

Connected Nations 2020

England report



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Overview

This annual report measures progress in the availability and capability of broadband and mobile services in England and highlights work by Ofcom, the UK Government and communications companies to improve connectivity.

Alongside this England report, we publish separate reports on broadband and mobile availability across the UK and each of its [nations](#). We also provide an [interactive dashboard](#) for people to see data for different areas and services.

What we have found

- Fixed and mobile networks in England were able to meet the increased demands placed on them by Covid-19. A shift to people spending more time at home drove increased demand on broadband networks during the day, although the peak remained in the evening. Mobile networks also experienced increases in voice traffic.
- The number of homes and businesses in England without access to at least decent broadband continues to shrink.¹ Factoring in coverage from both fixed and fixed-wireless networks, we estimate that around 0.5% of premises (119,000) in England are still without a decent broadband connection.² These premises may be eligible for a connection under the universal broadband service, with no costs to the customer unless these exceed £3,400.
- Over 6.1 million homes in England now have access to a gigabit-capable broadband connection – able to deliver download speeds of up to 1 Gbit/s as well as faster upload speeds, and with better reliability than older broadband technologies. Almost 4 million of these homes have access to full fibre – an increase of around 1.6m homes since 2019.
- Superfast broadband coverage has increased to 96% of homes in England, up from 95% last year.

¹ Unless otherwise specified, coverage figures for decent broadband count all UK premises (residential and commercial). Coverage for all other speed tiers counts residential premises only, unless otherwise specified.

² While coverage of both fixed networks and fixed wireless access (FWA) networks has increased, and we have gathered data from more networks; last year we included data from the largest fixed and FWA providers (specifically mobile network operators). In addition, the data on premises has been updated and may include new build premises for which decent broadband will be available once complete but where the network connections have not been included in data provided by operators.

- Good mobile services from at least one operator are available outdoors across 97% of England's landmass but only 84% has coverage from all four operators (up from 81% in 2019). The UK Government's Shared Rural Network programme, agreed in March 2020, will extend coverage beyond this in the coming years.
- Across England, 81% of homes and businesses should be able to get good indoor 4G coverage from all operators, falling to 46% in rural areas.
- We estimate that 19,500 premises in England cannot access either a decent fixed broadband service or get good 4G coverage indoors.
- The number of towns and cities with 5G coverage in England has increased further, with services largely clustered around the largest cities.

Connectivity has never been more important

People have been relying on connectivity more and more over recent years, and the Covid-19 pandemic has brought this reliance into even sharper relief. In March 2020, life changed suddenly for many people across the UK. People needed broadband and mobile connections to work from home, keep up with schoolwork, access medical appointments and public services, contact friends and family, shop online and keep themselves entertained.

England's fixed access networks have seen significantly increased demand from users, with average monthly data usage now standing at 438 GB per connection, increasing from 325 GB last year (and up from 241 GB in 2018). The restrictions due to the Covid-19 pandemic have also resulted in a shift in usage. Peak demand is still in the evenings and has continued to grow, but daytime traffic has increased significantly throughout the year. Upstream traffic has also increased, driven by increased use of video calling for work and to keep in touch with friends. Nonetheless, networks had the capacity to meet user demands and stayed well within capacity limits.

Mobile networks successfully coped with the increased demand and changes in data and voice traffic patterns during the Covid-19 lockdown, with increased data usage near residential areas.

