

Connected Nations 2022

Wales report



Published 15 December 2022

Contents

Section

1. Overview	1
2. Fixed broadband services in Wales	4
3. Mobile, data and voice	23

1. Overview

Our objectives include delivering internet we can rely on through ensuring fast and reliable connections and services for everyone, everywhere. In this annual Connected Nations Wales report, we measure progress in the availability of broadband and mobile services in Wales, including the roll-out of gigabit-capable, full fibre and 5G networks.

Alongside this Wales report, we have published separate reports on broadband and mobile availability in the [UK as a whole](#) and [each of its nations](#). Our [interactive dashboard](#) allows people to easily access data for different areas of the UK and specific services. We are also releasing the [International Broadband Scorecard 2022](#), which compares the UK's recent position on broadband availability with a number of other European nations.

What we have found in Wales

- **Coverage of high speed networks continues to grow rapidly.** Full fibre is available to 40% / 0.6m of premises in Wales – an increase of 13 percentage points / 0.2m premises over 2021. Full fibre availability in rural areas has increased to 33% (up from 24% in 2021) but continues to lag behind urban areas. Gigabit-capable broadband covers 52% / 0.8m of premises in Wales. Superfast coverage in Wales has increased to 95%.
- **The number of premises without access to decent broadband continues to fall.** It is now around 0.7% / 10,000.¹
- **Customers are increasingly taking up the higher speed services that are now available to them.** Over 71% of consumers that have access to superfast broadband have upgraded to a superfast service, increasing from 66% in 2021. We estimate that around 28% of premises that are able to get full-fibre are actually taking it.
- **Powys remains the local authority in Wales** with the highest number of premises 2,157; (3% of premises) without access to decent broadband from either a 4G, Fixed connection or WSP.
- **The availability of 5G services continues to grow but lags behind some of the other nations.** The level of coverage provided outside of premises by individual mobile network operators (MNO) in Wales now spans a range from 10-46% (based on our High Confidence level), the second lowest of the four UK nations.
- **4G continues to improve but at a slow pace.** 90% of Wales' landmass has 4G geographic coverage from at least one of the mobile operators but only 62% has coverage from all 4 operators (up from 61% in 2021). Voice services from all four operators are predicted to be available inside 91% of premises in Wales, unchanged from last year.
- **There continues to be a high level of 4G outdoor premise coverage in Wales.** Individual mobile operator coverage ranges between 96-99%, with a range of 88-95% for rural areas.
- Dwyfor Meirionnydd (42%), Clwyd West (47%) and Brecon and Radnor along with Montgomeryshire (51%) are the Senedd Cymru constituencies with the lowest 4G coverage (geographic) from all four operators.

Faster, better networks are increasingly available in Wales

Full fibre and gigabit-capable broadband coverage continues to improve in Wales and remains in line with the UK average

Around 0.6m (40%) of homes in Wales now have access to full fibre connections – an increase of 0.2m premises (13 percentage points) in the past year. Full fibre availability in rural areas has increased to 33% (up from 24% in 2021) but continues to lag behind urban areas. Gigabit-capable broadband – able to provide broadband speeds of 1Gbit/s or higher – can be delivered over full fibre networks and the latest version of cable networks. Gigabit speeds are now available to 0.8m (52%) homes. Superfast coverage in Wales has increased to 95%.

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

5G rollout is expanding

EE, Virgin Media O2, Three and Vodafone have continued to extend their 5G networks across the UK, and we are reporting individual mobile network operator (MNO) coverage for the first time, based on the High to Very High Confidence range which we established in 2021.

We find that 5G coverage outside premises from individual mobile operators in Wales ranges from 10 – 46% at High Confidence. Most 5G sites are still focused around busy urban areas - Newport, Cardiff, Swansea and Llandudno - providing additional capacity to existing mobile data services. However, we are beginning to see coverage extending into smaller towns such as Treorchy, Neath and Pontyclun. The distribution of this investment across the UK remains broadly similar to last year, with 4% of sites in Wales, compared to 86% in England, 8% in Scotland, and 2% in Northern Ireland.

Good connections are available to most people in Wales

Superfast broadband (with speeds of at least 30Mbit/s) is now available to 95% of premises in Wales (an increase of one percentage point from last year). We estimate that around 71% of premises that are able to get superfast broadband actually take it. So, although most people have superfast broadband available to them, some do not always choose the fastest speeds.

Mobile operators provide a high level of 4G coverage outside of premises in Wales, with coverage from each individual mobile network in the vicinity of 96-99% premises. There continues to be a significant difference between coverage in urban and rural areas in Wales. Individual operators' 4G coverage outside rural premises in Wales ranges from 88-95% while each MNO continues to serve 98-99+% of urban premises. Outdoor voice coverage levels remain unchanged from 2021, and ranges from 96–98% across individual MNOs for rural premises, rising to 99+% across individual MNOs for urban premises.

A small, but decreasing, number of properties in Wales still cannot access decent broadband

Just under 10,000 premises in Wales cannot get a decent broadband service of at least 10Mbit/s download speed and 1Mbit/s upload speed from either fixed or fixed wireless networks. Some of these premises may be eligible to be connected under the universal broadband service. Since its launch in early 2020, there have been around 168 orders for the universal service in Wales that will result in full fibre connections being available to almost 1,096 premises that previously had no access to decent broadband.

We expect that many of the remaining premises will be in particularly remote areas, so households will have to contribute to the costs of building a connection. For a significant number of these, connection costs will be very high, which means they may need alternative solutions. The UK Government is continuing to look at options for these very hard to reach premises and has recently launched a trial to see whether satellite can be used to deliver high speed connections in more than a dozen hard to reach locations across the UK.

We estimate that there are just over 6,000 premises in Wales that cannot access either a decent broadband service, or good 4G mobile coverage.

2. Fixed broadband services in Wales

Introduction

The availability of high-speed fixed broadband services in Wales continues to improve as the roll-out of full fibre gathers pace and Virgin Media O2 has completed the upgrade of its network to gigabit-capability. Openreach remains the largest provider of full fibre connectivity but smaller operators such as Ogi, Voneus, Airband and Broadway Partners are also making significant contributions. However, there remains a small percentage of very hard-to-reach properties located in areas where it is more complex and costly to build networks. Customers in these areas may need to consider alternative solutions such as fixed wireless access and satellite. Public intervention has played an essential role in ensuring that availability has reached current levels and continued intervention is essential to deliver connectivity to the greatest number of properties.

