Connected Nations

Wales Report 2023

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1. Overview

Ofcom's objective is to make communications work for everyone including, to promote reliable, widely available, and high-quality networks. In this annual Connected Nations Wales report, we measure progress in the availability of broadband and mobile services across Wales and the UK, including the newest full fibre, fixed wireless access and 5G networks now being rolled out.

Alongside this Wales report, we also publish separate reports on broadband and mobile availability for the UK as a whole and each of its other nations. Our interactive dashboard allows people to easily access data for specific types of services across Wales and the UK. Previously, Ofcom has also published an update on Planned Network Deployments for Very High Capacity networks in the UK for the next three years.

What we have found

Broadband

- **Access to full-fibre networks continues to grow in Wales, with coverage now above the halfway mark.** Full fibre is now available to 55% or 798,000 residential premises, which is slightly below the UK average of 57%.
- **Take-up of services on residential full-fibre networks has risen over the last year.** There was an increase of three percentage points, from 28% reported last year to 31% this year in take-up of services on full-fibre networks. This equates to 239,000 total full-fibre connections in Wales.
- **Superfast coverage in Wales is up marginally from 95% last year to 96% this year.** Availability of superfast coverage in rural areas lags behind urban areas. Take-up of superfast from fixed lines is now at 73% of residential premises where it is available, up from 71% last year.
- **The number of premises that still cannot access decent broadband from fixed line or fixed wireless networks has fallen to around 8,000 premises in Wales**. We estimate that around 1,000 of these premises will be connected via publicly funded schemes by September 2024, leaving less than 7,000 premises without decent broadband coverage.
- **In Wales, 93% of customers can access a fixed wireless access (FWA) service from a mobile network operator (MNO),[1] while 31% can access FWA from a wireless internet service provider (WISP).** This is a very high proportion compared to the rest of the UK, where only 7% premises on average have FWA coverage from WISPs.

Mobile

- **The deployment of 5G networks is gathering pace**. 5G coverage outside of premises in Wales from individual mobile operators ranges from 11-69% across the four MNOs (based on our High Confidence measure).
- **4G geographic coverage from all four operators has remained stable in Wales at 62%. 4G coverage in Wales from individual MNOs** ranges from 73-85%, depending on the operator.
- **There continues to be a high level of 4G outdoor premises coverage in Wales** with 94% of premises having outdoor 4G coverage from all four operators, compared with 98% across the UK.

[1] Our reporting here is based on data from BT/EE and Three – see the annex in the UK report for further information on the methodology.

2. Fixed broadband and voice services in Wales

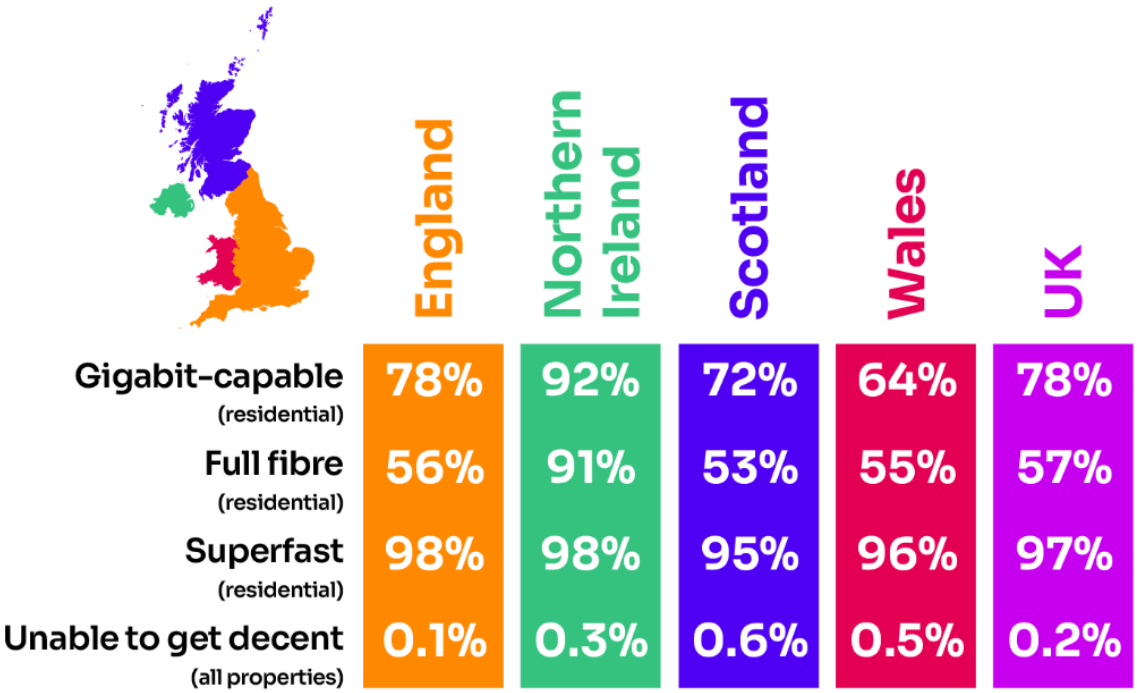
Introduction

Key highlights

- **Access to full-fibre networks continues to grow in Wales, with coverage now above the halfway mark.** Full fibre is now available to 55% or 798,000 residential premises, an increase of 15 percentage points or 227,000 premises over 2022. As of September 2023, gigabit-capable broadband covers 64% or 931,000 premises.
- **Take-up of services on full-fibre networks has risen over the last year.** There was an increase of three percentage points, from 28% reported last year to 31% this year in take-up of services on full-fibre networks. This equates to 239,000 total full-fibre connections in Wales.
- **There is considerable variation in full fibre take-up across the Local Authorities in Wales.** Three of the ten UK local authorities with the highest take-up as a proportion of premises with access to full fibre are in Wales – Ynys Môn, Ceredigion and Powys.
- **The number of premises that still cannot access decent broadband from fixed line or fixed wireless networks has fallen to** around 8,000 premises in Wales. We estimate that around 1,000 of these premises will be connected via publicly funded schemes by September 2024, leaving 7,000 premises without decent broadband coverage.
- **The local authorities with the lowest level of superfast coverage** are Powys (84%) and Ceredigion (86%), both of which are largely rural local authorities. Torfaen and Ynys Môn – also largely rural - have the lowest levels of full-fibre coverage at 22% and 31% respectively.
- **In Wales, 93% of customers can access an FWA service from an MNO,[2] while 31% can access FWA from a WISP.** This is a very high proportion compared to the rest of the UK, where only 7% premises on average have FWA coverage from WISPs.
- **Consumers are moving from legacy voice services towards Voice over Internet Protocol (VoIP)**. As the switch-off of the legacy public switched telephone network progresses, customers are increasingly migrating to managed voice services delivered over broadband by their provider, while others are giving up their landline altogether and taking broadband-only packages.

[2] Our reporting here is based on data from BT/EE and Three – see the annex in the UK report for further information on the methodology.

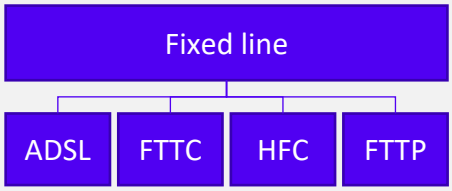
Figure 2.1: Summary of broadband coverage at a fixed location across the UK and nations



Source: Ofcom analysis of operator data (September 2023).

Background to fixed line broadband technologies

Fixed connections provide broadband access at specific locations, such as residential or business premises. Fixed line broadband technologies can be broken down into different technology types.



