Connected Nations 2025

Methodology Annex

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Section

A1 – Methodology

1. This annex explains our approach to obtaining and analysing information from providers for the purposes of our Connected Nations reporting.
2. The reports use data gathered from the providers listed in Section A2, as well as information already held by Ofcom.

Calculating the 'premise base'

3. This section explains how we identify, include, and categorise premises. In summary:
    - We use property information from Ordnance Survey's AddressBase® database including both Royal Mail postal addresses and additional property details from local authority sources. This ensures our 'premise base' is comprehensive and allows us to measure how network expansion is affecting all sections of the UK.
    - We consider the sub-properties within a building regardless of the number of postal delivery points serving them. This ensures our overall report, as well as our published maps and apps, better reflect coverage at individual premises across the UK and are consistent with coverage information from providers.
4. We use the AddressBase® Premium and Islands products to provide the base dataset used to assess broadband and mobile coverage for residential and commercial premises. For the annual Connected Nations 2025 reports, we used Epoch 119.[1]
5. AddressBase® includes information about 44 million addresses, properties, and land areas where services are provided, by combining three datasets:
    - Local Government National Land and Property Gazetteer (NLPG)
    - Ordnance Survey MasterMap address layer
    - Royal Mail Postal Address File (PAF)®
6. Each record in AddressBase® refers to a Basic Land and Property Unit (BLPU), defined in the British Standard for Addressing (BS7666) as "area of land in uniform property rights or, in the absence of such ownership evidence or where required for administration purposes, inferred from physical features, occupation or use".
7. Each BLPU has a Unique Property Reference Number (UPRN), a spatial reference and one or more Land and Property Identifiers.
8. We combine AddressBase® data with additional geographic classifications from the Office for National Statistics (ONS) National Statistics Postcode Lookup (2021 Census May 2025), and Urban and Rural categories derived from the Locale classification.

[1] https://docs.os.uk/os-downloads/addressing-and-location/addressbase-core-principles/release-notes

Method

9. Our approach to identifying the 'premise base' includes three stages:

    - Identifying 'Service delivery addresses': the address locations that are indicative of where a service would be provided.
    - Data cleansing: for use in reporting, the list of premises is linked to other attributes to identify statistical or administrative geographic units, or rurality categories. Timing of data may impact on how many records may be linked.
    - Reporting definition: the inclusion of all records based on premises classification or status may change dependent on the specific focus of a report.

10. A 'Service delivery address' can be defined as a premises that meets the following three requirements:

    - Is able to receive mail either directly or indirectly (via a parent, sibling or holding address)
    - Is not a 'parent-shell',[2] and
    - Does not have a parent address or the parent address is classified as a 'parent-shell'.[3]

