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# Connected Nations 2021

## England report

Strong, Secure Networks

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# Overview

This annual report measures progress in the availability of broadband and mobile services in England and highlights work by Ofcom, the UK Government and communications companies to improve connectivity. We publish reports on broadband and mobile availability across the UK and each of its nations, alongside an interactive dashboard for people to see data for different areas and services.

The importance of connectivity, and access to fast and reliable voice and broadband services, has been highlighted once again in 2021. Covid-19 has meant that people have continued to rely significantly on these services for work, education, healthcare and entertainment, particularly in the early months of this year.

## What we have found

- Full-fibre broadband is available to 6.5 million homes (27%) an increase of 2.5 million premises compared to last year. Around 46% of homes in England now have access to a gigabit-capable broadband connection. This is a significant increase from last year (25%), although still some way from the UK Government aim of 85% by 2025.[1]
- Superfast broadband coverage in England remains stable at 96%.
- The number of homes and businesses in England without access to at least decent broadband continues to shrink. Accounting for coverage from both fixed and fixed-wireless networks, we estimate that around 0.2% of premises, or around 61,000 premises, in England are still without a decent broadband connection. These premises may be eligible for a connection under the broadband Universal Service Obligation (USO).
- 5G rollout is underway in England, although consumers are still overwhelmingly dependent on previous generations of technology, especially 4G.
- Across England, 99% of homes and businesses should be able to get good indoor 4G coverage from at least one operator.
- Good 4G mobile services from at least one operator are available outdoors across 98% of England's landmass.
- The UK Government has agreed the Shared Rural Network with operators to improve mobile coverage across the UK.

[1] The 85% target is for the UK as a whole.

# Fixed broadband services

## Introduction

Connectivity continues to improve in England, and most homes have a choice of connections which offer superfast or higher speeds. This chapter will highlight that significant progress has been made in deployment of full-fibre and gigabit-capable networks across England. While rural consumers still tend to have fewer options than their urban counterparts, the direction of travel is a positive one.

This year, Ofcom published its Wholesale Fixed Telecoms Market Review, setting out our model for regulation of the fixed telecoms markets for the next five years. We aim to encourage competition between different networks where viable, providing high quality services, choice and affordable broadband for consumers throughout the UK. Where competition is not viable, we have set a cost-based charge control to allow Openreach to recover its investment costs. This approach is a key factor in providing regulatory certainty for operators to continue to roll out full-fibre broadband.

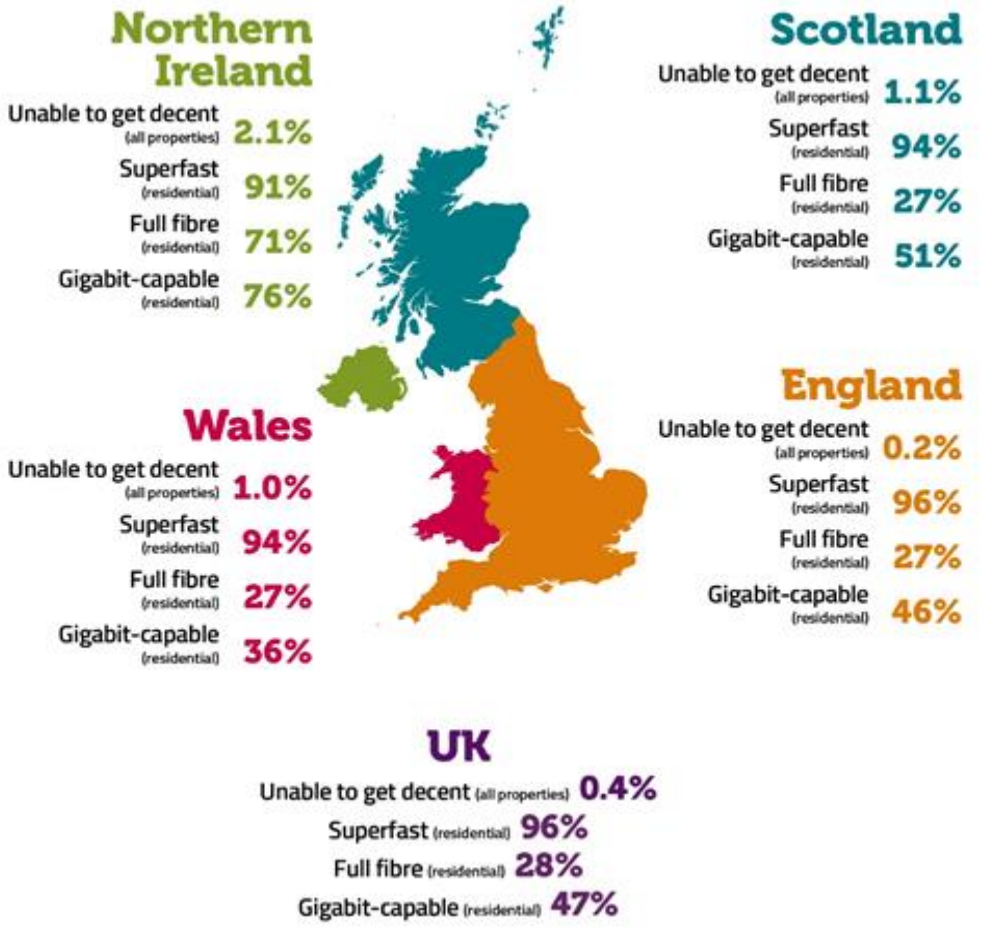
The UK Government has set a target of at least 85% gigabit coverage across the whole UK by 2025, and expressed an ambition to reach as close to 100% as possible. In the 2021 Budget, the Chancellor announced a continuation of the £5 billion investment in Project Gigabit, of which £1.2 billion will be made available by 2025 to help achieve this 85% target.