Key highlights

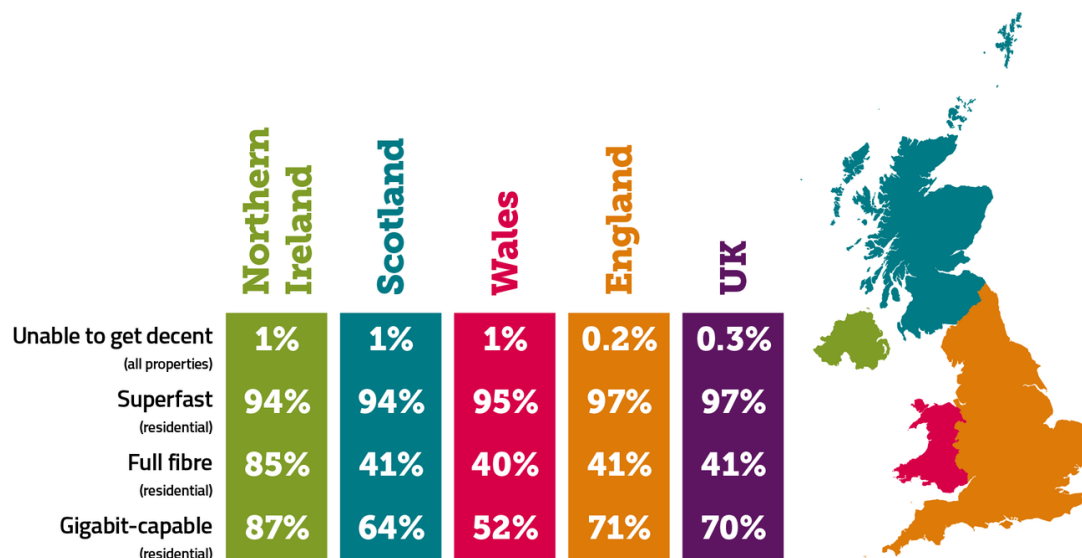
Key findings for Wales

- **Coverage of high speed networks continues to grow rapidly.** Full fibre is available to 40% / 0.6m of premises in Wales – an increase of 13 percentage points / 0.2m premises over 2021. Full fibre availability in rural areas has increased to 33% (up from 24% in 2021) but continues to lag behind urban areas. Gigabit-capable broadband covers 52% / 0.8m of premises in Wales. Superfast coverage in Wales has increased to 95%.
- **The number of premises without access to decent broadband (from either a fixed or wireless connection) continues to fall.** It is now around 1% / 10,000.² Some of these premises will be eligible for the broadband universal service obligation.
- **Customers are increasingly taking up the higher speed services that are now available to them.** Over 71% of consumers that have access to superfast broadband have upgraded to a superfast service, increasing from 66% in 2021. We estimate that around 28% of premises that are able to get full fibre are actually taking it.
- **Powys remains the local authority in Wales with the highest number of premises (around 2,000/ 3% of premises) without access to decent broadband** from either fixed or wireless connection, or good 4G coverage. Brecon and Radnorshire and Montgomeryshire are the Senedd Cymru constituencies with the highest number of these premises (both with around 1,000 of these premises).

² Unless otherwise specified, coverage figures for decent broadband count all UK premises (residential and commercial). Coverage for other speed tiers count residential premises only.

Fixed broadband coverage

Figure 2.1: Summary of broadband coverage at a fixed location across the UK and Nations



Source: Ofcom analysis of provider data (September 2022)

The UK has a variety of available fixed broadband services

Fixed broadband in the UK is available at a variety of speeds, delivered over different technologies

- **Copper (ADSL)³** – Copper cables are used to connect from the exchange to the premises (also known as ‘standard broadband’). Maximum download speed is up to 24 Mbit/s. Actual speeds delivered by copper connections diminish with distance. Copper can also be affected by poor weather. Since the copper network is old, it can be susceptible to faults, and it consumes more energy than newer broadband technologies.
- **Fibre to the cabinet (FTTC)** – There is fibre to the cabinet, with copper cables used to connect from the cabinet to the premises. FTTC uses very high-speed digital subscriber line (VDSL) technology. Maximum download speed is up to 80 Mbit/s (except for G.fast).⁴ As with ADSL, actual speeds diminish with distance, and the network can be affected by poor weather and is susceptible to faults.
- **Hybrid fibre coaxial cable (HFC)** – The cable TV network⁵ uses fibre to a street cabinet and coaxial cable from the street cabinet to the premises. There is decreased signal loss compared to the use of copper, which means co-axial cables are capable of delivering much higher speeds. Broadband is supported using the DOCSIS standard, which shares the capacity downstream and upstream between multiple customers.⁶ The latest standard of cable technology, DOCSIS 3.1, is capable of delivering gigabit speeds, although since capacity is shared among users, it may not be the case that each user can simultaneously receive gigabit speeds. Depending on the configuration of the access network in any particular area, this can lead to localised congestion. This may be particularly acute in the upstream direction where total capacity is more limited.⁷
- **Full fibre or ‘fibre to the premises’ (FTTP)** – The connection from the exchange to the premises is provided entirely over fibre. Generally, distance to the premises does not affect the speed delivered. Full fibre is less susceptible to faults and is not usually impacted by poor weather. It is also more efficient as it consumes less energy whilst transmitting the same amount of data.⁸
- **Fixed Wireless Access (FWA) via mobile networks:** Fixed wireless access on mobile networks is offered on licensed 4G and 5G networks, usually to an indoor router. These services share the network capacity with mobile users, meaning that the capacity of the network has to be carefully managed between the demands of existing mobile users and FWA customers. There may be areas of high mobile demand where a reliable FWA service cannot be offered.
- **Fixed Wireless Access via Wireless ISPs (WISPs):** The majority of these services are delivered over wireless networks that communicate via a wireless link between a provider’s mast site and an external antenna fixed to a customer’s premise. These networks mostly use license exempt or lightly licensed spectrum and we are beginning to see some use of 5G technology.⁹ Due to the frequencies where this spectrum is available, performance may be limited by line-of-sight issues although use of 5G spectrum alleviates some of these issues. ▬

³ Asymmetric Digital Subscriber Line.

⁴ Openreach deploys G.fast at some cabinets. It uses fibre to the cabinet, and copper from the cabinet to the customer. By using a higher frequency signal on the connection to the customer, G.fast can offer higher speeds than normal FTTC deployment, with Openreach offering wholesale services at up to 330 Mbit/s. However, the signal degrades more quickly so the customers able to get ultrafast speeds are limited to those closest to the cabinet.

⁵ Most cable broadband in the UK is provided by Virgin Media O2.

Table 2.2: Summary of characteristics of different types of fixed broadband

Type of broadband	Speed	Use cases	Fixed broadband technologies that can provide this service
Decent¹⁰	10 Mbits/s download; 1 Mbit/s upload	Making a high definition video call using applications like Zoom, Teams, WhatsApp or Facetime. Downloading a 1 hour HD TV episode (1GB) in almost a quarter of an hour.	Copper (ADSL) FTTC (VDSL) HFC Cable Full Fibre
Superfast	At least 30 Mbit/s download	One person streaming 4K/UHD video. Downloading 1 hour HD TV episode in under 4 and half minutes. Several devices working simultaneously.	FTTC (VDSL) HFC Cable Full Fibre
Gigabit	1 Gbit/s and above download	It is feasible to download a full 4K film (100GB) in under 15 mins, or a 1 hour HD TV episode in 8 seconds. Likely to be more reliable and future proofed.	HFC Cable (when upgraded to DOCSIS3.1) Full Fibre

FWA (both that provided by MNOs and by WISPs) can also provide decent and superfast speeds and, under certain conditions, may be gigabit-capable, but this will be dependent on the specific deployment, available capacity at the site, and the number and location of users.

Fixed broadband coverage has continued to increase across Wales

Full-fibre broadband is now available to 40% of premises, with gigabit-capable broadband available to 52%

Full-fibre (FTTP) broadband is now available to 40% / 0.6m premises

Full fibre roll-out is growing quickly, with 40%/ 0.6m premises in Wales now served by full fibre, a growth of 13 percentage points and 0.2m additional premises in the past year. The increase in coverage in Wales is largely due to the continued investment in the rollout of fibre networks from Openreach and increasingly Ogi as well as the continued progress in phase two of the Welsh Government’s Superfast Cymru programme. The Welsh Government’s £56m full fibre roll-out with Openreach will conclude in March 2023 serving around 39,000 premises that would not otherwise been connected to full-fibre broadband.

⁶ DOCSIS: Data Over Cable Service Interface Specification.

⁷ Virgin Media O2 is in the process of upgrading its cable network to full fibre to deliver further enhancements to its services. Virgin Media O2, [Q3 2022 Earnings Release](#), November 2022.

⁸ See the UK report for a more detailed description of full fibre technologies.