11. The following source tables are used to identify the UPRNs that will be included in our analysis:

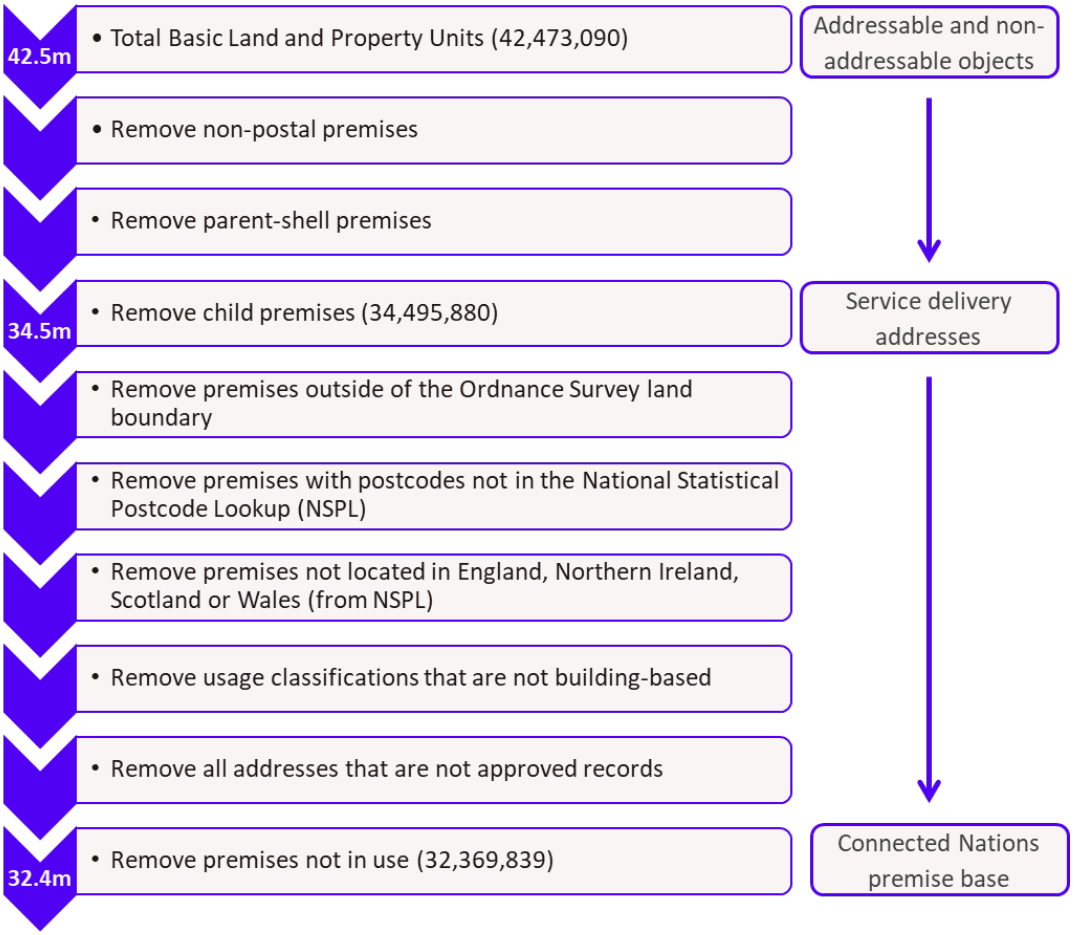
    - [AB BLPU Table] AddressBase® Basic Land and Parcel Unit Table
    - [AB Classification Table] AddressBase® Classification Table
    - [NSPL Postcode Table] National Statistics Postcode Lookup Table

12. Figure 1 shows the conceptual steps used to build the premise base.

[2] A building or site that acts solely as a container for multiple individual premises, with services provided to the individual units. For example, a block of residential flats, where each household buys its own services. Although the block will have an address, it does not represent a household or business that a service would be provided to.

[3] In the Methodology Annex of our Connected Nations 2019 report we provided a number of examples of how a 'Service delivery address' is defined, including an example of a parent-shell (see paragraphs A1.18 – A1.21) .

Figure 1: Conceptual steps to calculating the premise base (Epoch 119 counts)



13. The following SQL code is used to construct the premise base. A separate process is undertaken to link provider data to individual addresses.

```
SELECT
	* -- all fields
FROM
	[AB BLPU Table] b
	LEFT JOIN [NSPL Postcode Table] n ON UPPER(replace(b.postcode_locator,' ','')) =
UPPER(n.postcode) -- join to NSPL on postcode
	LEFT JOIN [NSPL Country Table] nc using (ctry) -- join to the country lookup
	LEFT JOIN [AB Classification Table] c ON b.uprn = c.uprn --join to classifications on
uprn
	LEFT JOIN [AB Classification Table] cp ON b.parent_uprn = cp.uprn --join to
classifications on parent_uprn
WHERE
	b.addressbase_postal IN ('D','C','L') -- is an addressable object (postal address)
AND
	left(c.classification_code,1) != 'P' --not a parent shell
AND
	(
	b.parent_uprn is null --does not have a parent
```

```
        OR
        left(cp.classification_code,1) = 'P' --has a parent, but that parent is a parent-shell
        )
AND
        b.country !='J' --uprn is within Ordnance Survey Land Boundary
AND
        n.postcode is not null --postcode exists in NSPL
AND
        UPPER(nc.country_name) IN ('ENGLAND', 'NI', 'SCOTLAND', 'WALES') --UPRN in
Eng,NI,Scot,Wal (excludes Channel Islands and Isle of Man)
AND
        (
        left(c.classification_code,1)='C' -- Commercial
        OR left(c.classification_code,1)='R' -- Residential
        OR left(c.classification_code,1)='X' -- Dual Use
        OR left(c.classification_code,2)='ZS' -- Object of Interest->Stately Home
        OR left(c.classification_code,2)='ZW' -- Object of Interest->Place of Worship
        OR c.classification_code = 'OR04' -- Additional Mail / Packet Addressee
        )
AND
        b.logical_status = 1 --approved addresses only
AND
        (
        b.blpu_state IS NULL
        OR
        b.blpu_state = 2
        ) --in use premises
```