Fixed broadband services

Figure 1: Broadband scorecard for 2020

	England	UK
Residential coverage (% of residential premises):		
Superfast broadband coverage (>=30 Mbit/s)	96%	96%
Urban	98%	98%
Rural	84%	81%
Ultrafast broadband (>=300Mbit/s)	61%	59%
Urban	66%	65%
Rural	21%	20%
Full fibre coverage	16%	18%
Urban	16%	18%
Rural	17%	17%
Homes and businesses unable to get 10 Mbit/s download & 1 Mbit/s upload speed by fixed or fixed wireless connection (% of all premises):	0.5%	0.6%
Urban	0.2%	0.2%
Rural	2.0%	2.9%
Average broadband speeds and data use:		
Average download speed	74 Mbit/s	73 Mbit/s
Urban	78 Mbit/s	77 Mbit/s
Rural	52 Mbit/s	50 Mbit/s
Average upload speed	13 Mbit/s	13 Mbit/s
Urban	13 Mbit/s	13 Mbit/s
Rural	16 Mbit/s	14 Mbit/s
Data use (monthly average)³	438 GB	438 GB⁴
Urban	448 GB	450 GB
Rural	367 GB	369 GB

Source: Ofcom analysis of operator data.

³ Although both the urban and rural averages are higher for the UK than for England, the average overall usage figure is the same. This is because of a different proportion of rural and urban connections (13% rural for England versus 14% for the UK).

⁴ The UK report records a monthly average of 429 GB, which includes connections for which no location could be determined. Those connections have been excluded from the UK total here.

Introduction

Connectivity across England is improving, and there have been significant gains in recent years. In 2020, commercial investment and government interventions have enabled further rollout of fixed broadband coverage. However, there remains a significant group of, mostly rural, consumers who are unable to receive decent speeds. In England, around 119,000 homes and businesses cannot receive speeds of at least 10 Mbit/s download and 1 Mbit/s upload over a fixed line or fixed wireless connection. Of these, 54% are in rural areas.

For this report, we have refined our approach to include data from around 20 additional full fibre communications providers and, for reporting on fixed wireless coverage, we include data from both mobile network operators (MNOs) and a larger number of fixed wireless network operators.

Superfast broadband is available to

96%
of homes in England

16% have full fibre and **25%** have a gigabit-capable connection

0.5% are unable to get decent broadband



Fixed broadband coverage

Key highlights

- Full-fibre broadband services are now available to 16% of homes in England.
- Superfast broadband coverage to homes in England stands at 96%, broadly similar to 2019 (95%). Superfast coverage of homes in rural areas remains lower at 84%.
- Factoring in the coverage from fixed wireless providers, we estimate that as few as 119,000 homes and businesses in England are unable to access a decent broadband service, subject to confirmation of individual premises coverage.⁵
- In 2020, the average download speed in England was 74 Mbit/s and average upload speed was 13 Mbit/s. In rural areas, the average download speed (52 Mbit/s) remains significantly lower than in urban areas (78 Mbit/s).
- Average data usage per connection in England stood at 438 GB per month, and a rise of around 113 GB over the year. Premises in rural areas consume an average of 367 GB per month, and urban areas an average 448 GB.

There is growing investment in gigabit capable and full-fibre broadband in England

Our data shows that coverage of gigabit-capable broadband (including full fibre) is increasing in England. This is broadband able to provide speeds of over 1,000 Mbit/s or 1 Gbit/s. The Government has set a minimum target for the whole of the UK of 85% gigabit-capable coverage by 2025, with an

⁵ We have revised the way we collect information about coverage from FWA providers for this year's report. In addition, the data on premises has been updated and may include new build premises for which decent broadband will be available once complete but where the network connections have not been included in data provided by operators.

ambition to get as close to 100% coverage as possible. Gigabit-capable broadband is currently available in 25% of residential premises in England.

Full fibre connections are available to 16% of homes, increasing from 10% in 2019. This increase is largely due to the continued investment in the rollout of fibre networks from providers included last year, such as BT, Virgin Media and KCOM. However, we are also now including coverage data from many more, smaller, fibre network providers. While these providers do not significantly alter the national figures, they are important in providing full fibre coverage at the local level.

There is substantial private sector investment currently taking place across England, with a range of operators currently working to improve connectivity. These include operators, such as Openreach, Virgin Media, and CityFibre, focused on building on a national or regional scale and those more focused on specific geographic markets or area types (such as Gigaclear).