### Key highlights

- Full-fibre broadband services are now available to 27% of homes in England. Gigabit-capable broadband is available to 46% of premises in England, a notable increase from 25% last year.
- Almost all homes in England can access at least superfast broadband. Coverage remains the same as last year at 96%, although superfast coverage of homes in rural areas in England is at 85%.
- When we include fixed wireless providers, we estimate that as few as 61,000 homes and businesses in England are unable to access a decent broadband service.
- In 2021, the average download speed in England was 88 Mbit/s and the average upload speed was 15 Mbit/s.
- In rural areas, the average download speed was 66 Mbit/s, considerably lower than urban areas, where the average download speed was 91 Mbit/s.
- Average data usage per connection in England was 462 GB per month, an increase of just over 5% from last year.

## Fixed broadband coverage

**Figure 1: Summary of fixed line broadband coverage across the UK and Nations**




*Source: Ofcom analysis of operator data.*

## Coverage of full-fibre and gigabit-capable broadband in England continues to grow

Across England, there has been a significant increase in full fibre availability, with 6.5 million premises (27% of premises) able to access a full-fibre connection, which is an increase of 11 percentage points from last year.

Gigabit-capable coverage in England has also increased, partly as a result of the full fibre increase, now available to 11.3 million premises (46% of premises) compared to 6.1 million premises (25%) last year, again showing a significant increase over the last year.

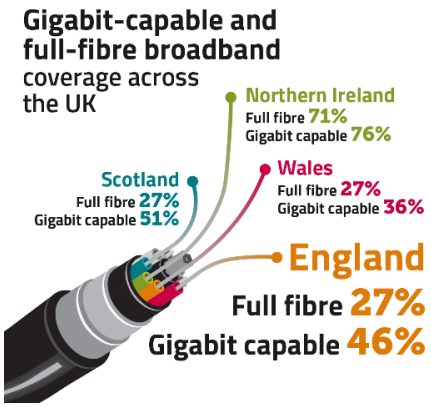


**Figure 2: Residential coverage of gigabit-capable and full-fibre broadband, urban/rural breakdown**

| | Gigabit-capable | | Full-fibre | |
|---|---|---|---|---|
| | 2020 | 2021 | 2020 | 2021 |
| **England** | **6.1m (25%)** | **11.3m (46%)** | **4.0m (16%)** | **6.5m (27%)** |
| Urban | 5.6m (26%) | 10.5m (49%) | 3.5m (16%) | 5.7m (27%) |
| Rural | 0.5m (18%) | 0.8m (26%) | 0.5m (17%) | 0.8m (25%) |
| **United Kingdom** | **7.9m (27%)** | **13.7m (47%)** | **5.1m (18m)** | **8.2m (28%)** |
| Urban | 7.2m (29%) | 12.7m (50%) | 4.4m (18%) | 7.2m (28%) |
| Rural | 0.7m (17%) | 1.0m (25%) | 0.7m (17%) | 1.0m (24%) |

*Source: Ofcom analysis of operator data.*

The nature of this roll-out means there remain differences between urban and rural access. Gigabit-capable broadband is available to 49% of urban premises, compared to only 26% of rural premises. This disparity is partly because Virgin Media O2's upgrade to DOCSIS3.1[2] accounts for a significant portion of the increased gigabit-capable coverage,[3] and this cable network is based on old cable TV franchises, mainly based around cities.

The increase in national coverage is largely due to continued investment in the rollout of fibre networks in the UK from large providers. That said, we have this year increased the number of fibre network providers that we gather data from; these providers tend to be smaller and often target rollout in the less well served areas, and they play an important role in providing full-fibre coverage at the local level.

