you with (main supplier) for reception/ accessing network?

Nine in ten smartphone users in Scotland are satisfied with their ability to connect to the internet via 3G or 4G

In 2016, 90% of smartphone users in Scotland were ‘very’ or ‘fairly’ satisfied with their ability to connect to the internet using their mobile network (via 3G or 4G). This was in line with the UK as a whole (88%). Satisfaction with the ability to connect to the internet via 3G or 4G was 30 percentage points higher among smartphone users in urban than in rural areas of Scotland (94% vs. 64%).

Figure 4.17 Satisfaction with ability to connect to the internet via 3G or 4G



Source: Ofcom Technology Tracker, H1 2016

Base: Adults aged 16+ who personally use a smartphone (n = 2487 UK, 319 Scotland, 1532 England, 291 Wales, 345 Northern Ireland, 170 Scotland urban, 149 Scotland rural)

Significance testing: Arrows indicate any significant differences at the 95% confidence level between Scotland and UK in 2016 and between Scotland urban and rural in 2016.

QD21K: Thinking about your mobile phone service only, how satisfied are you with (main supplier) for ability to connect to the internet using the mobile network (3G or 4G)?

Note: Figures above chart columns indicate the proportion of people who were ‘very’ or ‘fairly’ satisfied with the ability to connect to the internet using the mobile network