In partnership with operators, local authorities have undertaken to improve connectivity, and address 'not spots' in their areas. For example:

- In March 2020, Leeds City Council signed a £20.3m deal with BT providing full fibre connectivity to hundreds of public sector locations including council housing.⁶
- By May 2020, the Superfast Northamptonshire project, which is part-funded by Northamptonshire County Council, had rolled out full fibre internet to 10,000 properties in the county in pursuance of its target of 40% full fibre coverage by the end of 2023.⁷
- In 2020, the Greater London Authority (GLA) awarded £33.9m to support fibre projects across the city's boroughs.⁸
- Hyperoptic, which aims to roll out its full fibre network to 2 million premises (both residential and business) by 2021 and 5 million by 2024,⁹ reached an agreement in July 2020 with Sheffield Council to deploy full-fibre broadband to the 5,400 social housing units in the city.¹⁰
- Community Fibre, which aims to roll out full-fibre broadband to 1 million London premises by 2023,¹¹ completed rollout of full-fibre broadband to all social housing in the London Borough of Sutton in September 2020.¹²

⁶ Leeds City Council, [Programme launched to bring full fibre connectivity to Leeds](#), 2 March 2020.

⁷ Gigaclear, [10,000 properties connected to ultrafast broadband in rural Northamptonshire](#), May 2020.

⁸ Mayor of London, [Connected London Newsletter](#), October 2020.

⁹ Hyperoptic, [Gigabit broadband designed for new build homes](#).

¹⁰ Hyperoptic, [Sheffield Council agrees full fibre rollout](#), 2 July 2020.

¹¹ Community Fibre, [Community Fibre to invest up to £400 million in accelerated expansion of full-fibre broadband to one million households and businesses across London](#), 29 July 2020.

¹² Community Fibre, [Sutton gains access to some of the fastest internet speeds in Europe in partnership with Community Fibre](#), 10 September 2020.

Figure 2: Residential coverage of gigabit-capable broadband, urban/rural breakdown

	Gigabit-capable	Of which full fibre
England	6,116,000 (25%)	65%
Urban	5,582,000 (26%)	62%
Rural	534,000 (18%)	97%
United Kingdom	7,888,000 (27%)	65%
Urban	7,195,000 (29%)	62%
Rural	693,000 (17%)	97%

Source: Ofcom analysis of operator data.

Consumers in England can increasingly choose ultrafast connections

Ultrafast services are defined as those able to deliver broadband speeds of or above 300 Mbit/s. In 2020, 14.8m (61%) residential premises in England were able to receive ultrafast broadband, up from 13.4m (55%) in 2019.

Figure 3: Coverage of residential ultrafast broadband (≥300Mbit/s), urban/rural breakdown

	England	UK
Urban	66%	65%
Rural	21%	20%
Total	61%	59%

Source: Ofcom analysis of operator data.

Figure 4: English Local Authorities with highest coverage of residential ultrafast broadband (≥300Mbit/s)

Local Authority	Coverage %
City of Kingston-upon-Hull	98%
Luton	94%
Dudley	93%
Middlesbrough	92%
Portsmouth	92%
Nottingham	92%
Wolverhampton	92%
Harlow	92%
Worthing	92%

Source: Ofcom analysis of operator data.

Superfast coverage is widespread in England

Ofcom defines superfast broadband as a service which delivers a minimum download speed of at least 30 Mbit/s. Over 2020, superfast broadband coverage of residential properties in England stood at 96%, broadly similar to last year.

There is also a significant difference between the availability of superfast broadband in urban and rural areas, with 98% of homes in urban areas having access to superfast broadband compared to 84% in rural areas. This is broadly consistent with the rest of the UK. Five English Local Authorities have coverage close to 100%: Luton, Gosport, Sandwell, Stevenage, and Epsom and Ewell.