There are four primary types of **fixed line connections** for fixed broadband access:

- **ADSL**[3] – Copper (telephone) cables are used to connect the exchange to each premises. Maximum download speed is up to 24 Mbit/s. Actual speeds delivered diminish with length of cable to the premises.
- **Fibre to the cabinet (FTTC)** – FTTC involves fibre to the street cabinet, with copper cables connecting the cabinet to the premises. FTTC uses 'very high-speed digital subscriber line' (VDSL)[4] technology. As with ADSL, speeds diminish with length of cable, but as cabinets are generally located close to premises, maximum download speed is normally up to 80 Mbit/s.
- **Hybrid fibre coaxial (HFC) cable** – With HFC, there is fibre to a street cabinet and coaxial cable from the cabinet to the premises. Because there is decreased signal loss compared to copper, HFC can deliver higher speeds over longer distances. Cable broadband in the UK is provided by Virgin Media O2, and its cable network can deliver gigabit speeds.[5]
- **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 can deliver gigabit speeds.[6]

We categorise fixed broadband connections based on the download speed they can provide:

- **Decent** – can provide at least 10 Mbit/s download and 1 Mbit/s upload speeds.[7] It can be delivered by ADSL, FTTC, HFC cable or full fibre. Decent broadband provides sufficient speeds for making a high-definition video call. Over minimum decent broadband, downloading a one-hour HD TV episode (1 GB) would take almost 15 minutes.
- **Superfast** – can provide download speeds of at least 30 Mbit/s and can be delivered by FTTC, HFC cable or full fibre. Superfast broadband provides sufficient speed for one person streaming 4K/UHD video. Downloading a one-hour HD TV episode would take under four and a half minutes and several devices can work simultaneously.
- **Gigabit-capable** – are able to offer download speeds of 1 Gbit/s and above. It can be delivered by HFC cable or full fibre. With gigabit-capable broadband, it is feasible to download a full 4K film (100 GB) in under 15 mins, or a one-hour HD TV episode in eight seconds.

[3] ADSL: Asymmetric Digital Subscriber Line.
[4] Another technology known as G.fast is also sometimes deployed at, or near, a limited number of cabinets offering higher speeds than VDSL.
[5] Cable broadband access networks are shared between a large number (usually hundreds) of premises.
[6] Most full-fibre access networks utilise Passive Optical Network (PON) approaches where capacity in the downstream and upstream direction is shared between around 30 to 60 users.
[7] The UK Government defines the characteristics of Decent broadband. This is the level of connection currently deemed necessary for consumers to participate in a digital society.

Fixed broadband coverage continues to increase across Wales

Full-fibre broadband is now available to more than half of residential premises in Wales

The availability of full-fibre networks is growing quickly in Wales. As of September 2023, 55% or 798,000 residential premises had access to full-fibre (FTTP) broadband network(s). This is an increase of 15 percentage points or 227,000 premises compared to last year.

Increased access to full fibre continues to be driven primarily by the rollout of Openreach's network and increasingly, Ogi, an alt-net operator, which focusses on previously underserved communities and regions.

The Welsh Government's Superfast Cymru programme has now concluded with the second phase connecting a total of 44,000 premises over four years at a cost of £57 million.[8] In partnership with Openreach, the four-year project has given access to full-fibre connectivity to 44,000, exceeding the original target of 39,000. The rollout, with an original budget of £57 million, has been as a result of Welsh Government and EU funding, investment from Openreach and support from the UK Government. All properties that have benefitted can now access future proofed 'fibre to the premises' technology, which can deliver gigabit speeds allowing for faster downloads and smoother streaming.

Residential premises in Wales in urban areas are more likely to have access to full-fibre networks (59%) compared to rural areas (41%).

Table 2.1: Residential gigabit-capable and full-fibre coverage

	Full fibre			Gigabit capable		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
England	56% (14.1m)	59% (12.7m)	42% (1.3m)	78% (19.6m)	83% (18.2m)	45% (1.4m)
Northern Ireland	91% (0.7m)	95% (0.5m)	82% (0.2m)	92% (0.8m)	97% (0.6m)	82% (0.2m)
Scotland	53% (1.4m)	58% (1.3m)	32% (0.2m)	72% (1.9m)	80% (1.8m)	34% (0.2m)
Wales	55% (0.8m)	59% (0.7m)	41% (0.1m)	64% (0.9m)	71% (0.8m)	41% (0.1m)
UK average	57% (17.1m)	59% (15.2m)	43% (1.8m)	78% (23.2m)	83% (21.3m)	45% (1.9m)

Source: Ofcom analysis of provider data (September 2023).

[8] Welsh Government, Tens of thousands of homes and businesses can access gigabit capable speeds as rollout of full fibre broadband smashes targets, 6 December 2023.

Connecting rural Wales – Shell Island[9]

- Openreach is the incumbent wholesale fixed network operator for almost all of the UK. It has the largest network and connects the most premises. It plans to reach 25 million premises with full fibre by December 2026. More than 770,000 Welsh homes and businesses across all local authority areas – in both urban and rural parts of the country – can now access Openreach's full-fibre infrastructure.
- Openreach has set out some examples of the impact of its deployment in rural and remote areas. For example, Shell Island near Llanbedr in Gwynedd can now access some of the fastest broadband speeds available.
- To bring full-fibre broadband to the area, Openreach engineers ran new fibre cables from the nearest exchange in Llanbedr (nearly four kilometres away). Part of the work involved drilling and laying new underground ducts two metres beneath the tidal area of the peninsula, that runs between Shell Island and the mainland. The work needed to coincide with low tide-times and required specific drilling equipment.
- Using a trench digger, known as a 'ditch witch', Openreach engineers drilled horizontally across the tidal area. They drilled for 400m across the tidal area to complete the work.
- In addition to Shell Island itself, full-fibre broadband was also made available to a number of rural properties in the area along with the enterprise park at Llanbedr airfield.

Connecting rural Wales – Mydroilyn[10]

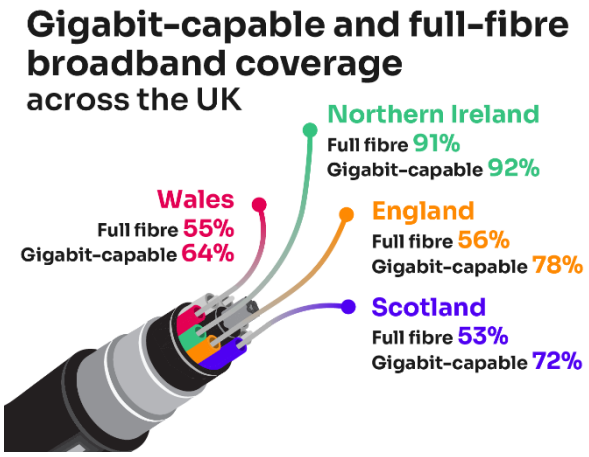
- Another example of recent deployment and its benefits to local businesses is the village Mydroilyn near Aberaeron in Ceredigion, where a furniture business was provided with Openreach's full-fibre broadband.
- Given its rural location, footfall to the showroom is low so the business's online presence is essential. Potential customers online need as much information as possible to make informed decisions and that needs several high-resolution pictures, video clips and live-streaming – something that was very difficult to do without higher speed broadband.
- With limited broadband connectivity in the village, the work of uploading images of new furniture on to the website was both time consuming and labour intensive (while uploading anything longer than short 5 second videos was not possible).
- The shop says that the availability of full fibre has transformed how the company goes about its business, with the majority now being done using social media channels rather than visits to the showroom or website.

[9] Openreach, Tide turns for Full Fibre connectivity, 10 March 2023.
[10] Openreach, TikTok connection leads to business boost for rural antiques dealership, 10 May 2023.

Gigabit-capable broadband is now available to 64% or 931,000 homes in Wales

Gigabit-capable broadband can be delivered over both full-fibre and HFC technologies; therefore, the increase in full-fibre coverage has also resulted in an increase in the number of premises able to access gigabit-capable broadband. By September 2023, 64% or 931,000 residential premises in Wales had access to a gigabit-capable broadband service, an increase of 12 percentage points or 179,000 residential premises on last year.[11]

247,000 (27%) residential premises in Wales have access to two gigabit-capable networks, while 29,000 (3%) have three or more gigabit-capable networks available.