Data matching for fixed coverage

14. Collecting address-level coverage data allows us to create a comprehensive dataset with the availability of fixed broadband services, including access technologies and predicted speeds, for premises across the UK. Most providers give us UPRNs, whereas others provide address information that we try to match against a UPRN.

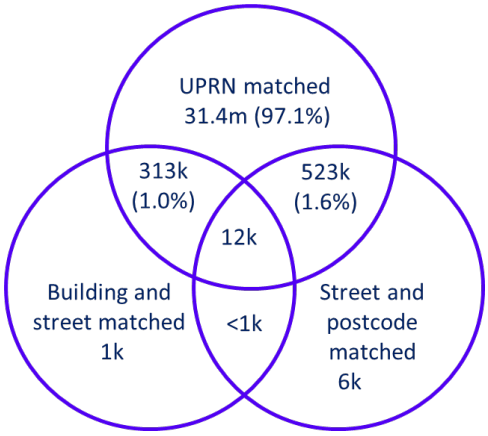
15. For Connected Nations 2025 we received over 124 million records on fixed broadband availability at individual premises. Almost all premises (99.7%) in our uniquely identified premise base, which forms the basis of our reporting on fixed coverage, could be matched to at least one provider using the UPRN or building address reference.

16. Our approach to address matching involves comparing records using:

    - Direct matches based on the UPRN hierarchy
    - Confident matches using addresses that have an identified building number or name, street address and postcode, and
    - Approximate matches using addresses that have a street address and postcode.

17. Figure 2 shows that 31.4 million premises (97.1%) were matched to provider records using only the UPRN. Some premises were matched to multiple records using different methods, but 99.7% of the premise base could be matched against at least one record using the UPRN. Just over 7,000 premises were matched using address information only.

Figure 2: Address matching of fixed network provider records to the July 2025 premise base



18. Of the remaining 91,000 (0.3%) of premises not initially matched by UPRN or building address information, nearly 10,000 could be subsequently linked to a property via the UPRN parent-child relationship, leaving a net total of just over 81,000 premises in the July 2025 premise base where no confident match could be used.

19. Across the 124.5 million records received from all fixed network providers, 184,000 records (0.15%) could only be matched to a postcode and 9,000 could not be assigned to any geographic location. These records have not been used in our analysis.

20. As the number of unused records is small, and provider overlaps reduce the number of premises for which no information is available to less than 0.3% of the premise base, we have not used any postcode-based estimates to ensure that we are reporting as accurately as possible at the address level.

Fixed broadband networks

Coverage

21. Our data on fixed coverage was collected from 52 network providers (see Section A2). Providers were asked to submit information for all premises where an end-user could order a fixed broadband service on their network, including access technologies available and predictions of download and upload speeds, with a reference date of 1 July 2025.

22. For full fibre availability, providers were asked to only include premises for which:

    - Fibre is deployed in close proximity, so only a dedicated fibre connection to the premises would be necessary to provide full-fibre connectivity to the local exchange or access node, and
    - The end user would expect to pay only a published pre-agreed connection charge, if one was to be imposed.

23. Fixed broadband availability is calculated against the Connected Nations premise base discussed above. The premise base for July 2025 consists of 32.4 million premises, of which

30.3 million are classified as residential, and was derived from the AddressBase® Premium and Islands Epoch 119 products.