Figure 5: Coverage of residential superfast broadband (≥ 30 Mbit/s), urban/rural breakdown

	England	UK
Urban	98%	98%
Rural	84%	81%
Total	96%	96%

Source: Ofcom analysis of operator data.

Although 96% of all homes in England have access to superfast broadband, take up remains lower at 58%.

We anticipate broadband coverage of higher speeds will increase across England, encouraged by both increased private investment and public sector interventions to facilitate network deployment. The UK Government has announced plans for a £5bn Gigabit Broadband programme to fund the deployment of gigabit-capable networks across the country, with at least £1.2bn to be spent by March 2025.¹³ One scheme to support this, the Gigabit Broadband Voucher Scheme to support fibre rollout to rural areas, has already launched, and we expect further details to be announced shortly.¹⁴

The number of premises unable to access decent broadband has fallen

The number of consumers unable to achieve decent speeds over a fixed line has fallen again. Taking into account all fixed line connections, 99% of premises in England can access decent broadband from a fixed line. Around 302,000 or 1% of premises do not have access to decent broadband via a fixed connection.

¹³ HM Treasury, [Spending Review to fight virus, deliver promises and invest in UK's recovery](#), 25 November 2020; HM Treasury, [National Infrastructure Strategy](#), 25 November 2020.

¹⁴ Department for Digital, Culture, Media & Sport, [Gigabit Voucher Broadband Scheme](#).

Figure 6: Homes and businesses unable to receive decent broadband (≥ 10 Mbit/s DL, ≥ 1 Mbit/s UL) over a fixed line

	2018	2019	2020
England	484,000 (2%)	412,000 (2%)	387,000 (1%)
Urban	162,000 (1%)	138,000 (1%)	146,000 (1%)
Rural	322,000 (11%)	273,000 (8%)	240,000 (7%)
United Kingdom	677,000 (2%)	610,000 (2%)	583,000 (2%)
Urban	181,000 (1%)	161,000 (1%)	170,000 (1%)
Rural	496,000 (12%)	449,000 (10%)	413,000 (10%)

Source: Ofcom analysis of operator data.

Wireless technologies are also used to deliver broadband to a fixed location

Some premises may be served by broadband provided over a wireless network (known as fixed wireless access, or FWA), using either a mobile network or a dedicated network. Fixed wireless access on mobile networks is offered on licensed 4G and 5G networks, usually to an indoor router, although broadband services to a fixed location (dedicated networks) are also provided by Wireless Internet Service Providers (WISPs). We estimate that 268,000 premises in England should be able to receive at least a decent broadband from an FWA network where they do not have a decent broadband connection from a fixed network.

If the networks are managed well, both MNOs and WISPs can deliver a decent broadband service and are an alternative network technology for consumers who cannot receive a decent broadband connection from their fixed network.

Factoring in coverage from both fixed and fixed wireless networks, across the United Kingdom, we estimate that 190,000 properties are unable to access decent broadband. Of these, we estimate that 63%, or 119,000, are in England. These premises may be able to have a new connection built under the Broadband Universal Service Obligation (USO).

The Broadband Universal Service Obligation (USO)

The broadband USO gives people with homes and businesses in the UK the right to request a decent broadband connection, where an affordable service is unavailable. Ofcom designated BT as the universal service provider (USP) for the UK excluding Hull, and KCOM for the Hull area. The broadband USO launched on 20 March 2020, shortly after the UK entered lockdown due to the Covid-19 pandemic.

To date, just over 4,000 premises in the UK have been connected via the USO mechanism, of which 3,245 are in England.¹⁵

¹⁵ Source: BT.



Mobile services

Introduction

Mobile services are an important part of people's daily lives and business. People expect to have access to decent mobile connections wherever they live, work and travel.

This year, monthly mobile traffic in England increased by 41% to 355,000 terabytes – representing 83% of the data traffic of the whole UK.