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

The vast majority of residential premises in Wales have access to superfast broadband – defined as a broadband connection that can provide download speeds of at least 30 Mbit/s. Our latest data shows the proportion of residential premises that have access to superfast broadband (or faster) stands at 96%, or roughly 1.4 million residential premises in Wales.

As with full-fibre coverage, urban premises are more likely to have superfast coverage (99% of all premises) compared to rural residential premises, of which 86% have access to superfast broadband via a fixed line.

Availability of superfast broadband in Wales has doubled since 2013 (48%), partly due to commercial builds and partly as a result of the Welsh Government's intervention programme Superfast Cymru.

Update on Welsh Government initiatives

The Welsh Government's Access Broadband Cymru scheme continues to provide grants to fund, or part fund, the installation of broadband at some of the hardest to reach premises in Wales. The Local Broadband Fund supports local authorities and social enterprises to deliver broadband to whole communities.

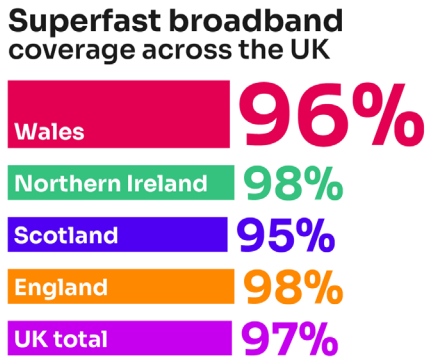
The Welsh Government digital infrastructure barrier busting taskforce report has been published and work is underway to deliver its recommendations. The Public Sector Broadband Aggregation network securely connects over 110 public sector organisations, including nearly 5,000 public sector sites, in Wales.

[11] The share of gigabit-capable broadband delivered over full fibre is likely to be impacted by Virgin Media O2 upgrading its HFC network to full fibre by 2028. Virgin Media O2, Virgin Media O2 bolsters future network with fibre upgrade plan. 29 July 2021.

Table 2.2: Residential superfast coverage

	Total	Urban	Rural
England	98%	99%	89%
Northern Ireland	98%	99%+	93%
Scotland	95%	99%	79%
Wales	96%	99%	86%
UK average	**97%**	**99%**	**88%**

Source: Ofcom analysis of provider data (September 2023).



There is variation in the coverage of superfast broadband and full fibre across the 22 local authorities in Wales

The deployment of superfast and full-fibre broadband is generally more difficult and costly in rural areas than in larger towns and cities. This is primarily as a result of the greater distances between infrastructure nodes, small settlements and individual properties, plus the comparatively lower number of customers that can be connected. In some cases, people living in rural communities have had to pool public sector financial support in the form of vouchers in order to secure network build. Previously rural communities had to wait longer for superfast connections than their urban counterparts, but more recently much full-fibre deployment has been targeted at rural communities where its impact has been significant.

Superfast broadband coverage, and even more so, full-fibre availability varies greatly between Welsh local authorities as outlined in Table 2.3. Caerphilly, Cardiff, Merthyr Tydfil, Newport, Rhondda, Swansea and Vale of Glamorgan all have superfast coverage at 99%. The local authorities with the lowest level of superfast coverage are in Powys (84%) and Ceredigion (86%), both of which are largely rural local authorities.

Conwy and Vale of Glamorgan lead local authorities on full-fibre coverage at 79% and 77% respectively, whilst Torfaen and Ynys Môn have the lowest levels of full-fibre coverage at 22% and 31% respectively. Torfaen is predominantly urban whilst Ynys Môn is predominantly rural.

Some predominantly urban local authorities have high levels of superfast availability alongside low levels of full-fibre coverage – Torfaen 98%/22%; Neath Port Talbot 98%/36% and Blaenau Gwent 98%/39%.

Other predominantly rural local authorities have comparatively low levels of coverage of both superfast broadband and full fibre – Powys 84%/36%; Ceredigion 86%/39% and Ynys Môn 94%/31%.

Table 2.3: Residential superfast broadband and full-fibre availability in each local authority

Local authority	Coverage of superfast (% of all residential premises)	Coverage of full fibre (% of all residential premises)
Blaenau Gwent	98%	39%
Bridgend	98%	67%
Caerphilly	99%	65%
Cardiff	99%	69%
Carmarthenshire	91%	54%
Ceredigion	86%	39%
Conwy	96%	79%
Denbighshire	95%	67%
Flintshire	97%	72%
Gwynedd	93%	40%
Merthyr Tydfil	99%	68%
Monmouthshire	92%	59%
Neath Port Talbot	98%	36%
Newport	99%	62%
Pembrokeshire	93%	40%
Powys	84%	36%
Rhondda Cynon Taf	99%	43%
Swansea	99%	52%
Torfaen	98%	22%
Vale of Glamorgan	99%	77%
Wrexham	97%	58%
Ynys Môn	94%	31%

Source: Ofcom analysis of provider data (September 2023).

Ogi to reach 100,000 premises by end of 2023

- Ogi continued to rollout its full-fibre network during 2023, and says it will reach 100,000 premises by the end of the year. The alt-net provider is operational in 60 communities across south Wales and it has over 9,000 home and business customers. New towns added to the rollout this year include seaside town, Tenby[12], along with post-industrial communities Blackwood, Maesteg and Tonypandy, and parts of the Welsh capital, Cardiff.
- Following an agreement with the Welsh Government, Ogi also progressed work on a new high-capacity network set to bring greater resilience into south Wales over the Prince of Wales Bridge. The new dark fibre and micro duct network, set to go live in early 2024, will increase capacity along the M4 corridor as carriers, hyper-scalers and internet service providers look to expand in Wales.[13]

Fixed wireless access networks provide another option for customers in Wales

In addition to the fixed line technologies discussed above, it is also possible to receive fixed broadband via wireless networks, called Fixed Wireless Access (FWA). FWA can be delivered by mobile network operators (MNOs), on licensed 4G and 5G networks, and by wireless internet service providers (WISPs), which communicate via a wireless link between a provider's mast site and an external antenna fixed to a customer's premise.

In Wales, 93% of customers can access an FWA service from an MNO,[14]while 31% can access FWA from a WISP. This is a very high proportion compared to the rest of the UK, where only 7% can access FWA from a WISP. The relatively high percentage in Wales could be as a result of some WISPs being focused on providing services in parts of Wales.

Table 2.4: Coverage of MNO and WISP FWA networks with at least decent broadband (all premises)

	MNO FWA	WISP FWA
England	96%	7%
Northern Ireland	85%	3%
Scotland	95%	2%
Wales	93%	31%
UK	**95%**	**7%**

Source: Ofcom analysis of provider data (September 2023).

[12] Ogi, Iconic seaside town gears up for Ogi, 4 October 2023.
[13] Ogi, New digital superhighway set to benefit Wales, 17 October 2023.
[14] Our reporting here is based on data from BT/EE and Three – see the annex in the UK report for further information on the methodology.

Take-up of services on full-fibre and superfast broadband networks is increasing

Take-up of services on full-fibre networks is increasing

As the rollout of full-fibre networks progresses, more customers are using this new technology as it becomes available.

In Wales, we estimate that take-up of services on full-fibre networks among premises where it is available is 31% or 239,000 premises. This represents an increase in take-up in the past year of three percentage points and is higher than the UK-wide take-up level of 28%.

Table 2.5: Estimated residential full-fibre broadband take-up as a percentage of premises where full-fibre networks are available: 2021-2023

	2021	2022	2023
England	25%	25%	27%
Northern Ireland	19%	25%	39%
Scotland	22%	23%	28%
Wales	24%	28%	31%
UK average	**24%**	**25%**	**28%**

Source: Ofcom analysis of provider data (September 2023).

