European Commission

Broadband Coverage in Europe 2022

Mapping progress towards the coverage objectives of the Digital Decade

FINAL REPORT

A study prepared for the European Commission
DG Communications Networks, Content & Technology
by:

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POINT topic

Digital Single Market

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Abstract

The Broadband Coverage in Europe study is designed to monitor the progress of EU Member States towards the gigabit coverage and 5G coverage targets as set out in the Digital Decade Policy programme – namely: 'Gigabit connectivity for all by 2030' and 'at least 5G in all populated areas'. This report covers thirty-one countries across Europe – the EU27, plus Norway, Iceland, Switzerland and the UK, and analyses the availability of eleven broadband technologies (DSL, VDSL, VDSL2 Vectoring, cable modem DOCSIS 3.0, DOCSIS 3.1, FTTP, FWA, LTE, 5G, 5G coverage on the 3.4–3.8 GHz spectrum band, and satellite) across each market, at national and rural levels. In addition, three combination categories indicating the availability of one or more forms of broadband connection are included in the study. These cover overall fixed broadband availability, next-generation access (NGA) availability and overall FTTP & DOCSIS 3.1 availability. Europe-wide overview, country comparisons and year-on-year trends are provided in this report. Additionally, broadband coverage developments in study countries are discussed in individual country chapters.

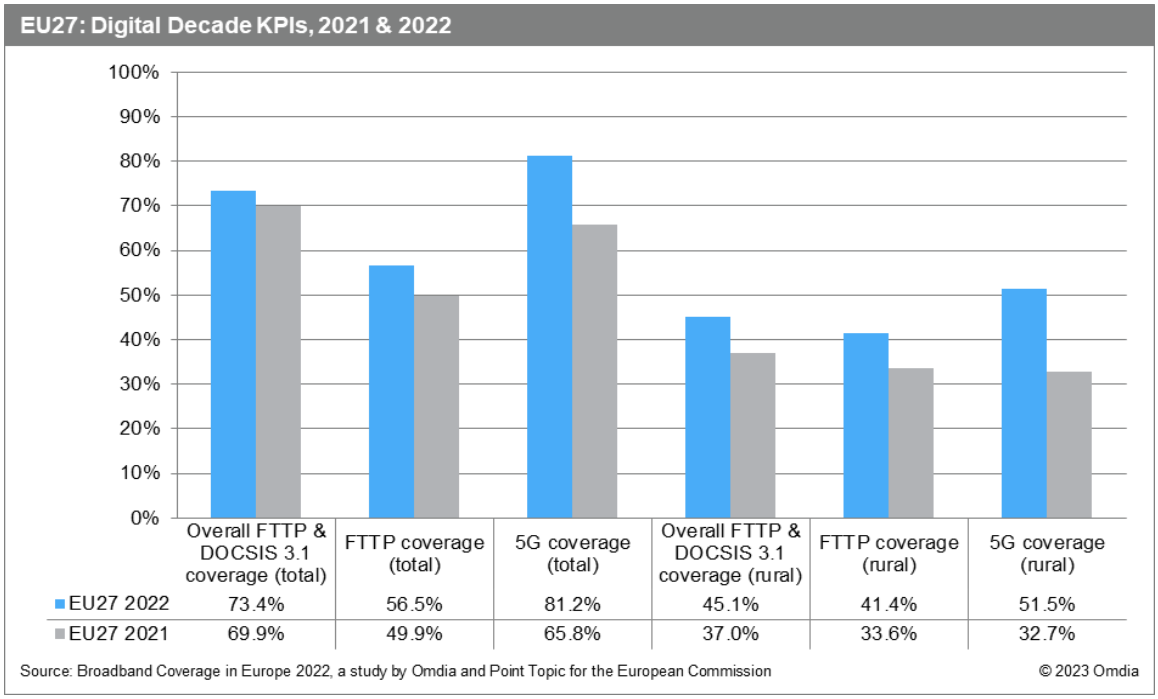
Préface

L'étude sur la Couverture Haut-Débit en Europe a été conçue pour suivre la progression des États membres de l'UE vers les objectifs de couverture en gigabits et en 5G définis dans le programme politique de la décennie numérique - à savoir : « connectivité gigabit pour tous d'ici à 2030 » et « au moins 5G dans toutes les zones peuplées ». Ce rapport étudie trente-et-un pays en Europe (l'UE-27 ainsi que la Norvège, l'Islande, la Suisse et le Royaume-Uni), et analyse la disponibilité de onze technologies haut débit (DSL, VDSL, VDSL2 Vectoring, modem câble DOCSIS 3.0, DOCSIS 3.1, FTTP, FWA, LTE, 5G, couverture 5G sur la bande de fréquences 3,4–3,8 GHz et satellite) sur chacun des marchés, à la fois au niveau national et dans les zones rurales. De plus, trois combinaisons indiquant la disponibilité d'une ou plusieurs formes de connexion haut débit sont incluses dans l'étude. Celles-ci comprennent la disponibilité globale du haut débit fixe, la disponibilité de l'Accès à une Nouvelle Génération (ANG) et la disponibilité globale des réseaux FTTP et DOCSIS 3.1. Ce rapport donne un aperçu de la situation à l'échelle européenne et fournit des comparaisons entre pays ainsi que les évolutions d'une année à l'autre. De plus, le développement de la couverture haut débit dans les différents pays étudiés est abordé de façon individuelle dans des chapitres dédiés.

Executive Summary

- The Broadband Coverage in Europe study is designed to monitor the progress of EU Member States towards the gigabit coverage and 5G coverage targets as set out in the Digital Decade Policy programme – namely: 'Gigabit connectivity for all by 2030' and 'at least 5G in all populated areas'. In 2022, DG CONNECT selected Omdia, in partnership with Point Topic to run the three-year project. The research team surveyed NRAs and telecommunications groups across each participating state to compile the requisite information. The current research team has conducted the broadband coverage study since 2016. In addition, Point Topic was the incumbent provider introducing the original research methodology in the period 2010–2012. The Omdia team, under the IHS Markit brand (in cooperation with VVA), delivered the study from 2013–2015 and adopted similar data collection and analysis methods to those implemented by Point Topic in order to ensure comparability of datasets for the purposes of time-series assessment.
- The collected data reflects the situation at the end of June 2022 compared to the situation at the end of June 2021. For the 2022 edition, the research team reviewed the technologies and combination coverage categories included in the study and upon discussion with DG CONNECT, excluded the 'Average LTE coverage' category as all countries were reporting universal or near-universal availability, and added a new metric to monitor the progress in roll out of 5G coverage on the 3.4–3.8 GHz spectrum band. Moreover, the definition of speed coverage has been changed to align with the BEREC definition of "expected peak download speed" as outlined in BEREC guidelines BoR (20) 42 and BoR (20) 165. Speed coverage data for previous years depicts actual achievable speeds.
- This report covers 31 countries across Europe – the EU27, plus Norway, Iceland, Switzerland, and the UK and analyses the availability of eleven broadband access technologies (DSL, VDSL, VDSL2 Vectoring, cable modem DOCSIS 3.0, cable modem DOCSIS 3.1, FTTP, FWA, LTE, 5G, 5G coverage on the 3.4–3.8 GHz spectrum band, and satellite) across each market, at national and rural levels. In addition, three combination categories indicating the availability of one or more forms of broadband coverage are also included in the study. These cover overall fixed broadband availability, next generation access (NGA) availability and overall FTTP & DOCSIS 3.1 availability.
- Following the completion of Brexit in 2020, the UK was kept among the study countries but was excluded from the EU totals calculations shown in this report. However, the accompanying data tool includes totals for both EU27 as well as EU28 for comparison purposes.
- In June 2023, the European Commission issued the Implementing Decision (EU) 2023/1353 setting out key performance indicators (KPIs) to measure the progress towards the digital targets of the Digital Decade Policy Programme 2030. Three of these KPIs are included in the Broadband Coverage in Europe study: (1.) Overall FTTP & DOCSIS 3.1 coverage measures gigabit connectivity of fixed Very High-Capacity Networks (VHCN), i.e., the technologies considered to currently be able to deliver gigabit connectivity, namely FTTP and cable DOCSIS 3.1; (2.) FTTP coverage is also considered separately when interpreting VHCN coverage data; and (3.) 5G coverage, which presently measures coverage of next-generation wireless high-speed networks with at least 5G equivalent performance in accordance with the principle of technology neutrality.[1]
- The Digital Decade target on gigabit connectivity is measured as the percentage of households covered by fixed Very High-Capacity Networks (VHCN). The technologies considered are those currently capable of supporting gigabit speeds, namely FTTP and cable DOCSIS 3.1. At the end of June 2022, 73.4% of EU homes were passed by either FTTP or cable DOCSIS 3.1 networks, i.e. those technologies currently capable of supporting gigabit speeds. Compared to mid-2021, combined coverage of FTTP & DOCSIS 3.1 networks grew significantly, increasing by 3.5 percentage points, representing a slow-down in growth compared with the previous study period. This can be attributed to a stagnation in the growth of DOCSIS 3.1 coverage following the completion of upgrades by a number of European cable operators, in the twelve months leading to the end of June 2022.
- Rural Overall FTTP & DOCSIS 3.1 coverage reached 45.1% of rural households, growing by 8.1 percentage points in the twelve months to mid-2022. In absolute terms, 13.9 million rural households across the EU were passed by either FTTP or DOCSIS 3.1 networks at the end of June 2022.

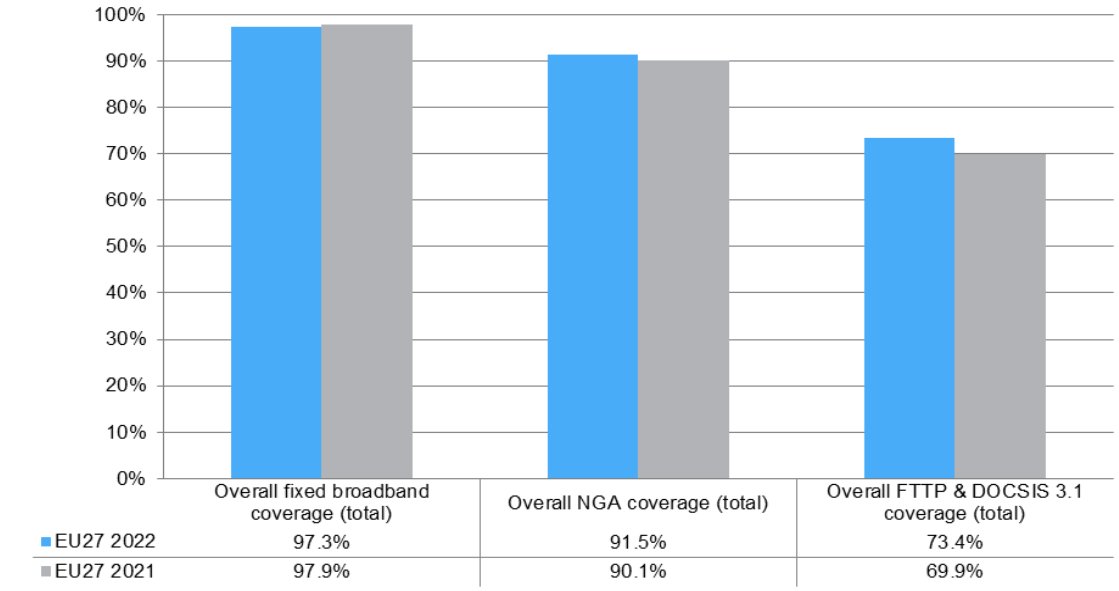
[1] For more details see COMMISSION IMPLEMENTING DECISION (EU) 2023/1353 of 30 June 2023 setting out key performance indicators to measure the progress towards the digital targets established by Article 4(1) of Decision (EU) 2022/2481 of the European Parliament and of the Council, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023D1353



- FTTP availability, identified by the European Commission as one of the Digital Decade KPIs, continued to grow at an increasing rate compared to previous years, rising by 6.6 percentage points to pass over half (56.5%) of EU homes at the end of June 2022. FTTP was the fastest growing broadband technology and for the first time FTTP coverage level took over that of VDSL.
- In the twelve months to the end of June 2022, FTTP coverage expanded more quickly than other fixed broadband technologies in rural areas. Rural FTTP availability increased by 7.8 percentage points, reaching four in ten rural EU households (41.4%). This significant increase indicates the increased focus of many European operators on deploying FTTP networks even in traditionally less profitable rural areas.
- 5G coverage, also highlighted as a Digital Decade KPI, made significant progress in the twelve months to mid-2022 and official data on 5G coverage is now available in most countries. Following a 15.4 percentage point increase compared to mid-2021, 5G services were available to 81.2% of EU households. This high coverage can be largely attributed to the use of dynamic spectrum sharing (DSS), which has been deployed by many leading European mobile network operators[2].
- While 5G deployments were initially focused on urban areas, in the twelve months to the end of June 2022 availability of 5G services in rural areas increased considerably thanks to the deployment of dynamic spectrum sharing (DSS), with more than half (51.5%) of rural households being able to connect to 5G networks in mid-2022.
- The collected data also shows that more than 185 million EU households (97.3%) had access to at least one of the main fixed broadband access technologies at the end of June 2022, a slight reduction in coverage compared to the end of June 2021.
- By mid-2022, the availability of Next Generation Access (NGA) services (VDSL, VDSL2 Vectoring, DOCSIS 3.0, DOCSIS 3.1 and FTTP) in the EU reached 91.5% of households. This equates to a 1.4 percentage point increase, or 1.25 million additional households, compared to the end of June 2021. In total, 174 million households had access to NGA services in mid-2022.

[2] The current KPI for the 5G target does not take into account the quality of service provided under peak time conditions. A key challenge is to ensure that the deployed networks respond to future needs, notably support key industry sectors and critical applications that will benefit consumers and businesses in all sectors. To measure Member States readiness to overcome this challenge, further examination is required to enhance and broaden the measurement framework for 5G.

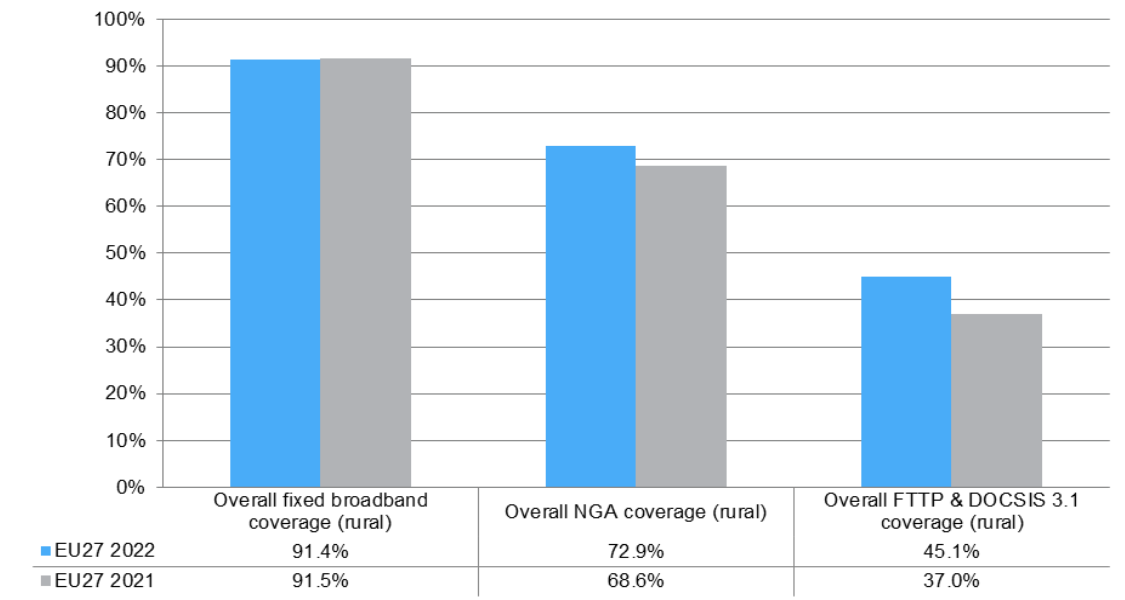
EU27: Coverage by technology combination, total, 2021 & 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission © 2023 Omdia

- Rural broadband coverage continued to be lower than national coverage across EU Member States. In mid-2022, 91.4% of rural EU homes were passed by at least one fixed broadband technology and more than seven in ten (72.9%) had access to high-speed next generation services. Rural NGA coverage growth slowed over the year, but still increased by 4.3 percentage points, equating to over 1.6 million additional rural households having access to NGA broadband services compared to the end of June 2021.

EU27: Coverage by technology combination, rural areas, 2021 & 2022

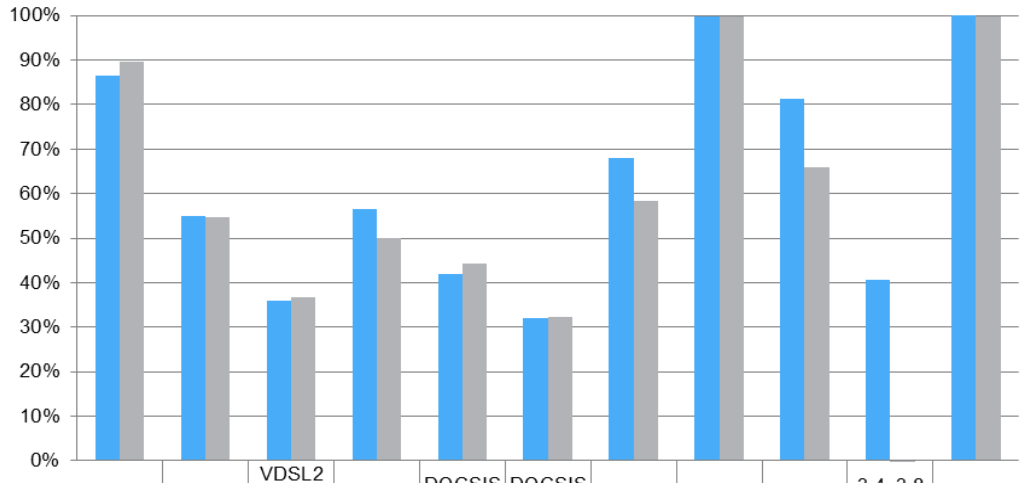


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission © 2023 Omdia

- In mid-2022, DSL remained the dominant fixed access technology in the EU27, passing 86.6% of homes. This equates to a decline of 2.9 percentage points compared to mid-2021, as new DSL deployments are limited and exceeded by total household growth. Moreover, in several countries legacy copper networks are being decommissioned and replaced by FTTP networks, thus further contributing to the decrease in DSL coverage.
- At the end of June 2022, VDSL services were available to 54.9% of EU households, a marginal increase of 0.2 percentage points during the twelve-month period. VDSL is no longer the most pervasive NGA technology in the EU27, having been overtaken by FTTP during the study period. VDSL coverage growth has plateaued since 2020 as operators have diverted investments towards more advanced technologies (especially FTTP) in pursuit of the Digital Decade targets.

- Availability of VDSL2 Vectoring reached over a third (35.9%) of EU households, a 0.9 percentage point decrease compared to mid-2021. This technology was tracked for the first time in 2019 to indicate coverage of higher-capacity bandwidth services offered via legacy copper networks and typically providing download speeds higher than 100Mbps.
- By mid-2022, 41.8% of EU households had access to high-speed cable broadband services and 31.9% of EU homes were passed by cable networks upgraded to the DOCSIS 3.1 standard, which is capable of delivering gigabit broadband connections. Cable DOCSIS 3.0 coverage decreased by 2.3 p.p. due to decommissioning in favour of FTTP in a number of study countries, while DOCSIS 3.1 coverage decreased slightly by 0.3 percentage points year-on-year.

EU27: Coverage by technology, total, 2021 & 2022

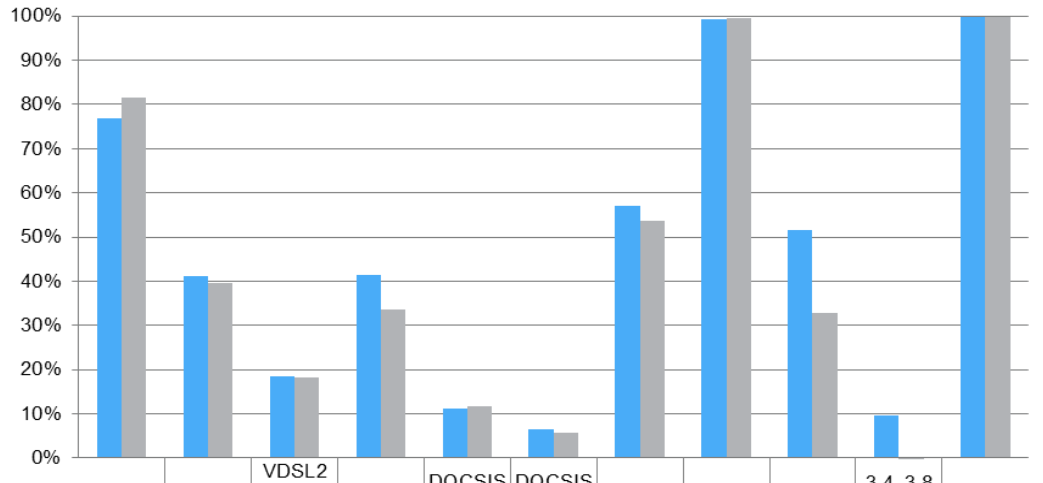


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
EU27 2022	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%
EU27 2021	89.5%	54.7%	36.8%	49.9%	44.2%	32.2%	58.2%	99.8%	65.8%	-	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- By the end of June 2022, nearly all EU households (99.8%) were covered by LTE mobile networks.
- 5G coverage on the 3.4–3.8 GHz spectrum band was analysed for the first time in this year's study, and coverage reached 40.7% of EU households as of June 2022, meaning that over half the overall 5G footprint has access to 5G networks capable of delivering high throughput.