Full-fibre coverage varies across local authorities in England; while some authorities enjoy coverage over 90%, some have under 2%. Areas with the most, and least, full-fibre coverage are relatively spread out across England and neither is significantly concentrated in one region.

[2] Data Over Cable Service Interface Specification: The latest standard of cable technology, DOCSIS 3.1, is capable of delivering download speeds of up to 10Gbit/s and upload speeds of up to 1Gbit/s, although in practice speeds average out significantly below this – and since capacity is shared among users, it may not be the case that each user can simultaneously receive gigabit speeds.

[3] Since gathering our coverage data in September 2021, Virgin Media O2 has completed this upgrade across the UK.

**Figure 3: English local authorities with highest levels of full-fibre coverage**

| Local authority | Coverage (%) |
|---|---|
| City of Kingston-Upon-Hull | 98% |
| Coventry | 92% |
| Milton Keynes | 89% |
| Peterborough | 82% |
| Worthing | 71% |
| East Riding of Yorkshire | 69% |
| City of London | 68% |
| Epsom and Ewell | 68% |
| Westminster | 66% |
| Exeter | 66% |

*Source: Ofcom analysis of operator data.*

As indicated below, the ten authorities with the highest levels of gigabit-capable broadband coverage are broadly in urban areas. This is in line with the urban/rural split for gigabit-capable coverage across England.

**Figure 4: English local authorities with highest coverage of gigabit-capable broadband**

| Local authority | Coverage (%) |
|---|---|
| City of Kingston-Upon-Hull | 98% |
| Coventry | 95% |
| Wolverhampton | 93% |
| Camden | 92% |
| Gloucester | 92% |
| Dudley | 92% |
| Birmingham | 91% |
| Barking and Dagenham | 90% |
| Southampton | 90% |
| Merton | 90% |

*Source: Ofcom analysis of operator data.*

## A large proportion of premises in England can access superfast coverage, although there is a notable urban/rural divide here

As well as full fibre and gigabit-capable, we report on coverage of superfast broadband across the UK, which is broadband capable of delivering a download speed of at least 30 Mbit/s. In 2021, superfast broadband coverage of residential properties in England stood at 96%, broadly similar to last year.

There is, however, 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 85% in rural areas. This pattern is reflected across the rest of the UK.

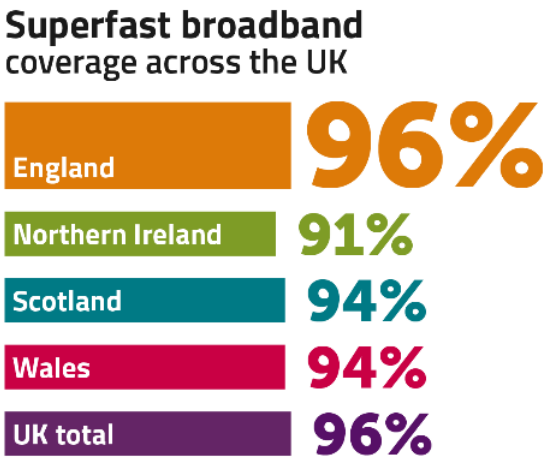



**Figure 5: Coverage of residential superfast broadband, urban/rural breakdown**

| | England | United Kingdom |
|---|---|---|
| Urban | 21.0m (98%) | 24.7m (98%) |
| Rural | 2.6m (85%) | 3.4m (83%) |
| **Total** | **23.6m (96%)** | **28.1m (96%)** |

*Source: Ofcom analysis of operator data.*

Some English Local Authorities have superfast coverage over 99%, including (among others) Gosport, Sandwell, Wigan, Wolverhampton, Peterborough, Watford and South Gloucestershire. A significant majority of the local authorities with the lowest superfast coverage are rural, including areas such as West Devon (79%), Eden (83%) and Forest of Dean (83%).

## The number of premises unable to access decent broadband has fallen when we take into account coverage by Fixed Wireless Access

Decent broadband over a fixed connection is available to almost all homes and businesses in England, and the number of premises without this access continues to fall. However, some premises in England still cannot access decent broadband over a fixed line. As outlined above, some of these premises receive broadband over a wireless connection.

Looking just at fixed connections, around 451,000 (2%) premises in England do not have access to a decent broadband service. This figure suggests a slight increase from last year, although this is largely explained by a methodology change in our Spring 2021 update.[4]

[4] In our spring 2021 update we refined the way that these properties are identified and 'address-matched' to operator data to more precisely provide estimated speed data for individual apartments and similar premises. Previously we had included premises in our figures where we had no operator coverage data but they were closely associated with adjacent properties. We have since refined the way that these properties are identified and 'address-matched' to operator data to more precisely provide estimated speed data for individual apartments and similar premises. In doing so, the number of properties for which we have no operator data increases, which results in the higher figure given here. See also footnote 4 in Connected Nations Spring Update 2021.