Key highlights:

- Voice services from all four operators are available (outdoors) to 92% of England's landmass.
- In England, 81% of homes and businesses have good indoor 4G coverage from all four network operators.
- Good 4G services from all four operators are available (outdoors) across 84% of England's landmass.
- In England, 71% of major roads have in-vehicle 4G coverage from all four operators.
- Commercial investment in 4G rollout is now focusing on delivering improvements where demand is concentrated. In England, indoor coverage to premises and outdoor geographic coverage have marginally improved. Outdoor coverage is now available in the majority of places where people live and work.
- However, coverage of England's landmass remains patchy, especially in rural areas. In March 2020, the UK Government agreed a £1bn deal for the network operators' Shared Rural Network, to deliver new coverage to rural areas in England.¹⁶
- 5G deployment has continued, largely focusing on areas with existing high demand for mobile services.

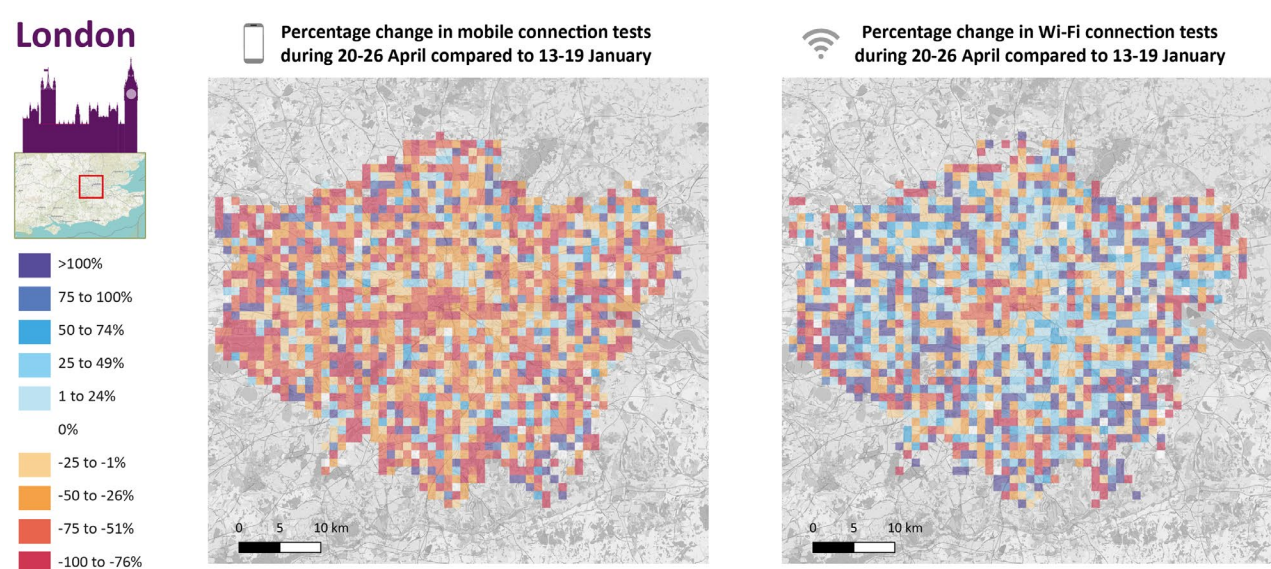
Mobile services during Covid-19

UK Mobile network operators (MNOs) successfully coped with the increased demands and changes in data and voice traffic as people began working from home and schools were shut during the Covid-19 spring lockdown.

¹⁶ Department for Digital, Culture, Media & Sport, [Press release: Shared Rural Network](#), 9 March 2020.