EU27: Coverage by technology, rural areas, 2021 & 2022



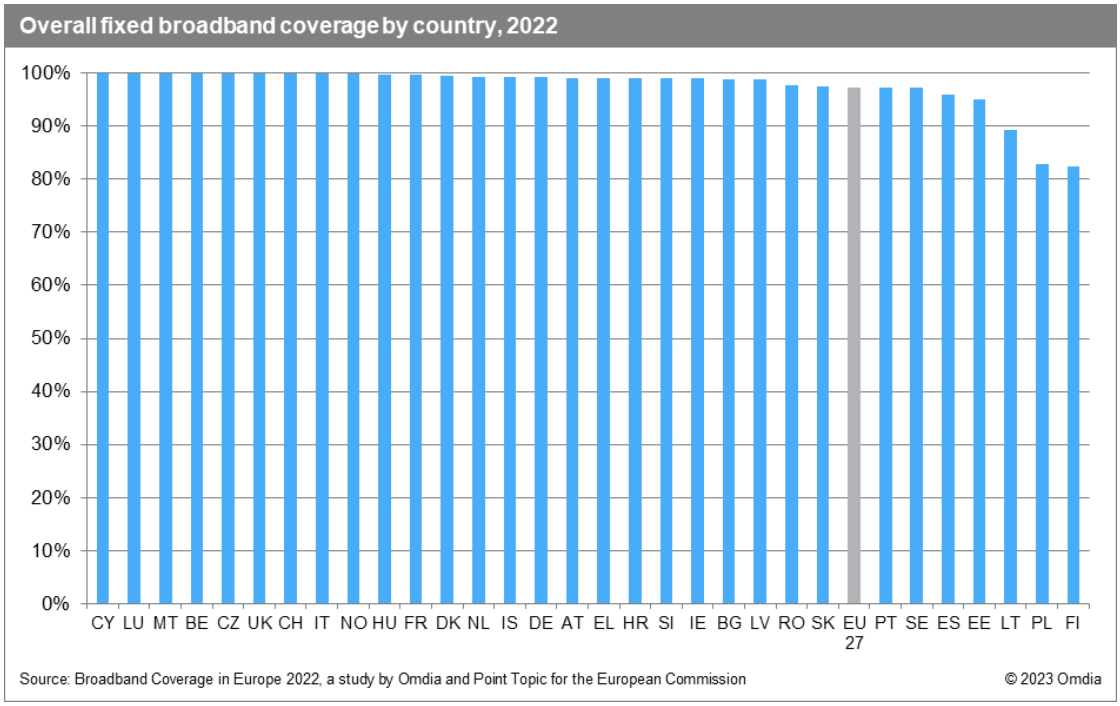
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
EU27 2022	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%
EU27 2021	81.6%	39.6%	18.1%	33.6%	11.6%	5.7%	53.6%	99.6%	32.7%	-	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

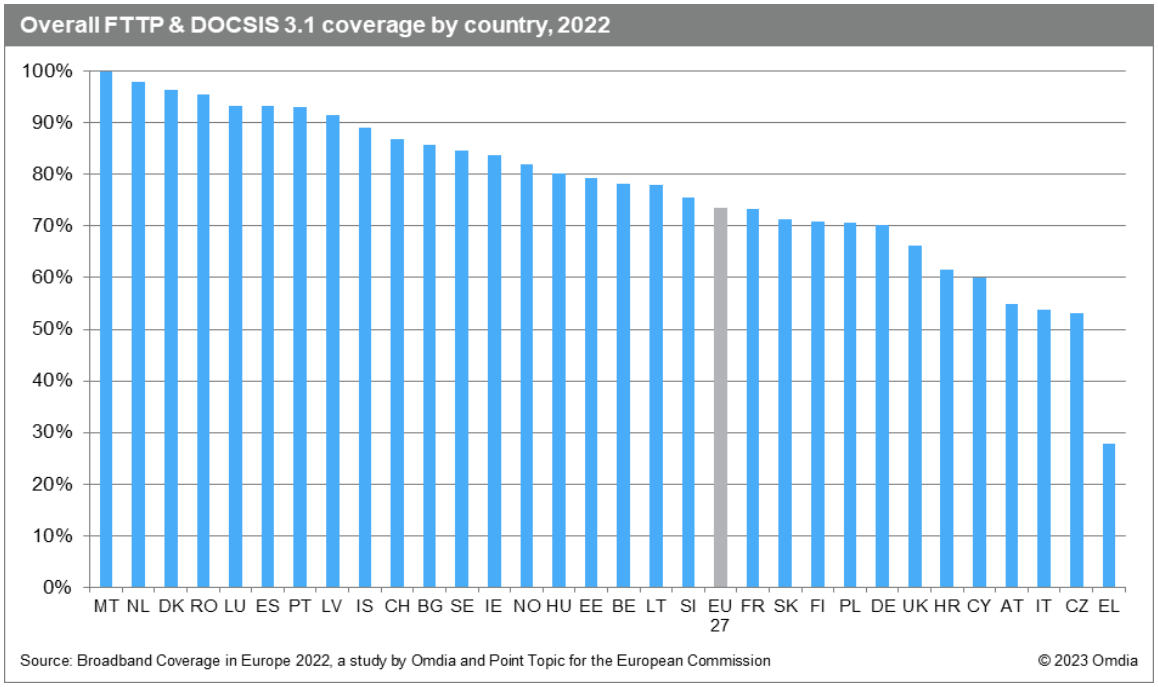
- Examining rural broadband coverage, there was a difference of 5.9 percentage points between the availability of fixed broadband services at a total level (97.3%) and at a rural level (91.4%). The gap

was much wider in terms of NGA technologies, as NGA networks passed 72.9% of rural EU homes, 18.6 percentage points lower than total NGA coverage. Nevertheless, the gap between rural and national coverage, for both fixed and NGA technologies, continues to narrow compared to previous editions of the study, supported by increasing investment in rural broadband.

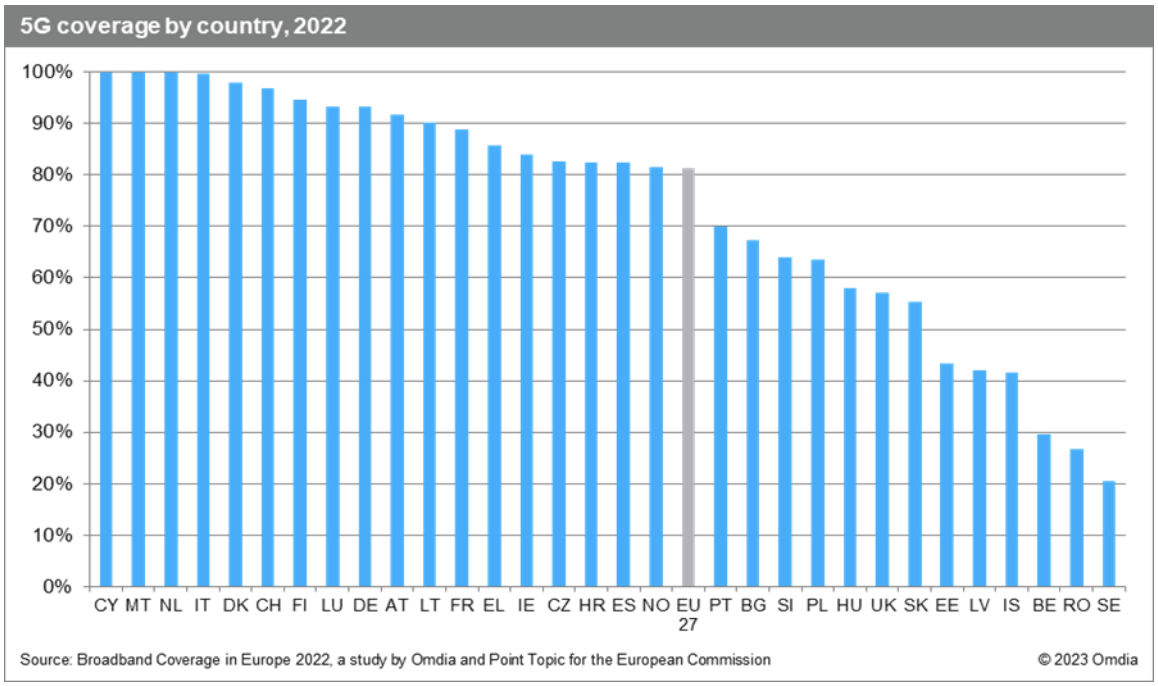
- Rural VDSL coverage continued to increase, albeit at a slower pace than that recorded in previous years. By mid-2022, rural VDSL coverage increased by 1.6 percentage points and reached 41.2% of rural EU households. Growth in rural VDSL services highlights the continued efforts of particularly incumbent operators to upgrade existing DSL networks in rural areas.
- Examining mobile broadband technologies, the availability of LTE networks in rural areas has reached saturation: 99.2% of rural EU homes were passed by at least one LTE network at the end of June 2022.
- Deployments of 5G coverage on the 3.4–3.8 GHz spectrum band have been primarily focussed on urban and sub-urban areas, because this spectrum band is less well-suited to rural coverage (due to the need for much higher base station density and near perfect line of sight) than lower-frequency bands such as the 700 MHz band. By June 2022, 5G coverage on the 3.4–3.8 GHz spectrum band was available to less than one in ten rural households in the EU (9.6%).
- Out of the 31 study countries, 27 countries registered fixed broadband coverage levels above 95%, while 24 countries had fixed broadband coverage above the EU27 average (97.3%). Four countries registered complete fixed broadband coverage including Belgium, Cyprus, Luxembourg, and Malta. In three countries (Lithuania, Poland, and Finland), fixed broadband services were available to fewer than 90% of households.



- Malta was the only country to report complete coverage for combined FTTP & DOCSIS 3.1 technologies, thus reaching the Digital Decade gigabit connectivity target, which is measured as the percentage of households covered by fixed Very High-Capacity Networks (VHCN), i.e., those networks capable of supporting gigabit broadband speeds – FTTP and cable DOCSIS 3.1. The Netherlands, Denmark and Romania recorded FTTP & DOCSIS 3.1 coverage levels above 95%.
- Out of the 31 study countries, 19 countries reported FTTP & DOCSIS 3.1 coverage above the EU27 average (73.4%). At 27.8%, Greece is the lowest ranked country in this study in terms of the proportion of homes passed by the gigabit-speed capable networks.



- Looking at mobile broadband technologies, LTE coverage reached at least 99.0% of households in 30 out of 31 study countries. By mid-2022, commercial 5G services had been launched in all 31 study countries, following launches in Latvia and Portugal over the course of the year. Eleven study countries achieved 5G coverage greater than 90% as of June 2022.



- 5G coverage on the 3.4–3.8 GHz spectrum band surpassed 70% in five countries (Finland, Italy, Switzerland, Denmark and Austria), and a further four countries achieved coverage greater than 50%.

Résumé

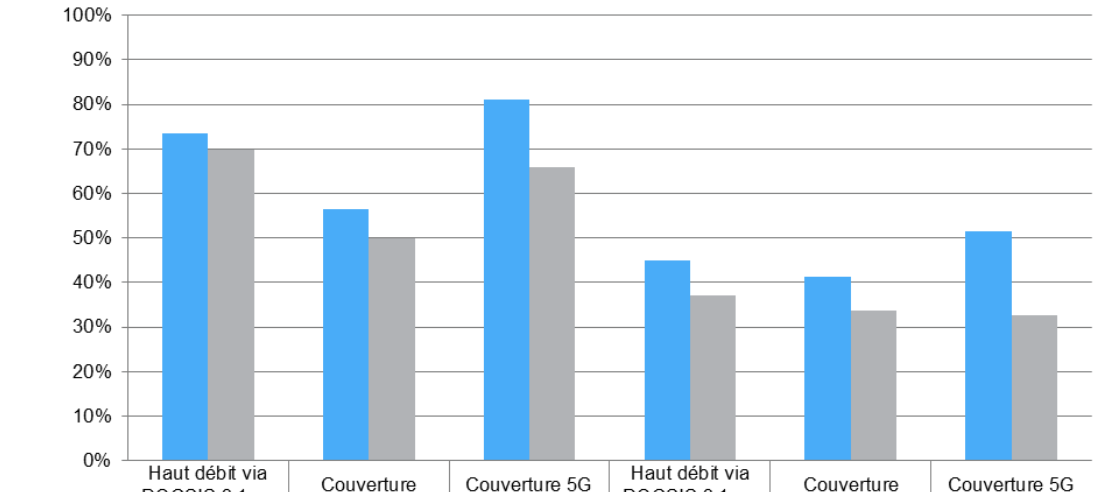
- L'étude sur la Couverture Haut-Débit en Europe a été conçue pour suivre la progression des États membres de l'UE vers les objectifs de couverture en gigabits et en 5G définis dans le programme politique de la décennie numérique - à savoir : « connectivité gigabit pour tous d'ici à 2030 » et « au moins 5G dans toutes les zones peuplées ».
- En 2022, la DG CONNECT a sélectionné Omdia, en partenariat avec Point Topic, pour mener à bien ce projet de trois ans. Dans chaque pays participant, l'équipe de recherche a consulté les autorités nationales de régulation ainsi que des entreprises de télécommunications pour récolter les informations nécessaires à l'étude. L'équipe de recherche conduit l'étude sur la couverture en haut débit depuis 2016. De plus, Point Topic est à l'origine de la première étude sur la période 2010–2012. L'équipe Omdia, à l'époque sous le nom IHS Markit (en collaboration avec VVA), a réalisé l'étude pour la période 2013–2015 et avait adopté des méthodes similaires à celles de Point Topic pour la collecte et l'analyse de données afin de garantir la comparabilité des jeux de données et l'analyse des évolutions temporelles.
- Les données recueillies reflètent la situation à la fin du mois de juin 2022, à comparer avec la situation fin juin 2021. Pour l'édition 2022, l'équipe de recherche a réévalué les technologies et les combinaisons de technologies inclues dans l'étude, et en accord avec l'équipe DG CONNECT, a exclu la catégorie "Couverture LTE moyenne" étant donné que tous les pays faisaient état d'une disponibilité universelle ou quasi-universelle et a ajouté une nouvelle mesure pour suivre les progrès du déploiement de la couverture 5G sur la bande de fréquences 3,4–3,8 GHz. En outre, la définition de la couverture de la vitesse a été modifiée pour s'aligner sur la définition de l'ORECE de la "vitesse de téléchargement maximale attendue", comme indiqué dans les recommandations de l'ORECE BoR (20) 42 et BoR (20) 165. Les données relatives à la couverture de la vitesse pour les années précédentes décrivent les vitesses réelles réalisables.
- Ce rapport couvre trente-et-un pays à travers l'Europe, à savoir l'UE-27 ainsi que la Norvège, l'Islande, la Suisse et le Royaume-Uni, et analyse la disponibilité de onze technologies haut débit (DSL, VDSL, VDSL2 Vectoring, modem câble DOCSIS 3.0, modem câble DOCSIS 3.1, FTTP, FWA, LTE, 5G, couverture 5G sur la bande de fréquences 3,4–3,8 GHz et satellite) sur chacun des marchés, au niveau national et dans les zones rurales. De plus, trois combinaisons indiquant la disponibilité d'une ou plusieurs formes de connexion haut débit sont également incluses dans l'étude. Celles-ci couvrent la disponibilité globale du haut débit, la disponibilité de l'Accès de Nouvelle Génération (ANG), et la disponibilité globale des réseaux FTTP et DOCSIS 3.1.
- Suite à la fin des négociations du Brexit en 2020, le Royaume-Uni a été conservé parmi les pays de l'étude, mais a été exclu des calculs totaux de l'UE présentés dans ce rapport. Cependant, l'outil de données d'accompagnement comprend des totaux pour l'UE 27 et l'UE 28 à des fins de comparaison.
- En juin 2023, la Commission européenne a publié la décision d'exécution (UE) 2023/1353 établissant des indicateurs clés de performance (ICP) pour mesurer les progrès accomplis dans la réalisation des objectifs numériques du programme politique 2030 de la décennie numérique. Trois de ces ICP sont inclus dans l'étude Broadband Coverage in Europe : (1) la couverture globale FTTP & DOCSIS 3.1 mesure la connectivité gigabit des réseaux fixes à très haute capacité (VHCN), c'est-à-dire les technologies considérées comme étant actuellement capables de fournir une connectivité gigabit, à savoir le FTTP et le câble DOCSIS 3.1 ; (2.) la couverture FTTP est également considérée séparément lors de l'interprétation des données de couverture VHCN ; et (3.) la couverture 5G, qui mesure actuellement la couverture des réseaux sans fil à haut débit de la prochaine génération avec une performance au moins équivalente à la 5G, conformément au principe de neutralité technologique[3].
- L'objectif de la décennie numérique en matière de connectivité gigabit est mesuré en pourcentage de ménages couverts par des réseaux fixes à très haute capacité (VHCN). Les technologies prises en compte sont celles qui sont actuellement capables de supporter des vitesses de l'ordre du gigabit, à savoir le FTTP et le câble DOCSIS 3.1. A la fin juin 2022, 73,4% des foyers de l'UE étaient couverts par des réseaux modem câble DOCSIS 3.1 ou FTTP, c'est-à-dire les technologies actuellement capables d'offrir des débits atteignant le gigabit. Par rapport à la mi-2021, la couverture combinée des réseaux FTTP et DOCSIS 3.1 a augmenté de 3,5 points de pourcentage, ce qui représente un ralentissement de la croissance par rapport à la période d'étude précédente.

[3] Pour plus de détails, voir EUR-Lex - 32023D1353 - FR - EUR-Lex (europa.eu), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023D1353

Cela peut être attribuée à une stagnation de la croissance de la couverture DOCSIS 3.1 après l'achèvement des mises à niveau par un certain nombre de câblo-opérateurs européens au cours des douze mois précédant la fin du mois de juin 2022.

- La couverture FTTP et DOCSIS 3.1 dans les zones rurales a atteint 45,1% des ménages ruraux, augmentant de 8,1 points de pourcentage au cours des douze mois précédant la mi-2022. En termes absolus, 13,9 millions de ménages ruraux dans l'UE étaient desservis par des réseaux FTTP ou DOCSIS 3.1 à la fin du mois de juin 2022.

UE27 : La décennie numérique ICP, 2021 & 2022



	Haut débit via DOCSIS 3.1 ou FTTP (national)	Couverture FTTP (national)	Couverture 5G (national)	Haut débit via DOCSIS 3.1 ou FTTP (rural)	Couverture FTTP (rural)	Couverture 5G (rural)
EU27 2022	73.4%	56.5%	81.2%	45.1%	41.4%	51.5%
EU27 2021	69.9%	49.9%	65.8%	37.0%	33.6%	32.7%

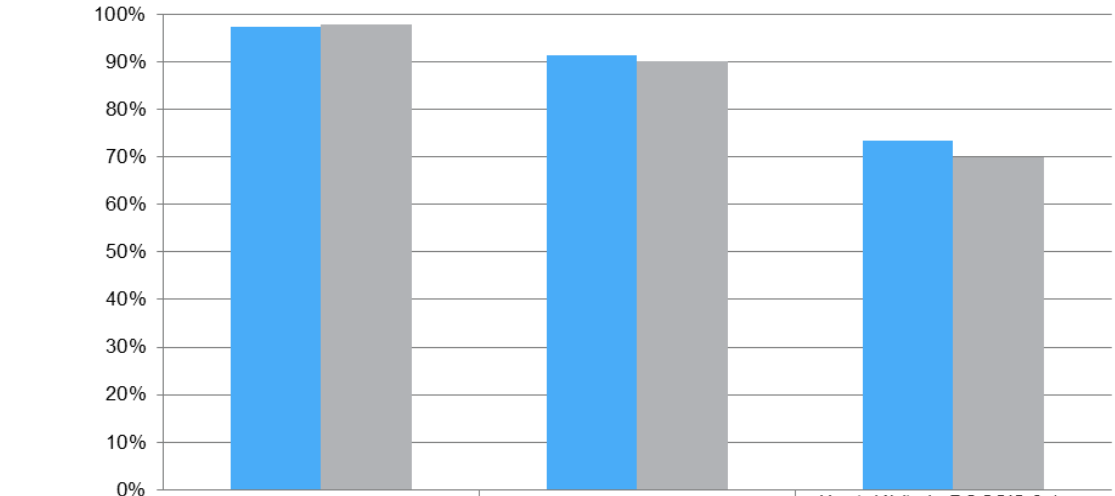
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- La disponibilité des réseaux FTTP, identifiée par la Commission européenne comme l'un des indicateurs clés de performance de la décennie numérique, a continué de croître à un rythme similaire à celui de l'année dernière, avec une hausse de 6,6 points de pourcentage, pour atteindre plus de la moitié (56,5%) des ménages européens couverts à la fin juin 2022. La vitesse de déploiement de la fibre FTTP reste la plus élevée de l'étude et pour la première fois, le niveau de couverture FTTP a pris le pas sur celui du VDSL.
- Au cours des douze mois précédant juin 2022, la couverture FTTP s'est étendue plus rapidement que les autres technologies à bande fixe dans les zones rurales. La disponibilité du FTTP en milieu rural a augmenté de 7,8 points de pourcentage, atteignant quatre ménages sur dix des ménages ruraux de l'UE (41,4%). Cette forte augmentation indique que de nombreux opérateurs européens se concentrent davantage sur le déploiement de réseaux FTTP, même dans les zones rurales traditionnellement moins rentables.
- La couverture 5G, également identifiée comme l'un des indicateurs clés de performance de la décennie numérique, s'est fortement répandue entre juin 2021 et juin 2022 et les données officielles sur la couverture 5G sont désormais disponibles dans la plupart des pays. Après une augmentation de 15,4 points de pourcentage par rapport à la mi-2021, les services 5G étaient disponibles pour 81,2% des ménages de l'UE. Cette couverture élevée peut être attribuée en grande partie à l'introduction du partage dynamique du spectre (DSS), qui a été déployé par de nombreux principaux opérateurs de réseaux mobiles européens.[4]
- Alors que les déploiements de la 5G se sont d'abord axés sur les zones urbaines, la disponibilité des services 5G dans les zones rurales a considérablement augmenté grâce au déploiement du partage dynamique du spectre (DSS), avec plus de la moitié (51,5%) des ménages ruraux de l'UE couverts à la mi-2022.