**Figure 6: Homes and businesses unable to receive decent broadband (>= 10 Mbit/s DL, >= 1Mbit/s UL) over a fixed line (rounded up to nearest 1000)**

| | 2021 |
|---|---|
| **England** | **451,000 (2%)** |
| Urban | 217,000 (1%) |
| Rural | 234,000 (7%) |
| **United Kingdom** | **651,000 (2%)** |
| Urban | 248,000 (1%) |
| Rural | 403,000 (9%) |

*Source: Ofcom analysis of operator data.*

However, 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 wireless internet service provider (WISP), usually dedicated to the provision of broadband services.

We estimate that 390,000 premises in England should be able to receive at least a decent broadband connection from a FWA network, where they do not have a decent broadband connection from a fixed network.


Taking into account both fixed and fixed wireless networks, we estimate that 123,000 premises across the United Kingdom are unable to access decent broadband. Of these, we estimate that 61,000 premises are in England, which amounts to 0.2% of England's premises.

These premises may be able to have a new connection built under the broadband Universal Service Obligation (USO).

The broadband USO provides everybody with the right to request a 'decent' broadband connection. Where an affordable service is not available, or due to be available in twelve months under a publicly funded scheme, the customer is eligible for the USO if the costs of providing the connection are below £3,400 or, where the costs are above £3,400, the customer agrees to pay the excess.

BT is responsible for delivering the USO in the UK (excluding Hull), and KCOM for the Hull Area. To date, BT has received just under 1,350 orders, of which 1,100 are in England. Each order may require network build that can serve multiple premises – these orders will lead to network capable of providing full-fibre connections being built that can serve 5000 premises in England that do not currently have access to decent broadband.

Shortly after the USO launched, we were concerned that BT may not be complying with the USO conditions correctly when it was calculating the excess costs for a given connection. This was potentially resulting in some customers receiving too high a quote for a connection, meaning fewer people took advantage of the USO. We opened an investigation into BT's

approach to calculating quotes for excess costs in October 2020.[5] In November 2021, we closed the investigation and amended the conditions imposed on BT regarding cost calculations.[6]

## Take-up of higher speed packages is also continuing to grow

While coverage of broadband networks has increased, the benefit of this cannot be realised if consumers do not take advantage of these services when they are available.

We estimate that the take-up of services using full fibre at any speed, where fibre is available, is around 25% in England. We note that this reporting may be lower than expected because, while networks are being deployed at pace, take-up is likely to lag behind coverage. This is likely to explain the slight drop from 27% take-up last year.

For those 96% of premises in England that are able to take superfast broadband, around 69% of them do so. This is a notable increase from 61% last year.

## Data usage over fixed connections has increased.

Consumers continue to use more data over their fixed connections as more people use broadband for data-heavy activities such as streaming. Average monthly data usage now stands at 462 GB per connection in England, up from 438 GB last year and 325 GB in 2019.

During 2021, nationwide lockdowns and subsequent restrictions due to Covid-19 have continued, meaning many people have been using their home broadband connections for work and education, for keeping in touch with friends and family, for accessing essential services, and for leisure. As such, increased data usage may be a result of greater reliance on high-speed connections during lockdowns.

Average download traffic is at 423 GB and has grown by around 5% in the past year, while peak download traffic (in the period 6pm to midnight) has grown by around 14% and is now at 182 GB. The figures for this year were recorded during May, when the lockdown in England was easing.

Data usage is much higher in urban than rural areas. Average data usage in urban areas is 475 GB, compared to 373 GB in rural areas.

[5] Ofcom, Investigation into BT's compliance with its obligations as a broadband universal service provider, 29 November 2021.
[6] Ofcom, Approach to high excess costs under the broadband universal service Modification to the Universal Service Conditions, 11 November 2021.

## Future developments and growth of smaller operators

The UK Government has set a target of at least 85% gigabit coverage across the whole UK by 2025, and expressed an ambition to reach as close to 100% as possible. In the 2021 Budget and Spending Review, £5bn was committed to the Gigabit Broadband programme, funding this deployment of gigabit-capable networks across the UK, with at least £1.2bn of this to be made available by 2025. The UK Government also provides vouchers including through the Gigabit Broadband Voucher Scheme for individual eligible customers to contribute towards the installation of gigabit-capable infrastructure.