24. The AddressBase® data was combined with additional geographic classifications from the ONS 2021 Census National Statistics Postcode Lookup from May 2025, and Urban and Rural categories derived from the Locale classification.

25. In our reporting on fixed broadband coverage, we normally focus on coverage figures for residential properties. We will also highlight distinctions between residential and commercial premises where appropriate.

Calculating availability

26. For our reporting on available broadband speeds, we use the maximum predicted download speed available from any provider covering a premises:

    - Since the first Connected Nations report in 2011, we have tracked the progress of superfast broadband rollout. We use 30 Mbit/s download speeds as the threshold for defining superfast services.
    - Since 2021 we have reported on the availability of gigabit-capable networks, which can deliver download speeds of 1 Gbit/s.

27. We also monitor the proportion of premises that do not have access to a decent broadband service, defined as a service capable of delivering a download speed of at least 10 Mbit/s and an upload speed of 1 Mbit/s. Our reporting also includes premises that could not be matched to any provider record.

Coverage for business enterprises

28. Where we report on the availability of broadband services for small and medium enterprises (SMEs), we have used an address match process to link our Connected Nations premise base to a business classification system, the Dun and Bradstreet Business Universe. This dataset provides over 3.9 million records across classes of business, including agricultural, construction, financial, food, clothing, footwear, hotels, restaurants, pubs, local service, manufacturer, recreation, cultural, sporting activity, transport, motor, fuel, and wholesale business locations. The dataset is used subject to the following attributions:

    - © Dun & Bradstreet Inc., 2025. All Rights Reserved
    - © Crown copyright. All rights reserved. Licence number 10002057
    - © CACI 2025

29. We linked nearly 3.3 million records (84%) from this dataset using building, or street, and postcode identification to records in the AddressBase® Premium and Islands Epoch 119 products to identify the UPRN for each business record. A further 550,000 records (14%) could only be matched to postcodes, and just under 100,000 records (2.5%) could not be matched.

30. Due to the reliance on building, or street, and postcode identification, there is ambiguity in the matching process. We undertook further analysis to remove business records where we were not confident in the matching result. Finally, we constrained the analysis to the 2.5 million records that were within our Connected Nations premise base.

31. The definition of SMEs is based on the number of employees at the specific site. The categories of SME are:

- Micro: Sole trader or fewer than 10 employees.
- Small: 10 to fewer than 50 employees.
- Medium: 50 to fewer than 250 employees.

32. It should be noted that for Connected Nations we only collect data on the availability of broadband products. Many businesses, particularly medium-sized ones, will be able to get good connectivity via dedicated leased lines, which are not included in our coverage data.

Fixed broadband services: take-up, line speeds, and data usage

33. We collected data from 57 fixed network and internet service providers (ISPs) on their active lines, i.e. connections that provide an active broadband service to residential or business customers, as a snapshot for July 2025. We asked for information per connection, including upload and download speeds, for both retail services and services provided to other ISPs as a wholesale service.

Estimating take-up

34. Take-up is estimated from the reported active lines against the coverage data from July 2025 to ensure consistency. Table 2.5 in the main Connected Nations report was derived by examining all premises with a full-fibre broadband service in July 2025 and identifying when full fibre was first reported to us as being available to the property.

Measured line speeds

35. We asked providers to submit the maximum download and upload speed recorded on each line and, for all technologies other than full fibre, the average download and upload speed recorded as well. Speeds could be as measured or, when no measurements were available, as configured for the broadband service.

36. For consistency across technologies, our analysis of active broadband speeds is based on the per-line maximum download and upload as reported by the ISPs. Note that reports before 2024 used average line speeds, hence those figures are not directly comparable with the ones provided from 2024 onwards.

37. Only lines that could be assigned to a geographic location at postcode level and with a reported speed greater than zero were used in the analysis. These criteria were met by 18 million records out of c.26.5 million lines reported to us. Calculation of average speeds uses the data meeting the criteria, which is then weighted to reflect the actual number of active lines (as reported).

Data usage

38. Our estimates of the average monthly data usage per customer connection (across all technologies and for full fibre only) are based on aggregated data traffic measured at the Optical Line Terminal (OLT) or headend. In addition to the volumes of data uploaded and downloaded over July 2025, we gathered information on the number of connected lines for each OLT or headend to derive the average usage per connection.