Gigabit-capable broadband is now available to 52% / 0.8m premises

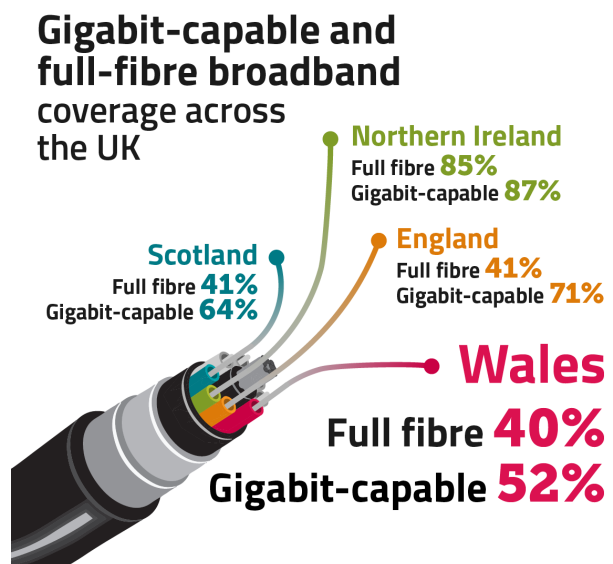
Our data shows rapid expansion of gigabit-capable networks. By September 2022, 52% / 0.8m residential premises had access to gigabit-capable broadband, compared to 36% / 0.5m residential premises in 2021. This significant growth has been driven by the continued rollout of full-fibre broadband by many network operators, as well as Virgin Media O2’s now completed upgrade programme.⁹

Table 2.3: Residential gigabit-capable and full fibre coverage

	Gigabit-capable			Full fibre		
	Total	Urban	Rural	Total	Urban	Rural
England	71% (17.6m)	76% (16.5m)	37% (1.1m)	41% (10.1m)	42% (9m)	34% (1.1m)
Northern Ireland	87% (0.7m)	96% (0.5m)	65% (0.2m)	85% (0.7m)	94% (0.5m)	65% (0.2m)
Scotland	64% (1.7m)	72% (1.6m)	26% (0.1m)	41% (1.1m)	44% (1m)	24% (0.1m)
Wales	52% (0.8m)	58% (0.6m)	34% (0.1m)	40% (0.6m)	41% (0.5m)	33% (0.1m)
UK	70% (20.8m)	76% (19.3m)	37% (1.5m)	42% (12.4m)	43% (11m)	35% (1.4m)

Source: Ofcom analysis of provider data (September 2022).

The table above illustrates that while there has been an increase in gigabit-capable coverage in both urban and rural areas, there has been a greater increase in urban areas.



⁹ Virgin Media O2, [Virgin Media O2 completes gigabit upgrade in boost for Britain’s broadband target](#), 7 December 2021.

Roll-out of gigabit-capable and full fibre networks

Availability of full fibre and gigabit-capable networks is expected to continue to increase over the next few years, with different providers continuing to take different approaches to their business models for deployment:

- Openreach is the incumbent wholesale infrastructure provider for almost all of the UK.¹⁰ It has the largest network and connects the most premises. Openreach is on track to reach 25 million UK homes and businesses with access to full-fibre ultrafast broadband by December 2026 and has already reached more than 550,000 properties across Wales. With a workforce of around 2,300 in Wales, Openreach already employs the nation's largest team of telecoms engineers and professionals.
- Having completed the upgrade of its cable network in December 2021,¹¹ Virgin Media O2 has this year been progressing with a fibre upgrade across its existing network with the aim of offering full fibre across its network footprint by 2028.¹² In July 2022, Virgin Media O2's shareholders (alongside an investment firm) announced a new joint fibre venture which plans to pass up to 7m premises with a wholesale full fibre network, including an initial focus on 5m homes not currently served by Virgin Media O2's existing network;¹³
- Ogi has continued its full fibre roll out at pace throughout 2022. The company has now announced over half of its first phase 150,000 premises plan. The plans already unveiled means that Ogi's network will reach a third of all premises in Pembrokeshire during 2023, with new towns and villages in Bridgend, Caerphilly and Rhondda Cynon Taf increasing the company's overall reach to 7 Local Authority areas.¹⁴ The business continues to grow, scaling to a team of over 165 by the end of 2022, with hundreds more supported through its supply chain. Revised planning processes have seen the business shorten build times and reduce disruption and environmental impact. Ogi is also delivering a programme to install backhaul dark fibre along the South Wales Trunk Road via a ground-breaking concession from Welsh Government – bringing much-needed diversity and resilience to Wales's strategic digital connectivity network.
- Netomnia has been rolling out its high-speed network in Wrexham as part of an up to £12 million investment in the area, with the aim of connecting around 40,000 premises with FTTP. The company is partnering with business-to-business communications firm G-Force Communications to rollout its broadband infrastructure. Founded in 2019, Netomnia builds, owns, operates and maintains the fibre network infrastructure and partners with internet service providers (ISPs) to then provide a broadband service to customers. Wrexham is the third area in Wales to receive investment in broadband infrastructure from Netomnia, following Bridgend and Barry.¹⁵
- Voneus, a wireless and full fibre UK ISP, which is backed by Macquarie Capital, has continued to expand its operations in South Wales by acquiring IRG Computers - a wireless internet provider

¹⁰ KCOM is the incumbent in and around the city of Kingston upon Hull. KCOM committed to full fibre deployment a number of years ago and availability is approaching 100%. KCOM is also extending its full fibre footprint beyond its traditional area of operation. KCOM, [KCOM unveils £100m vision to deliver full fibre future for region](#), 8 September 2022.

¹¹ Virgin Media O2, [Virgin Media O2 completes gigabit upgrade in boost for Britain's broadband target](#), 7 December 2021.

¹² Virgin Media O2, [Q3 2022 Earnings Release](#).

¹³ Virgin Media O2, [New £4.5bn investment to extend Virgin Media O2's fibre footprint to 80% of the UK](#), 29 July 2022.

¹⁴ Ogi, [Major boost for Wales's full fibre ambition](#), August 2022.

¹⁵ Netomnia, [Newport set to benefit from Netomnia's ultrafast broadband roll-out](#), October 2022.

that serves rural areas across parts of Carmarthenshire, Ceredigion, Pembrokeshire and the Swansea Valleys.¹⁶

- Broadway Partners has been helping communities across Scotland and Wales get connected to high-speed broadband. Its primary offering is full fibre, but the company also uses wireless technology to extend the reach and capability of its network.¹⁷
- Dragon Wi-fi (established in 2014) is a provider of Fixed Wireless Access and full-fibre services for both residential and commercial clients throughout Pembrokeshire, West Wales and more recently in North Wales.¹⁸

Openreach to connect Yr Wyddfa to full fibre

Openreach has started work to bring full-fibre broadband to the summit of Yr Wyddfa. The mammoth engineering task will involve running 7km of gigabit-capable cable, along the mountain railway (that carries over 150,000 visitors) from the nearest exchange in Llanberis to the summit. Once completed, Yr Wyddfa, standing at 1,085m, will be the highest point in the UK with full fibre connectivity. The café at the summit will benefit from the gigabit capable connectivity and of course those living at the base of Yr Wyddfa. In addition, the improved connectivity will play a vital role in assisting search and rescue teams that are frequently called upon to find lost or injured walkers on Yr Wyddfa. Every year more than 600,000 walkers make their way to the top of Yr Wyddfa and traditionally search and rescue teams have to rely on radio signal to communicate when searching for those that need help. This method of radio communication can be impacted by heavy fog. The new ultrafast and reliable broadband connection will also mean that search and rescue teams will be able to access vital real-time data, such as accurate localised weather forecasts, which could help save valuable time in a rescue operation, and potentially save lives.

Openreach connects Caban Mwnt Cafe

Openreach has recently connected Caban Mwnt café at Mwnt beach with full-fibre broadband. The infrastructure in Mwnt enables LoRaWAN (long range wide area network) technology to be used that provides real time data on visitors, weather and alerts when the nearby defibrillator has been tampered with. This allows Ferwig Community Council to make data driven decisions, ensuring adequate resources are provided at this unique location. To connect the café Openreach engineers had to run fibre from the exchange around five kilometres away in Cardigan across fields and down narrow lanes. Working closely with Ceredigion Council the company was able to agree early starts for their work in order to minimise disruption to visitors of the popular beauty spot.

¹⁶ ISP Review, [Broadband ISP Voneus acquire Welsh rival IRG Computers](#), September 2021

¹⁷ Broadway Partners, [Press Release](#), October 2021.

¹⁸ Dragon WiFi, [About](#).

Coverage of superfast broadband remains high, with most homes in Wales having access to a superfast broadband connection

Superfast broadband is now available to around 95% of premises in Wales, an increase of one percentage point compared to last year.

Table 2.4: Residential superfast coverage

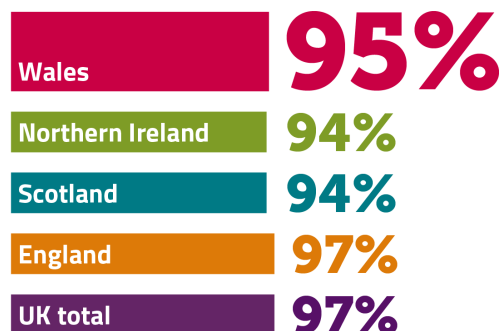
	Superfast	Urban	Rural
England	97%	98%	88%
Northern Ireland	94%	99%	82%
Scotland	94%	99%	76%
Wales	95%	99%	84%
UK	97%	98%	86%

Source: Ofcom analysis of provider data (September 2022).