In addition, investment from local governments and operators is going some way to tackle the ongoing urban/rural disparities in access to broadband. Some examples of this work include:

- Building Digital UK's Project Gigabit's third phase will provide gigabit-capable connections to 567,000 hard-to-reach premises across Cheshire, Devon, Dorset, Somerset, Essex, Herefordshire, Gloucestershire, Lincolnshire, East Riding and North Yorkshire. Work to build the connections is due to commence in 2024.[7]
- Across 2021, Openreach announced a series of investments in the South West, aiming to reach over 700,000 additional premises, including in 181 rural and harder to serve areas.[8]
- In July 2021, the Greater London Authority awarded a concession to BAI Communications to build full-fibre networks using London Underground tunnels and ducts.[9]

There are many alternative network providers deploying full-fibre networks. A 2021 report by the Independent Networks Co-operative Association (INCA) highlighted significant private investment and found that the independent sector is four times larger than it was a decade ago.[10]

Some of this work is in regions that are not typically commercially attractive for larger operators. As such, these alternative providers are increasingly playing an important role in the roll-out of gigabit capable broadband. For example, in June, full fibre provider LightSpeed Broadband announced a second wave of building across the east of England, to Norfolk and Essex.[11]

Alternative providers also serve more densely populated urban areas. In November, CityFibre announced that it will be investing £21 million to deploy full fibre to homes and businesses in Lincoln.[12] Similarly, Hyperoptic has announced it will be providing full-fibre broadband in Hounslow.[13]

[7] Department for Digital, Culture, Media & Sport, Better broadband for 500,000 rural homes in UK gigabit revolution, 29 October 2021.
[8] Openreach, South West to get £112m ultrafast Full Fibre broadband boost, 24 June 2021.
[9] Transport for London, Mayor fulfils commitment and confirms high-speed mobile coverage across Tube network, 22 June 2021.
[10] The Independent Networks Cooperative Association, Metrics for the UK independent network sector, May 2021.
[11] ISPreview, Lightspeed Broadband Reveal New East England Fibre Rollout, 18 June 2021.
[12] ISPreview, CityFibre Invest GBP21m to Rollout FTTP Broadband in Lincoln, 23 November 2021 .
[13] Total Telecom, Hounslow Council agrees wayleave for hyperfast broadband rollout, 4 October 2021.

In addition to full fibre, alternative network providers continue to invest in other technologies that can deliver better services. In November, rural broadband provider Voneus rolled out a FWA network to Dalton Piercy, Hartlepool, improving residents' download and upload speeds.[14]

## Broadband scorecard 2021

**Figure 7: Broadband scorecard for 2021**

| **Residential** | **England** *(% of residential premises)* | **UK** *(% of residential premises)* |
|---|---|---|
| **Full-fibre coverage** | **27%** | **28%** |
| Urban | 27% | 28% |
| Rural | 25% | 24% |
| **Gigabit-capable coverage** | **46%** | **47%** |
| Urban | 49% | 50% |
| Rural | 26% | 25% |
| **Superfast broadband coverage (>=30 Mbit/s)** | **96%** | **96%** |
| Urban | 98% | 98% |
| Rural | 85% | 83% |

*Source: Ofcom analysis of operator data.*

| **Homes and businesses unable to get 10 Mbit/s download & 1 Mbit/s upload speed from a fixed or fixed wireless connection** | **England** *(% of all premises)* | **UK** *(% of all premises)* |
|---|---|---|
| Urban | 0.0% | 0.0% |
| Rural | 1.6% | 2.5% |
| **Total** | **0.2%** | **0.4%** |

*Source: Ofcom analysis of operator data.*

[14] Voneus, Levelling up of broadband connection to Hartlepool village made online gaming 'playable again', November 2021.

| Average broadband speeds and data use (over whole day) | England | UK |
|---|---|---|
| **Average download speed** | **88 Mbit/s** | **87 Mbit/s**[15] |
| Urban | 91 Mbit/s | 90 Mbit/s |
| Rural | 66 Mbit/s | 63 Mbit/s |
| **Average upload speed** | **15 Mbit/s** | **15 Mbit/s** |
| Urban | 14 Mbit/s | 14 Mbit/s |
| Rural | 20 Mbit/s | 18 Mbit/s |
| **Data use (monthly average)**[16] | **462 GB** | **460 GB** |
| Urban | 475 GB | 475 GB |
| Rural | 373 GB | 374 GB |

*Source: Ofcom analysis of operator data.*

[15] This figure excludes connections not assigned to a location.

[16] The UK report records a monthly average of 453 GB, which includes connections for which no location could be determined. Those connections have been excluded from the UK figures provided here. There are a different proportion of rural and urban connections (13% for England and 14% for the UK), so the overall average usage figure for England is higher than for the UK, despite a slightly lower rural average.

# Mobile services

## Introduction

Mobile services play an ever-increasing role in people's lives. People expect to have access to decent mobile connections wherever they live, work or travel. This chapter will look at the availability of mobile coverage, outside and inside premises, and on roads across England, rollout of 5G over the last year, and investment and use of mobile services.