We observed a shift in traffic patterns across networks during the period as people began working from home. The areas of highest data traffic moved from urban areas to the suburbs. Mobile data traffic fell during the first week of lockdown measures across the UK. Crowdsourced data available to us suggest that the reduction in overall data traffic across the operators was likely due to users moving their data to home Wi-Fi connections. Most of central and Greater London experienced a large decrease in mobile activity during the period. While the largest reductions were in metropolitan areas, data connections in some more suburban areas also fell, such as those with strong office presences and busy railway stations. Areas with notable increases in mobile activity during lockdown were mostly residential, as people spent more time at home and in parks during the lockdown. Similarly, Wi-Fi connections increased in most residential areas.¹⁷

Figure 7: Percentage change in mobile and Wi-Fi connection tests during 20-26 April compared to 13-19 January: London

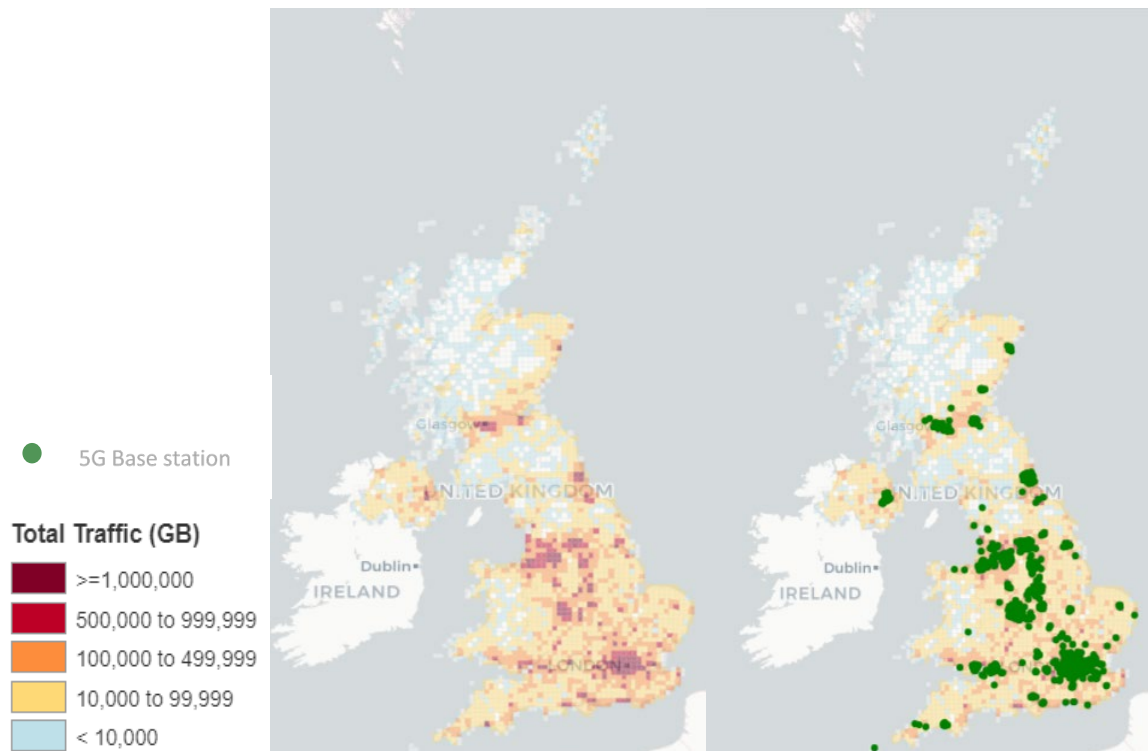


Source: Ofcom analysis of crowdsourced Android data. Notes: left-hand map percentages refer to the difference in the number of 2G, 3G, 4G and 5G-only connection tests made during 20-26 April compared to 13-19 January; right-hand map percentages refer to the difference in the number of Wi-Fi connection tests made during the same period; decreases shown in red; increases shown in blue. More information on the connection tests and how this information is collected is available in the [Technical Methodology](#) Annex to the Mobile Matters report.

¹⁷ Ofcom, [Mobile matters: Researching people's experience of using Android mobile services](#), 8 October 2020.