39. Until 2024, we collected data usage on a per line basis, hence the monthly averages reported this year are not directly comparable with those in Connected Nations reports prior to 2024.

40. We also asked the providers for the location of their OLTs and/or headends. Our estimates of average data usage at nation and local authority level are derived from the data usage measured at the OLTs and/or headends in the relevant location.

Fixed Wireless Access

41. Fixed Wireless Access (FWA) services can be provided on a mobile network by Mobile Network Operators (MNOs), where the capacity is shared with mobile users, or on a dedicated wireless network by Wireless Internet Service Providers (WISPs).
42. We asked both MNOs and WISPs for a list of the properties that could be served with FWA by their network without the installation of new access points, and to specify whether this service is at least a decent broadband service. Our statement on Delivering the Broadband Universal Service explains our research on how FWA can deliver a decent broadband service.[4]
43. Our analysis of FWA coverage uses data based on the providers' modelling of their network as of July 2025. The MNOs and WISPs included in our analysis are listed in Section A2.
44. The data from both MNOs and WISPs was matched against the same premise base used for fixed broadband coverage.

Satellite coverage

45. Our analysis of satellite coverage in the UK is currently limited to a single provider that offers Low Earth Orbit (LEO) satellite broadband services directly to consumers.
46. LEO satellite constellations have the capacity to deliver coverage and broadband services to all parts of the UK. We have focused our analysis on the take-up of these services and their geographic distribution.
47. We have mapped geographical coordinates of customer premises equipment (latitude and longitude) to the nearest UPRN and compared these locations against other network technologies that are available at those locations.

Fixed voice services

48. We also gathered supplemental data from seven of the largest providers of fixed voice services to assess changes to the take-up and delivery of these services in the 12 months up to 1 July 2025.
49. We asked the providers to share a breakdown of the technology used to delivery voice services to residential customers with a collection date of 1 July 2025.
50. We also asked about the number of residential customers that migrated from a PSTN-based voice service to a Voice over Broadband service in the 12 months up to the collection date, and the number of customers that had moved to a broadband-only service during the same period.
51. Finally, we asked for a breakdown of the number of residential customers that had taken a Voice over Broadband service with respect to those that were new customers to the

[4] See paragraphs 3.29-3.42.

provider, existing customers that had initiated the change (for example, through a service or package upgrade) and those for which the change was initiated by the provider.

Mobile

Coverage

52. Our data on the coverage of mobile networks was collected from the four MNOs (BT/EE, Three, Virgin Media O2 and Vodafone)[5] as 100m x 100m pixels referenced against the Ordnance Survey Great Britain (OSGB) grid system.[6] Coverage for all networks was as of 1 July 2025.

53. Premises coverage is calculated against the Connected Nations premise base for July 2025, derived from AddressBase® Premium and Islands Epoch 119 as discussed at the beginning of this annex.

54. AddressBase® data was combined with additional geographic classifications from the ONS 2021 Census National Statistics Postcode Lookup from May 2025, and Urban and Rural categories derived from the Locale classification.

55. Roads data is taken from Ordnance Survey and Northern Ireland Land & Property Services open data sources.

56. We apply technology-specific thresholds to each 100m x 100m pixel to determine whether a sufficiently strong signal is available to successfully make a phone call or send or receive data. These pixels are aggregated to provide an estimate of either the landmass or the number of premises that are covered by the corresponding mobile technology.

57. In 2018 measurement work was undertaken by Ofcom to identify the minimum coverage level (the technology-specific threshold) required to deliver a good quality of experience to consumers on the 4G network. We also identified minimum coverage levels for 2G and 3G networks, which allows us to present a consistent view of coverage on all these networks to consumers.

58. For 2G, 3G and 4G networks, we define coverage based on the minimum signal strength required to deliver at least a 98% probability of making a 90-second voice call successfully. In the case of 4G specifically, our definition also reflects at least a 95% chance of getting a download speed of at least 2 Mbit/s. We use the signal strength thresholds shown in Table 1 when estimating coverage.