Coverage of superfast broadband in Wales has nearly doubled since 2013 (48%) as a result of the Welsh Government’s Superfast Cymru programme. The technology rolled out by Openreach was primarily Fibre to the Cabinet with some full fibre. This roll-out finished in 2018. The Welsh Government awarded its Superfast Cymru successor scheme contract to Openreach which is expected to provide full fibre to 39,000 premises, in three lots across Wales by June 2022, tackling some of those areas in the final 5% of Wales that still cannot access a superfast broadband (30Mbit/s +) connection. This will be achieved with £56m of public subsidy from the Welsh Government funding.

The cost of deployment rises disproportionately as you enter the most remote communities and therefore, the extension costs more, yet does not get to as many premises. To date, Openreach has built its full fibre network to a total of 32,949 premises (up from 29,959 in Mar 2022 and 25,855 in Dec 2021 – of these, 9,592 premises are in the Lot 1 area (North West Wales), 10,204 are in Lot 2 (East Wales) and 13,153 in Lot 3 (South West Wales). At the end of this contract, there will remain areas in Wales that are poorly served but it is hoped that commercial builds from Openreach, Ogi and the deployment of alternative technologies will reduce numbers.

Superfast broadband coverage across the UK



Broadband services are also available across large parts of the UK using wireless networks

Fixed wireless access (FWA) on mobile networks

Of the four MNOs in the UK, only Virgin Media O2 does not offer FWA services. Based on information from the MNOs about their coverage levels, we estimate that 93% of premises in Wales have access to an MNO FWA service. This is an increase of two percentage points from last year.¹⁹

FWA services offered over the MNOs 4G and 5G networks, share the network capacity with mobile users, meaning that the capacity of the network has to be carefully managed between the demands of existing mobile users and FWA customers. This means that there may be areas of high mobile demand where a reliable FWA service cannot be offered.

We carried out some research this year on the performance of FWA services delivered over mobile networks (similar to the research we carried out last year on the speeds offered by WISP networks). Our results show that FWA packages are offering similar capabilities to fixed connections, except in relation to latency (see the main UK report for further details).

Fixed wireless access via wireless ISPs (WISPs)

These FWA services are delivered over networks that communicate via a wireless link between a provider's mast site and an external antenna fixed to a customer's premise. They mostly use license exempt or lightly licensed spectrum, and due to the range of frequencies being used to deliver this service, performance may sometimes be limited by line-of-sight issues. We are beginning to see some use of 5G technology, which alleviates some of these line-of-sight issues.

¹⁹ This estimated coverage figure is based on coverage data provided by EE and Three. While Vodafone provides an FWA service across its mobile network, we do not have data at the level of granularity needed to map its coverage to UK premises and so it is not included in this figure. More generally, coverage forecasts are determined by predictive modelling tools, localised issues may mean that particular premises may not be able to receive a service despite being predicted to do so.

We have further expanded our collection of WISP data this year to now include 26 providers. Based on estimates from these providers, around 32% of residential premises in Wales have coverage from a WISP network. This is much higher than the other nations and compared to the UK average of 7%.

Table 2.5: Coverage of MNO and WISP FWA networks with at least decent broadband (residential premises)

	MNO FWA	WISP FWA
England	96%	7%
Northern Ireland	85%	0%
Scotland	95%	2%
Wales	93%	32%
UK	95%	7%

Source: Ofcom analysis of provider data (September 2022).

This could be largely as a result of the fact that when many areas of rural Wales had no prospect of getting fixed broadband services many small businesses seized the opportunity to provide wireless broadband. When the Welsh Government launched its Broadband Support Scheme, later renamed as the Access Broadband Cymru scheme, it was easy for consumers to request a wireless service and let the provider deal with the application process for financial assistance. In many areas this allowed consumers to access broadband services many years earlier than if they had waited for a fixed broadband solution and in some areas, it remains an important source of connectivity.

Some premises in Wales still cannot access decent broadband

Taking into account all fixed line connections, 97% of homes and businesses in Wales have access to at least decent broadband. This means around 45,000 premises do not have access to decent broadband via a fixed connection, most of these premises are in rural areas.

As discussed above, MNOs and WISPs can offer a decent broadband service and can provide an alternative network technology for the premises that cannot currently access decent broadband from a fixed connection. Based on the coverage estimates from FWA providers, we estimate a significant proportion of those premises that do not have access to a decent broadband service could have access via an FWA network.

Table 2.6: Premises without access to a decent broadband service from either a fixed or wireless network

	Remaining premises without access to decent broadband
England	40,000
Northern Ireland	9,000
Scotland	21,000
Wales	10,000
UK	80,000

Source: Ofcom analysis of provider data (September 2022).

Our latest estimate is that 10,000 (0.7%) premises in Wales still do not have access to a decent broadband service via either a fixed or fixed wireless network. This figure has reduced from around 15,000 last year. This reduction is likely due to a combination of factors, including the increased number of smaller fibre network and FWA providers from which we have gathered data, and the increasing roll-out of some publicly funded schemes.

Some of the 10,000 premises will be due to receive a decent broadband service under a publicly funded scheme within the next 12 months. Any remaining premises may be able to have a new connection built under the broadband universal service obligation.



Premises without a decent connection from any means

When we analyse the 10,000 premises in Wales against 4G indoor mobile coverage data (reported in the next section), we estimate that around 6,000 premises cannot access either a decent fixed broadband service, or good 4G indoor coverage (of at least 2Mbit/s).

The number of premises across Welsh local authorities without access to either these or a WISP broadband service, has decreased but Powys, Carmarthenshire, Gwynedd and Monmouthshire remain at the top of the list.

Table 2.7: Ten local authorities in Wales with the highest (ie. Descending order) number of premises which are unable to receive decent broadband from either 4G, fixed connection or WISP

Local Authority	Premises without mobile – fixed - WISP	
Powys	2157	3%
Carmarthenshire	842	1%
Gwynedd	638	1%
Monmouthshire	638	1%
Ceredigion	608	2%
Conwy	346	1%
Pembrokeshire	265	0%
Denbighshire	180	0%
Wrexham	135	0%
Ynys Môn	71	0%

The broadband universal service obligation (USO)

The broadband USO provides everybody with the right to request a broadband connection with a download speed of at least 10 Mbit/s and an upload speed of 1 Mbit/s (as well as a number of other specific technical characteristics).²⁰

Where an affordable service²¹ with these characteristics is not available, or due to become available in the next 12 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.²² BT is the USP for the UK (excluding Hull), and KCOM for the Hull area. They are required to provide the USO and to report at six monthly intervals on delivery.²³

BT’s delivery of the broadband USO

As of October this year, BT had received 1851 orders – 168 of which were in Wales.²⁴ Each order may require network build that can serve multiple premises, and therefore will lead to full fibre

²⁰ In particular these are: a contention ratio of no more than 50:1; latency which is capable of allowing the end user to make and receive voice calls effectively; and the capability to allow data usage of at least 100GB a month.

²¹ When the USO was launched (in March 2020), we specified in the USO conditions that an affordable service was one that costs £45 per month, rising annually by CPI. This has now risen to £48.90 per month in line with CPI.

²² In calculating whether the costs are below or above £3,400, the universal service provider (USP) must take into account where costs could be shared by several USO eligible premises.

²³ BT Group, [A Universal Service Obligation](#).

²⁴ BT’s public reporting shows a slightly lower number of total confirmed orders, this is because it only covers orders prior to, and during, network build, whereas the 1851 figure also includes orders made once build has completed.

connections being built that can serve just under 9,500 premises (1096 in Wales) that do not have access to decent broadband. The break down by Nation is shown below.

Table 2.8: USO Orders and number of premises built

	Number of USO Orders	Total homes passed by resulting build
England	1488	7099
Northern Ireland	85	702
Scotland	110	583
Wales	168	1096

Source: Ofcom analysis of BT data.

There are still some premises that may not get connected under the USO

Data analysis by BT indicates that there are a number of premises where the costs to connect them are likely to exceed the £3,400 cost threshold in the USO. In these cases customers will receive excess cost quotes that may be quite high in some cases. Those premises that are the most expensive to connect and are likely to need alternative solutions.