Mobile coverage is high across the board, with almost all areas of England able to receive 4G from at least one provider. There remain some disparities between urban and rural areas, and Ofcom remains engaged in the development of the Shared Rural Network programme, seeking to expand the provision of mobile coverage across the UK. More consumers are buying 5G handsets, but 4G remains the dominant technology for all forms of traffic.

Ofcom is developing a strategy for our approach to the mobile sector, aiming to support the delivery of high-quality connectivity and innovation to deliver good outcomes for citizens and consumers. We will be taking a broad look at changes taking place across the sector to consider how competition currently operates and how it is likely to evolve over the next five to ten years.

### Key highlights

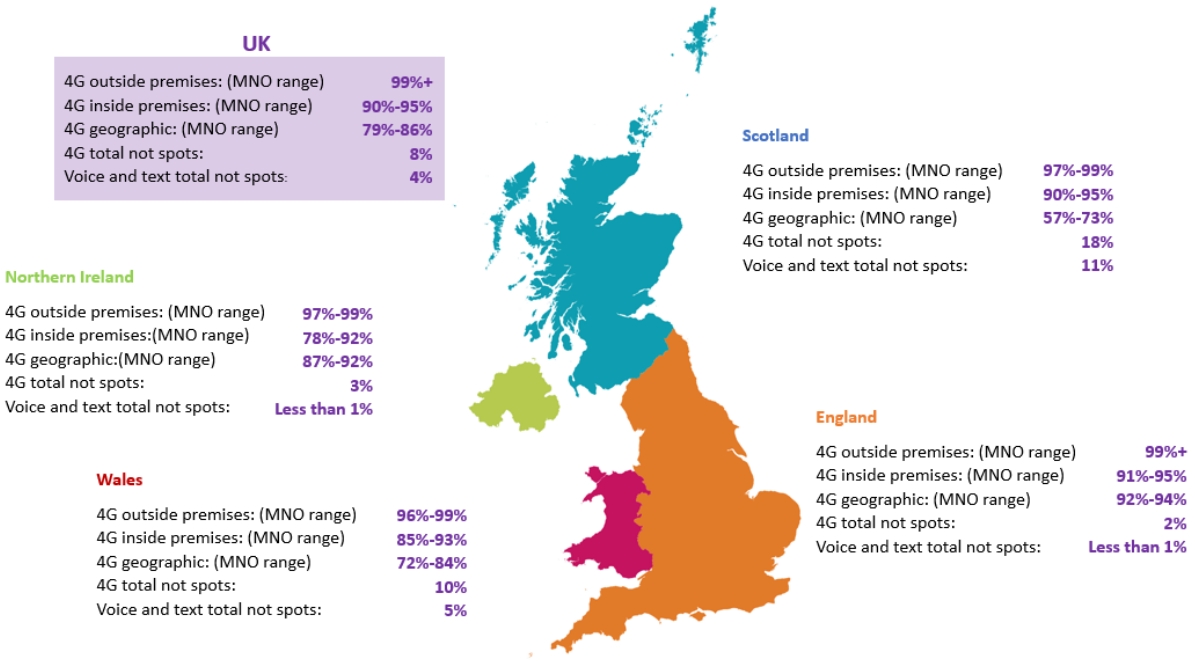
- Voice services from all four operators are available to 99% of premises (outdoors) in England.
- Good 4G services from all four operators are available across 98% of premises (outdoors) in England.
- In England, 82% of homes and businesses have good indoor 4G coverage from all four network operators.
- In-vehicle 4G coverage from all four operators is available on 72% of major roads in England.
- 5G is available from more than 5500 mobile sites in England. Its rollout remains largely focused on adding capacity in urban areas, and is only available across a small part of landmass.
- This year, total monthly mobile data traffic in England increased by 36% compared to last year, and stood at 483 petabytes.

## 5G rollout and adoption is evolving

Deployment of 5G has continued at pace in 2021, with outdoor 5G coverage available from at least one operator for between 44% and 60% of premises in England (as an indication of coverage in populated areas).[17] Take-up of 5G remains modest, and most consumers continue to rely on established 2G, 3G and 4G technology.

Local Authorities and commercial operators have worked in partnership to fund research and rollout of 5G technology. For example, West Midlands local authorities are working with 5PRING to explore 5G applications in the area within their 'Smart Cities' challenge.[18] Sunderland City Council has invested in a partnership with BAI Communications to deploy a private 5G network in the city, with hopes of stimulating economic growth and transforming delivery of public services.[19]

**Figure 8: Summary of mobile coverage across the UK and the Nations**




*Source: Ofcom analysis of operator data.*

[17] These figures cover a range from high to very high confidence in 5G availability. For more detail on how these ranges are derived, see Annex A- Connected Nations Methodology.
[18] Coventry and Warwickshire Local Enterprise Partnership, 5PRING and West Midlands Local Authorities challenge local innovators to lead the 5G 'Smart Cities' revolution, 11 May 2021.
[19] My ITU, Sunderland to deploy city-owned 5G network, 22 October 2021.