There is variation in take-up by local authority

We have analysed differences in take-up rates at the local authority level across the UK, to provide some insight into variations.

The local authorities with the highest levels of take-up are in Table 2.6 below. Kingston upon Hull has the highest take-up as a proportion of premises with access to full fibre, followed by Ynys Môn (Isle of Anglesey), Test Valley, City of London and Cornwall. Three of the ten local authorities are in Wales: Ynys Môn, Ceredigion and Powys.

We note that several of the local authorities on this list are largely rural. Higher take-up in these areas could be partly driven in some cases by the low availability of decent or superfast services prior to full-fibre deployment.

Table 2.6: Ten local authorities in the UK with highest levels of take-up, as proportion of premises with access to full fibre

Local authority	Nation	Coverage of full fibre (% of all premises)	Take-up (% of all premises with full-fibre coverage)
Kingston upon Hull	England	98%	64%
Ynys Môn	Wales	24%	61%
Test Valley	England	25%	59%

Local authority	Nation	Coverage of full fibre (% of all premises)	Take-up (% of all premises with full-fibre coverage)
City of London	England	50%	57%
Cornwall	England	42%	55%
Ceredigion	Wales	34%	52%
West Lancashire	England	48%	49%
Powys	Wales	32%	49%
East Riding of Yorkshire	England	78%	49%
East Hertfordshire	England	22%	49%

Source: Ofcom analysis of provider data (May 2023).
Excludes local authorities where full-fibre coverage is <20%.

Take-up of superfast broadband in Wales has increased to 73% of residential premises where the service is available

We estimate that for those residential premises in Wales that have access to superfast broadband services or faster, around 73% of them take a broadband package that delivers superfast speeds or faster. This represents an increase of two percentage points from the 71% take-up level reported last year.

Take-up of superfast broadband increased in all four nations in the 12 months to May 2023. England and Northern Ireland remain the nations with the highest take-up of superfast broadband.

Table 2.7: Estimated superfast take-up as a percentage of residential premises where superfast services are available: 2021-2023

	2021	2022	2023
England	69%	73%	75%
Northern Ireland	73%	73%	74%
Scotland	68%	71%	73%
Wales	66%	71%	73%
UK average	69%	73%	75%

Source: Ofcom analysis of provider data (September 2023).

Some premises in Wales still cannot access decent broadband

The number of premises in Wales unable to access decent broadband has fallen further, but around 8,000 still don't have access

We estimate that 2% of homes and businesses in Wales cannot access decent broadband, which is defined as connections which provide at least 10 Mbit/s download speed and 1 Mbit/s upload speed, from a fixed line connection. This is around 36,000 premises, a drop of 8,000 since last year, when we reported that 44,000 premises did not have decent broadband via a fixed line.

Of those premises that do not have decent broadband via fixed lines, some will be able to access decent broadband via fixed wireless access services offered by MNOs or WISPs. Taking account of the coverage available from FWA, we estimate that this leaves around 0.5% or 8,000 premises in Wales without a decent broadband service from either fixed line or fixed wireless networks. The remaining premises without access to decent broadband service has fallen by 2,000 from the 10,000 premises we reported last year.

Table 2.8: Remaining premises without access to a decent broadband service from either a fixed or wireless network, 2022 and 2023[15]

	2022	2023
England	40,000	33,000
Northern Ireland	9,000	3,000
Scotland	21,000	18,000
Wales	10,000	8,000
UK total	**80,000**	**61,000**

Source: Ofcom analysis of provider data (September 2023).

[15] All figures in the table have been rounded to the nearest 1,000.

The broadband universal service obligation (USO) is one mechanism for connecting those without decent access

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).[16]

Where an affordable service 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.[17] Where the costs are above £3,400, the customer has the option to pay the excess costs to get a USO connection. BT is the universal service provider 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.[18]

As of October this year, BT had received a total of nearly 241 USO orders in Wales since the launch of the USO in March 2020, compared with nearly 2,000 orders across the UK. [19] These orders will end up connecting 1,313 premises in Wales that do not have access to decent broadband.

The map below shows how those USO orders are spread across the UK by local authority area (as a proportion of premises), and the totals by nation. Some local authorities in west Wales have received a high number of connections.

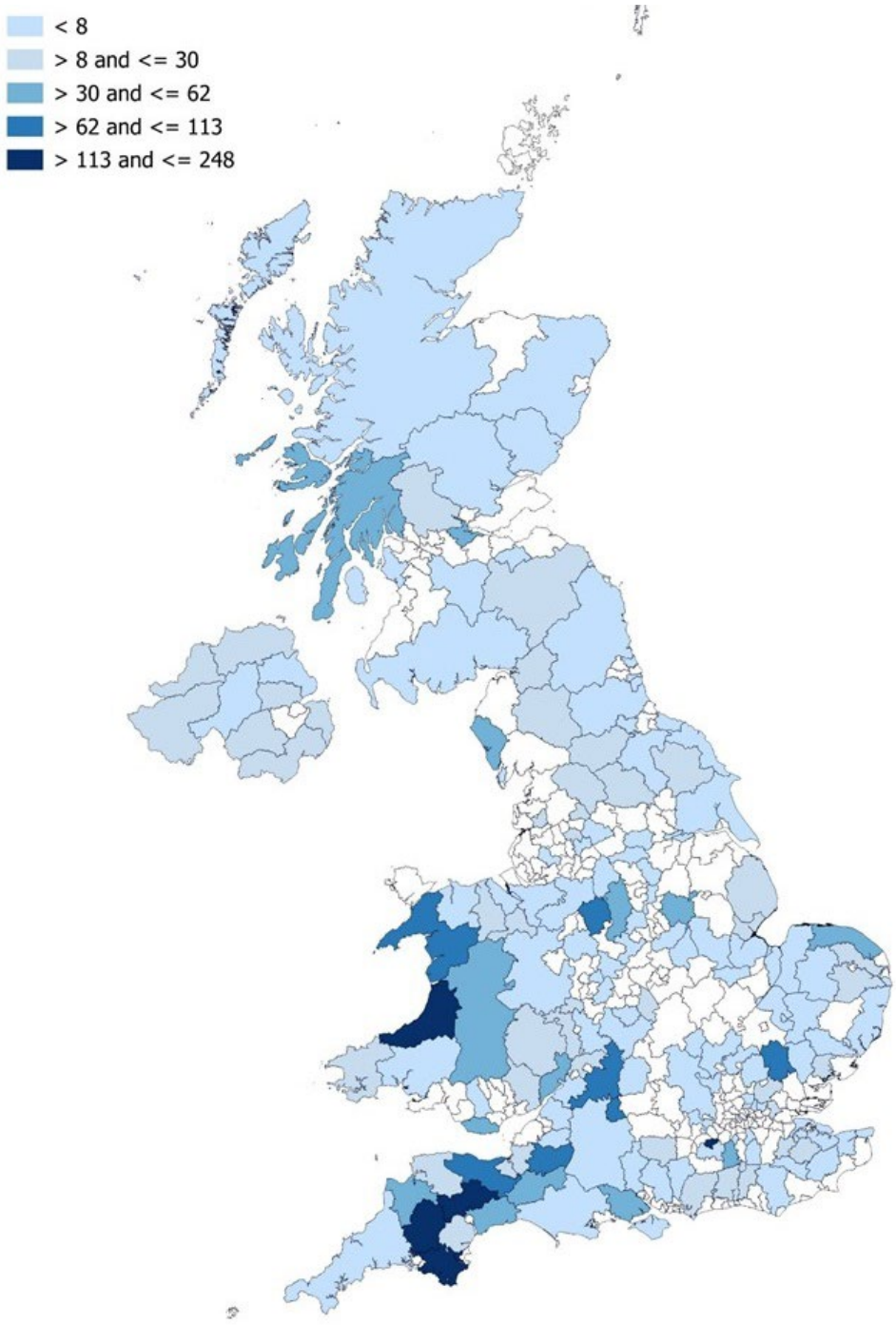
Table 2.9: USO orders and number of premises built[20]

	Number of USO orders	Total premises passed by resulting build
England	1,529	7,258
Northern Ireland	87	723
Scotland	111	498
Wales	241	1,313

Source: Ofcom analysis of BT data (September 2023).