[4] L'ICP actuel pour l'objectif 5G ne tient pas compte de la qualité du service fourni en période de pointe. L'un des principaux défis consiste à faire en sorte que les réseaux déployés répondent aux besoins futurs, notamment en soutenant les secteurs industriels clés et les applications essentielles qui profiteront aux consommateurs et aux entreprises dans tous les secteurs. Pour mesurer l'état de préparation des États membres à relever ce défi, un examen plus approfondi est nécessaire pour améliorer et élargir le cadre de mesure de la 5G.

- Les résultats de l'enquête montrent aussi que plus de 185 millions de ménages de l'UE (97,3%) avaient accès à au moins une des principales technologies haut débit fixe en juin 2022, une légère réduction de la couverture par rapport à la fin juin 2021.
- A la mi-2022, la couverture en services d'accès nouvelle génération (VDSL, VDSL2 Vectoring, DOCSIS 3.0, DOCSIS 3.1 et FTTP) atteignait 91,5% des ménages européens. Cela représente une hausse de 1,4 points de pourcentage, soit 1,25 millions de ménages supplémentaires par rapport à la fin juin 2021. Au total, 174 millions de ménages avaient accès au haut débit de nouvelle génération à la mi-2022.

UE27 : Couverture par combinaison de technologies au niveau national, 2021 & 2022

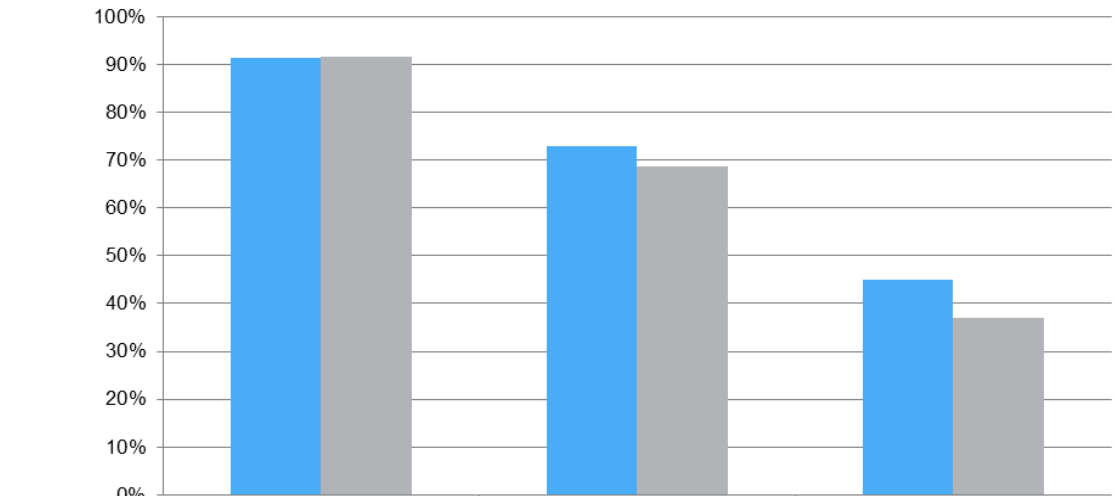


	Haut débit fixe	Haut débit ANG	Haut débit via DOCSIS 3.1 ou FTTP
EU27 2022	97.3%	91.5%	73.4%
EU27 2021	97.9%	90.1%	69.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- La couverture en haut débit des zones rurales reste inférieure à la couverture au niveau national dans l'ensemble des Etats membres de l'UE. A la mi-2022, 91,4% des foyers ruraux étaient couverts par au moins une technologie de haut débit fixe, et plus de sept sur dix (72,9%) avaient accès aux services très haut débit de nouvelle génération. La croissance de la couverture ANG en milieu rural s'est ralentie au cours de l'année, mais a tout de même augmenté de 4,3 points de pourcentage, ce qui équivaut à plus de 1,6 million de ménages ruraux supplémentaires ayant accès aux services à large bande ANG par rapport à la fin du mois de juin 2021.

UE27 : Couverture par combinaison de technologies au niveau rural, 2021 & 2022

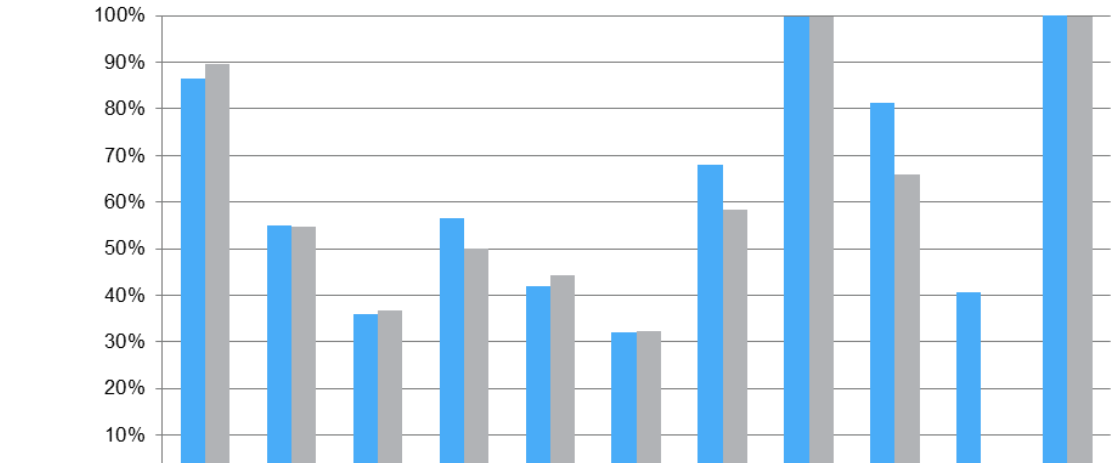


	Haut débit fixe	Haut débit ANG	Haut débit via DOCSIS 3.1 ou FTTP
EU27 2022	91.4%	72.9%	45.1%
EU27 2021	91.5%	68.6%	37.0%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- A la mi-2022, la connexion par modem DSL continue d'être la technologie de haut débit fixe la plus répandue dans l'UE27, couvrant 86,6% des ménages européens. Cela représente une diminution de 2,9 points de pourcentage comparé à mi-2021, en raison des déploiements limités de nouveaux réseaux DSL, rattrapés par la croissance totale des ménages. De plus, dans plusieurs pays, les anciens réseaux de cuivre sont mis hors service et remplacés par des réseaux FTTP, contribuant ainsi à la diminution de la couverture DSL.
- A la fin juin 2022, la technologie VDSL couvrait 54,9% des ménages européens, soit une augmentation marginale de 0,2 points de pourcentage au cours de la période de douze mois. VDSL n'est plus la technologie ANG la plus répandue dans l'UE27, ayant été dépassé par le FTTP au cours de la période étudiée. La croissance de la couverture VDSL s'est stabilisée depuis 2020, les opérateurs ayant commencé à réorienter leurs investissements vers des technologies plus avancées (en particulier le FTTP) dans le cadre de l'agenda de la décennie numérique.
- La technologie du VDSL2 Vectoring a était disponible pour plus d'un tiers (35,9%) des foyers de l'UE fin juin 2022, soit un déclin de 0,9 points de pourcentage par rapport l'année précédente. Cette technologie a été mesurée pour la première fois en 2019 pour indiquer la couverture des services bande passante à plus grande capacité, offerts via l'héritage réseaux cuivre et offrant généralement des vitesses de téléchargement supérieures à 100 Mb/s.
- A la mi-2022, 41,8% des foyers de l'Union européenne avaient accès à une connexion rapide via câble modem et 31,9% des foyers de l'UE étaient couverts par des réseaux câblés ayant été mis à jour au standard DOCSIS 3.1, qui sont par ailleurs capables d'offrir des vitesses atteignant le gigabit. La couverture du câble DOCSIS 3.0 a diminué de 2,3 points de pourcentage en raison du déclassement en faveur du FTTP dans un certain nombre de pays étudiés, tandis que la couverture DOCSIS 3.1 a légèrement augmenté de 0,3 point de pourcentage d'une année sur l'autre.

UE27 : Couverture par technologie au niveau national, 2021 & 2022

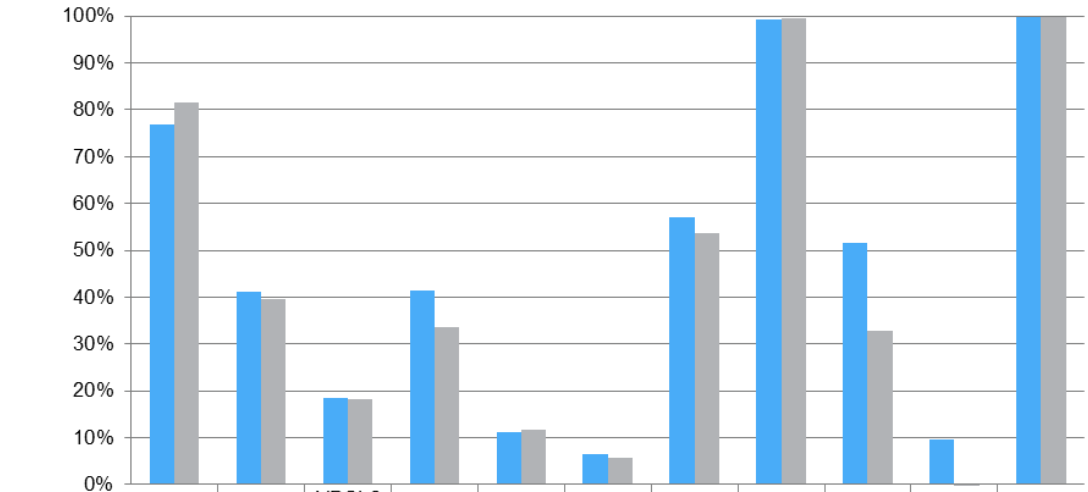


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
EU27 2022	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%
EU27 2021	89.5%	54.7%	36.8%	49.9%	44.2%	32.2%	58.2%	99.8%	65.8%	-	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- À la fin du mois de juin 2022, la quasi-totalité des ménages de l'UE (99,8%) étaient couverts par des réseaux mobiles LTE.
- La couverture 5G dans la bande de fréquences 3,4–3,8 GHz a été analysée pour la première fois dans l'étude de cette année, et la couverture a atteint 40,7% des ménages de l'UE en juin 2022, ce qui signifie que plus de la moitié de l'empreinte 5G globale a accès à des réseaux 5G capables de fournir un débit élevé.

UE27 : Couverture par technologie au niveau rural, 2021 & 2022

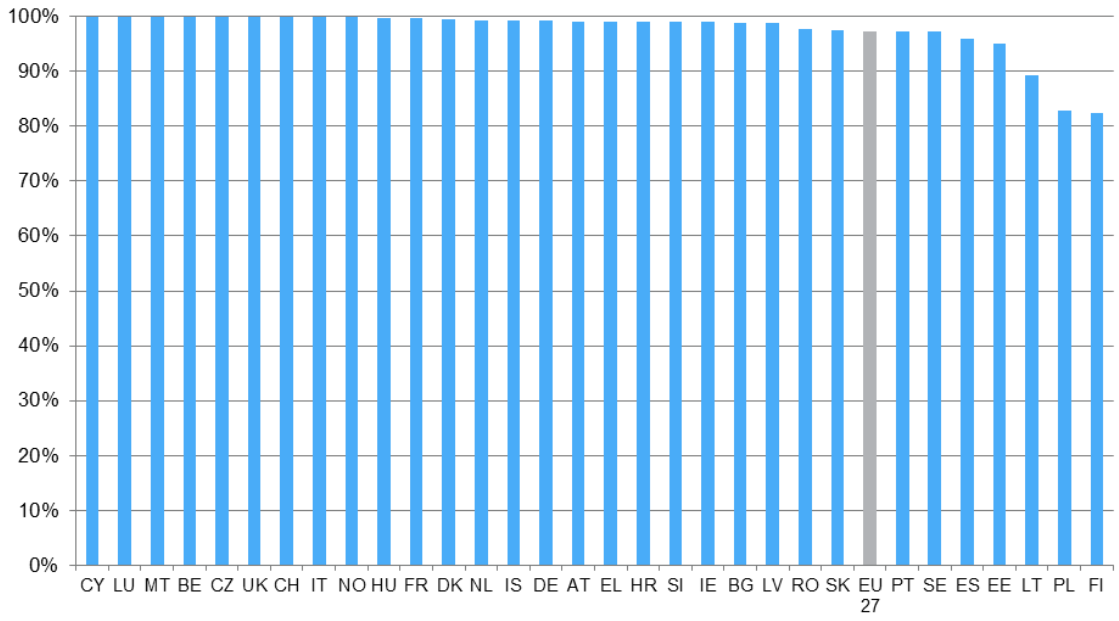


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
EU27 2022	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%
EU27 2021	81.6%	39.6%	18.1%	33.6%	11.6%	5.7%	53.6%	99.6%	32.7%	-	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- En ce qui concerne le haut débit dans les zones rurales, il existe une différence de 5,9 points de pourcentage entre la couverture en haut débit fixe au niveau global (97,3%) et au niveau rural (91,4%). Cette différence était davantage marquée en termes de technologies ANG : ces réseaux étaient accessibles pour 72,9% des ménages ruraux, soit 18,6 points de pourcentage de moins que la couverture totale en ANG. Cependant, la différence entre couverture globale et rurale continue de se réduire par rapport aux éditions précédentes de l'étude, grâce à l'augmentation des investissements dans les réseaux en zones rurales.
- La couverture des réseaux VDSL des zones rurales a continué d'augmenter, mais à un rythme plus lent que celui enregistré les années précédentes. L'accessibilité des réseaux VDSL a augmenté de 1,6 points de pourcentage, couvrant 41,2% des ménages ruraux de l'Union européenne. Cette croissance des réseaux VDSL en zones rurales souligne la focalisation des opérateurs, en particulier des opérateurs historiques, sur la modernisation des réseaux DSL existants.
- En ce qui concerne les technologies mobiles à haut débit, la disponibilité des réseaux LTE dans les zones rurales a atteint la saturation : 99,2% des foyers ruraux de l'UE étaient desservis par au moins un réseau LTE à la fin du mois de juin 2022.
- Les déploiements de la couverture 5G sur la bande de fréquences 3,4–3,8 GHz ont été principalement axés sur les zones urbaines et suburbaines, car cette bande de fréquences est moins bien adaptée à la couverture rurale (en raison de la nécessité d'une densité de stations de base beaucoup plus élevée et d'une ligne de visée presque parfaite) que les bandes de fréquences inférieures telles que la bande 700 MHz. En juin 2022, moins d'un ménage rural sur dix dans l'UE (9,6%) bénéficiait d'une couverture 5G sur la bande de fréquences 3,4–3,8 GHz.
- Parmi les 31 pays étudiés, 27 atteignaient une couverture en haut débit fixe supérieure à 95%, et 24 pays offraient une couverture en haut débit fixe supérieure à la moyenne des UE27 (97,3%). Quatre pays étudiés offraient une couverture en haut débit fixe complète de leur territoire, notamment la Belgique, Chypre, le Luxembourg, et Malte. Dans trois des pays (Lituanie, Pologne et Finlande), moins de 90,0% des ménages avait accès à une connexion en haut débit fixe.

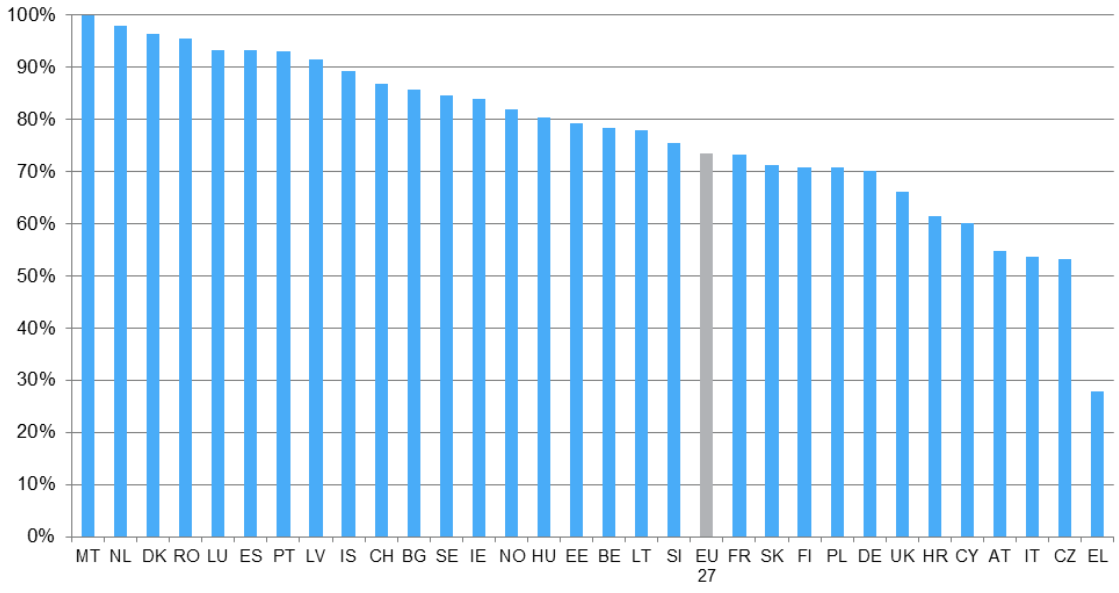
Couverture en haut débit fixe par pays, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

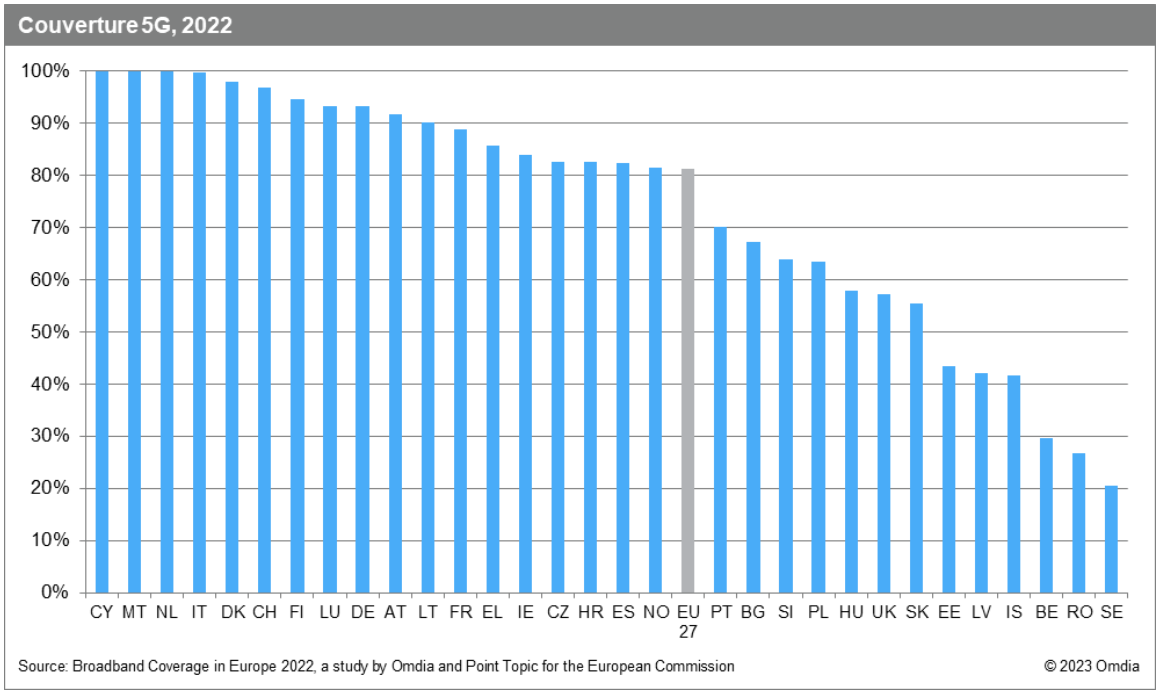
- Malte est le seul pays à avoir déclaré une couverture complète pour les technologies combinées FTTP et DOCSIS 3.1, atteignant ainsi l'objectif de connectivité gigabit de la décennie numérique, qui est mesuré comme le pourcentage de ménages couverts par des réseaux fixes à très haute capacité (VHCN), c'est-à-dire des réseaux capables de supporter des vitesses de haut débit gigabit - FTTP et câble DOCSIS 3.1. Les Pays-Bas, le Danemark et la Roumanie ont enregistré des niveaux de couverture FTTP et DOCSIS 3.1 supérieurs à 95%.
- Sur les 31 pays étudiés, 19 ont déclaré une couverture FTTP & DOCSIS 3.1 supérieure à la moyenne de l'UE27 (73,4%). Avec 27,8%, la Grèce est le pays le moins bien classé de cette étude en termes de proportion de foyers desservis par des réseaux capables d'atteindre la vitesse du gigabit.

Couverture en haut débit via DOCSIS 3.1 ou FTTP par pays, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

- S’agissant du haut débit mobile, les réseaux LTE couvraient au moins 99,0% des ménages dans 30 des 31 pays de l’étude. A la mi-2022, la 5G était commercialement déployée dans les 31 pays étudiés, après les lancements en Lettonie et au Portugal au cours de l'année. Onze pays de l'étude ont atteint une couverture 5G supérieure à 90% en juin 2022.



- La couverture 5G dans la bande de fréquences 3,4–3,8 GHz a dépassé 70% dans cinq pays (Finlande, Italie, Suisse, Danemark et Autriche), et quatre autres pays ont atteint une couverture supérieure à 50%.