# Mobile coverage in England

## Methodology

In this section we report on coverage both inside and outside premises, on geographic coverage (i.e. the proportion of landmass covered) and on coverage along roads.

The mobile coverage figures provided 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. We take the accuracy of the data supplied to us seriously and we continue to monitor, through drive testing, the accuracy of all operators' coverage predictions. We note that operators continue to update and improve their prediction models and continue to work with them to ensure appropriate validation is undertaken.

## Overview of coverage in England

Coverage in England is the highest of the four nations of the UK, with very high levels of outside premises coverage predicted by all MNOs, and high levels of coverage also predicted indoors and across the whole of England (although some rural areas continue to experience gaps in service). Below we provide an overview of coverage available to consumers in England from different MNOs, against indoor, outdoor and geographic metrics. We then go on to explore how this compares to coverage from all MNOs (reflecting areas of maximum choice), coverage from at least one MNO and differences in urban and rural coverage.

**Figure 9: Mobile coverage in England**

| | O2 | Vodafone | EE | Three |
|---|---|---|---|---|
| Geographic – 4G | 92% | 92% | 94% | 92% |
| Geographic – voice | 98% | 98% | 95% | 95% |
| Indoor premises – 4G | 95% | 95% | 94% | 91% |
| Indoor premises – voice | 99%+ | 99% | 97% | 96% |
| Outdoor premises – 4G | 99%+ | 99% | 99%+ | 99% |
| Outdoor premises - voice | 99%+ | 99%+ | 99%+ | 99%+ |

*Source: Ofcom analysis of operator data.*

## Coverage outside premises

Outdoor coverage refers to the predicted availability of mobile coverage outside premises.

In England, nearly all premises are predicted to have outdoor 4G coverage from at least one provider, and 98% are predicted to receive service from all four operators.

However, there remain disparities in coverage between urban and rural areas. While almost all rural premises in England are predicted to have outdoor 4G coverage in the vicinity from at least one provider, only 89% are predicted to have outdoor 4G coverage from all four MNOs. For urban areas this figure increases to 99%.

**Figure 10: Outdoor 4G coverage, urban/rural breakdown**

| | From at least one MNO | From all MNOs |
|---|---|---|
| **England** | **99%+** | **98%** |
| Urban | 99%+ | 99% |
| Rural | 99%+ | 89% |
| **United Kingdom** | **99%+** | **98%** |
| Urban | 99%+ | 99% |
| Rural | 99% | 87% |

*Source: Ofcom analysis of operator data.*

## Indoor coverage

Indoor coverage refers to the predicted availability of mobile coverage inside a building. This is based on an assumption that the signal available outside a building loses on average 10dB in signal strength in getting inside the building.

Indoor 4G and voice call coverage remain stable, with no substantial changes since last year. Individual operators are predicted to provide indoor 4G coverage for between 91% and 95% of premises, and voice coverage indoors for 96% to 99%+ of premises. More than 99% of premises in England have indoor 4G coverage from at least one provider, and 82% from all four.

Rural coverage continues to be slightly lower, with individual MNOs predicted to provide 4G inside 69-81% of rural premises, and voice coverage inside 79-97% of rural premises. In these rural areas, 96% of premises have indoor 4G coverage from at least one provider, and only 47% have coverage from all four.

Where indoor coverage remains poor, alternative options are available. One such alternative is Wi-Fi calling (the ability to make and receive calls over a Wi-Fi network). All UK MNOs offer Wi-Fi calling to consumers.

## Geographic coverage

In this section, we focus on geographic coverage of the landmass of England where there is a sufficiently strong signal to provide a good 4G service outside.

There have been some incremental improvements by individual operators on geographic coverage, with all operators' coverage footprints have seen increases (sometimes not observable as a percentage point) on those found in September 2020.

**Figure 11: Geographic 4G coverage, urban/rural breakdown**

| | From at least one MNO | From all MNOs |
|---|---|---|
| **England** | **98%** | **84%** |
| Urban | 100% | 98% |
| Rural | 97% | 82% |
| **United Kingdom** | **92%** | **69%** |
| Urban | 99%+ | 97% |
| Rural | 91% | 66% |

*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.