[16] 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 100 GB a month.
[17] 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 £54 per month in line with CPI.
[18] BT, USO Reports. KCOM, USO Reports. To date KCOM has not received any eligible USO orders.
[19] 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 2,000 figure also includes orders made once build has completed.
[20] While conducting final accuracy checks for the purpose of our report, BT informed us that the implementation of a new data model might have impacted on their reporting of total USO orders and premises passed by resulting build. We are following this up with BT and will publish corrected data if necessary.

Figure 2.2: Map of USO premises passed by Local Authority Area (per 100,000 premises)



Source: Ofcom analysis of BT data (September 2023) using 2021 Local Authority boundaries.

Our planned network deployment report indicates how rollout of full fibre could progress over the next three years

We published our second forward-looking report about planned network deployments of full fibre in October 2023. This report is based on the stated deployment plans of network operators as of May 2023 up to three years in advance, and it includes plans that are privately funded as well as those that are supported through public funds or intervention. It does not take account of any aspirations

or plans by public authorities, whether national or local, to roll out networks in their geographical areas.

We are estimating that by May 2026, compared to March 2023 in brackets, in Wales:

- 99% of urban premises will have access to gigabit-capable broadband (up from 67%).
- 73% of rural premises will have access to gigabit-capable broadband (up from 39%).
- there will be an additional 325 FWA masts in Wales (up from the current value of 1,400).
- there will be twenty fixed operators in Wales (up from sixteen).
- 70% of premises will be covered by two or more operators (up from 16%).
- 5,200 premises will not have decent broadband from a fixed line or FWA connection.

For the methodology and further information, see the Planned Network Deployments 2023 report.

Satellite services may offer an alternative option for customers in hard-to-reach areas.

Satellite technologies continue to evolve rapidly, and Low Earth Orbit (LEO) satellites particularly could potentially help to serve parts of the UK which are harder to reach through more traditional technologies.

This year we have collected data on LEO satellite provision. Starlink currently offers the only direct-to-consumer LEO service in the UK through its retail 'plug and point to the sky' product.[21] This delivers nationwide broadband coverage, and the data provided to us by Starlink indicates that it provides around 42,000 connections in the UK. More detail is available in the Connected Nations UK report.

Steps are being taken to support the rollout of satellite services. For example, in 2022 we refreshed our Space spectrum strategy to optimise opportunities and improve use of space to better support businesses and households, including to connect harder to reach premises. The UK Government is supporting trials to deliver high-speed connections to harder to reach locations and in August 2023 it announced proposals for a Connectivity in Low Earth Orbit scheme (CLEO), which would be designed to help industry develop new constellations.

The migration from legacy voice services to digital voice is continuing

The UK's traditional landline voice services are undergoing a substantial transition as network operators retire their legacy systems (referred to as the public switched telephone network, or 'PSTN').

BT and Openreach aim to retire BT's PSTN network and the Openreach wholesale services that deliver PSTN by the end of 2025. Other providers using the same legacy technology as BT are following a broadly similar timescale. As of 5 September 2023, Openreach has stopped new sales of the wholesale services delivering the PSTN across the UK, an important step in the PSTN switch off

[21] For information on residential services, see Starlink for homes. Services include a 'Standard' package for £75/month and a range of 'Priority' services priced at £80-£300/month, with hardware options priced from £449 on Starlink Service Plans.

process.[22] BT has said it will begin its digital voice regional rollout in Wales in Spring 2024, engaging with stakeholders.[23]

To make sure landline services continue to be available in the future, providers currently using legacy telephony networks will deliver landline calls over a digital technology called Voice over Internet Protocol (VoIP) over a broadband connection.[24] Our UK wide data found that as of June 2023, 34% of all landline connections are now delivered over VoIP, while 25% of all landlines use a similar technology to the PSTN but does not rely on the PSTN, called Emulated PSTN. Only 41% of landlines remain on the PSTN as of June 2023.

We published advice for consumers in January 2023 on what the switch-off means for landline and our expectations of providers. For more information, see the Connected Nations UK report.

[22] Openreach, Openreach puts the stopper on copper.
[23] BT, BT announces regional rollout schedule for Digital Voice, 26 September 2023.
[24] When discussing VoIP in this context, we are referring to managed voice services in which the voice service provider can control and manage the quality of the service over the broadband connection. This does not include general 'VoIP' calls made using personal online communication services such as Skype or WhatsApp, potentially over a range of different devices.

3. Mobile, data and voice

Introduction

In an increasingly interconnected world, mobile services continue to play an integral role to our daily lives – whether it's enabling seamless communication on the go, providing internet access, or powering wireless connectivity for devices like smart meters.

In this section, we provide an update on the progress mobile network operators (MNO) are making with their 5G rollout plans, while continuing to report on the broader availability of mobile coverage outside and inside premises, across the landmass of Wales and on roads.

This section also outlines efforts to enhance geographic mobile coverage in rural Wales, and the latest developments in relation to the planned switch-off of 3G and 2G mobile services by MNOs.

We recommend that this section is read in conjunction with the Mobile, data and voice section in the UK Connected Nations 2023 report.

Key highlights

- **The availability of mobile 5G non-standalone continues to grow rapidly**. 5G coverage outside of premises from at least one operator ranges from 83% at High Confidence to 72% at Very High Confidence, third in the UK behind England and Scotland.
- **4G continues to underpin the mobile experience in Wales**. Individual operators provide good 4G coverage in Wales, with geographic mobile coverage ranging from 73-85%, depending on the operator. Coverage from all four operators is available across 62% of Wales, unchanged from last year. **There continues to be a high level of 4G outdoor premises coverage in Wales** with 94% of premises having outdoor 4G coverage from all four operators, compared with 98% across the UK.
- **The switch-off of 3G networks in Wales is underway.** 3G will be switched off by all MNOs across Wales in the coming years and will be completed by the end of 2025. This will result in improved network efficiency and enable more spectrum to be used for higher speed higher capacity 4G and 5G services in Wales.
- **Dwyfor Meirionnydd (42%), Brecon and Radnor (50%) and Montgomeryshire (51%)** are the Senedd Cymru constituencies with the lowest 4G coverage (geographic landmass) from all four operators, unchanged from last year.

Figure 3.1: Summary of mobile coverage across the UK and nations

	England	Northern Ireland	Scotland	Wales	UK
5G outside premises (MNO range)	51-81%	26-62%	39-70%	11-69%	48-78%
4G outside premises (MNO range)	99-99%+	98-99%	98-99%+	96-99%	99-99%+
4G geographic (MNO range)	92-95%	88-92%	59-76%	73-85%	80-87%
4G total not spots	2%	3%	16%	9%	7%
Voice & text total not spots	1%	1%	10%	4%	4%

Source: Ofcom analysis of operator data (September 2023).

Background to mobile technologies

Mobile services described in this section include:

- **5G non-standalone (5G NSA)** involves deploying 5G radio equipment alongside existing 4G. This delivers an increase in capacity and allows MNOs to support demand as it continues to grow, without the congestion and degradation of service quality that would otherwise result.
- **5G standalone (5G SA)** involves the deployment of a new 5G core network. This could enable new use cases such as Augmented Reality (AR) /Virtual Reality (VR) and robotics, supported by the broader capabilities of 5G including ultra-low latency, advanced virtual network (slicing) functions, and potentially improved coverage.[25]
- **4G, 3G and 2G** are other generations of mobile standards with specified features. The introduction of 3G supported the use of data applications such as web browsing, while 4G has supported more data intensive activities such as streaming and gaming.