1. Introduction

The growth and competitiveness of the European economy depends on investments in Information and Communication Technologies (ICTs). The European Commission estimates that half of all productivity growth derives from ICT[5], while the ITU's analysis of more than 200 studies on broadband impact notes that a 10% increase in broadband penetration yields an increase in GDP ranging between 0.25–1.5%[6]. Moreover, OECD estimates that 10% increase in broadband penetration can raise labour productivity by 1.5%[7] and an EIB study asserts that a doubling of broadband speeds can result in 0.3% GDP growth[8].

In order to foster the development of network-based knowledge economy and stimulate growth the European Commission has been promoting strategies to encourage digital opportunities and enhance Europe's leading position in digital economy. In May 2015, the Digital Single Market (DSM) strategy was adopted to eliminate online barriers, which hamper free movement of goods and services online and mean that businesses, governments and individuals cannot fully benefit from digital tools that would be available to them but that are currently locked in 27 different regulatory environments.

The European Commission estimates that once completed, a DSM could create up to €415 billion per year and generate hundreds of thousands new jobs. The DSM strategy is based on three pillars:

1. Access: better access for consumers and businesses to digital goods and services across Europe;
2. Environment: creating the right conditions and a level playing field for digital networks and innovative services to flourish;
3. Economy & Society: maximising the growth potential of the digital economy.

However, in order for the consumers, businesses and governments to fully benefit from the provisions of the DSM, it is essential that access to digital infrastructure is ensured by facilitating roll out of reliable high-speed broadband networks across Europe. In September 2016, the European Commission introduced a new set of competitive Gigabit Society connectivity targets to be achieved by 2025[9]. These targets include:

- Gigabit connectivity for all main socio-economic drivers such as schools, transport hubs and main providers of public services as well as digitally intensive enterprises.
- All urban areas and all major terrestrial transport paths to have uninterrupted 5G coverage.
- All European households, rural or urban, will have access to Internet connectivity offering a download speed of at least 100Mbps, upgradable to Gigabit speed.

Moreover, the Digital Compass communication adopted in March 2021 set out ambitious "Digital Decade" 2030 targets, which further highlight gigabit connectivity for everyone and 5G coverage everywhere by 2030. In September 2021, the "Path to the Digital Decade" proposal then identified and confirmed the importance of investment-friendly regulatory and policy framework, which would facilitate collaboration between national and EU-level policies and foster investment to achieve the Digital Decade 2030 targets. The Digital Decade Policy Programme 2030 (DDPP) confirms and operationalises the vision of the Digital Compass communication for Europe's digital transformation by 2030.[10]

The European Commission has been monitoring broadband deployments since 2008 with the Digital Scoreboard serving as a tool for assessing progress towards these targets. Broadband availability metrics are also a component of the Digital Economy and Society Index (DESI) that summarises indicators on Europe's digital performance and Member States' digital competitiveness. One of DESI's four dimensions focuses on connectivity and measures the deployment and quality of broadband infrastructure.

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[5] The Digital Agenda for Europe – Driving European growth digitally, Brussels 18 December 2012, COM(2012) 784 final

[6] ITU (2016), "Working Together to Connect the World by 2020: Reinforcing Connectivity Initiatives for Universal and Affordable Access", https://www.broadbandcommission.org/Documents/publications/davos-discussion-paper-jan2016.pdf

[7] OECD (2011), "National Broadband Plans", OECD Digital, Economy Papers, No. 181, OECD Publishing. http://dx.doi.org/10.1787/5kg9sr5fmqwd-en

[8] Bohlin et al (2014), EIB Institute, "The economic impact of broadband speed: Comparing between higher and lower income countries", https://institute.eib.org/wp-content/uploads/2014/04/EIB_broadband-speed_120914.pdf

[9] Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society, Brussels 14 September 2016, https://ec.europa.eu/digital-single-market/en/news/communication-connectivity-competitive-digital-single-market-towards-european-gigabit-society

[10] Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030 (Text with EEA relevance), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022D2481

In order to monitor the progress of broadband networks' deployment across the Member States, DG CONNECT (the European Commission Directorate General for Communications Networks, Content and Technology) has commissioned the Broadband Coverage in Europe (BCE) project to examine household coverage of all of the main fixed and wireless broadband technologies with a specific focus on Next Generation Access (NGA) technologies. In 2013, DG CONNECT selected the consortium of IHS Markit & VVA to run the three-year project. In 2016, IHS Markit partnered with the previous research provider of the BCE study, Point Topic, and was subsequently chosen to continue to deliver the broadband coverage research for the period 2016–2018. In 2019, the IHS Markit and Point Topic research team was awarded the research contract until 2021. In August 2019, IHS Markit Technology, which the Broadband Coverage in Europe research team was part of, was acquired by Informa Group and the new research organisation has been since rebranded as Omdia. The original research team now belongs under Omdia and in 2022 was again awarded the research contract for the period 2022–2024, again in partnership with by Point Topic.

The European Commission publishes and analyses the data in the Digital Scoreboard. A number of broadband coverage indicators are also included in the Digital Economy and Society Index (DESI), which will form part of the State of the Digital Decade report as well as the European Semester related country assessments. In order to align reporting of the broadband coverage data with the publications of the DESI, the broadband coverage data collection has been scheduled to reflect the situation at the end of June (i.e. half-year data rather than year-end data points are collected). This change was first implemented in the 2015 edition of the BCE study and has been continued since then.

As in previous years, the study is primarily based on a survey of broadband network operators and National Regulatory Authorities (NRAs) to obtain a Europe-wide picture of the coverage of the eleven main broadband technologies. The study covers 30 countries including the EU27, the UK, Norway, and Iceland. A separate study is commissioned annually by Glasfasernetz Schweiz to conduct identical research of broadband coverage in Switzerland. Results of the study are also included in this report increasing the total number of study countries to 31. Following the completion of Brexit, data for the UK are excluded from the EU totals but data for the UK continues to be collected and included in the study. However, the accompanying data tool includes totals for both EU27 as well as EU28 for comparison purposes.

The eleven broadband technologies analysed in this study are:

- DSL (including VDSL)
- VDSL (including VDSL2 Vectoring)
- VDSL2 Vectoring
- Cable modem DOCSIS 3.0 (including DOCSIS 3.1)
- DOCSIS 3.1
- FTTP (Fibre-to-the-Premises)
- FWA (Fixed Wireless Access)
- LTE
- 5G
- 5G utilizing the 3.4–3.8 GHz spectrum band
- Satellite

Coverage of these technologies is reported at both the national and rural levels, based on the number of homes passed by each individual technology.

In 2019, the research team in agreement with DG CONNECT, reviewed the categories included in the previous iterations of the study and made several changes to reflect the technological developments and requirements of broadband connectivity. The previously tracked metrics of standard cable modem broadband, WiMAX, and HSPA were excluded and three new technologies were introduced: VDSL2 Vectoring, cable modem DOCSIS 3.1, and FWA. VDSL2 Vectoring was included to indicate availability of higher-capacity bandwidth services (typically providing download speeds higher than 100Mbps) offered via legacy copper networks. Tracking of cable network upgrades to DOCSIS 3.1 provides insight into coverage of networks capable of delivering gigabit speeds. Fixed Wireless Access (FWA) technologies, including Wi-Fi, WiMAX and in particular 4G LTE-TDD standards have been gaining popularity in the last number of years and the research team expects FWA to become an even more relevant access technology with the launch of 5G FWA services.

With 5G coverage of urban areas and major terrestrial transport paths being one of the Gigabit Society connectivity targets and given the fact that operators have deployed 5G networks and launched 5G services in many study countries by mid-2020, 5G was included among the technologies tracked by the study for the first time in 2020. In 2022 an additional category was added, tracking the coverage of 5G

utilizing the 3.4–3.8 GHz spectrum band, bringing the total number of technologies tracked by the study to eleven.

The study also aims, as requested by DG CONNECT, to estimate the overall "combination" coverage of technologies, accounting for the overlap of the different technologies capable of delivering a comparable level of performance. The combination categories included in this study are:

- Overall fixed broadband coverage
    - Includes all the main fixed-line broadband access technologies, but excludes satellite
    - Combination of DSL (including VDSL and VDSL2 Vectoring), cable modem DOCSIS 3.0 (including DOCSIS 3.1), FTTP, and FWA
- Next Generation Access (NGA) coverage
    - Includes fixed-line broadband access technologies capable of achieving download speeds meeting the Digital Agenda objective of at least 30Mbps coverage
    - Combination of VDSL (including VDSL2 Vectoring), DOCSIS 3.0 (including DOCSIS 3.1), and FTTP
- Overall FTTP & DOCSIS 3.1 coverage
    - Includes fixed-line broadband access technologies primarily capable of achieving gigabit download speeds
    - Combination of DOCSIS 3.1 and FTTP

The previously tracked Overall broadband coverage category, which included both fixed and mobile technologies, was excluded from the study in 2019 as overall broadband coverage levels reached universal coverage in the vast majority of study countries and the relevance of findings relating to this category has become limited.

Due to the fact that multiple operators may deploy their networks in the same or similar areas, particularly in urban and more densely populated locations, it is necessary to take into account the possibility of overlapping coverage when determining coverage of the individual technologies as well as combination categories.

The methodology used in this report mirrors the approach developed by Point Topic in 2012, adopting a regional approach to measuring overlapping and complementary coverage. Coverage data was collected on a regional level using NUTS 3 statistical units as a research basis. The NUTS (Nomenclature of Units for Territorial Statistics) areas are geographical subdivisions generally based on existing national regional divisions of EU countries and associated countries (such as Norway, Iceland, Switzerland and the UK). More specifically, NUTS 3 level areas are smaller regional units of 150,000 to 800,000 inhabitants. There are 1,380 NUTS 3 areas in the 31 study countries. With general statistical data (such as population, household, and area size) readily available on NUTS 3 level, using this regional approach provides a comprehensive and detailed view of broadband coverage across Europe and allows for a year-to-year comparison with the BCE 2012–2021 data (with the exemption of the new category for 5G coverage on the 3.4–3.8 GHz spectrum band introduced in the 2022 study).

In addition to individual technology coverage and combination technology coverage, DG CONNECT required coverage by download speed to be included in the study. The following speed categories were thus included among the research metrics:

- Coverage by broadband network/s capable of at least 30Mbps download speed
- Coverage by broadband network/s capable of at least 100Mbps download speed
- Coverage by broadband network/s capable of at least 1Gbps download speed
- Coverage by broadband network/s capable of at least 1Gbps upload and download speed

Coverage by speed categories was first estimated by the research team in the 2013 edition of the BCE study. By including this additional metric, it is possible to obtain an additional analytical layer to evaluate the study countries' progress towards the Digital Agenda goals and determine the actual speeds consumers will be able to receive on the networks available to them. Coverage of at least 1Gbps download speed was a newly introduced category added in the study for the first time in 2019. And in 2021, a 1Gbps upload and download speed coverage was added while the now universally achieved at least 2Mbps download speed coverage was excluded from the list of speed categories tracked by the study.

For the 2022 study, following discussions with DG CONNECT, the definition of speed coverage has been changed to align with the BEREC definition of "expected peak download speed" as outlined in

BEREC guidelines BoR (20) 42 and BoR (20) 165. Speed coverage data for previous years depicts actual achievable speeds.

The following table details the scope of the Broadband Coverage in Europe 2022 study.

Scope	Description of Broadband Coverage Metrics
Geographical coverage	• EU27 + Iceland, Norway, Switzerland, and the UK • Rural and national coverage
Technologies	The following technologies are included: • DSL (including VDSL and VDSL2 Vectoring) • VDSL • VDSL2 Vectoring • Cable modem DOCSIS 3.0 (including DOCSIS 3.1) • DOCSIS 3.1 • FTTP (Fibre-to-the-Premises, i.e. Fibre-to-the-Home and Fibre-to-the-Building) • Fixed Wireless Access (FWA) • LTE • 5G • 5G utilizing the 3.4–3.8 GHz spectrum band • Satellite The study also covers the following technology combinations: • Overall fixed broadband coverage (including DSL, VDSL, VDSL2 Vectoring, FTTP, cable modem DOCSIS 3.0, DOCSIS 3.1 and FWA) • NGA coverage (including VDSL, VDSL2 Vectoring, FTTP, cable modem DOCSIS 3.0 and DOCSIS 3.1) • Overall FTTP & DOCSIS 3.1 coverage
Speeds	The study covers the following speed categories: • At least 30Mbps download • At least 100Mbps download • At least 1Gbps download • At least 1Gbps upload/download

Acknowledgements

It would not be possible to deliver the results of this project without the support of all involved parties. The research team would like to thank all survey respondents, both regulators and operators, who took the time to fill in the BCE questionnaire and provide us with the fundamental information and data that form the core of this study. We are very grateful for their involved and responsible approach in addressing the demanding request for information and data. While the figures in our deliverables might not always be exactly the same as those provided by respondents (due to a number of complex factors, such as different statistical bases or definitions), the research team always attempted to prioritise data received directly from respondents and reflect this information in our estimates as much as possible.

2. Project Objectives

The specific objectives of the study can be set out as below:

- Collect coverage data on a country, regional, and rural level for different technologies through:
    - a survey of operators (ISPs) and National Regulatory Authorities (NRAs);
    - a review of alternative sources (e.g. operator websites, white papers, consultant reports);
- Estimate coverage for different technology and speed combinations; and
- Write up a final report on the findings on EU and country-level and prepare a database with statistical data.

3. Methodological approach in detail

The methodological approach used in the 2022 edition of the Broadband Coverage in Europe study mirrors the approach used in the 2013–2021 studies, which was in turn based on a methodology first implemented by Point Topic in 2012. Applying the same methodological approach allows the research team to ensure both consistency and year-on-year comparability of the data.

As in previous years of the project, a survey of National Regulatory Authorities (NRAs) and broadband network operators forms the core of this study. The survey results were validated and cross-checked against additional information gathered from other sources (including public announcements by telecoms groups) in parallel with the survey data collection. The additional research also helped to fill in any gaps, which resulted from incomplete information from NRAs or operators. Lastly, survey data and additional information were combined and used to calculate national coverage by individual technologies as well as the combination coverage categories and speed coverage categories for all study countries. The timeline of the data reflects the situation at the end of June 2022 (i.e. half-year data rather than year-end data points were collected).

The following chapters of this report provide a detailed description of the project's methodology.

3.1 Survey design and data collection

For the sake of consistency, the research team used similar wording and formatting of the survey questionnaire as in 2012–2021. Using near-identical question wording enables the research team to deliver findings which can be compared with research undertaken in previous years.

Where possible, the research team contacted survey participants that were approached for the 2012–2021 data collection. During the previous data collection runs the research team updated and expanded the list to include new contacts in already surveyed companies and organisations as well as those companies that were not previously approached. The fact that the BCE project is a long-running project means that most respondents are familiar with the study as well as the survey questionnaire, making it easier for them to fill in the by-now familiar information.

The survey questionnaire focuses on one central question, which asks about the absolute number of homes passed by broadband networks, and is applied to the following key metrics of the research:

- Technology coverage – for each of the technologies (with the exception of satellite) a question was included asking NRAs to supply the number of homes passed by each individual technology in the country.
- Regional coverage – NRAs and operators were also asked to supply homes-passed information for each of the NUTS 3 regions in all study countries for each of the technologies.
- Rural coverage – the same questions were asked of respondents for homes passed in rural areas of each NUTS 3 region as well as for the total number of rural homes passed country-wide.
- Speed coverage – the survey questionnaire also includes questions asking participants about the numbers of homes passed by networks able to achieve speeds of at least 30Mbps, 100Mbps and 1Gbps. An additional speed category of at least 1Gbps upload and download speed was included in the 2021 survey questionnaire as requested by DG CONNECT.

In addition to the coverage questions, the survey questionnaire also provided space for additional comments and explanations of the various technologies and speed specifications in cases in which respondents' definitions differed from those outlined in the survey (detailed definitions of the individual broadband technologies are included in the Appendices of this report). These comments provided further insight and were reflected in the final analysis of the data.

Given the nature of satellite broadband coverage, questions regarding satellite coverage were not included in the survey questionnaire. The satellite coverage across Europe was determined based on conversations with leading satellite providers such as Eutelsat, a KA-SAT broadband provider and other smaller satellite operators.

The research team has been from the onset of this project aware of the sensitivity of the requested data provided by operators, as much of the coverage data (especially on such a granular level) could be regarded as commercially sensitive by operators. Therefore, confidentiality of the information gathered from both NRAs as well as individual operators was assured at all stages of the survey data collection and subsequent analysis.

3.2 Defining households and rural areas

The central question posed by the survey questionnaire asks about the number of homes passed by individual operator and/or technology networks, depending on the respondent. In order to make determining the numbers of homes passed in each NUTS 3 region easier for respondents, the research team provided guidance by including the total number of households in each area in the survey questionnaire.

As it is not possible to obtain annually updated household figures by NUTS 3 regions for all of the BCE study countries, the research team calculated the number of households in each NUTS 3 region using NUTS 3 level population data published annually by Eurostat and average household size figures also published by Eurostat annually for each country. This approach allows the research team to maintain a unified methodology across all study countries using one data source.

One of the key dimensions of the study is centred around gaining information on broadband coverage in rural areas. In order for the rural data collected in the period 2013–2022 to be comparable to the 2012 dataset, the research team uses a methodology first developed by Point Topic in 2012, which defines rural areas using the Corine land cover database, and creates a database of population and land type in every square kilometre across Europe. Households in square kilometres with a population of less than one hundred are classified as rural. This granular approach based on population density identifies the truly rural areas likely to be unserved or underserved by broadband operators.

According to an updated estimation of rural population in individual NUTS 3 regions, approximately 15% of households in the study countries were rural in 2022. Combining this information with updated population and household data from Eurostat, the EU statistical office, allowed the research team to create new estimates for the numbers of rural households across each market and NUTS 3 area.

3.3 Additional research conducted in parallel to the survey

In addition to data gathered through the NRAs and ISPs survey, the research team carried out supplemental research to check the validity of survey data as well as to fill in any missing information.

The additional research was built on the research team's extensive in-house knowledge of the European broadband sector and was complemented with country and regional-level data collected from publicly available NRAs and ISPs reports and details on broadband strategies and development plans of individual companies and governments.

This desk-based research provided basic estimates on country-level coverage for each technology. In many cases, information on regional deployments of next generation access technologies was also available, or it was possible to infer such detail from company communications.

The individual elements of the additional research were determined on a country-by-country basis and included (but were not limited to) desk research of the following publicly available sources:

- NRAs market reports
- ISPs financial reports and press releases
- Industry organisations' white papers, special reports and analysis
- Industry news

3.4 Validation and integration of data

In this phase of the study, data collected through the survey and via additional research was brought together to obtain the actual coverage figures for all study countries.

The data integration was conducted on a country-by-country basis. Information gathered from additional research was cross-checked with results of the survey. In cases in which data points were missing, for example some of the NUTS 3 regions or rural coverage, a modelling methodology was applied to fill in the gaps. Models used varied on a case-by-case basis, and relied on a range of inputs, which included national coverage and regional presence data as well as the research team's knowledge of individual markets, companies' deployment strategies and ancillary data, such as population density.

Each country's data was integrated for each technology individually. This allowed the research team to first obtain estimates for individual technologies at a NUTS 3 level, which were then used to calculate estimates for technology combinations – again at a NUTS 3 level. Regional data was finally summed to obtain national-level coverage information. When integrating data on individual technologies, special

attention was paid to areas for which coverage of the same technology was provided by multiple operators, in order to rule out possible overlap.

At the end of the data validation and aggregation process, the research team was able to provide estimates for each of the eleven broadband technologies in all NUTS 3 areas both on total and rural level.

3.5 Estimating coverage for different technology combinations

After reaching the broadband coverage figures by individual technologies in each country and NUTS 3 regions, the research team calculated estimates for the following three technology combinations, taking into account overlaps of different technologies:

- Overall fixed broadband coverage (including DSL, VDSL, VDSL2 Vectoring, FTTP, Cable modem DOCSIS 3.0, DOCSIS 3.1 and FWA)
- Overall NGA coverage (including VDSL, VDSL2 Vectoring, FTTP, cable modem DOCSIS 3.0, and DOCSIS 3.1)
- Overall FTTP & DOCSIS 3.1 coverage.

For the sake of consistency, the research applied a similar methodology in the 2022 study to the approach used in the 2012–2021 editions of the study. Unless information provided by NRAs or telecoms groups suggested otherwise, a standardised default formula was used, taking the average of:

1. The minimum possible coverage; equal to the coverage of the most widespread technology or operator in the area; and
2. The maximum possible coverage; equal to the sum of the coverage of all the technologies or operators being considered, or if the sum is higher than 100%, coverage is capped at 100%.

As in previous studies, a varied formula was used in cases where technologies' coverage was more complementary than overlapping. In these cases, the minimum coverage was taken as equal to the sum of the complementary technologies, if this was greater than the most-widely available single technology.

Additionally, the estimates for combination coverage on a national level were made by summing the estimates for the NUTS 3 areas rather than applying this formula on a country level. This approach provides a more accurate data output than simply taking the country-level average.

Once the research team completed the final country level dataset, it was passed on to DG CONNECT and to the NRAs of all of the study countries for their feedback and comments before the finalised data was used as components of the Digital Society & Economy Index (Connectivity Dimension) and published as part of the individual country assessment reports.

In a number of cases, new and more accurate data was provided to the research team impacting previous years' data and thus justifying restatements of the figures published in the Broadband Coverage in Europe 2021 study.