The Welsh Government's Barrier Busting Taskforce

The Welsh Government's Barrier Busting Taskforce has focused on barriers and potential or known issues in the key touch points between industry and public services, such as streetworks, access to public assets, planning, regulation, and communications. In November, the Taskforce published its report and recommended that the Welsh Government take the following actions:

- Take action to improve communications on digital infrastructure with residents and businesses.
- Facilitate open and transparent communications between the telecommunications industry and public bodies in Wales.
- Work across public bodies and the telecommunications industry to extend coverage of broadband in Wales through changes to publicly funded schemes.
- Create a standardised approach to managing public assets for digital infrastructure.
- Update standards and codes of best practice to underpin the delivery of digital infrastructure in Wales.
- Use information and regulatory levers available in Wales to drive improvements in digital infrastructure and create the right conditions for investment.

The recommendation on communication was highlighted by the taskforce as the first priority proposing that research be undertaken into the understanding of residents and businesses about the digital connectivity around them:

- to identify the level of understanding of options available to get faster broadband amongst those unable to access fibre.
- to assess residential and business awareness of the information channels and organisations that can give further support and advice; and
- to identify the level of understanding about how mobile and broadband infrastructure is deployed.

The research would then inform a communications campaign to inform residents and businesses about the benefits of digital connectivity and inform communities about deployment activity. As part of work to support and deliver the campaign, community digital champions (potentially in local authorities) could help support communities to understand the technological solutions available to them.

The availability of satellite services is increasing and may offer an alternative option for customers in poorly served areas

Satellite broadband services have been available in the UK for some time but take-up of these services has remained low compared to traditional broadband services. The technology for delivering satellite broadband has evolved significantly in recent years, and continues to do so, with an increasing number of satellite constellations now being launched. We provide further details in the main UK report about the recent launch of low earth orbit (LEO) satellites, in particular by Starlink, who launched its LEO satellite broadband service in the UK last year and which now

provides coverage across the UK (excluding the top two thirds of the Shetland Islands).²⁵ These services are currently more expensive than traditional broadband services (Starlink's broadband is priced at £75 a month, plus a £460 one-off installation fee)²⁶ but may offer a good alternative option for customers in hard to reach areas who would otherwise face very high costs to install a traditional fixed broadband connection.

The UK Government has recently announced a new trial that will see the extent to which satellites can be used to deliver high-speed connections to two 'very hard to reach' locations' in Wales.²⁷ Snowdonia National Park will see two sites connected: the base of the Ogwen Valley Mountain Rescue Organisation to support their life-saving operations and Ty Cornel, an outdoor activity centre in Crafnant Valley managed by Scouts Cymru to help improve safety for wardens and the public traversing the isolated 25 acre site as well as enabling new educational resources for visiting school university or scout groups. Other locations have been identified around the UK, and discussions for further trial sites are ongoing, including small island locations in England, Scotland and Wales.

²⁵ See Starlink's [online coverage map](#). In September, Starlink expanded its coverage further north, reaching up to around the bottom third of the Shetland Islands, with the rest planned to follow in the first quarter of 2023. ISPreview, [Starlink Expand UK Coverage to Include Part of Shetland Islands](#), 27 September 2022.

²⁶ [Starlink](#).

²⁷ UK Government, [Broadband beamed from space to isolated areas under plans to boost countryside internet connections](#), November 2022.

Wales: a sustainable space nation

In its policy document published at the beginning of the year, the Welsh Government highlights the unique environment that Wales offers to the space sector and sets out various areas where the government hopes to lead growth, including space launch capabilities.

Key aspects relating to the current and potential future of the space sector in Wales include:

- space launch, training and experience capability at Spaceport Snowdonia at Llanbedr in Gwynedd, and proposals for sea-based launch platform operating from Port Talbot
- strengths in areas such as low earth orbit satellite capabilities, developing reusable manufacturing space satellites
- satellite technology used to find water on other planets currently being trialled in Wales
- test and evaluation of new greener propulsion technologies at existing facilities, including Llanbedr, Aberporth Range in Ceredigion, Radnor Range in Powys and Pendine in Carmarthenshire
- a cluster of pioneering companies including Airbus Defence & Space, Raytheon, Qinetiq, and Qioptiq - who manufacture 98% of the global supply of space-qualified glass used in satellites and space vehicles
- a network of research and teaching facilities, including the Compound Semiconductor Applications Catapult in Newport and AMRC Cymru in Broughton, Flintshire, which support sector research and development across the UK
- the Wales Academic Space Partnership which is harnessing collaborative academic expertise from several Welsh universities

Public sector investment has a key role in delivering connectivity, particularly in harder to reach areas

Governments across the UK continue to supplement commercial rollout by investing in faster speeds for the hardest to reach areas. While subsidy schemes designed to bring superfast speeds continue to operate, governments are also now using public funding to support gigabit-capable connectivity, primarily full fibre services.

The UK Government has set a target of at least 85% gigabit coverage by 2025, alongside an ambition to get as close to 100% as possible. To help achieve this, it has committed, under Project Gigabit, to invest £5 billion to bring high speed broadband to hard-to-reach areas considered too difficult or expensive to connect under industry commercial plans.

The Project Gigabit: public review request for information – Wales, which closed in May, identified 231,400 premises across Wales that either do not have access to gigabit-capable broadband or are not in suppliers' plans to provide such infrastructure over the next three years. The Welsh Government is continuing its market engagement activity, with UK Government support, to identify and refine potential Intervention Areas by January 2023.

Other examples of ongoing government schemes to support fast speeds in hard to reach areas in Wales include:

- The UK Government provides vouchers through the Gigabit Broadband Voucher Scheme for individual eligible customers to contribute towards the installation of faster connections using gigabit-capable infrastructure. During the year, the Welsh Government confirmed that it has ended its top-up funding for the Gigabit Broadband Voucher Scheme. The Welsh Government had been doubling the value of the vouchers (£3,000 for homes and £7,000 for businesses).
- The Welsh Government’s £56m full fibre roll-out with Openreach will conclude in March 2023 serving around 39,000 premises that would not otherwise been connected to full-fibre broadband.
- The Welsh Government’s Local Broadband Fund supports local authorities and social enterprises to deliver broadband to whole communities. The fund has provided grant funding to schemes across Wales including in Monmouthshire, Cardiff and Gwynedd.
- The Access Broadband Cymru grant scheme provides a broadband safety net though funding of up to £800 to connect individual homes, businesses and third sector premises. Following a recommendation by the National Infrastructure Commission for Wales following its work on digital infrastructure issues, the Welsh Government has conducted a review of the ABC scheme. The review highlighted a number of recommendations, one of which is a simplification of the application process.

More people are upgrading to higher speed services and new technologies

Take up of full fibre services is increasing

It is important to understand whether consumers are benefiting from higher speed and more reliable broadband services when they are available.

We estimate that the take-up of services in Wales using full fibre at any speed, where fibre is available, is around 28% which is in line with the UK average.

Our reporting of full-fibre take-up may appear lower than expected because networks are deploying at pace and take-up lags behind coverage. This could occur because there is a lag in awareness of availability or consumers need to wait until their existing service contract ends before they can migrate to a new service.

Table 2.9: Estimated full fibre take-up as a percentage of premises where full fibre services are available: 2021 and 2022

	2021	2022
UK	24%	25%
England	25%	25%
Northern Ireland	19%	25%
Scotland	22%	23%

	2021	2022
Wales	24%	28%

Source: Ofcom analysis of provider data (May 2022).

Take-up of superfast broadband has also increased

Overall, we estimate that for those premises that are able to take superfast broadband services (95% of all premises in Wales), around 71% of them do so.²⁸ This is an increase from around 66% last year.

Figure 2.10: Estimated superfast take-up as a percentage of premises where superfast services are available: 2021 and 2022

	2021	2022
UK	69%	73%
England	69%	73%
Northern Ireland	73%	73%
Scotland	68%	71%
Wales	66%	71%

Source: Ofcom analysis of provider data (May 2022).