4G coverage in England is predicted to be present in vehicles from all MNOs across 72% of major roads (motorways and A roads), with individual MNO coverage ranging from 87-92% for this metric. In-vehicle mobile voice services are predicted to be available from all MNOs for 88% of major roads in England. This falls to 83% when accounting for just A or B roads in England.

A more detailed breakdown of coverage along A and B roads is available in the interactive dashboard.

## Shared Rural Network

The Shared Rural Network project was agreed between the UK Government and UK mobile operators in March 2020, as a key plank in improving UK mobile coverage and to support the Government's ambition of achieving 95% coverage of the UK landmass by 2025. Under the agreement, each MNO is committed to reaching 88% coverage of UK landmass by 2024, and 90% of the landmass within six years from 2020 (subject to certain conditions), with an expectation that this will see the 'at least one operator' footprint (i.e. the area where there is mobile coverage available, but not always from the same MNO) reach 95% of UK landmass by 2025. Ofcom is responsible for assessing operators against these 88% and 90% targets, which have been added to spectrum licences to make them binding.

Over 2021, MNOs have begun to make progress towards the 88% target, which they are delivering though their own investment, and we have observed small increases (sometimes not sufficient to establish a percentage change) across the MNOs. This progress has included 24 new sites in England, out of 46 new sites in total across the UK.

A key objective of the programme when it was announced in March 2020 was a reduction in the number of partial 'not spots' consumers experienced, where service was available from one MNO

but not others. Since that time, we have seen a circa one percentage point decline in partial not spot levels in England (there has been a two percentage point decline across the whole UK).

## Mobile traffic

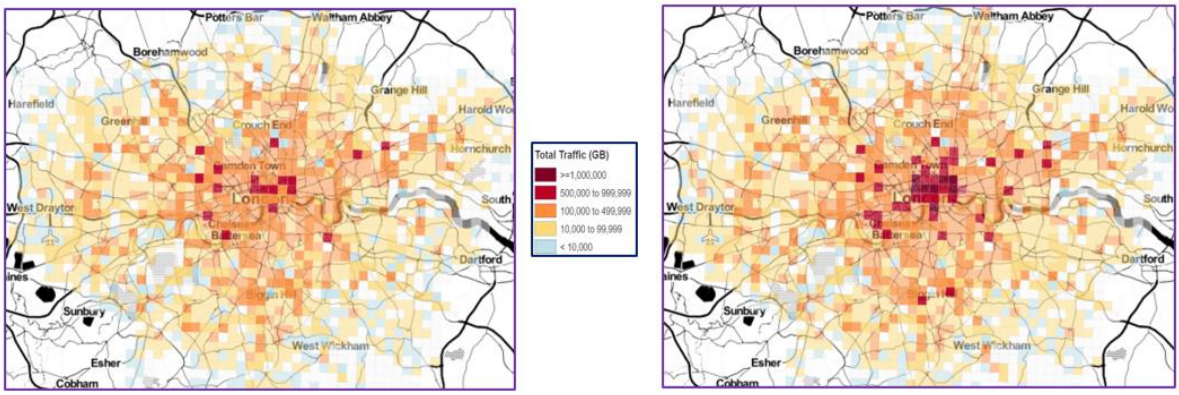
Mobile traffic continues to grow significantly year-on-year, with 5G making only a modest impact on the share carried by 4G.

Monthly data consumption in England has increased 36% year on year. 4G traffic continues to dominate, representing 91% of all traffic in England. 5G traffic is increasing, and has more than tripled from 5 petabytes to 16 petabytes in England over the last year.[20] However, it continues to play a small role in absolute terms, with total data consumption at 483 petabytes.

Data consumption remains higher in urban areas compared to rural areas. This largely reflects population distribution, as opposed to any significant difference in the data consumption of a typical user in rural areas.

Although the effects of Covid-19 have continued to impact mobile traffic distribution, we have seen in our analysis that traffic has to some degree returned to urban cores in 2021, with significant increases in traffic volumes in dense urban areas such as central London. This reflects a combination of general increases in data consumption, and greater footfall in these areas over period in 2021 in which data was collected, as public health restrictions were loosened during the summer months.

**Figure 12: Traffic density in London 2020 vs 2021**




*Source: Ofcom analysis of operator data.*

An associated consequence of Covid-19 was an heightened emphasis on UK holidays, which led to increased demand for mobile services in certain rural locations. Operators adapted to this change by deploying new sites and upgrading capacity to support the increase in consumer volume. As a result, operators started including coastal towns and summer hotspots as performance indicators, and fast tracked key coastal towns for tactical and significant capacity upgrades, with at least 80 new deployments across the UK, including many in England.[21] This should result in enduring improvements in service in these locations in the future.

[20] 1 PB is equivalent to 1,000,000 GB.
[21] Based on responses from two MNOs.