3.6 Estimating coverage for speed categories

The speed categories were first included as broadband coverage metrics in 2013 in order to provide additional analytical layer to evaluate the study countries' progress towards the Digital Agenda goals and to estimate the download speeds available to households across the EU Member States. This additional component of the broadband coverage research was retained in the 2022 edition of the study. For the 2021 study an additional category was added to track coverage of broadband with gigabit speeds in both the upstream and downstream (and the previously-reported 2Mbps category was discontinued). The new category is only available for markets where the NRA was able to provide this information. Thus, the following speed categories are included among the metrics:

- Coverage by broadband network/s capable of at least 30Mbps download speed
- Coverage by broadband network/s capable of at least 100Mbps download speed
- Coverage by broadband network/s capable of at least 1Gbps download speed (included since 2019)
- Coverage by broadband network/s capable of at least 1Gbps upload and download speed (included since 2021)

Including the speed metrics allows for a comparison of the technology coverage, which might be reported as relatively high, to the actual speeds consumers will be able to receive over the networks available to them.

For the 2022 study, the definition of speed coverage has been changed to align with the BEREC definition of “expected peak download speed” as outlined in BEREC guidelines BoR (20) 42 and BoR (20) 165 from the previously applied definition of “actual achievable speed”.

The following speed categories were added among the research metrics and questions regarding these categories were included in the survey questionnaire:

- Coverage by broadband network/s capable of realistically achieving actual download peak time speeds of at least 30Mbps. The expected peak time speed is the speed that a household could expect to receive when using a broadband service during the whole peak-time period. The speed should describe the actual capability of the network. This category encompasses VDSL (including VDSL2 Vectoring), FTTP, DOCSIS 3.0/3.1 cable broadband and FWA (4G TD LTE standard and 5G FWA). However, not all connections utilizing these technologies can achieve 30Mbps and higher actual peak download speeds. For example, VDSL connections with distance from the exchange point higher than 500m see radical decrease in actual speeds or FWA over 4G can face issues in terms of speed and connection stability. Therefore, respondents were asked to exclude those connections from their answers.
- Coverage by broadband network/s capable of realistically achieving actual peak time download speeds of at least 100Mbps. The expected peak time speed is the speed that a household could expect to receive when using a broadband service during the whole peak-time period. This category encompasses FTTP, DOCSIS 3.0/3.1 cable broadband, VDSL2 Vectoring and 5G FWA (if speeds higher than 100Mbps are attainable over 5G FWA). In cases where Vectoring is applied to VDSL2 technology and speeds reach 100Mbps and higher download speeds, VDSL with Vectoring was asked to be included in this category. However, as not all connections utilizing these technologies can achieve 100Mbps actual download speeds (for example, in the case of FTTB (fibre-to-the-building) connections included in the FTTP category in-building wiring can pose significant constraints on achievable end-user broadband speeds), respondents were asked to exclude those connections from their answers.
- Coverage by broadband network/s capable of realistically achieving actual peak time download speeds of at least 1Gbps. This category encompassed FTTP and DOCSIS 3.1 cable broadband access technologies. However, as with the other speed categories, not all connections utilizing these technologies can achieve 1Gbps actual download speeds and respondents were asked to exclude those connections from their answers.
- Coverage by broadband network/s capable of realistically achieving actual upload and download peak time speeds of at least 1Gbps. This category encompassed FTTP and DOCSIS 3.1 cable broadband access technologies. However, as with the other speed categories, not all connections utilizing these technologies can achieve 1Gbps actual upload and download speeds and respondents were asked to exclude those connections from their answers.

The coverage of these speed categories was then defined as a household having technical access to one or more networks supporting at least the relevant download/upload speed if the connection’s broadband speed was capable of achieving the relevant speed during the whole peak time period – i.e. the time of the day with a typical duration of one hour when the network load is at its maximum.

As speed information can be generally hard to decode, even for the NRAs and ISPs themselves, the research team, in addition to the collected survey data, also relied on sector knowledge regarding deployments to make informed estimates of achievable speeds to gain a complete picture of coverage by the download speed categories. No such estimation was made for the new 1Gbps upload and download category.

Note that unlike the technology coverage, the speed metric categories have been determined on a country level only, as gathering information on rural and regional NUTS 3 level would not have been feasible within the scope of the study – although we hope that NRAs and ISPs will consider collecting and making such information available at a future point in time.

3.7 Estimating additional mobile coverage metrics

As required in the Tender Specifications for CNECT/2021/OP/0081 and following the discussions with DG CONNECT at the inception meeting, the research team has included two mobile metrics as part of

the Broadband Coverage in Europe 2022 study, both aimed to monitor availability of 5G mobile broadband services to European consumers:

- 5G coverage
- 5G coverage on the 3.4–3.8 GHz spectrum band

5G coverage was included in the Broadband Coverage in Europe study for the first time in 2020, reflecting the progress of mobile operators that have deployed and launched their 5G networks in many European countries. Over the twenty-four months to mid-2022, significant progress has been made in 5G coverage due to the introduction of the Dynamic Spectrum Sharing (DSS) technology, which enables parallel use of LTE and 5G in the same frequency band. Moreover, official regulatory data on 5G rollouts has become available in the past year, providing a robust view of progress in 5G deployments. This is in addition to the research team review of information published by network operators on the cities and areas where their 5G networks and services have been launched.

Given the quite vast differences in performance quality delivered over 5G networks, the research team (in coordination with DG CONNECT) has this year introduced a second metric aimed at examining progress in the roll-out of 5G networks utilizing the 3.4–3.8 GHz frequency band, which is considered the most appropriate for 5G (5G primary band), capable of delivering high throughput (large contiguous bandwidth) and at the same time traveling significant distances, which in general means an improvement in quality of service and user experience.

4. European Overview

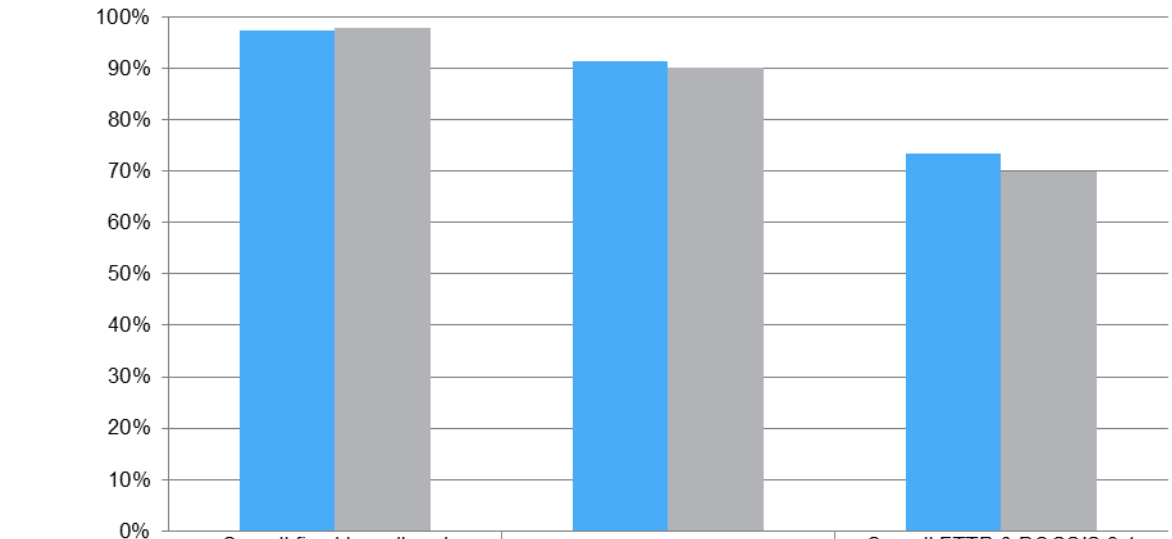
4.1 Europe-wide coverage by technology combinations

The main objective of the Broadband Coverage in Europe 2022 study was to assess the availability of broadband services across the EU, with additional information provided for Norway, Iceland, Switzerland, and the UK.

There are eleven broadband technologies examined in the 2022 edition of the BCE study: DSL, VDSL, VDSL2 Vectoring, FTTP, cable modem DOCSIS 3.0, DOCSIS 3.1, FWA (fixed wireless access), LTE, 5G, 5G coverage on the 3.4–3.8 GHz spectrum band, and satellite. All technologies except 5G coverage on the 3.4–3.8 GHz spectrum band were included in previous edition(s) of the study, thus ensuring comparability and the possibility to evaluate progress in broadband rollout across Europe.

The collected data shows that more than 185 million EU households (97.3%) had access to at least one of the main fixed broadband access technologies in mid-2022 (excluding satellite). The proportion of homes passed by at least one fixed broadband network (DSL, cable DOCSIS 3.0, FTTP or FWA) decreased marginally during the twelve months to mid-2022, by 0.6 percentage points (p.p.).

EU27: Coverage by technology combination, total, 2021 & 2022



	Overall fixed broadband coverage (total)	Overall NGA coverage (total)	Overall FTTP & DOCSIS 3.1 coverage (total)
EU27 2022	97.3%	91.5%	73.4%
EU27 2021	97.9%	90.1%	69.9%

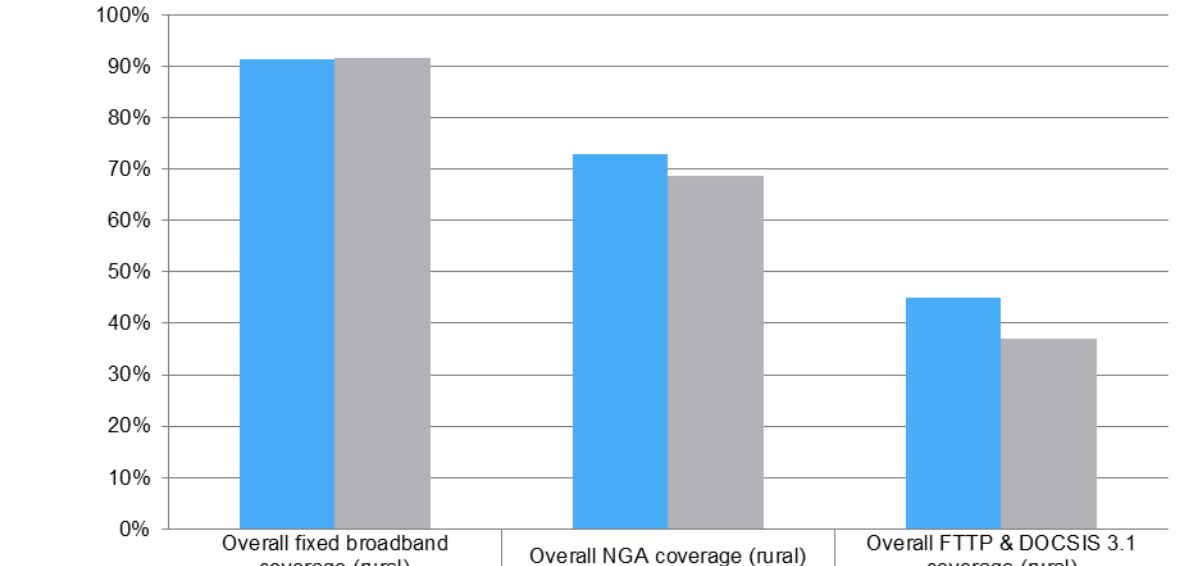
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The largest growth among the combination categories was witnessed in coverage of FTTP & DOCSIS 3.1 networks. These two technologies are those primarily capable of achieving at least 1Gbps, a stretch target of the Connectivity for a European Gigabit Society policy initiative[11]. During the twelve-month period to mid-2022, overall coverage of these networks increased by 3.5 percentage points. This marked a deceleration in coverage growth compared to the twelve months to mid-2021 (10.3 percentage points), mainly due to a slow-down in the rollout of DOCSIS 3.1 upgrades, which are now complete in a number of countries. Coverage of these ultra-high speed networks now reaches an additional 5.6 million EU homes, for a total of almost 140 million.

Coverage of NGA broadband continued to grow steadily, reaching 91.5% of EU households in mid-2022, an increase of 1.4 percentage points. Over 1.2 million additional EU households gained access to at least one of the NGA technologies (VDSL incl. VDSL2 Vectoring, FTTP, and cable modem DOCSIS 3.0 incl. DOCSIS 3.1) and in total 174 million EU homes were passed by at least one NGA network. In the future, it can be expected that growth in NGA coverage will slow down as NGA networks approach universal coverage levels.

[11] Connectivity for a European Gigabit Society - Brochure | Shaping Europe's digital future (europa.eu)

EU27: Coverage by technology combination, rural areas, 2021 & 2022



	Overall fixed broadband coverage (rural)	Overall NGA coverage (rural)	Overall FTTP & DOCSIS 3.1 coverage (rural)
EU27 2022	91.4%	72.9%	45.1%
EU27 2021	91.5%	68.6%	37.0%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Access to fast broadband services in rural areas remains a key priority for the EU. At the end of June 2022, 91.4% of rural households across the EU27 had access to at least one fixed broadband technology, in line with the figure recorded for mid-2021 (91.5%). But rural coverage of FTTP & DOCSIS 3.1 networks continued to grow strongly, increasing by more than 8 p.p. to reach 45.1% of rural homes in the EU – 13.9 million households in total, more than double the level recorded in 2019. This growth also helped to drive an increase in rural NGA coverage, and more than seven in ten rural households (72.9%) now have access to NGA, an increase of 4.3 p.p. since mid-2021.

Broadband coverage levels in rural regions remain notably lower than total national coverage, with the 91.4% rural fixed broadband coverage 5.9 percentage points below the total coverage of 97.3%. But the gap between total coverage and rural coverage of FTTP & DOCSIS 3.1 networks remained much larger, at 28.3 percentage points, though it narrowed during the twelve months to mid-2022, from 32.8 percentage points in 2021. Meanwhile, the difference in total and rural NGA coverage continued to narrow in 2022, falling to 18.5 p.p., highlighting the continued shift in NGA network deployments towards rural areas.

4.2 Europe-wide coverage by individual technologies

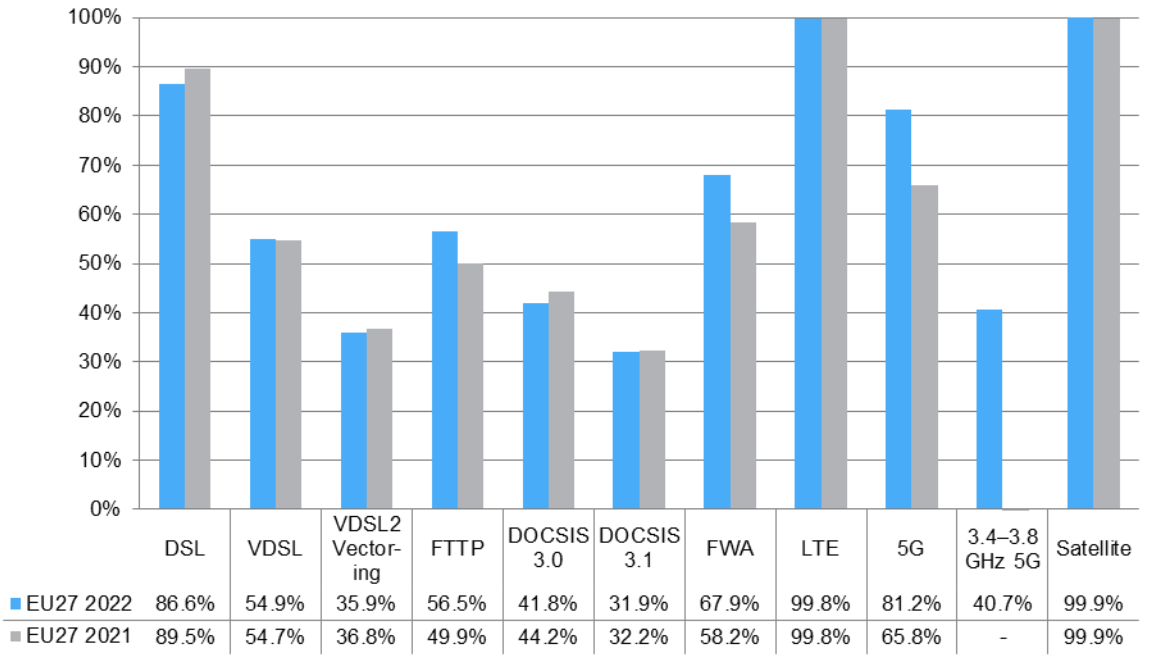
4.2.1 Coverage by technology in total

Examining the availability of fixed broadband technologies, DSL remained the most pervasive broadband technology, reaching 86.6% of EU households in mid-2022. This represents a 2.9 percentage point decline compared to mid-2021, underpinned by the growing number of operators opting for disconnection of copper lines and upgrade to fibre.

FTTP growth continued strongly over the year, and FTTP networks are now available to more than half of homes in the EU, with 56.5% of households having coverage, an increase of 6.6 p.p. since mid-2021. FTTP is now the leading NGA technology at EU level, having overtaken VDSL for the first time to reach over 107 million households (an increase of 11.8 million).

Coverage of cable modem networks declined slightly over the year to mid-2022, as the focus shifted further towards rollout of FTTP infrastructure. By mid-2022, 41.8% of EU households had access to high-speed cable broadband provided by DOCSIS 3.0, a decrease of 2.4 p.p. from mid-2021. Cable services provided over DOCSIS 3.1 were available to 31.9% of EU households, which means that 76.3% of DOCSIS 3.0 networks had been upgraded to the DOCSIS 3.1 standard at the end of June 2022, up from 72.8% the previous year.

EU27: Coverage by technology, total, 2021 & 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
EU27 2022	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%
EU27 2021	89.5%	54.7%	36.8%	49.9%	44.2%	32.2%	58.2%	99.8%	65.8%	-	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Over the study period, VDSL coverage remained flat, growing only marginally by 0.2 percentage points since mid-2021. VDSL coverage growth in Europe has stalled as operators have diverted investments towards more advanced technologies (especially FTTP) in pursuit of the Digital Decade targets. At the end of June 2022, VDSL was available to more than half of EU households (54.9%). Availability of VDSL2 Vectoring technology declined for the first time, and by mid-2022, 35.9% of EU homes were passed by VDSL2 Vectoring, a 0.9 percentage point increase compared to the end of June 2021.

Fixed Wireless Access, which includes Wi-Fi, WiMAX, 4G LTE-TDD, and 5G FWA was available to 67.9% of EU households at the end of June 2022, a 9.7 percentage point increase compared to mid-2021. This represents a further acceleration in growth from the previous year (when coverage increased by 6.4 percentage points). This reflects the increasing importance of 4G and 5G FWA access, which the research team expects to continue growing strongly in the next few years.

Examining mobile network coverage, LTE growth remained flat over the study period, at 99.8% availability. With LTE coverage at an almost universal level in most of the EU, the focus has now shifted to 5G rollouts. Mobile network operators made further significant progress in 5G over the year to June 2022. Official data on 5G coverage is now available for most countries, and the research team has reviewed available information published by network operators on their 5G network deployments and

service launches to complete the picture at EU level. By June 2022 more than four in five households across the EU (81.2%) were passed by 5G networks, a substantial increase since the previous year.

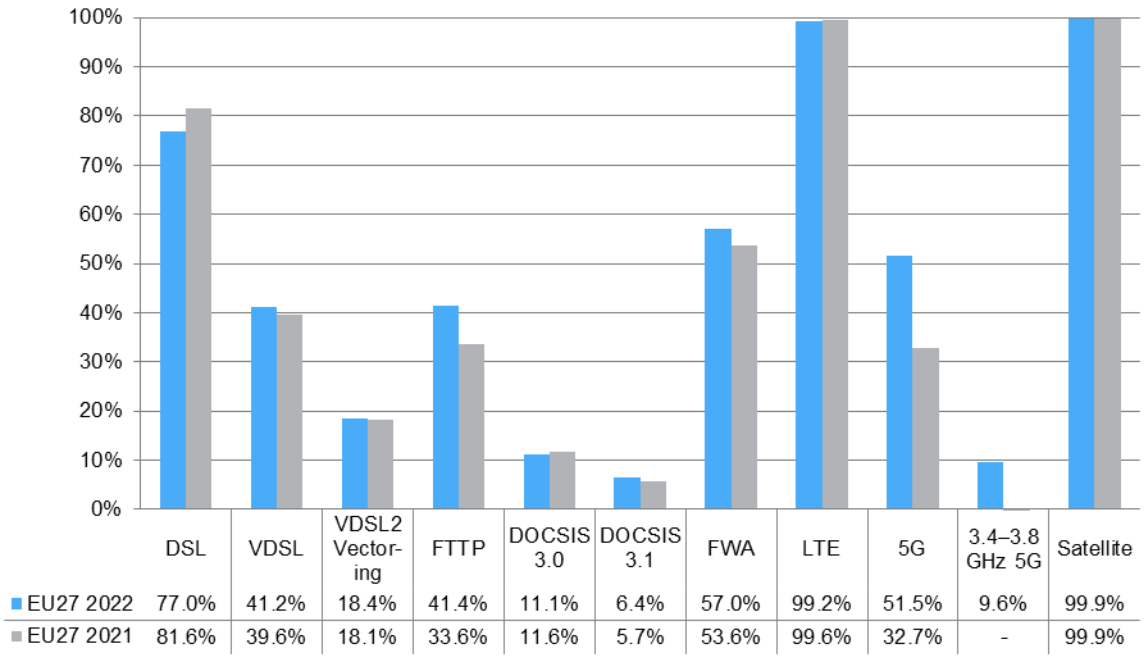
Much of this 5G coverage has been provided by the use of Dynamic Spectrum Sharing technology (DSS), which has allowed operators to deploy 5G coverage rapidly using existing infrastructure. In order to better track the deployment of new 5G infrastructure, the research team has added a new category for the 2022 study, tracking the coverage of 5G networks using the 3.4–3.8 GHz band. Coverage of these networks reached 40.7% of EU households as of mid-2022, meaning that four in ten EU citizens have access to fast 5G services using this band.

At the end of June 2022, satellite broadband was available to 99.9% of EU households, remaining the most pervasive technology in Europe in terms of overall coverage. Our research indicates there has been no change in satellite broadband availability in Europe compared to 2021. There continued to be limited coverage from KA-band satellites in Estonia, with satellite broadband reaching only certain parts of the country. Iceland remained the only study country where there were no satellite broadband services available.