[5] We note that, at the time the information request was issued, the merger between Vodafone and Three UK had only recently been completed. Consequently, the two operators submitted separate datasets for coverage prediction and all other inputs required for the 2025 reporting period.

[6] https://www.ordnancesurvey.co.uk/documents/resources/guide-coordinate-systems-great-britain.pdf

Table 1: Mobile signal strength thresholds

Service		Metric[7]	Outdoor	Indoor and in-car[8]
2G		RxLev	-81dBm	-71dBm
3G		RSCP CPiCH	-100dBm	-90dBm
4G		RSRP	-105dBm	-95dBm
Voice	**2G**	RxLev	-81dBm	-71dBm
	3G	RSCP CPiCH	-100dBm	-90dBm
	4G	RSRP	-105dBm	-95dBm
5G and 5G SA High Confidence		SS-RSRP	-110dBm	N/A
5G and 5G SA Very High Confidence		SS-RSRP	-100dbm	N/A

59. For 5G networks, including 5G SA, we define availability of coverage based on the minimum signal strength (SS-RSRP) required for devices to establish a reliable 5G connection. This definition supports a reporting framework suitable for different variants of 5G in low, mid, and high frequency bands, without inferring a typical service or performance (although where a reliable connection is established, we would expect core data services to be supported, subject to available capacity).

60. We provide a view of outdoor 5G and 5G SA coverage availability across a range that provides increasing confidence of a reliable 5G connection, from High Confidence (where a signal strength of -110dBm or better is predicted) to Very High Confidence (where a signal strength of -100dBm or better is predicted). We associate the High Confidence level with at least an 80% probability of coverage being present in the predicted location, and the Very High Confidence level with a probability of around 95%.

61. Noting that the MNOs supply predictions to Ofcom based on a 50% confidence level across a pixel, to establish these higher confidence levels we have worked back from the on-the-ground thresholds typically used as the limit for maintaining a 5G connection. We have then accounted for the overall effectiveness of the MNOs' 5G predictions (prediction error statistics) and local level variability, as well factoring in the differences between handset performance. The consequential combined standard deviation across these effects, which

[7] **RxLev:** the Received Signal Level in 2G networks.
RSCP CPiCH: the Received Signal Code Power on the primary Common Pilot Channel for 3G networks.
RSRP: the Reference Signal Received Power in 4G networks.
SS-RSRP: the Synchronization Signal reference signal received power in 5G networks.

[8] 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.

we have taken to be in the region of 12dB, enabled us to establish signal strengths at which predictions supplied to us on a 50% reliability basis from a reasonable prediction model were likely to align with our High Confidence (-110dBm, 80% probability) and Very High Confidence (-100dBm, 95% probability) predictions of coverage in a given location.

62. We also provide some combined 4G and 5G coverage data based on the methodology used for Map Your Mobile, our new mobile coverage checker, which was launched in June 2025.[9]

Mobile prediction models

63. The mobile coverage figures provided in this report rely on the accuracy of coverage prediction data supplied by the MNOs.

64. We take the accuracy of the data supplied to us seriously given its importance to policy making and to ensuring people are well informed about available coverage. We will continue to monitor, through drive testing, the accuracy of all operators' coverage predictions.

65. We note that the MNOs continue to update and improve their prediction models, which is welcome. Ofcom will continue to engage and encourage operators to focus on an approach that provides consumers with confidence in coverage being reliably available where it is predicted.

Mobile data traffic

66. This data was collected in July 2025 and included information on the data volumes uploaded and downloaded in each cell in the four mobile networks. The geography of data traffic is defined by the location of the associated mobile cell base station.

Urban, suburban and rural classifications

67. We have used the Locale classification to identify premises and pixels as being in an urban or rural area. Locale is a third-party data source based on analysis of census output areas. Each output area is assigned to one of seven Locale Groups using a combination of Government conurbation definitions, population density at the output area and postcode sector levels, urban sprawl boundaries, Ordnance Survey roadmaps and additional visual inspection.