The migration of the UK’s telephony network to digital is gradually progressing

The UK’s traditional landline services are undergoing a substantial transition as network providers retire their legacy systems (referred to as the Public Switched Telephone Network, or ‘PSTN’) and replace them with modern systems. BT and Openreach aim to retire BT’s PSTN network and the Openreach wholesale services that deliver PSTN by the end of 2025, with Virgin Media working on a broadly similar timescale. To make sure landline services continue in the future, providers currently using legacy telephony networks will deliver landline calls over a digital technology called Voice over Broadband (VoBB), which uses Voice over Internet Protocol (VoIP) over a broadband connection.

Analysis of provider data shows that around 27% of UK landline services²⁹ are now delivered over broadband, up from 15% last year. Increasingly, customers have their landline service moved to VoBB when they change provider or upgrade their phone and broadband package. Last year, BT and Virgin Media also began migrating some of their existing customers, known as managed or provider-

²⁸ For all UK premises, the take-up of superfast broadband is slightly lower, at 70%. Under section 72B of the Communications Act, the Secretary of State must give Ofcom a direction to review the broadband USO if it appears that, on the basis of information we have published, take-up of superfast broadband has reached at least 75% of all UK premises.

²⁹ This figure relates primarily to residential and SME voice lines, although not all operators were able to provide SME data.

led migrations. In the year to August 2022, around 1.6 million customers migrated to a VoBB service, with just over half, resulting from a managed migration.

In March, BT announced it had temporarily suspended its programme of managed migrations of existing customers, noting it had underestimated the disruptive impact the upgrade would have on some customers. It aims to re-start the programme once it has key solutions in place.³⁰

We are continuing to monitor the migration closely and engage with providers to help ensure customers are protected and disruption is minimised.

Customers can also choose a 'broadband-only' package, where they no longer take a phone service. Broadband-only packages – with or without the option to add a landline service – are offered by most full fibre providers and are increasingly being offered for copper-based broadband as well. In the year to August 2022, over half a million customers dropped their landline in favour of a broadband-only service. This is more than double the number that did the same last year. With landline usage falling,⁶⁴ we anticipate that adoption of broadband-only packages will continue to grow in the coming years.

The migration from the legacy telephone networks also brings certain challenges with respect to the resilience of landlines in the event of power cuts. This is discussed in more detail in the resilience section of the [main UK Report](#).

Senedd Cymru Climate Change Environment and Infrastructure Committee

Following its inquiry into digital connectivity in Wales, the Senedd Cymru Climate Change Environment and Infrastructure Committee published a series of recommendations in its report '[Digital Connectivity – broadband](#)', One of which was to urge the Welsh Government to seek reassurances from us that concerns were being addressed in relation to the migration to VoIP. In its response to the report, the Welsh Government said that it *“was concerned about the potential impact of the migration to Voice over Internet Protocol particularly in relation to the impact of power cuts on the ability to make emergency calls or the proper functioning of life and limb services that rely on the public switched telephone network, including alert pendants and other alarms.”*

³⁰ BT Group, [We're pausing our Digital Voice plans for Consumers, while we work on a more resilient rollout](#), 29 March 2022.

3. Mobile, data and voice

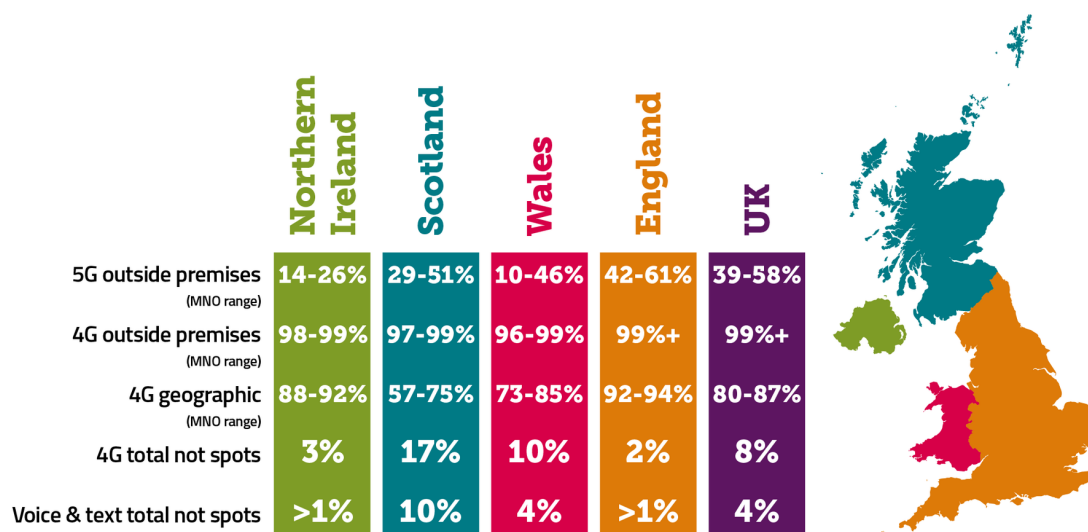
Introduction

Mobile services continue to play an ever more central role in people's lives, from on-the-go calls and internet access to wireless connectivity for smart meters. In this chapter, we provide an update on the progress operators are making with their 5G rollout plans, while continuing to report on the broader availability of mobile coverage outside and inside premises, across the UK's landmass and on roads.

Key highlights in Wales:

- **The availability of 5G services continues to grow but lags behind some of the other nations.** The level of coverage provided outside of premises by individual mobile network operator (MNO) in Wales now spans a range across 10-46% (based on our High Confidence level), the second lowest of the four UK nations.
- **4G continues to improve but at a slow pace.** 90% of Wales' landmass has 4G coverage from at least one MNO, in line with the levels reported in 2021. Coverage from all four MNOs is at the lower level of 62% but has risen slightly from the 61% reported in 2021. Voice services from all four operators are predicted to be available inside 91% of premises in Wales, unchanged from last year.
- **There continues to be a high level of 4G outdoor premise coverage in Wales.** Individual mobile operator coverage ranges between 96-99%, with a range of 88-95% for rural areas.
- Dwyfor Meirionnydd (42%), Clwyd West (47%) and Brecon and Radnor along with Montgomeryshire (51%) are the Senedd Cymru constituencies with the lowest 4G coverage (outdoors) from all four operators.

Figure 3.1: Overview of voice and data coverage across the UK and UK nations³¹



Source: Ofcom analysis of operator data (September 2022).

5G availability continues to grow

5G is within reach of a growing number of consumers, with around 20% of mobile handsets now 5G capable (up from c10% in 2021), and significant increases in coverage observed across the UK.³²

The mobile coverage data in this report is based on predictions provided to us by the MNOs. To evaluate the accuracy of the information provided to us, we undertake regular testing to ensure the predictions provided are suitable for national and regional reporting. The development of 5G predictions has required new approaches from the MNOs, and in many cases relies upon new iterations of their modelling tools. We have therefore undertaken a 5G-focussed monitoring exercise before publishing these predictions, and we will continue to engage with MNOs, and undertake further monitoring, as networks are rolled out and models are updated.³³

We report on 5G availability across a confidence range of ‘High Confidence’ and ‘Very High Confidence’, which reflects the likelihood of coverage predicted by the MNOs matching up to the coverage on the ground for consumers. Our approach to reporting on 5G coverage is set out in more detail in our Connected Nations UK Report.²³

In this year’s report, 5G outside premise coverage across the UK from at least one mobile network operator is predicted to be between 77% (for High Confidence) and 67% (for Very High Confidence). For Wales, this coverage outside premises from at least one MNO stands at 58% for High Confidence and 46% for Very High Confidence, up from 29-42% in 2021. These coverage increases have been

³¹ Note that the 5G outside premise range presented here is for individual MNOs at our High Confidence measure.

³² We note that not all 5G capable devices may be enabled with 5G subscriptions.

³³ Measurement data is collected as part of our monitoring activity on a regular basis. Ofcom, [Mobile signal strength measurement data from our spectrum assurance vehicles](#), 26 July 2022.

driven by additional 5G deployments, with over 12,000 5G deployments now in place across the UK, up from the 6,500 reported in 2021.³⁴ Of these, 86% are located in England, 8% in Scotland, 4% in Wales and 2% in Northern Ireland, broadly in line with previous trends.