When mentioning mobile 5G availability predictions, we refer to confidence ranges[26] reflecting the likelihood of on the ground coverage for consumers as:

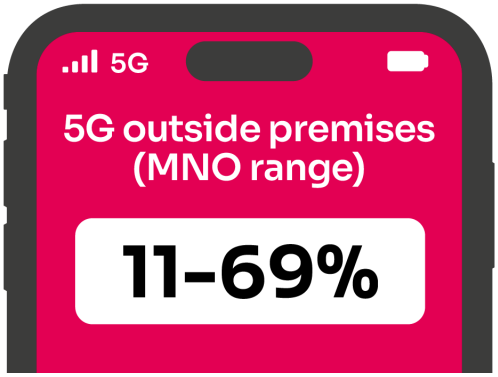
- **High Confidence** associated with a signal strength (-110 dBm), to equate to at least an 80% confidence level.
- **Very High Confidence** associated with a higher signal strength (-100 dBm), to equate to a circa 95% confidence level.

[25] Augmented Reality (AR): an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology. It overlays digital content, which could include a combination of sound, video, text, and graphics, onto a real-world environment using a headset or a device with a camera, such as a mobile phone.
Virtual Reality (VR): use of a headset to access a virtual experience, which could be digitally created or a captured 360° photo or video.

[26] Signal strengths refer to control channel signals – for further detail see our Methodology annex.

5G availability in Wales continues to grow

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.



Outdoor premises coverage of 5G

Deployment of 5G[27] across Wales and the UK has continued to gather pace in 2023. On a UK-wide basis, a notable increase in 5G coverage has been observed across the UK in 2023 and it now stands at 93% (High Confidence) and 85% (Very High Confidence), up from 78% and 67% respectively in 2022, for areas outside of premises where 'At least one MNO' provides coverage.[28]

In Wales, 5G coverage outside of premises from at least one operator ranges from 83% at High Confidence to 72% at Very High Confidence, third in the UK behind England and Scotland. This continues the strong rate of increase in coverage seen in the Connected Nations 2022 report.

Table 3.1: Range of 5G coverage outside of premises in Wales across individual MNOs, by year

	2022	2023
High Confidence	10-46%	11-69%
Very High Confidence	9-36%	10-60%

Source: Ofcom analysis of operator data (September 2022 and September 2023).

Across UK nations, 5G coverage outside of premises ranges across individual MNOs as follows: 51-81% for England; 11-69% for Wales; 39-70% for Scotland and 26-62% for Northern Ireland (all based on our High Confidence level).

Landmass coverage for 5G across individual MNOs is steadily increasing. However, it still remains relatively low in Wales, ranging from 1% to 37% of the landmass at High Confidence, and 1% to 29% at the Very High Confidence level (up from 1-15% and 0-11% respectively last year).

[27] In this section, we mostly report the availability of 5G on a NSA basis.

[28] By coverage outside a premises, we mean that coverage is predicted in a 100x100m area in which a dwelling is located, which can be seen as a proxy for outdoor coverage of populated areas. By 'At least one MNO' we mean the combined coverage that would be available if the total coverage of each MNO was included in an aggregated coverage footprint.

Additional 5G deployments have underpinned these increases in coverage, with more than 18,500 5G deployments[29] now in place across the UK, up from the 12,000 reported in 2022. Of these, 85% are located in England, 9% in Scotland, 4% in Wales and 2% in Northern Ireland, broadly in line with previous trends and reflecting national distribution of all mobile traffic across the UK.

4G geographic coverage across Wales is broadly stable

Overall, 4G geographic coverage across the UK is broadly stable compared with 2022. As shown in Table 3.2 below, there remain significant differences in geographic 4G coverage across the UK's nations. Individual operator coverage across Wales's landmass ranges remains similar to 2022 with a range of 73% to 85%.

Table 3.2: 4G geographic coverage ranges by UK nation

Nation	Range of 4G Geographic Coverage
Wales	73% to 85%
England	92% to 95%
Northern Ireland	88% to 92%
Scotland	59% to 76%
UK	**80% to 87%**

Source: Ofcom analysis of MNO predictions (September 2023).

Some MNOs have made small improvements in their geographic coverage this year. BT/EE continues to have the highest levels of geographic coverage across Wales's landmass at 85% (no change from last year) while Vodafone and Three had increases of one percentage point from last year and Virgin Media O2's (VMO2) coverage dropped by one percentage point.[30]

Table 3.3: 4G geographic coverage in Wales by MNO

	2022	2023
BT/EE	85%	85%
Three	77%	78%
Virgin Media O2	74%	73%
Vodafone	73%	74%

Source: Ofcom analysis of MNO predictions (September 2023).

[29] It should be noted that these deployments do not necessarily equate to a total of individual sites across all MNOs. For example, two MNOs may be offering coverage from the same site.
[30] We are engaging with VMO2 to understand potential reasons for this small reduction. We also note that all MNOs have coverage obligations to achieve landmass coverage of between 82% and 83% by July 2024 in Wales, so that any reduction should not be enduring.

4G geographic coverage across Wales from all four MNOs has remained steady at 62%. Table 3.4 provides information on the differences in 4G geographic coverage from all operators across the UK, with Wales third of the four UK nations.

Table 3.4: 4G geographic coverage from all MNOs by UK nation

Nation	% of landmass served by all operators (2022)	% of landmass served by all operators (2023)	Percentage points (pp) change
Wales	62%	62%	0pp
England	85%	85%	0pp
Northern Ireland	81%	81%	0pp
Scotland	46%	48%	+2pp
UK	**70%**	**71%**	**+1pp**

Source: Ofcom analysis of MNO predictions (September 2023).

Rural geographic 4G coverage across Wales from all four MNOs remains poor in many parts of Wales, particularly in areas like Ceredigion and Powys with levels remaining unchanged. Urban areas of Wales remain well served by 4G networks at 92% coverage.

Table 3.5: 4G geographic coverage from all MNOs by Urban/Rural

Nation	Total	Urban	Rural
Wales	62%	92%	59%

Source: Ofcom analysis of MNO predictions (September 2023).

Meanwhile, levels of 4G geographic coverage (per Table 3.6) by at least one MNO remain stable across both urban and rural areas of Wales.

Table 3.6: 4G geographic coverage from at least one MNO by UK nation and rurality

Nation	Total	Urban	Rural
Wales	91%	99%+	90%
England	98%	99%+	97%
Northern Ireland	97%	99%+	97%
Scotland	84%	99%+	84%
UK	**93%**	**99%+**	**93%**

Source: Ofcom analysis of MNO predictions (September 2023).

Table 3.7 demonstrates that the availability of 4G coverage across Wales's landmass increased for most MNOs in 2023, compared to 2022, with BT/EE still having the highest level of coverage for rural areas, up one percentage point at 84%.

Table 3.7: 4G geographic coverage change in rural Wales by MNO

	4G geographic coverage in rural areas (2022)	4G geographic coverage in rural areas (2023)
BT/EE	83%	84%
Three	75%	76%
Virgin Media O2	72%	71%
Vodafone	70%	71%

Source: Ofcom analysis of MNO predictions (September 2023).

There has been a decrease in the proportion of Wales's landmass which has no 4G coverage from any operator ('total not spots'), from 10% in 2022 to 9% in 2023. Table 3.8 provides a comparison of Wales's 4G total not spots against other UK nations, with the overall UK total not spot area having also reduced by one percentage point to 7% in 2023.

Table 3.8: 4G total not spots by UK nation

Nation	% of 4G total not spots
Wales	9%
England	2%
Northern Ireland	3%
Scotland	16%
UK	**7%**

Source: Ofcom analysis of MNO predictions (September 2023).