4.2.2 Coverage by technology in rural areas

Historically, it has been hard for operators to justify investments in rural areas. As a result of the low population density in these areas, investments can be viewed as economically less profitable. Consequently, achievement of the Digital Decade's goal of gigabit broadband available to everyone by 2030 will present a challenge, especially in EU's rural regions.

EU27: Coverage by technology, rural areas, 2021 & 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
EU27 2022	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%
EU27 2021	81.6%	39.6%	18.1%	33.6%	11.6%	5.7%	53.6%	99.6%	32.7%	-	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The most widespread fixed broadband technology in rural areas continued to be DSL, reaching 77.0% of rural EU households by mid-2022, down by 4.6 p.p. over the year due to the withdrawal of copper access in favour of FTTP, notably in Spain and Sweden. FTTP coverage continued to expand more quickly than other fixed broadband technologies in rural areas. Rural FTTP availability increased by 7.8 percentage points, reaching more than four in ten rural EU households (41.4%). This significant growth indicates the increased focus of many European operators on deploying FTTP networks even in traditionally less profitable rural areas.

Cable coverage in rural areas remained limited due to the high costs associated with deploying cable networks historically, and the shift in focus to FTTP in recent years. At the end of June 2022, cable modem DOCSIS 3.0 networks passed only 11.1% of rural EU homes, down fractionally since mid-2021. But rural availability of DOCSIS 3.1 continued to increase, reaching 6.4% of rural households at the end of June 2022, meaning that more than half of rural cable networks (58.0%) have now been upgraded to the DOCSIS 3.1 standard.

During the twelve months to mid-2022, rural VDSL coverage expanded by 1.6 percentage points, reaching 41.2% of rural households. As was the case in previous years, the additional VDSL coverage relates mainly to areas already covered by DSL networks, which are being gradually upgraded to VDSL. Consequently, this increase would not account for newly deployed networks to previously unserved areas. VDSL2 Vectoring was available to 18.4% of rural households: 17.5 percentage points fewer than on a national level.

Fixed Wireless Access was available to 57.0% of rural households in mid-2022, up by 3.3 p.p. over the study period. Recent years have seen the emergence of fixed wireless solutions as substitutes to traditional fixed broadband technologies in remote areas, mostly in rural regions.

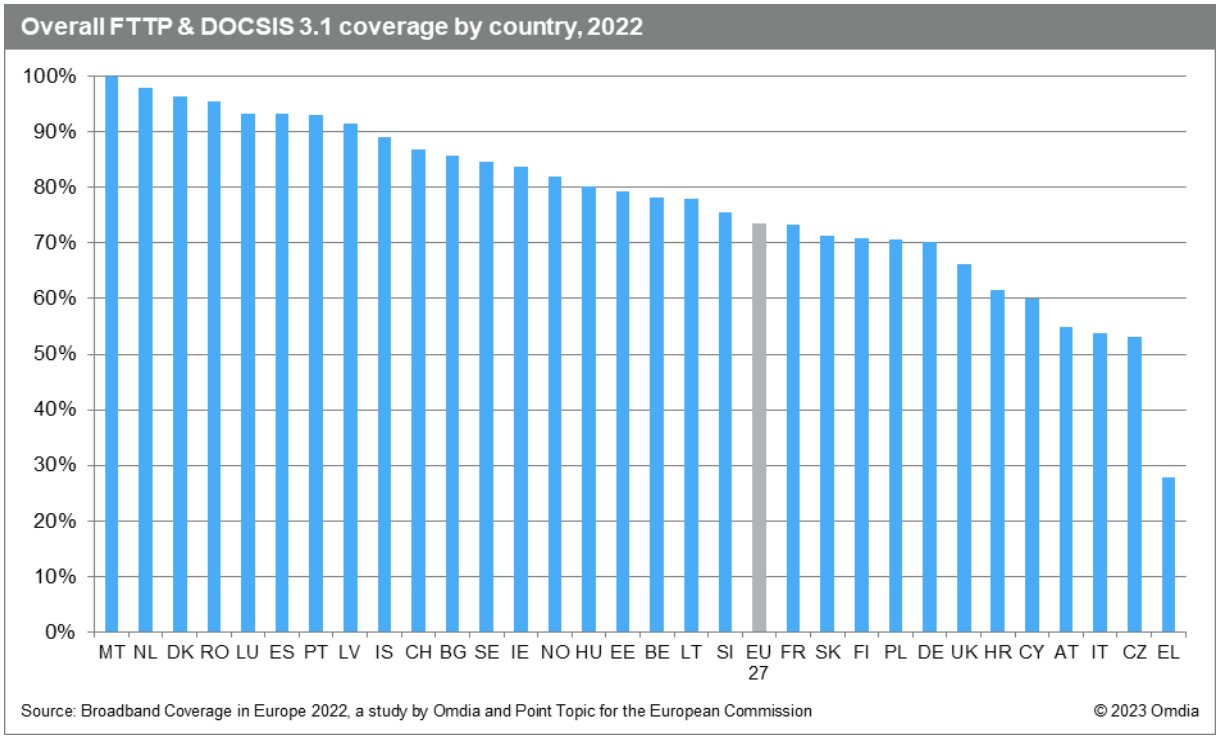
By mid-2022, rural LTE coverage approached near universal levels, with 99.2% of rural EU homes passed by at least one LTE network. As most areas become covered by LTE networks, the pace of rollouts has slowed down considerably, although further improvements in rural coverage are expected as 3G and 2G networks are switched off in coming years. Although 5G deployments tend to focus first on urban areas, availability of 5G services in rural areas has grown substantially, with more than half (51.5%) of rural EU households covered by 5G networks at June 2022. Much of this coverage uses DSS, therefore rural 5G coverage using the 3.4–3.8 GHz spectrum band was much lower as of mid-2022, at only 9.6% of rural households.

The nature of satellite technology means that satellite broadband services reach a similar level of coverage in rural areas as across the EU as a whole. As such, satellite broadband coverage remained relatively unchanged, reaching 99.9% of rural areas. Satellite remains the only option for receiving broadband access in the most sparsely populated and hard-to-reach regions.

4.3 Country comparison by total technology coverage

4.3.1 Total overall FTTP & DOCSIS 3.1 coverage by country

The Digital Decade target on gigabit connectivity is measured as the percentage of households covered by fixed Very High-Capacity Networks (VHCN). The technologies considered are those currently capable of supporting gigabit speeds, namely FTTP and cable DOCSIS 3.1.[12] At the end of June 2022, 73.4% of EU households were passed by at least one FTTP or DOCSIS 3.1 network, with coverage growing by 3.5 percentage points on the EU27 level. Overall FTTP & DOCSIS 3.1 coverage ranges between 27.8% in Greece and 100.0% in Malta. Among the countries registering the highest coverage were those with most widespread DOCSIS 3.1 coverage, such as Malta and the Netherlands both reaching coverage levels over 97%. Denmark and Romania were also among the leaders in this category owing to extensive FTTP coverage in both countries.



On the other hand, countries such as Greece, Czechia, Italy and Austria recorded the lowest levels, due to operators' past preference for VDSL upgrades over FTTP deployments, and in the case of Greece and Italy the absence of any DOCSIS 3.1 deployments.

4.3.1.1 Total FTTP coverage by country

As stated in the Commission Implementing Decision setting out KPIs to measure the Digital Decade targets, the evolution of FTTP coverage will also be taken into consideration when interpreting gigabit capable (VHCN) coverage. In the twelve months to mid-2022, FTTP coverage increased by 6.6 percentage points. Overall, 56.5% of EU homes were passed by FTTP networks with eleven countries recording FTTP coverage below the EU average.

Romania is now the country with the highest FTTP coverage level, with 95.6% of homes passed, following an 8.5 p.p. increase over the year.

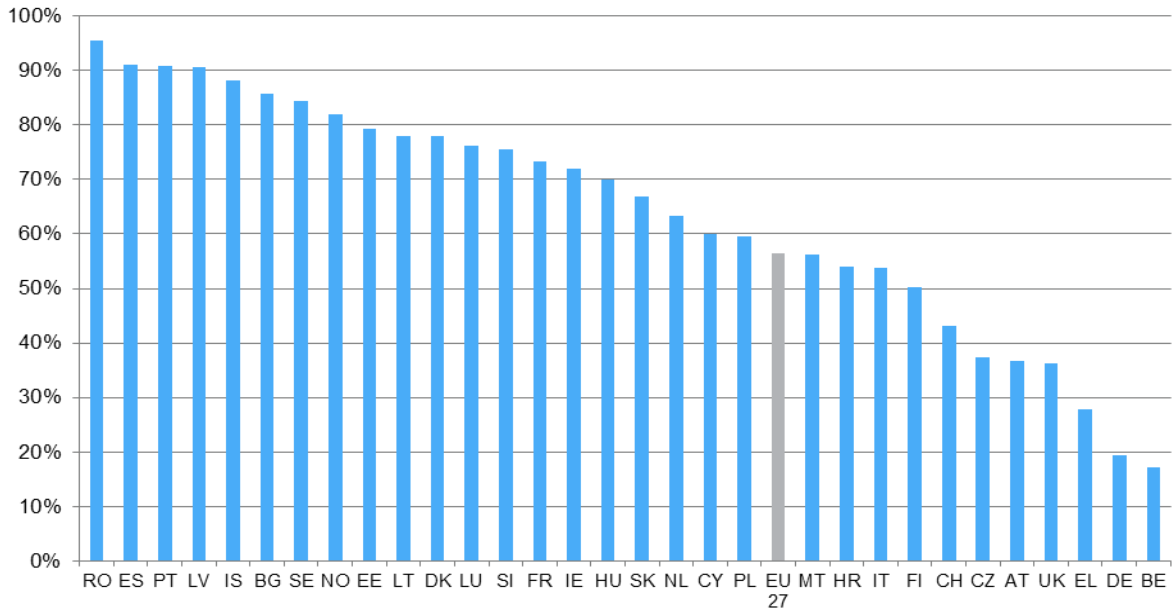
Three other countries – Spain, Portugal, and Latvia – reached FTTP coverage levels higher than 90%, and a further four surpassed 80%. As a testament to the increased FTTP deployment activity across Europe, six study countries recorded double-digit growth in FTTP coverage – Austria, Croatia, Cyprus, Finland, the Netherlands and the UK.

Whilst FTTP networks were available in all study countries, availability remained limited in some. However, this year, no country recorded FTTP coverage below 10% and only two countries, Belgium and Germany, recorded FTTP coverage below 20%. In both these countries, the incumbent has

[12] As set out in the Implementing decision setting out key performance indicators to measure the progress towards the digital targets, see EUR-Lex - 32023D1353 - EN - EUR-Lex (europa.eu), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023D1353

historically prioritised VDSL upgrades to existing DSL networks as opposed to investing in the typically more expensive FTTP technology. A similar strategy was adopted by operators in other countries such as Greece, the UK, Austria and Czechia, which all recorded FTTP coverage levels below 40% in mid-2022. But it is worth noting that some operators (such as BT/Openreach in the UK, for example) have now revisited their network deployment strategies to prioritise FTTP roll-out over legacy network upgrades, and this has led to some significant increases in FTTP coverage over the twelve months to mid-2022. In the UK, FTTP coverage grew by 13.1 p.p., Austria saw a 10.0 p.p. increase and in Greece, FTTP coverage increased by 8.0 p.p..

FTTP coverage by country, 2022

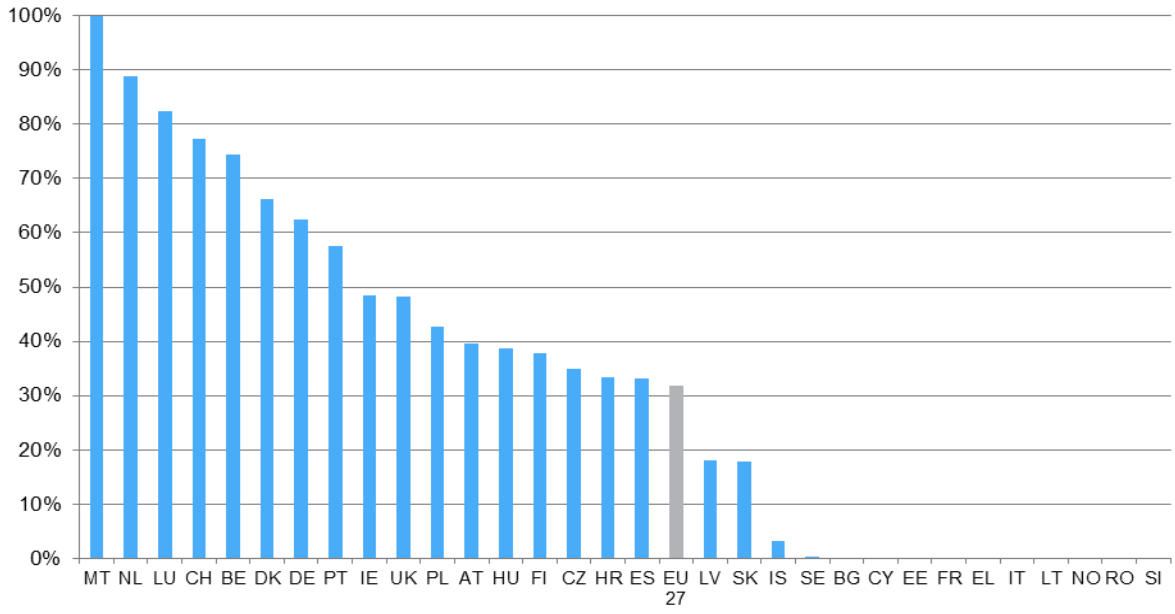


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

4.3.1.2 Total DOCSIS 3.1 coverage by country

The DOCSIS 3.1 standard allows cable operators to compete with fibre operators on the ultrafast broadband market, and as of mid-2022, DOCSIS 3.1 was available to 31.9% of EU households. This figure declined marginally since 2021, further indicating the shift in focus towards investment in FTTP, even among cablecos. Moreover, more than three quarters (76.3%) of DOCSIS 3.0 networks have been upgraded to the DOCSIS 3.1 standard by the end of June 2022, compared to 72.8% the year prior.

DOCSIS 3.1 by country, 2022

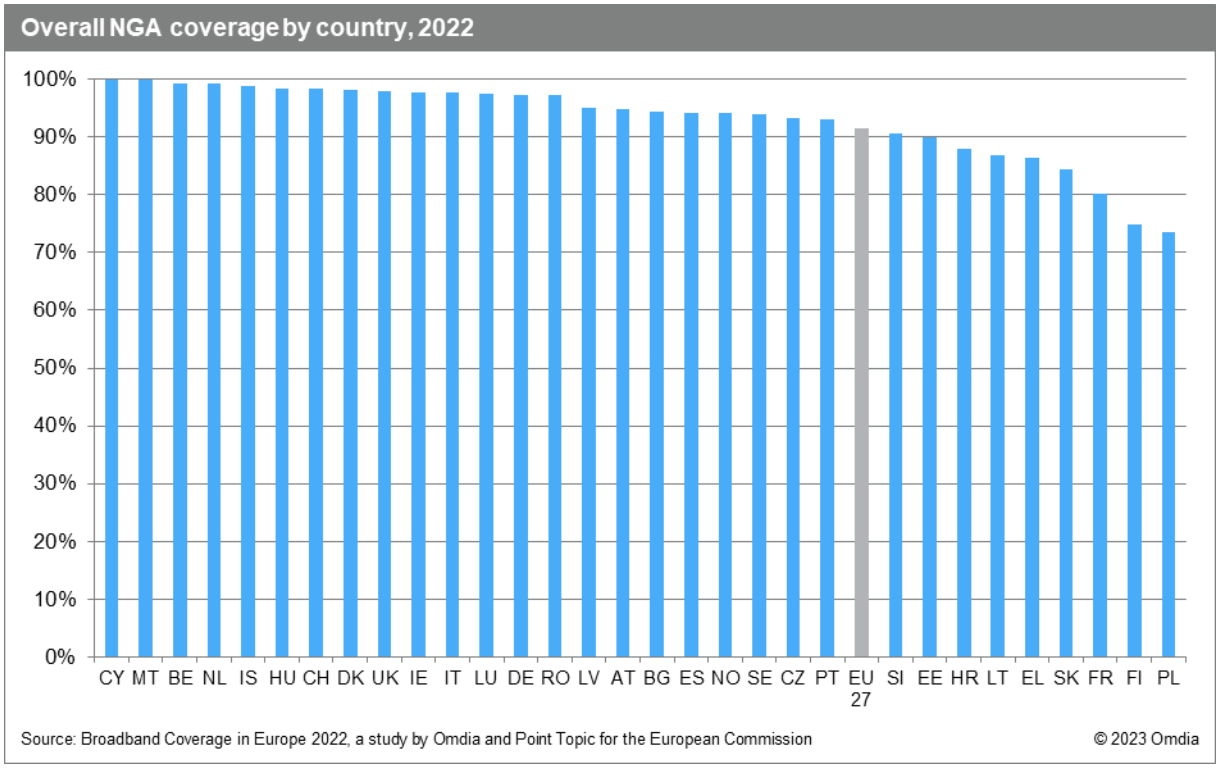


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DOCSIS 3.1 coverage varied widely across study countries, between 100.0% in Malta, and 0.0% in ten study countries. It is to be noted that in Croatia, Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, Malta, Poland, Portugal, Spain, and the UK, cable networks have been upgraded almost entirely or entirely to the DOCSIS 3.1 standard.

4.3.2 Total overall NGA coverage by country

The NGA combination category is comprised of VDSL (including VDSL2 Vectoring), FTTP, and cable modem DOCSIS 3.0 (including DOCSIS 3.1) technologies, all typically capable of delivering a service speed of at least 30Mbps (although VDSL local loop lengths mean that actual speeds do vary[13]). One of the original objectives of the Digital Agenda for Europe was to have complete coverage of European households at this speed. Since then, the goals have shifted towards gigabit coverage. Nevertheless, the analysis of this combination category still constitutes an important evaluation of the rollout of the relevant technologies and progress towards this goal.



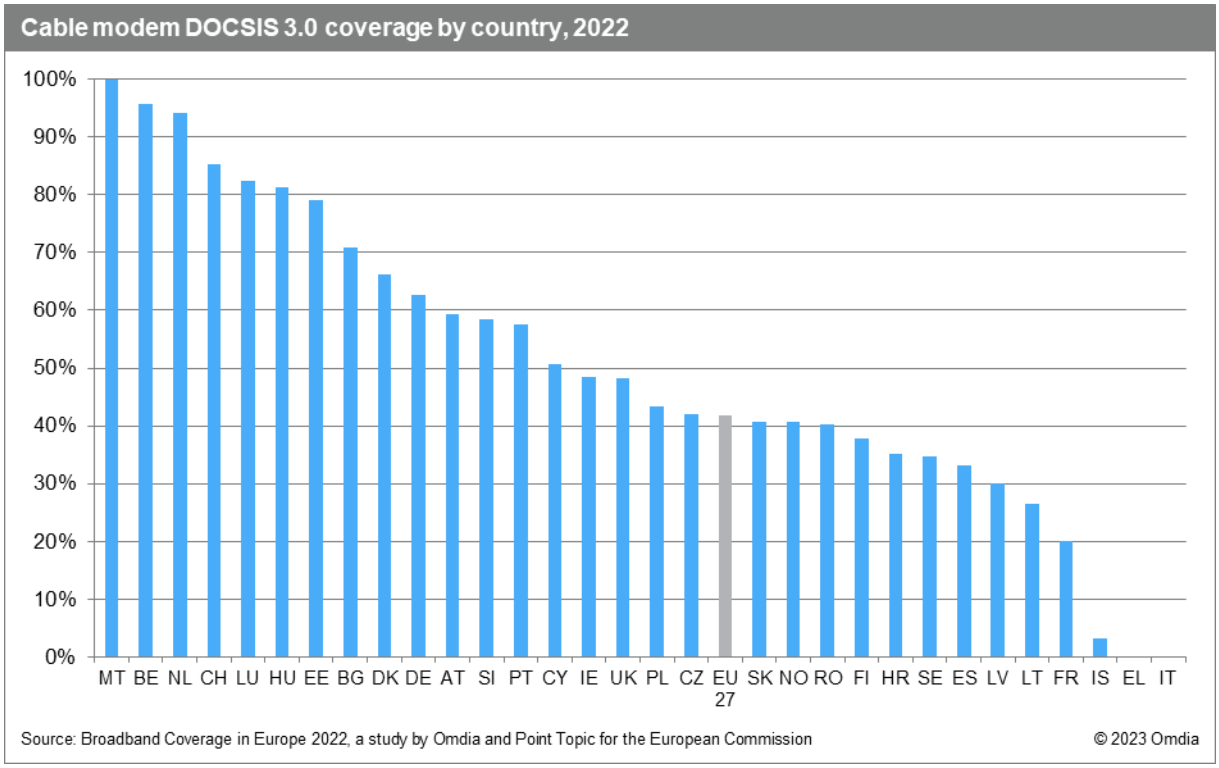
By the end of June 2022, there continued to be considerable differences in NGA coverage across the study countries, reflecting the various strategies adopted by network operators across Europe to deploy high-speed broadband. Cyprus and Malta were the two countries that recorded complete NGA coverage, whilst Belgium, the Netherlands, Iceland, Hungary, Switzerland, and Denmark continued to reach near universal NGA coverage levels.

On the other hand, nine countries reported coverage levels below the European average of 90.1%, with Poland recording the lowest coverage of the study, with 73.4% of homes passed by NGA networks.

4.3.2.1 Total DOCSIS 3.0 coverage by country

At the end of June 2022, cable modem DOCSIS 3.0 services were available to 41.8% of EU households. As was the case in previous iterations of this study, cable availability varied widely across study countries, from complete absence of coverage in Italy and Greece to universal coverage in Malta. Belgium and the Netherlands were the only other countries where coverage exceeded 90%.