As noted in the UK report, differences in deployment strategies are reflected in different coverage levels across the UK nations. The outdoor premise coverage range of individual MNOs in Wales, based on our high confidence level, is 10% to 46%. The range of coverage across the UK varies considerably with England at 42 – 61%, Scotland at 29 – 51% and Northern Ireland at 14 – 26%. For Wales, the 5G coverage outside of premises provided by individual operators is as shown in more detail in Figure 3.2 below.

Table 3.2: 5G outdoor premise coverage in Wales by mobile operator

	Very High Confidence	High Confidence
EE	36%	46%
Three	17%	34%
VM02	9%	10%
Vodafone	19%	27%

Source: Ofcom analysis of MNO predictions (September 2022).

5G coverage across the landmass of Wales is at significantly lower levels, and ranges across MNOs from less than 1% to 11% at Very High Confidence, and 1% to 15% at High Confidence.

Overall premises coverage

Even as 5G coverage increases, voice and data services continue to be most widely available (and accessed) via older technologies. In particular the 4G services offered by each of the MNOs continues to provide the fundamental backbone of most consumers’ experience. We therefore highlight below the range of 4G coverage available from individual MNOs, alongside measures for voice coverage (where 2G and 3G also play a role).¹¹

Outdoor premises coverage remains at a high level

As we have reported in recent years, individual operators continue to provide good 4G coverage outside more than 99% of premises in Wales.¹² In addition, 93% of premises in Wales have outdoor 4G coverage from all MNOs. Individual MNOs each provide coverage for outdoor voice calls in the vicinity of more than 99% of premises, while 98% of premises in Wales have coverage for outdoor voice calls from all MNOs.

There continues to be a significant difference between coverage in urban and rural areas. Individual operators’ 4G coverage outside rural premises in Wales ranges from 88-95% while each MNO continues to serve 98-99+% of urban premises. Outdoor voice coverage levels remain unchanged

³⁴ It should be noted that these deployments do not necessarily equate to a total of individual sites across all MNOs. For example, 2 MNOs may be offering coverage from the same site.

from 2021, and ranges from 96-98% across individual MNOs for rural premises, rising to 99+% from each individual MNOs for urban premises.

Indoor coverage continues to be high and other solutions are available for hard to serve locations

There are a number of factors which affect the coverage people receive indoors. These include the thickness of the walls, the building materials used in construction, and where in a building people are using their phone.¹³ As a result, some premises may see differences between operators’ predicted indoor coverage data and the actual coverage experience.¹⁴

For indoor 4G coverage, this year we find that the percentage of premises in Wales served ranges from 86-94% across individual MNOs. The availability of indoor voice calls is estimated to remain stable, ranging from 94-99+% across individual MNOs.

We continue to see a significant difference between rural and urban areas of Wales for indoor coverage, though there have been small improvements this year. Individual MNOs provide indoor 4G coverage to 68-81% of premises in rural areas, compared with 91-98% of urban premises. Indoor voice coverage is somewhat higher, ranging from 83-94% across individual MNOs for rural premises in Wales. This compares to a range of 97-99+% for urban premises.

Where indoor coverage is poor or unreliable, there are other solutions which can improve user experience. These include broadband-based calls on services such as WhatsApp, femtocells and WiFi calling.¹⁵ All MNOs offer WiFi calling to their customers - although not all mobile phones are configured to support this feature.

4G geographic coverage

Differences remain in coverage across the UK Nations, but small improvements can be seen

There remain significant differences in geographic 4G coverage across the UK’s nations. As of September 2022, MNOs provided geographic coverage ranging from 92-94% in England; 88-92% in Northern Ireland; 57-75% in Scotland; and 73-85% in Wales. This means that compared with 2021 the coverage range for England remains stable, with a 1 percentage point increase to the bottom end of the range in Northern Ireland, a 2 percentage point increase to the top of the range in Scotland, and 1 percentage point increases at both points of the range in Wales.

Table 3.3: 4G geographic coverage ranges by UK nation

	Range of 4G geographic coverage
Scotland	57% to 75%
England	92% to 94%
Northern Ireland	88% to 92%
Wales	73% to 85%
UK	80% to 87%

Source: Ofcom analysis of MNO predictions (September 2022).

The majority of operators have made small improvements in their geographic coverage this year. From the data reported to us, we can see that BT EE has increased its 4G geographic coverage by c1% to 85% of Wales; O2 has increased its coverage by c2% to 74%; Vodafone’s coverage has increased c1% to 73% and Three’s coverage remains unchanged at 77%.¹⁷

Table 3.4: 4G geographic coverage in Wales by MNO

	2022	2021
EE	84%	85%
O2	74%	72%
Three	77%	77%
Vodafone	73%	72%

Source: Ofcom analysis of MNO predictions (September 2022).

Figure 3.5 below highlights the differences in 4G geographic coverage from all operators across the UK nations. It shows that 4G geographic coverage in Wales from all mobile operators slightly increased this year to 62% up from 61% in 2021, in line with broader trends across the UK.

Vodafone’s wind and solar-powered mobile phone mast

Vodafone has switched on the UK’s first live wind and solar-powered mobile phone mast providing 4G coverage to the community of Eglwysrwr , Pembrokeshire. The specially designed mast, which potentially removes the need for a connection to the national electricity grid, could provide connectivity to ‘not-spots’ in the UK’s most remote and inaccessible locations and help Vodafone reduce carbon emissions and support its target of reaching net zero UK operations by 2027. The ‘self-powering’ mast incorporates a unique Crossflow Energy wind turbine that can generate power even in light winds. The trial, in partnership with Crossflow Energy and mobile infrastructure partner Cornerstone, is at Home Farm in the village of Eglwysrwr. It will run for two years and data gathered will help Vodafone optimise the technology and determine which sites are most suitable for ‘self-powering’ masts.

Table 3.5: 4G geographic coverage from all MNOs by UK nation

	% of landmass served by all operators (2022)	% of landmass served by all operators (2021)	% change
Scotland	46%	45%	+1%
England	85%	84%	+1%
Northern Ireland	81%	79%	+2%
Wales	62%	61%	+1%
UK	70%	69%	+1%

Source: Ofcom analysis of MNO predictions (September 2022).

As can be seen, geographic coverage from all operators remains at a much lower level than coverage from individual MNOs in many parts of Wales, especially in rural areas, although coverage from all operators in urban areas is at a much high level.

Table 3.6: 4G geographic coverage from all MNOs by urban/rural

Nation	Total	Urban	Rural
Wales	62%	92%	59%

Source: Ofcom analysis of MNO predictions (September 2022).

Differences across Senedd Cymru constituencies

4G geographic coverage in Senedd Cymru constituencies varies considerably between those in urban and rural parts of Wales. The Senedd constituency of Dwyfor Meirionnydd has the lowest availability at 42% and remains unchanged from last year; followed by Clwyd West (47%), Brecon and Radnorshire and Montgomeryshire (51%) which have seen percentage point increases.

Table 3.7: Difference in 4G geographic (all operators) coverage by Senedd Cymru constituency

Senedd Cymru constituency	Coverage %
Dwyfor Meirionnydd	42% (unchanged)
Clwyd West	47% (+ 1pp)
Brecon & Radnorshire	51% (+ 2pp)
Montgomeryshire	51% (+2pp)
Ceredigion	54% (+1pp)
Aberconwy	57% (+3pp)
Monmouth	60% (+2pp)
Carmarthen East& Dinefwr	63% (+3pp)
Cynon Valley	68% (+2pp)
Neath	71% (+3pp)

Source: Ofcom analysis of MNO predictions (September 2022).

Public policy interventions, including the Shared Rural Network, continue to progress

The Shared Rural Network (SRN) was agreed between the UK Government and the MNOs in March 2020. Work has continued throughout 2022 on a range of fronts towards the delivery of the SRN, with operators’ licence obligations to achieve good quality coverage across 88% of the landmass falling due in June 2024, and 90% of the landmass to be covered by January 2027. The UK Government also expects that as a result of this activity there will be good 4G coverage available across 95% of the UK landmass by the end of 2025 (based on the ‘At least one MNO’ measure).

Operators are committed to achieving the 88% target through their own investment, which includes a mixture of new site deployments, sharing and upgrades to existing infrastructure. MNOs have now

deployed more than 150 new sites directly towards these SRN requirements (this excludes sites that were already planned at the time the SRN was announced, or built primarily to support the Emergency Services Network¹⁸). Many more sites have been upgraded and taken together this activity has seen a small increase in the area where all MNOs now provide coverage.