68. We assign the Locale classifications to either Urban or Rural as follows:

    - Urban: Groups A to E
    - Rural: Groups F and G

69. For our fixed broadband analysis, every premises is assigned to an output area via its postcode. The Locale classification of the output area determines the classification of the premises as Urban or Rural.

70. For mobile coverage analysis, each pixel is assigned to an output area through a spatial comparison of the pixel's OSGB coordinates to the corresponding output area polygon. The

[9] Ofcom, Map Your Mobile methodology – August 2025

Locale classification of the output area determines the classification of the pixel as Urban or Rural.

71. For mobile traffic and site deployment analysis, we assign one of three classifications to each site:

    - Urban: Groups A and B
    - Suburban: Groups C to E
    - Rural: Groups F and G

The output area in which the site is located determines the classification.

Geographic boundary changes

72. There have been no changes to Westminster or devolved parliamentary constituency boundaries since the publication of Connected Nations 2024.

73. Local authority boundaries have also remained the same. There are 361 local authorities in the UK: 296 in England, 11 in Northern Ireland, 32 in Scotland, and 18 in Wales.

A2 – Data collection from providers

Ofcom requested data from communications providers using our powers under section 135 of the Communications Act 2003 and regulation 17 of the Open Internet Access (EU Regulation) Regulations 2016.[10]

Fixed network and service providers

The data for fixed networks and fixed broadband and voice services was obtained, or continued to be used, from the following providers:

- 1310
- 4th Utility
- Airband
- AllPoints Fibre
- Ask4
- Atlas Communications
- B4RN
- Bogons
- Brsk
- BT
- CityFibre
- Community Fibre
- Connect Fibre
- Connexin
- Country Connect
- County Broadband
- F&W Networks
- FibreNest
- Fibrus
- Freedom Fibre
- Full Fibre
- Fusion Fibre Group
- G.Network
- Gigaclear
- Glide Business
- GoFibre
- Grayshott Gigabit
- Hampshire Broadband
- Highland Broadband Networks
- Hyperoptic
- ITS Technology Group
- KCOM
- LightSpeed Broadband
- MS3
- Michaelston y Fedw Internet
- Netomnia
- nexfibre
- OFNL
- Ogi
- Openreach
- Orbital Net
- PlatformX Communications
- Quickline Communications
- Sky
- TalkTalk Telecom
- Technological Services
- Telcom Infrastructure
- toob
- Trooli
- Truespeed
- Virgin Media O2
- Vodafone
- Voneus
- Wessex Internet
- WightFibre
- Wildanet
- Zen Internet
- Zzoomm[11]

[10] S.I. 2016/607.

[11] Full Fibre and Zzoomm are listed as separate entities as our request for information pre-dated the completion of their merger.

Fixed wireless access providers

The data for fixed wireless access networks was obtained, or continued to be used, from the following providers:

Wireless internet service providers

- Airband
- County Broadband
- Cromarty Firth Wireless
- GoFibre
- Highland Broadband Networks (including Highland Wireless & IT Solutions)
- Highland Community Broadband
- InTouch Systems
- IX Wireless
- Kencomp Internet
- Net1
- Orbital Net
- Quickline Communications
- Stix Internet
- Voneus
- Wildanet
- Wessex Internet

WISPs are removed from the list if we do not receive new data or confirmation that previous data remains unchanged.

Mobile network operators

- BT/EE
- Three
- Vodafone

Satellite providers

- Starlink

Mobile network operators

The following mobile network operators supplied data for use in this report:

- BT/EE
- Three
- Virgin Media O2
- Vodafone

Neutral host providers

The following neutral host providers supplied data for use in this report:

- Boldyn Networks UK
- Britannia Towers II
- Cellnex UK
- Cornerstone Telecommunications Infrastructure
- Freshwave Services
- IONX Networks
- Ontix
- Shared Access
- Wireless Infrastructure Group

A3 – Glossary

2G: Second generation of mobile telephony systems and the first digital mobile technology, launched in the UK in 1992. Uses digital transmission to support voice, very low-speed data communications, and short messaging services.