[13] Please see Chapter 4.5 for more information on actual download speed coverage.



In most countries, cable modem DOCSIS 3.0 coverage has remained relatively unchanged over the last few years, owing to cable networks having largely been upgraded to DOCSIS 3.0 already, and the lack of further deployment of new cable networks. Increases in cable coverage are generally limited to infill of holes in existing coverage areas, or new housing developments within existing coverage footprints. On the other hand, decommissioning of cable networks and their upgrade to FTTP has already started in several study countries, with Cyprus witnessing the largest decrease of 15.3 percentage points compared to mid-2021, and large markets such as Spain and Germany seeing declines of more than 5 percentage points.

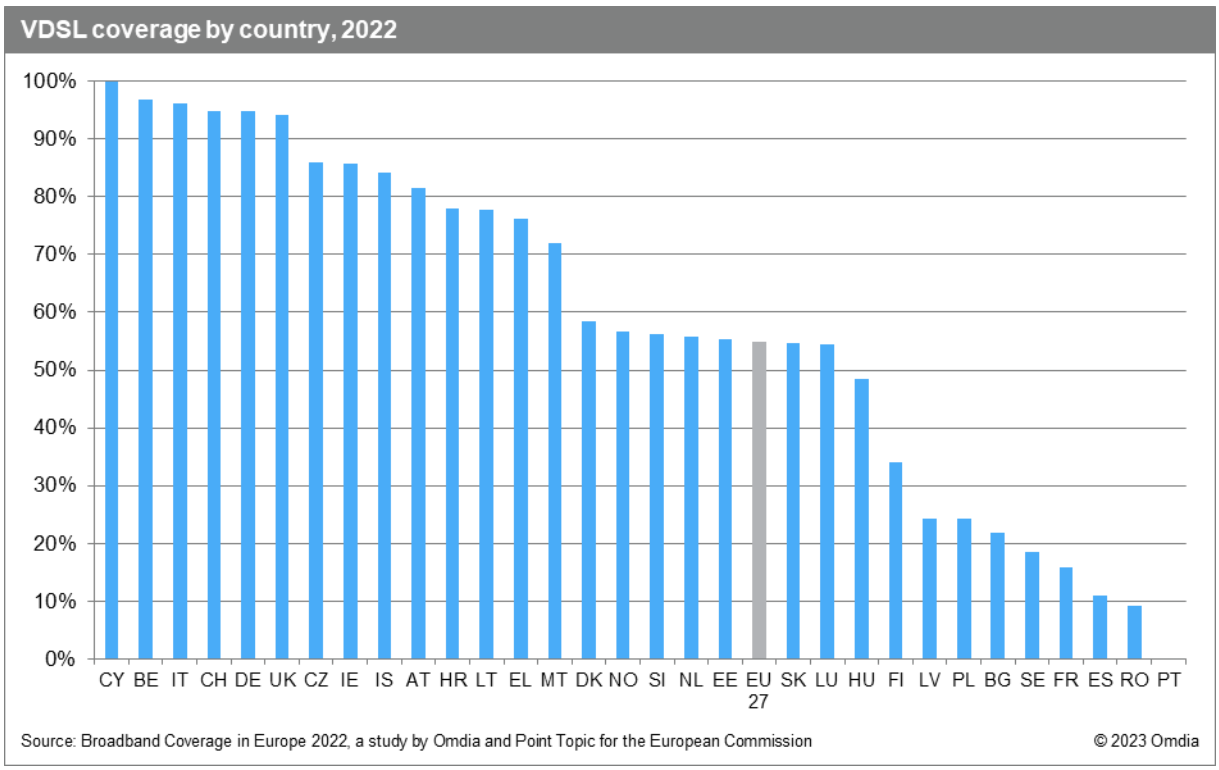
4.3.2.2 Total VDSL coverage by country

VDSL broadband services were available to 54.9% of EU households by mid-2022, unchanged from mid-2021. In the last few years, the pace of growth in VDSL coverage has slowed down gradually indicating a shifting strategy of most operators to move away from upgrading existing copper infrastructure to investing in deployments of fibre optic networks all the way to customers' property.

It is important to note that broadband performance on VDSL lines varies depending on the length of the copper loop from the VDSL enabled cabinet connected to the optical fibre backhaul. Formerly, households with a VDSL connection at a distance of about 500 metres from a VDSL enabled street cabinet or exchange, typically, reached download connection speeds of around 25Mbps. However, with the newest VDSL technology, these speeds can be achieved up to a distance of 1 000 metres.[14]

By mid-2022, Cyprus, Belgium, Italy, Switzerland, Germany, and the UK all recorded VDSL coverage levels that exceeded 90%, whilst VDSL networks passed more than 80% of homes in four other countries (Czechia, Ireland, Iceland, and Austria). Overall, 19 study countries recorded VDSL coverage levels that were higher than the EU average of 54.9%. Over the study period, Lithuania saw a 37.6 percentage point increase as the incumbent upgraded its legacy copper network. Latvia's coverage increased by 5.2 p.p., but no other country increased by more than 5 p.p., indicating the continuing shift in focus towards FTTP by European incumbents. Finland's VDSL coverage decreased by 10.8 p.p. over the year as a result of copper decommissioning.

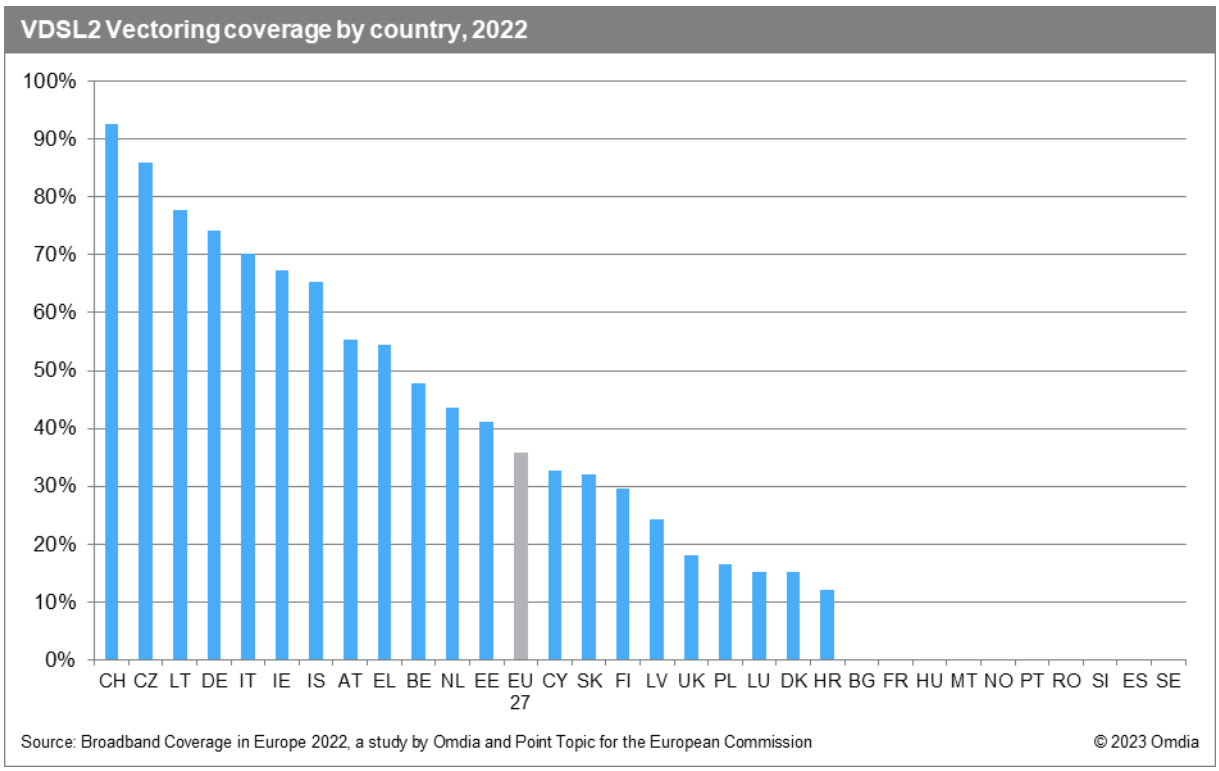
[14] For further analysis of actual download speed coverage please see Chapter 4.5.



VDSL services remained far from widespread in a number of countries. Romania, Spain, France, Bulgaria, and Latvia all recorded VDSL coverage below 20%, while Portugal remained the only country with no VDSL availability. Yet, it is important to note that in many of these countries, operators traditionally focus on deploying other NGA technologies, such as FTTP.

4.3.2.3 Total VDSL2 Vectoring coverage by country

Availability of VDSL2 Vectoring technology was tracked for the first time in 2019 to indicate coverage of higher-capacity bandwidth services offered via legacy copper networks, i.e. those typically providing download speeds higher than 100Mbps.



On average, VDSL2 Vectoring coverage reached over a third (35.9%) of EU households at the end of June 2022. However, availability of VDSL2 Vectoring services continued to vary widely across the EU,

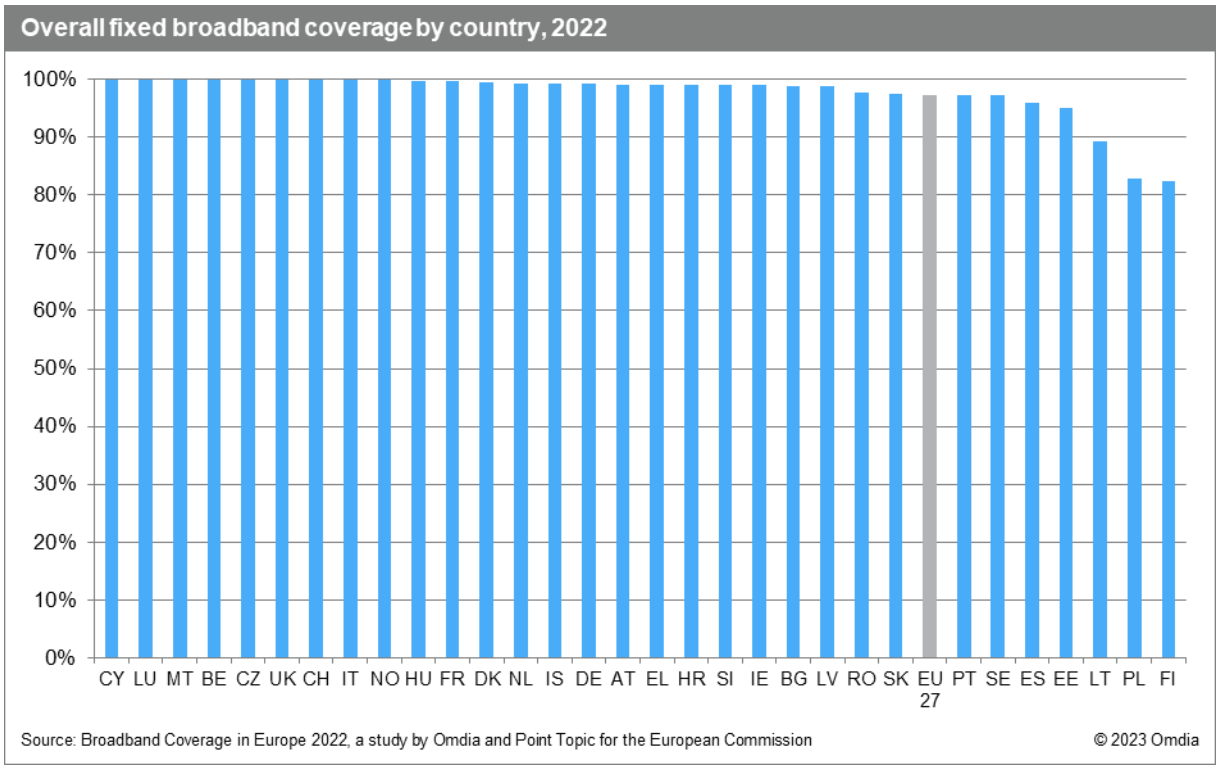
between 0.0% and 92.7%. The technology was absent in ten study countries, and its coverage surpassed 50% of households in nine countries. It is worth noting though that two countries, Switzerland and Iceland, which recorded two of the five highest VDSL2 Vectoring coverage levels are not EU Member States and therefore are not included in the average EU27 VDSL2 Vectoring coverage calculation.

Switzerland recorded the highest VDSL2 Vectoring coverage of this study, with 92.7% of homes passed by VDSL2 Vectoring, followed by Czechia, where VDSL2 Vectoring services were available to 86.0% of households. Moreover, due to the focus of the Czech incumbent's infrastructure arm on deploying VDSL2 Vectoring solutions over the last couple of years, Czechia's whole VDSL network footprint has been upgraded to this technology.

In the case of Italy, VDSL2 Vectoring is not deployed, but due to the nature of the legacy copper network grid, with large number of cabinets positioned close to customer premises, the VDSL network is capable of reaching speeds higher than 100Mbps. In order to not skew the results unfavourably, the research team worked with the Italian NRA to precisely identify those households close enough to the cabinet to receive at least 100Mbps coverage and only those were classified as VDSL2 Vectoring passed for the purposes of the study and included in this category.

4.3.3 Total overall fixed broadband coverage by country

The overall fixed broadband coverage category has been designed to provide a measure of progress in deployment of fixed broadband access technologies, which are capable of providing households with broadband services of at least 2Mbps download speed. Four technologies make up the overall fixed broadband coverage figure: DSL (including VDSL and VDSL2 Vectoring), cable (DOCSIS 3.0 and DOCSIS 3.1), FTTP, and FWA. FTTP coverage trends are discussed in more detail in the previous chapter 4.3.1.1. Total FTTP coverage by country.



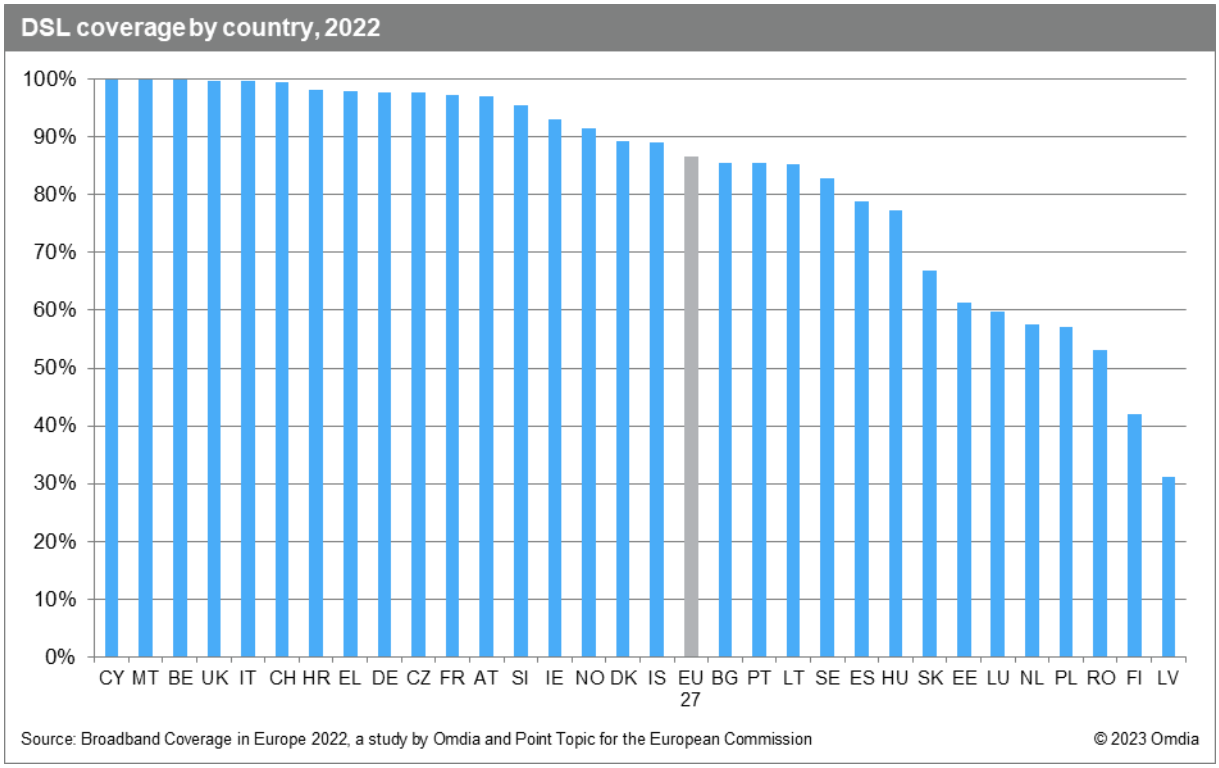
In total, 27 out of the 31 study countries registered fixed broadband coverage of above 95%, highlighting the breadth of fixed broadband coverage in most countries. As of mid-2022, three countries recorded complete fixed broadband coverage, namely: Cyprus, Luxembourg, and Malta. On the other hand, Lithuania, Poland, and Finland were the only countries with fixed broadband coverage levels below 90%.

4.3.3.1 Total DSL coverage by country

As was the case in previous iterations of this study, DSL continued to be the most pervasive fixed broadband technology in terms of coverage in most study countries. In total, 15 out of the 31 study countries recorded DSL coverage above 90%, although the EU27 average for DSL availability declined by 3.0 percentage point since mid-2021. At the end of June 2022, Cyprus and Malta reported complete

coverage by DSL networks. However, it is important to note that while universal DSL coverage was registered for these countries, this is generally considered accurate to one decimal place to account for the possibility of a negligible number of remote homes failing to receive DSL coverage.

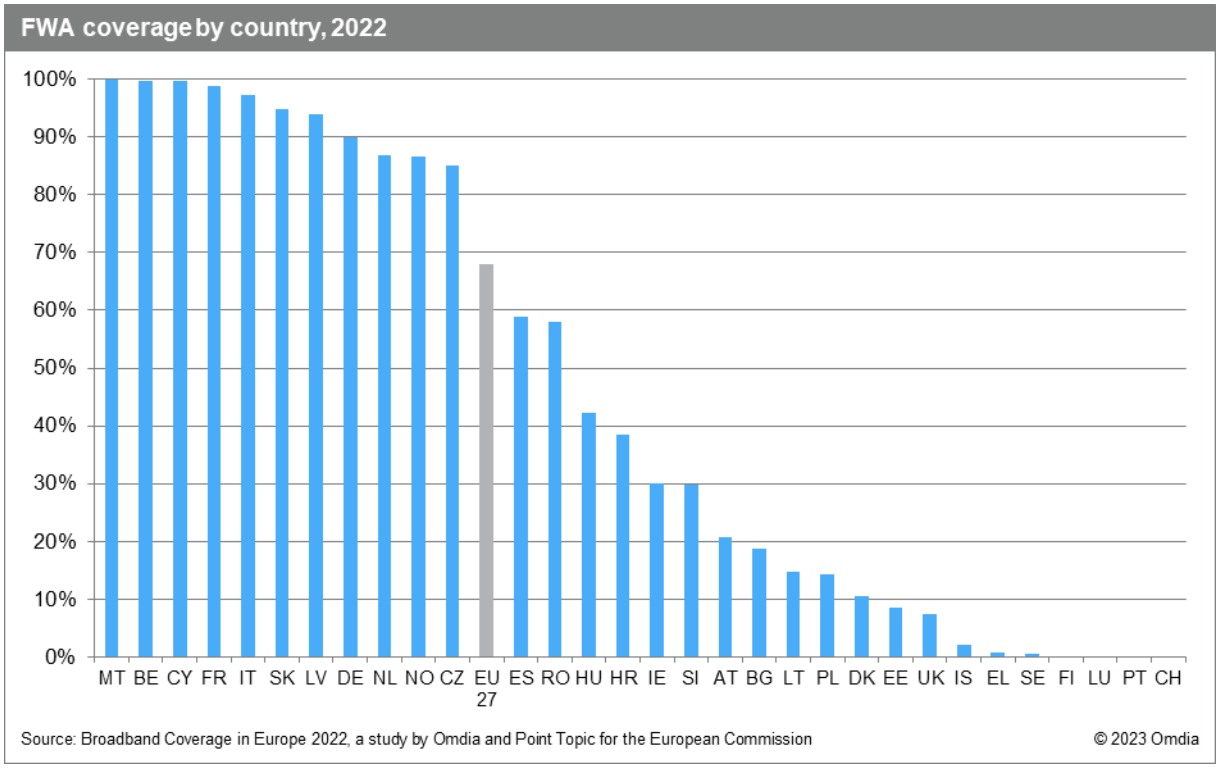
Universal or near-universal DSL coverage (i.e. very close to 100% of households) was observed in countries with the most developed traditional telephone networks as DSL technology utilizes legacy fixed line twisted-pair copper network infrastructure.



In an increasing number of countries, DSL coverage has decreased, most often as a result of decommissioning of legacy copper lines and their replacement by fibre optic networks or FWA and mobile networks in some instances (e.g. Finland). Latvia, Finland, Romania, Poland, the Netherlands, Luxembourg, Estonia and Slovakia all recorded DSL coverage levels below 75%.