5G rollout continues across England

Figure 8: Illustration of base station traffic volumes and base stations with 5G deployed on them



Source: Ofcom analysis of operator data.

Across the UK, 5G is now carried on around 3,000 mobile base stations (around a ten-fold increase in base stations reported to us from last year). Of these, 87% are in England, primarily clustered around the largest cities. The majority of 5G deployments are in already well-served areas, with more than 200 sites in London.¹⁸ In March 2020, West Midlands 5G established the country's first region-wide 5G testbed.¹⁹ There is also significant ongoing research into 5G connectivity and its applications in rural areas. In February 2020, the Department of Digital, Culture, Media and Sport made available £35 million for projects researching rural and industrial uses of 5G.²⁰

Local Authorities have forged partnerships with private entities to spur 5G rollout. In November, Birmingham City Council and Dudley Council signed lease agreements with mobile infrastructure companies to expedite the deployment of 5G across the region.²¹

¹⁸ We note that the data indicating around 3,000 base stations carrying 5G is based on the most recent information available from MNOs in September 2020. More detailed analysis on the distribution across existing busy sites, and across rural and urban areas, comes from a slightly earlier, but more detailed dataset based on the situation as of June 2020.

¹⁹ West Midlands Combined Authority, [West Midlands 5G awards O2 contract to launch UK's first 5G accelerators](#), 27 March 2020.

²⁰ Department for Digital, Culture, Media & Sport, [Press release: New £65 million package for 5G trials](#), 20 February 2020.

²¹ UK 5G Innovation Network, [Birmingham City Council and Dudley Council sign landmark lease agreements to accelerate the roll-out of 5G in the West Midlands](#), 19 November 2020.

Mobile coverage in England

Methodology

In this section we report on coverage both outside and inside premises, on geographic coverage (i.e. the proportion of landmass covered) and on coverage along roads.²² The mobile coverage figures provided in this report are based on predictions which the MNOs supply to Ofcom, with Ofcom undertaking regular testing to ensure the predictions provided are suitable for national and regional reporting.

Coverage outside premises

By outdoor coverage we mean the predicted availability of mobile coverage outside premises.

In England, nearly all premises have outdoor 4G coverage from at least one provider, and 98% from all four. In rural areas, 99% of premises have outdoor 4G coverage from at least one provider, and only 89% have coverage from all four.

Figure 9: Outdoor 4G coverage, urban/rural breakdown

	From at least one MNO	From all MNOs
England	100%	98%
Urban	100%	99%
Rural	99%	89%
United Kingdom	100%	98%
Urban	100%	99%
Rural	99%	87%

Source: Ofcom analysis of operator data.

Figure 10: Outdoor voice coverage, urban/rural breakdown

	From at least one MNO	From all MNOs
England	100%	99%
Urban	100%	100%
Rural	100%	96%
United Kingdom	100%	99%
Urban	100%	100%
Rural	100%	95%

Source: Ofcom analysis of operator data.

²² Our definition of 4G coverage reflects a level of service that supports nearly all 90-second telephone calls being completed without interruption and data connections that should deliver a connection speed of at least 2 Mbit/s (fast enough to browse the internet and watch glitch-free mobile video) almost all the time. For further information, please see the [Methodology](#) annex to the UK report.

Indoor coverage

By indoor coverage, we mean the predicted availability of mobile coverage inside a building. This is based on an assumed average loss of 10 dB for the signal in the pixel outside premises to get in through the building materials.

In England, 99% of premises have indoor 4G coverage from at least one provider, and 81% from all four. In rural areas, 96% of premises have indoor 4G coverage from at least one provider, and only 46% have coverage from all four.

Figure 11: Indoor 4G coverage, urban/rural breakdown

	From at least one MNO	From all MNOs
England	99%	81%
Urban	100%	86%
Rural	96%	46%
United Kingdom	99%	80%
Urban	100%	86%
Rural	95%	46%

Source: Ofcom analysis of operator data.