Geographic voice coverage

Mobile voice services from all four MNOs are available across 78% of Wales's geographic area, compared to 79% in 2022.[31] There was also a one percentage point decrease – to 76% - in levels of rural coverage, while urban coverage levels remain at 97%. Geographic voice coverage from at least one MNO remains flat on last year, equating to 99%+ of urban and 95% of rural Wales and at 96% overall.

[31] We note this small reduction in voice coverage impacting indoor and roads voice coverage percentages, and we are engaging with relevant MNOs to better understand the drivers for this.

Remote energy projects and connecting in complete not spots

Menter Mon is a not-for-profit social enterprise that delivers projects and services across North West Wales, aiming to add value to the region's resources for the benefit of local people, including the natural and built environment, heritage, language, people and agricultural produce. One of its most recent projects - Morlais Tidal Energy - aims to benefit local communities, the economy and help tackle climate change by using renewable energy to generate clean low carbon electricity from the sea, and potentially up to 240MW. In partnership with various stakeholders including Wavemobile, Virgin Media O2, the RSPB and the Welsh Government, Menter Mon is aiming to connect the tidal energy project, which began in early 2023. The solution uses a British designed and manufactured 4G small cell solution, which connects to a Low Earth Orbit satellite (becoming one of the first public networks to do so). It began providing a mobile 4G service in the summer for the engineers, wardens & visitors, at South Stack, just off the coast of Ynys Môn.

This was enabled using Ofcom's shared access licence. The shared access licence is part of a new framework for enabling shared use of spectrum, aiming to make it easier for people and businesses to access spectrum for a wide range of local wireless connectivity applications.

The lighthouse also benefits from this intervention, its tour guides can now accept contactless payments – previously it was over an 800 steep step detour its visitors would have taken to the RSPB Café to pay by card.

In addition, at South Stack, the RSPB is developing a wildlife tracking solution to monitor Guillemot birds using a non-GPS solution that exploits LoRaWAN, a low power IoT technology.[32] Tracking is required to monitor the impact of the tidal energy project on the birds and other wildlife, and due to a combination of radio spectrum & technologies, this can now be done in real time.

Not spot innovation in West Wales

A precursor to the work undertaken for the Morlais Tidal Energy project in Anglesey, began 145 miles away in Mwnt, on the West Wales coast.[33]

In 2022, a group of innovators including Cwmpas, the UK's largest co-operative development agency, Virgin Media O2, Wavemobile and the Welsh Government met at Mwnt, which was at the time a complete not spot. The team completed a trial consisting of a Low Earth Orbit satellite terminal, a battery pack for off-grid power and a 4G small cell which determined the feasibility of a rapidly deployed mobile service.

The trial was a success, and its findings were shared with the Morlais team in North Wales[34]. To leave a positive legacy for Mwnt, and using Ofcom's shared spectrum licence, the team worked with local stakeholders, including Caban Mwnt Café and Openreach, and as a result Mwnt now enjoys good mobile coverage. Since its permanent deployment, the system has handled at least three emergency calls, which demonstrates just how essential connectivity is, including in micro not spot locations.

Furthermore, tourists and walkers can stay in touch with family and friends on the beach, while national trust wardens and environmental groups can be kept informed of any wildlife emergencies (such as with the seals and their pups).

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[32] Virgin Media O2, The Great Rural Revival: Improved rural connectivity worth £65bn in new growth for UK economy, 1 August 2023.
[33] Board meetings with a twist as remote Ceredigion beach gets full fibre connection, 3 August 2023.
[34] Virgin Media O2 looks to the skies for Welsh connectivity, 1 August 2023.

There are differences in geographic coverage 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% which remains unchanged from last year; followed by Brecon & Radnorshire at 50%, Montgomeryshire at 51%, and Clwyd West at 52%. Clwyd West had a five percentage points increase in coverage since September 2022.

Table 3.9: 4G geographic (all operators) coverage by Senedd Cymru constituency (differences with 2022 in brackets)

	Geographic coverage (all operators)
Dwyfor Meirionnydd	42% (unchanged)
Brecon & Radnorshire	50% (-1pp)
Montgomeryshire	51% (unchanged)
Clwyd West	52% (+5pp)
Ceredigion	54% (unchanged)
Aberconwy	58% (+1pp)
Monmouth	61% (+1pp)
Carmarthen East & Dinefwr	63% (unchanged)
Cynon Valley	70% (+2pp)
Neath	72% (+1pp)

Source: Ofcom analysis of MNO predictions (September 2023).

4G premises coverage

Outdoor premises 4G coverage

Individual MNOs continue to provide a high level of 4G coverage outside of premises in Wales, with coverage ranging between 96-99% of premises. In addition, 94% of premises have outdoor 4G coverage from all four operators, compared with 98% across the UK. A comparison between Wales and other UK nations is provided in Table 3.10.

Table 3.10: Outdoor premises 4G coverage by UK nation (all operators)

Nation	Total
Wales	94%
England	99%
Northern Ireland	96%

Nation	Total
Scotland	97%
UK	**98%**

Source: Ofcom analysis of MNO predictions (September 2023).

Substantive differences remain between levels of urban and rural outdoor premises coverage in Wales. Individual operators' 4G coverage outside rural premises ranges from 88-96%, steady with 2022 coverage levels. A breakdown of coverage by MNO is provided in Table 3.11. Individual operators each provide outside coverage of 98-99%+ of urban premises in Wales.

Table 3.11: Outdoor premises 4G coverage in rural Wales (by operator)

MNO	% of rural premises with outdoor 4G coverage
BT/EE	96%
Three	88%
Virgin Media O2	90%
Vodafone	90%

Source: Ofcom analysis of MNO predictions (September 2023).

Outdoor premises voice coverage

In line with previous years' analyses, around 98% of premises in Wales have voice coverage outside from all four MNOs. This drops to 92% for premises in rural Wales, with no change since 2022. Again, almost every premises in Wales (whether urban or rural) has outdoor voice coverage from at least one MNO.

Indoor premises 4G coverage

A number of factors affect the coverage people receive indoors, including: the thickness of walls, building materials, and where in a building people are using their phone.[35] As a result, some premises may see differences between operators' predicted indoor coverage data and the actual coverage experience.[36]

Table 3.12 below outlines that indoor 4G coverage from all MNOs is 76% in Wales, third among the four nations. 76% of premises in Wales can receive 4G coverage indoors from all four operators, with no change from 2022. Table 3.13 shows that individual MNO coverage ranges between 86% and 94% of all premises in Wales (no change on 2022).

[35] Ofcom's Mobile Coverage Checker provides information on the likelihood of there being indoor coverage in buildings at different locations and explains more about the factors that affect mobile signal indoors.
[36] Ofcom determines indoor coverage by applying an average building entry loss of 10dB across buildings. We acknowledge this approach provides only a simplified view of indoor coverage and that the real experience depends heavily on the types of building material and insulation in a specific building.

Table 3.12: Indoor premises 4G coverage by UK nation (all operators)

Nation	Total
Wales	76%
England	87%
Northern Ireland	73%
Scotland	86%
UK	**86%**

Source: Ofcom analysis of MNO predictions (September 2023).

Table 3.13: Indoor premises 4G coverage in Wales (by operator)

MNO	% of rural premises with outdoor 4G coverage
BT/EE	94%
Three	86%
Virgin Media O2	90%
Vodafone	90%

Source: Ofcom analysis of MNO predictions (September 2023).

Table 3.14 below shows that, in rural Wales, indoor premises 4G coverage from individual MNOs ranges between 68% and 82% (compared to 68% and 81%, respectively, in 2022). Indoor 4G coverage from all four MNOs is available in 46% of premises in rural Wales (up from 45% in 2022 and continuing the recent trend).