3G: Third generation of mobile systems, launched in the UK in 2003. Provides low-speed data transmission and supports multi-media applications such as video, audio and internet access, alongside conventional voice services.

4G: Fourth generation of mobile systems, launched in the UK in 2012. Designed to provide faster data download and upload speeds on mobile networks and can also support **VoIP** services.

5G: Fifth generation of mobile technology standards, launched in the UK in 2020 and used to deliver higher speed data services.

5G Standalone (5G SA): Standalone refers to a **5G** New Radio access network that operates independently of other technologies and connects to a **5G** network core.

Access network: An electronic communications network that provides the connection between an end-user home or business and the local exchange or access node. It is sometimes referred to as the 'local loop' or the 'last mile'.

All roads: Motorways, A and B roads.

Base station: The active equipment installed at a mobile transmitter site. The equipment installed determines the types of access technology that are used at that site.

Decent broadband over a fixed or fixed wireless connection: A broadband connection that provides a download speed of at least 10 Mbit/s and an upload speed of at least 1 Mbit/sand, in addition, has the following technical characteristics: (i) a contention ratio of no more than 50:1; (ii) latency which is capable of allowing the end user to make and receive voice calls effectively; and (iii) the capability to allow data usage of at least 100 GB a month.[12]

Fibre to the Cabinet (FTTC): A fixed access network technology that consists of a fibre optic cable from the exchange to a street cabinet, with copper cables used to connect the cabinet to the premises.

Fixed Wireless Access (FWA): A fixed broadband access technology that supports broadband services via a wireless network – either via a mobile network operator (**MNO**) or wireless internet service provider (**WISP**).

Full fibre, also known as Fibre to the Premises (FTTP): An access network structure in which an optical fibre runs all the way from customers' premises to the local exchange or access node.

Gigabit-capable broadband: A network connection to a customer's premises capable of delivering download speeds of 1 Gbit/s or more. In the UK, this is typically delivered over **FTTP** or hybrid fibre coaxial (**HFC**) cable networks.

Hybrid Fibre Coaxial (HFC) cable: An access network structure in which the optical fibre extends from a local hub to the street cabinet. The remaining part of the access network from the street cabinet to the end-user's premises is usually connected via coaxial cables.

[12] The Electronic Communications (Universal Service) (Broadband) Order 2018

Internet Protocol (IP): The packet data protocol used for routing and carrying data across the internet and similar networks.

Internet Service Provider (ISP): A company that provides end-users with access to the internet and other related services such as data storage and email.

Low Earth Orbit (LEO) satellites: Satellite constellations that orbit at below 2,000 km and deliver satellite communications services, including lower latency broadband.

Major roads: Motorways and A Roads.

Mobile Network Operator (MNO): A provider which owns a cellular mobile network.

Mobile not-spot: An area which is not covered by any mobile network.

Pre-Digital Phone Line (PDPL): BT has developed an interim solution, called a 'pre-digital phone line', for certain complex or difficult-to-migrate customers such as landline-only or critical national infrastructure customers. This will allow those customers to move off BT's **PSTN** without the need to install a broadband connection or change legacy equipment.

Public Switched Telephone Network (PSTN): The UK's legacy landline network.

Superfast broadband: A data service or connection that can deliver download speeds of at least 30 Mbit/s.

Universal Service Obligation (USO): In March 2018, the Government introduced legislation[13] for a broadband universal service obligation, to give homes and businesses the right to request a **decent** and affordable broadband connection.

Voice (mobile): Mobile voice services that are managed by the mobile network (as opposed to a third-party voice app on a handset). The criteria for the availability of mobile voice services are given in Table 1 in the Methodology section.

Voice over Internet Protocol (VoIP): A technology that allows users to send calls using either the public internet or private **IP** networks.

Wholesale services: Products and services made available to third party communications providers on a wholesale basis and which act as inputs to their services.

Wireless Internet Service Provider (WISP): Broadband service providers using a wireless link between a provider's mast site and an external antenna fixed to a customer's premises. These are dedicated networks for broadband customers only. These networks mostly use spectrum under licence exemption or light licence authorisation.

[13] The Electronic Communications (Universal Service) (Broadband) Order 2018