Figure 12: Indoor voice coverage, urban/rural breakdown

	From at least one MNO	From all MNOs
England	100%	94%
Urban	100%	97%
Rural	99%	70%
United Kingdom	100%	93%
Urban	100%	97%
Rural	99%	70%

Source: Ofcom analysis of operator data.

In 2020, indoor voice coverage in English homes and businesses from all operators reached 94%, rising to 97% in urban areas.

Indoor coverage depends upon a range of factors, including the thickness of walls, building materials used in construction, and where in a building the phone is used. In some premises there may be differences between our predicted indoor coverage data and the actual coverage available. Ofcom's [online coverage checker](#) provides additional information on the likelihood of there being indoor coverage at different locations, which takes into account some of the factors that can affect a mobile signal. As a complement to voice coverage, all the operators in the UK make Wi-Fi calling services (the ability to make and receive a call over a Wi-Fi network) available to consumers, although not all mobile phones support this feature.

Geographic coverage

By geographic coverage, we mean the proportion of relevant landmass in which there is a sufficiently strong signal to provide a good 4G service outside.

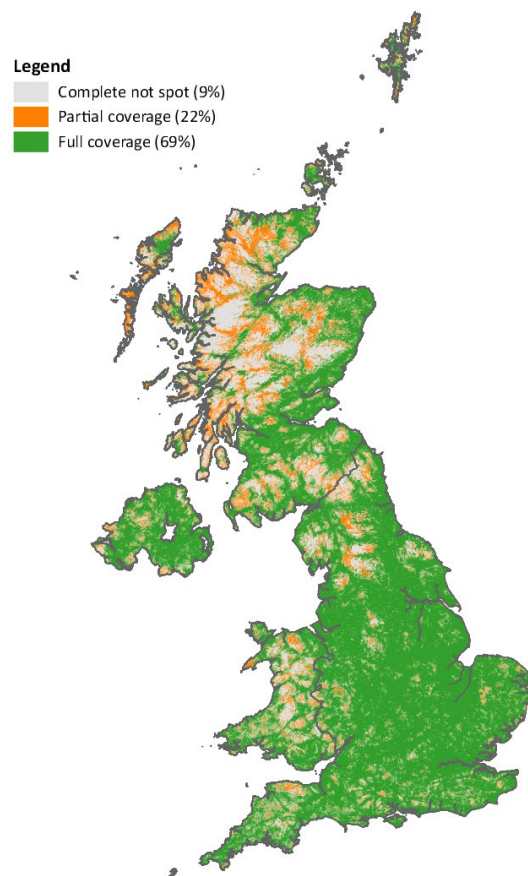
Figure 13: Geographic 4G coverage, urban/rural breakdown

	From at least one MNO	From all MNOs
England	97%	84%
Urban	100%	97%
Rural	97%	81%
United Kingdom	91%	69%
Urban	100%	96%
Rural	90%	65%

Source: Ofcom analysis of operator data.

Growth in 4G geographic outdoor coverage has plateaued, but there remain significant differences between operators in areas covered. The consumer experience is hampered by these ‘partial not-spots’ – areas not covered by all operators. 4G mobile coverage from at least one operator now reaches 97% of England’s landmass. However, 84% of England’s landmass has good 4G coverage from all four operators, falling to 81% in rural areas. The geographic area of England covered by all operators for telephone calls stands at 92%, and 90% in rural areas.

Figure 14: Geographic 4G coverage in the United Kingdom, September 2020



Source: Ofcom analysis of operator data.

Coverage on roads

Good coverage along the road network is important to assist with vehicle communications, navigation, infotainment and safety aids. A detailed breakdown of coverage along A and B roads can be found in the interactive dashboard.

In-vehicle 4G coverage from at least one operator along major roads in England now stands at 99%. 1.6% percent of major roads in rural areas are unable to receive in-vehicle 4G coverage. Around 0.2% of major roads lack voice coverage from any operator.