Table 3.14: Indoor premises 4G coverage in rural Wales (by operator)

MNO	% of rural premises with indoor 4G coverage (2022)	% of rural premises with indoor 4G coverage (2023)
BT/EE	81%	82%
Three	68%	68%
Virgin Media O2	75%	73%
Vodafone	68%	70%

Source: Ofcom analysis of MNO predictions (September 2023).

In urban areas of Wales, 85% of premises can access a 4G service indoors from all four MNOs. Meanwhile, 4G coverage is available from at least one MNO in 94% of rural premises and to 99%+ in urban areas.

Indoor premises voice coverage

Mobile voice services from all four MNOs remain available to 90% of indoor premises in Wales. Again, urban areas of Wales are better served with 96% (unchanged from 2022) indoor coverage, compared to 71% (unchanged from 2022) in rural areas. However, almost every premises in Wales whether urban or rural has indoor voice coverage from at least one operator.

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

MNOs have continued with the programme of work towards their obligations to provide 4G coverage across 88% of the UK landmass (to be achieved by the end of June 2024). In total MNOs have now deployed more than 190 new sites across the UK since 2020 to meet their SRN targets, with 35 new sites added this year. They have also upgraded thousands of sites with a combination of additional spectrum and higher operating power.[37] Three of the four MNOs have added in the region of one percentage point of landmass coverage in the last year, and individual MNOs' 4G geographic coverage now stands as: BT/EE (87.5%), Vodafone (83.3%), Virgin Media O2 (81.7%), and Three (80.5%).[38] As a result, 4G coverage from at least one MNO has reached 92.7%.

Three MNOs still have substantial progress to make to meet their obligations in the coming months. We note reports that three MNOs have approached the UK Government to ask for an extension to their 2024 deadline. However, we continue to prepare to assess MNO compliance with the 88% threshold and associated nations obligations in summer 2024.

Table 3:15: Total not spots across UK nations

Total not spots	May-22	Sep-22	Jan-23	Apr-23	Sep-23
England	2%	2%	2%	2%	2%
Northern Ireland	3%	3%	3%	3%	3%
Scotland	17%	17%	17%	16%	16%
Wales	10%	10%	9%	9%	9%
UK	8%	8%	8%	7%	7%

Source: Ofcom analysis of MNO predictions (September 2023).

The UK Government-funded elements of the SRN - which are focused on 'total not spot' areas and due to complete in early 2027 - are also progressing.[39] Digital Mobile Spectrum Limited (DMSL) is managing the programme and continuing to advance the required procurements which will underpin this. The MNOs and their suppliers are currently establishing where masts should go to deliver the best coverage by carrying out site suitability surveys. The first TNS planning application

[37] By higher operating powers we mean bringing the transmit power of the site (which can impact both coverage and capacity) nearer to the limits authorised in operator's spectrum licences.
[38] Note that we are providing MNO coverage levels here to one decimal place, given the relevance of this greater granularity to understanding progress against SRN commitments, and that some of these coverage increases are not apparent where we are reporting to the nearest whole number elsewhere in this report.
[39] A 'total not spot' is a geographic area not covered by any MNO.

has been approved for a mast on South Uist in the Western Isles, with more applications starting to be lodged.

The process of enabling sharing of the Home Office Emergency Services Network's Extended Area Service (EAS) masts is also progressing, with 154 masts put into design & planning by Building Digital UK (BDUK).[40] 50 sites are now fully upgraded, making them structurally suitable for the SRN Programme. In May, BDUK announced that the first EAS mast upgrade for SRN was activated in Lockerbie, Scotland. Collaborative work continues between BDUK, the Home Office, DMSL and the MNOs to make further EAS sites fully available in 2024.

In Wales, coverage from all four operators is forecast to rise to a minimum of 80%, up from 60%. Coverage from at least one operator will increase from 90% to 95% by the end of the programme. The uplift in Wales is illustrated in the table below per Senedd Constituency.

Table 3.16: Forecasted improvements in 4G coverage from all MNOs/ at least one MNO across Senedd Cymru regions as a result of the SRN

	4G coverage from all MNOs		4G coverage from at least one MNO	
Senedd Cymru region	**Pre-SRN**	**Forecast post-SRN**	**Pre-SRN**	**Forecast post-SRN**
Mid & West Wales	51%	78%	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: Forecast coverage improvements - Shared Rural Network (srn.org.uk).

The 3G switch-off has begun and plans for switching off the remaining 3G networks are underway

All MNOs have committed to switching off their 2G and 3G networks by 2033 at the latest, which will result in improved network efficiency and enable more spectrum to be used for faster 4G and 5G services. The MNOs are continuing to develop their own switch off timetables for these legacy technologies and this year saw the initial stages of 3G retirement ahead of national 3G switch-off.

- Vodafone became the first network to switch off some of its 3G services, starting in Basingstoke and Plymouth in March 2023, followed by Glasgow, Hull and Oxford in July 2023. It expects to complete its switch-off in early 2024.
- BT/EE piloted its 3G switch-off in Warrington in July 2023 and is planning to switch off its national 3G network in early 2024, starting in January. BT/EE stated that there were no customer complaints following its Warrington trial.

[40] BDUK is an executive agency sponsored by the Department for Science, Innovation and Technology.

- Three expects to complete its 3G switch-off by the end of 2024.
- Virgin Media O2 plans to switch off 3G services in 2025.

Vodafone, BT/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. Three does not operate a 2G service.

Numbers are decreasing, but there is still a residual level of ongoing 2G and 3G usage

Our latest estimates suggest that there are 2.4 million devices reliant on 2G or 3G networks. Over the last year, the number of these devices has, across the four MNOs, fallen sharply from between 5-6 million in the previous year.[41] Of the 2.4 million total, just over half a million are residential customers with a 3G device. Less than 3% of all mobile data traffic is now carried on the 3G networks, with 3G data traffic having decreased by an average of 44% year on year.[42]

Although 3G is being switched off over the next two years, customers with a 3G device will still be able to use the 2G network for voice calls and texts, and many devices are able to access the internet through a WiFi connection. Ultimately, these older devices will need to be upgraded or replaced, given the last 3G network is expected to switch off in 2025. Similarly, this will also apply to 2G devices as 2G is subsequently switched off in the years to come.

As Three does not operate a 2G service, it is particularly important for their customers using 3G devices to upgrade, so that they can continue to use voice and data services, as they will only be able to make emergency calls from their 3G device once Three switches off its 3G services.

Careful customer management and support will be necessary, particularly for vulnerable customers

Although the decision, timings, and process for switching off 3G and 2G is being led by the MNOs, we do have a clear role in ensuring that consumers are treated fairly and can continue to access the services they need.

In February 2023, we published a document setting out our expectations of mobile providers during the switch off process. This includes an expectation that MNOs minimise the impact of switch-off, so that customers experience the same level of coverage as before 3G and 2G switch-off.[43]

We also highlighted the importance of mobile operators contacting affected customers with sufficient notice, and providing advice to them on the steps they need to take to continue to use their mobile service. Vulnerable customers, and particularly those struggling financially, will need to be given additional support, and we continue to work with mobile operators to ensure that this support is in place.

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[41] The indicative range of 5 million to 6 million is to reflect the slight changes to reporting methodologies which make it difficult to do a direct comparison between the 2.4 million and the 5.5 million reported in the previous year.

[42] The 2.4 million devices figure includes 3G and 2G devices, both residential and business. Some customers with 4G/5G devices will also require VoLTE activation to continue using voice services once 3G is switched off.

[43] BT/EE, Three and Vodafone made it clear to us that they plan to offer broadly the same level of coverage via their 4G networks as they currently offer via 2G and 3G. Once its plans have progressed, we expect VMO2 to offer a similar commitment (to ensure broadly similar coverage after switch-off).

We continue to raise awareness through our communications and in 2023 have updated our consumer guidance to help explain what 3G and 2G switch-off means to consumers. We also work with consumer groups to help promote awareness and to help ensure any disruption is minimised.