On the publicly-funded side of the SRN, Digital Mobile Spectrum Limited is managing the programme and has made significant advances with the required procurements which will underpin delivery of coverage in Total Not Spots.¹⁹ Activity this year has included contracting for the acquisition, design and build of the Total Not Spot sites and the managed services associated with this.²⁰ The sites delivered are expected to be shared by all 4 MNOs.

It is expected that 4G coverage in Wales from all MNOs will increase from 61% to 80% and that 4G coverage from at least on MNO will increase from 91% to 95%. The biggest increase in coverage will occur in those Senedd regions with the largest proportion of rural areas, Mid & West Wales and North Wales where the 4G coverage from all MNOs will increase from 51% to 79% and 63% to 83% respectively.

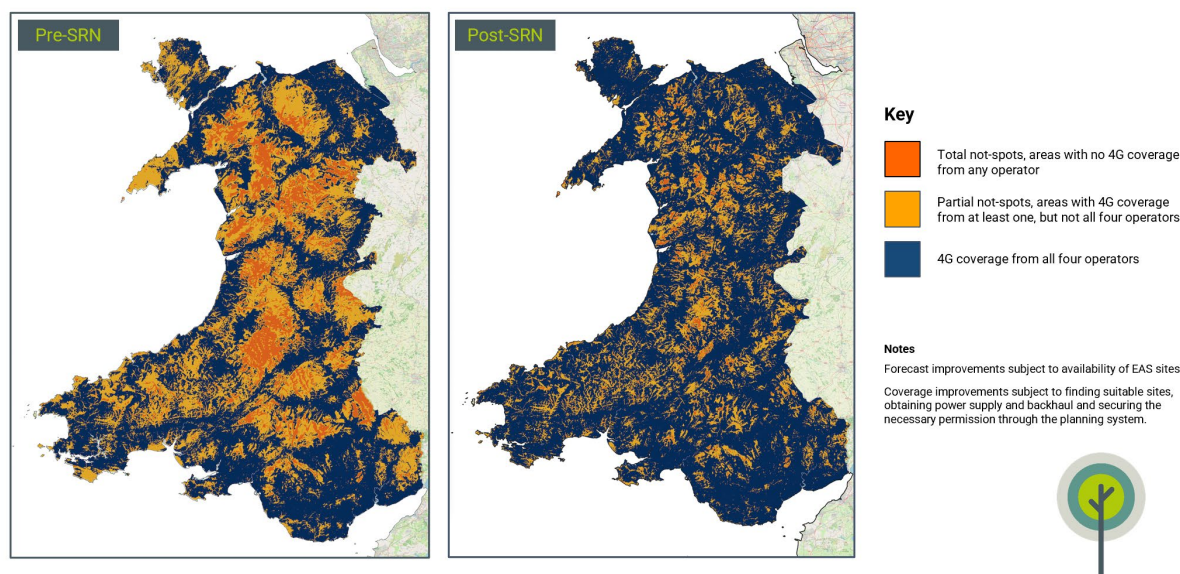
Table 3.8: Forecast for 4G coverage pre and post SRN by Senedd Cymru constituency

Senedd Cymru Region	4G coverage from all MNOs		4G coverage from at least onel MNO	
	Pre SRN	Forecast Post SRN	Pre SRN	Forecast Post SRN
Mid & West Wales	51%	79%	86%	97%
North Wales	63%	83%	93%	98%
South Wales Central	82%	90%	98%	99%
South Wales East	71%	89%	95%	99%
South Wales West	79%	88%	97%	99%

Source: Digital Mobile Spectrum Ltd (DMSL).

The following maps illustrate the uplift in 4G coverage in Wales as a result of the Shared Rural Network programme.

Figure 3.9: 4G coverage uplift map for Wales pre and post the SRN programme



Source: Digital Mobile Spectrum Ltd (DMSL).

The process of enabling sharing of the Home Office Extended Area Service (EAS) masts is also progressing. Over 100 masts have been put into acquisition by Building Digital UK (BDUK) and are now with Home Office suppliers to start work. The number of sites acquired, built and then made available to MNOs will continue to grow into 2023. This includes the Home Office completing the passive build upgrades to around 28 sites by March 2023. This will be followed by a programme of works with the operators to activate commercial coverage. The agreement which will enable the MNOs' access to these sites has been agreed and the first pilot site in Scotland is expected to be handed over to the MNOs for activation early next year.

2G & 3G coverage and switch off

Plans for switch-off of 3G networks, and eventually 2G networks, are progressing

In December 2021, the MNOs confirmed to the UK Government that they do not intend to offer services on their 2G and 3G networks past 2033 at the latest.²⁹ 2G and 3G services launched in the 1990s and 2000s respectively and running these networks alongside newer 4G and 5G services involves increased operating costs, as well as a less efficient use of spectrum and energy. Moving away from these older technologies will improve network efficiency and enable more spectrum to be used for 4G and 5G services.

MNOs are developing plans to switch-off their 3G networks first, with each MNO setting its own timetable. Vodafone is starting the switch off of its 3G network in early 2023 and has been contacting affected customers to advise them of the steps they need to take ahead of switch-off to ensure that their services are not disrupted. EE plans to start its 3G switch-off in early 2024, and Three expects to complete its switch-off by the end of 2024. Virgin Media O2 has yet to confirm a planned date for switch-off of its 3G network.

Vodafone, EE and Virgin Media O2 have not yet confirmed a date for switching off their 2G networks. We expect they will start making plans for this after their 3G network switch-offs are complete.

There are a range of users whose needs will require careful management

We are actively monitoring the implementation of switch-off and working closely with the MNOs to understand their progress and plans, in particular to ensure that affected customers and services are adequately informed. Early next year we plan to publish a document setting out our expectations of mobile providers as they implement switch-off, in particular the measures they should be taking to ensure that customers are protected and disruption is minimised.³⁰

Based on the latest estimates from MNOs, there are likely to be nearly 5.5m³¹ UK customers using devices reliant on 2G and 3G connectivity which will ultimately need to be upgraded or replaced.³² Some customers will continue to be able to use these devices after 3G switch-off as they can carry on using the 2G network for voice calls in particular.³³

In addition to mobile handsets, affected devices include those that offer machine-to-machine and Internet of Things (IoT) type applications, such as care alarms, security alarms and payment terminals. Many of these rely on roaming SIMs (non-UK SIMs which are used on a permanent basis in the UK and which roam to the best available network), where there may not be a direct relationship with a UK MNO and will not be captured by the total device estimate above. Given this, raising awareness of upcoming switch-offs across all affected stakeholders will be essential. As part of our monitoring activity, we are engaging with government and other relevant stakeholders, such as service providers and equipment manufacturers, to help support a smooth transition.

There is still a relatively significant level of ongoing 2G and 3G usage, particularly for voice traffic

The proportion of data traffic being carried over each MNO's 3G network is now relatively small, ranging from 2%-6%. In comparison, there is a higher proportion of voice traffic still using the 3G network, although the proportion varies significantly between the MNOs, with one MNO reporting 60% of its voice traffic using 3G, whereas for two other MNOs it is less than 15%. We would expect these percentages to decrease significantly over the coming years as 3G network switch-offs start being implemented and more customers upgrade and update their devices.

A much smaller proportion of MNOs' voice traffic is currently carried over 2G (around 4-5% for each MNO), although these percentages may rise as 3G networks switch-off. We expect MNOs to have plans in place to ensure their 2G networks have sufficient capacity so that customers do not experience degraded quality of voice calls once 3G networks are switched-off.

Our data has not yet shown a change in the levels of 2G or 3G coverage available across the UK, however we expect we will start to see a decline in 3G coverage levels from later next year as the MNOs start to progress their plans. We will monitor this closely but envisage that any impact on coverage will be negligible, given MNOs are taking steps to ensure that their 4G coverage is improved ahead of switch-off, particularly in any areas which might be reliant on 3G currently. Three, for example, has committed that by the time 3G switch-off happens, it will have updated its 3G sites to 4G as a minimum, or ensured that coverage is provided from neighbouring sites.³⁴