4.3.3.2 Total FWA coverage by country

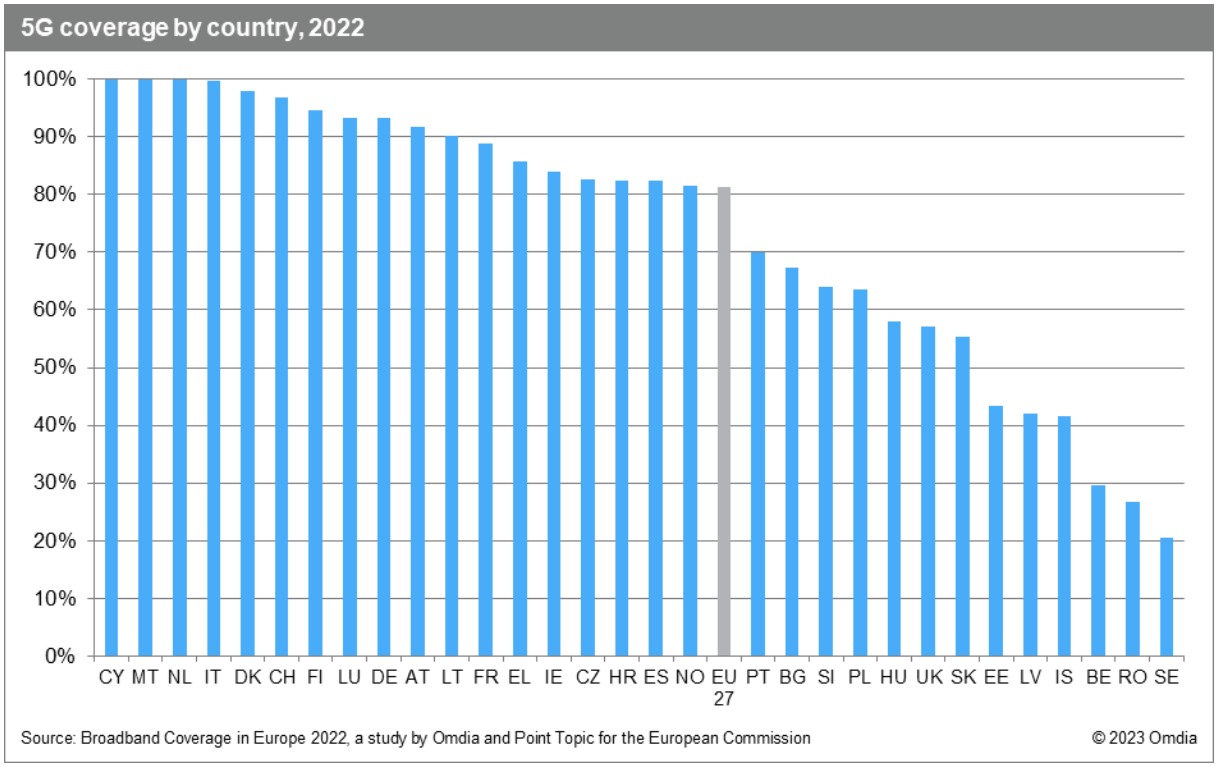
Fixed Wireless Access includes Wi-Fi, WiMAX, 4G TD LTE and 5G FWA. Those technologies generally provide a viable broadband solution for less-densely populated and harder-to-reach areas. The EU27 average for FWA coverage stood at 67.9% at the end of June 2022, with coverage ranging between 0.0% and 100.0%. In several countries, there were no FWA services available to households while only Malta recorded complete FWA coverage.



4.3.4 Total mobile broadband coverage by country

4.3.4.1 Total 5G coverage by country

Official data on 5G coverage is now available for many countries, and the research team has reviewed available information published by network operators on their 5G network deployments and service launches to complete the picture. Where the research team has estimated 5G coverage based on information published by operators on the cities and areas where their 5G services have been launched, we have taken into consideration that not all of a given city or an area would have been covered initially.



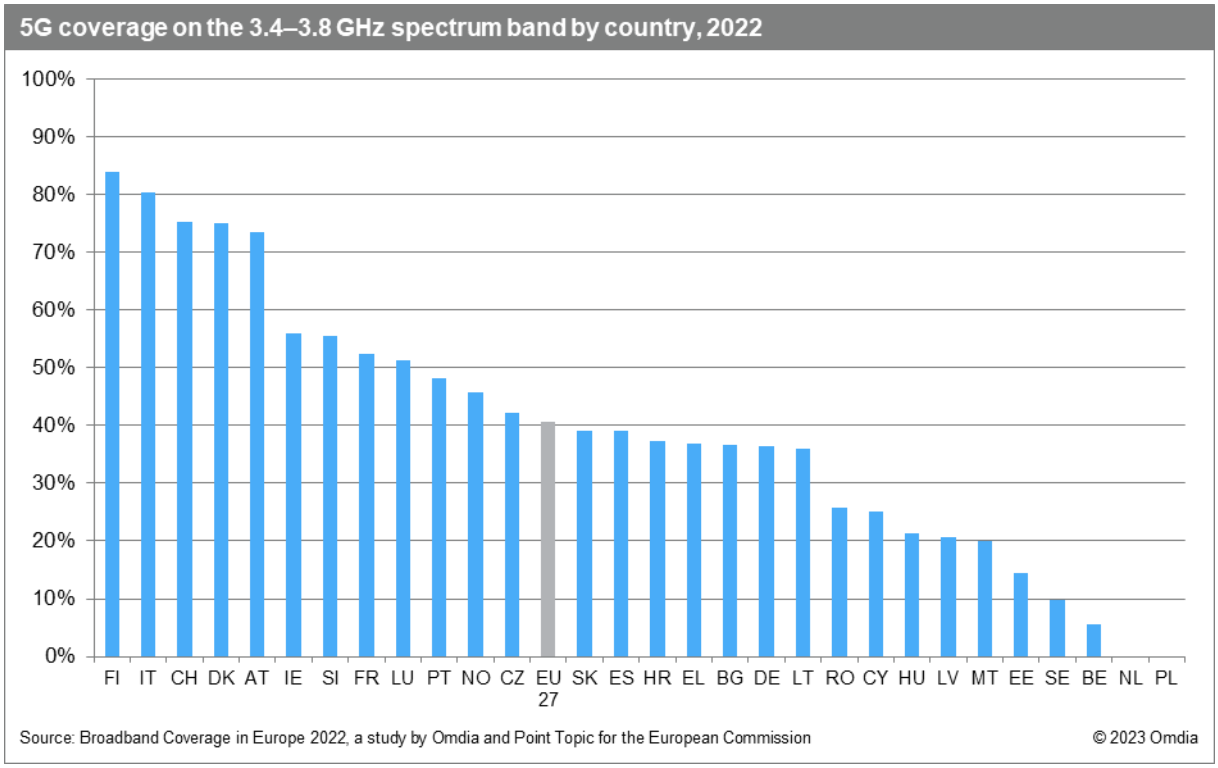
Note: 5G coverage includes coverage provided using Dynamic Spectrum Sharing (DSS)

Mobile network operators made further significant progress in 5G over the year to June 2022 with 5G services being available in all study countries following launches in Latvia and Portugal over the course of the year. Much of this coverage has been provided by the use of Dynamic Spectrum Sharing technology (DSS), which has allowed operators to deploy 5G coverage rapidly using existing infrastructure. Such an example is the Netherlands, where 5G coverage is now universal at 100.0% of households, a milestone also achieved by Cyprus and Malta. In Italy, Denmark, and Switzerland, 5G coverage reached more than 95% of households by mid-2022, and a further four countries surpassed 90% 5G coverage.

At the end of June 2022, only six countries failed to achieve 50% coverage of 5G services – Sweden, Romania, Belgium, Iceland, Latvia, and Estonia.

4.3.4.2 Total 5G coverage on the 3.4–3.8 GHz spectrum band by country

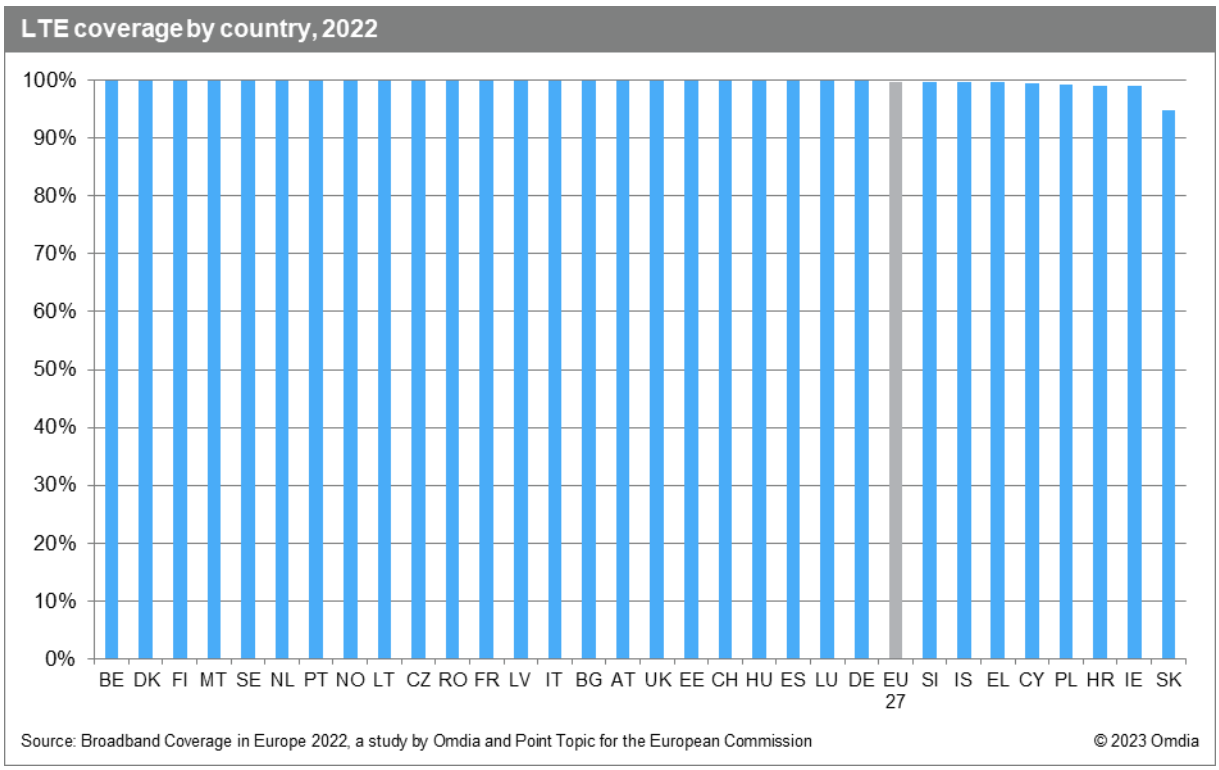
For the 2022 study, the Broadband Coverage in Europe team has added an additional technology category to track 5G coverage on the 3.4–3.8 GHz spectrum band. As of June 2022, these services were available to 40.7% of households in the EU, but availability ranged widely between different countries. Five countries – Finland, Italy, Switzerland, Denmark and Austria – recorded coverage greater than 70%, and a further four surpassed 50%. But two countries recorded zero coverage using this band – Poland and the Netherlands, the latter of which recorded 100% 5G coverage using other frequencies and DSS.



Note: Data on 5G coverage on the 3.4–3.8 GHz spectrum band is not available for Iceland and the UK

4.3.4.3 Total LTE coverage by country

LTE coverage in the EU remained near-universal in the twelve-month period to mid-2022, reaching 99.8% of households. Slovakia saw a decrease of 3.6 percentage points and was the country with the lowest LTE availability, at 94.8% of households covered.



4.3.5 Total satellite coverage by country

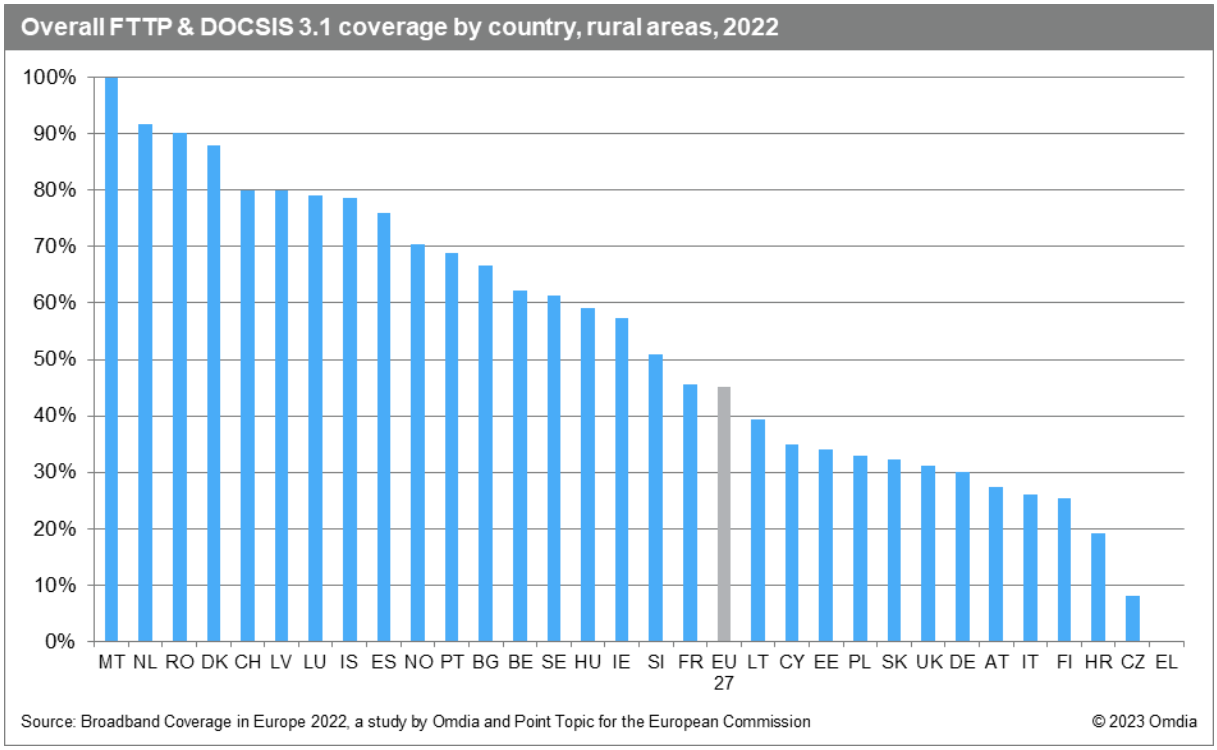
At the end of June 2022, all study countries, with the exception of Iceland, were covered by KA-band satellite, which is able to deliver a 2Mbps broadband service. However, in certain countries (Estonia and Norway) there was only partial satellite coverage. Satellite beams are capable of reaching 75.4% of Estonian households and 97.2% of Norwegian households, figures which are essentially unchanged since 2013. However, it is important to note that while satellites are technically able to cover all households in the reach of a particular beam, the actual number of users that can be serviced by a single beam is limited by the peak average bandwidth usage, thus restricting the number of serviceable homes in a particular area.

As in the previous years, the research team estimated the total EU coverage of satellite broadband as reaching over 99.0% of EU households. Satellite coverage in rural areas was assumed to be identical to the total satellite coverage and satellite coverage for overseas administrative areas was assumed to be the same as coverage of the respective countries to which they belong (France, Portugal and Spain).

4.4 Country comparison by rural technology coverage

4.4.1 Rural overall FTTP & DOCSIS 3.1 coverage by country

By mid-2022, 45.1% of rural EU homes were passed by either FTTP or DOCSIS 3.1 networks. Despite growing by 8.0 percentage points compared to the end of June 2021, overall FTTP & DOCSIS 3.1 coverage of rural regions across the EU was 28.3 percentage points lower than on a national level, although this gap has closed by 4.5 p.p. since 2021, indicating an increased focus on rural gigabit coverage by governments, regulators, and operators.

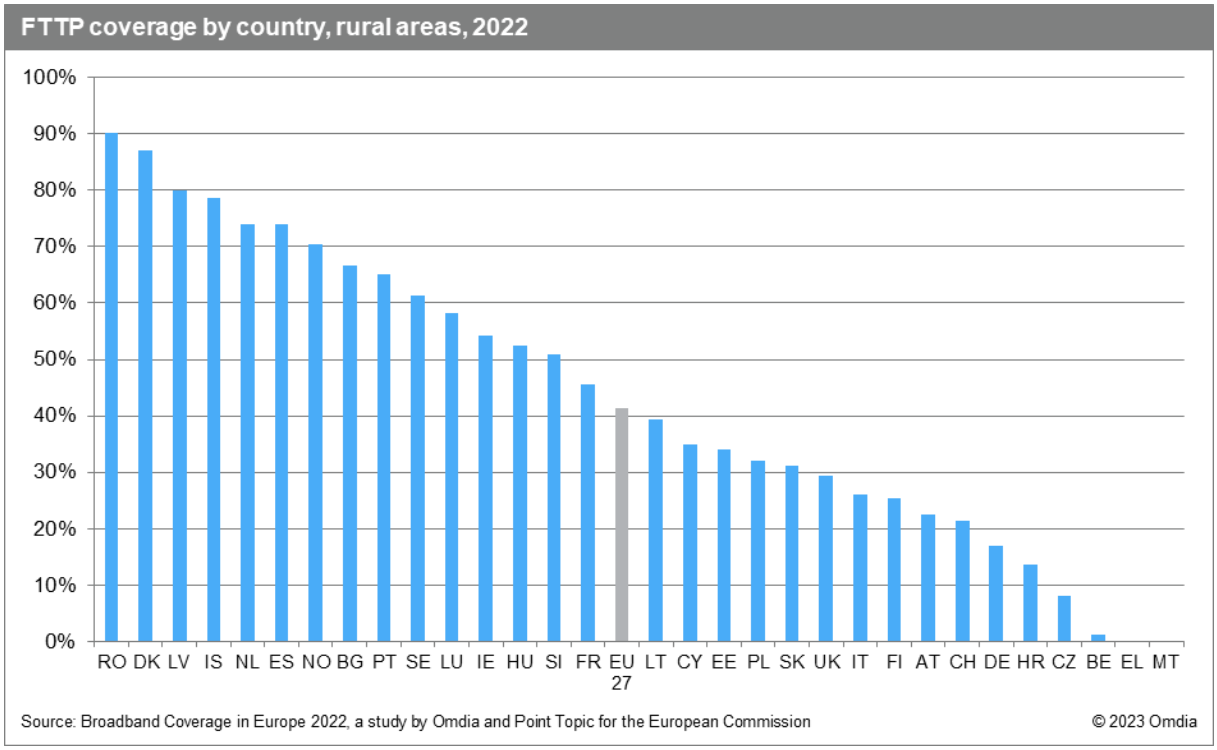


Greece was the only country to record a complete absence of FTTP & DOCSIS 3.1 coverage, with rural regions being covered by DSL-based technologies only. Thirteen countries recorded rural FTTP & DOCSIS 3.1 coverage levels below the EU average. Malta is the only country with complete FTTP & DOCSIS 3.1 rural coverage and another three countries (the Netherlands, Romania, and Denmark) recorded coverage above 80%.

4.4.1.1 Rural FTTP coverage by country

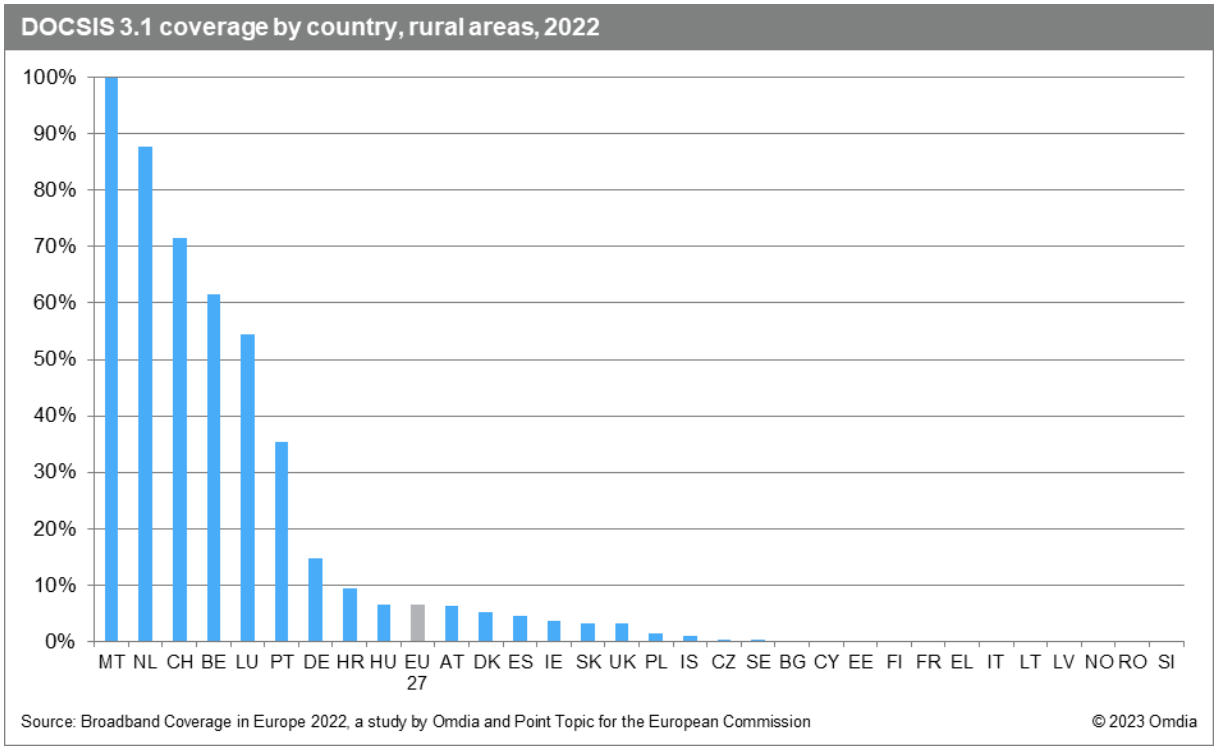
By mid-2022, Romania was the leader in terms of rural FTTP coverage (90.1%) followed closely by Denmark where FTTP services were available to 87.0% of rural households. In addition, FTTP networks passed more than 70% of rural homes in Latvia, Iceland, the Netherlands, Spain, and Norway. A further seven countries surpassed the 50% threshold. For the second year running the Netherlands recorded the largest year-on-year increase, with rural FTTP coverage growing by 19.5 percentage points and reaching 74.0% of rural Dutch households.

Conversely, sixteen countries recorded rural FTTP coverage below the EU average of 41.4% and FTTP remained absent from rural regions of Malta and Greece.



4.4.1.2 Rural DOCSIS 3.1 coverage by country

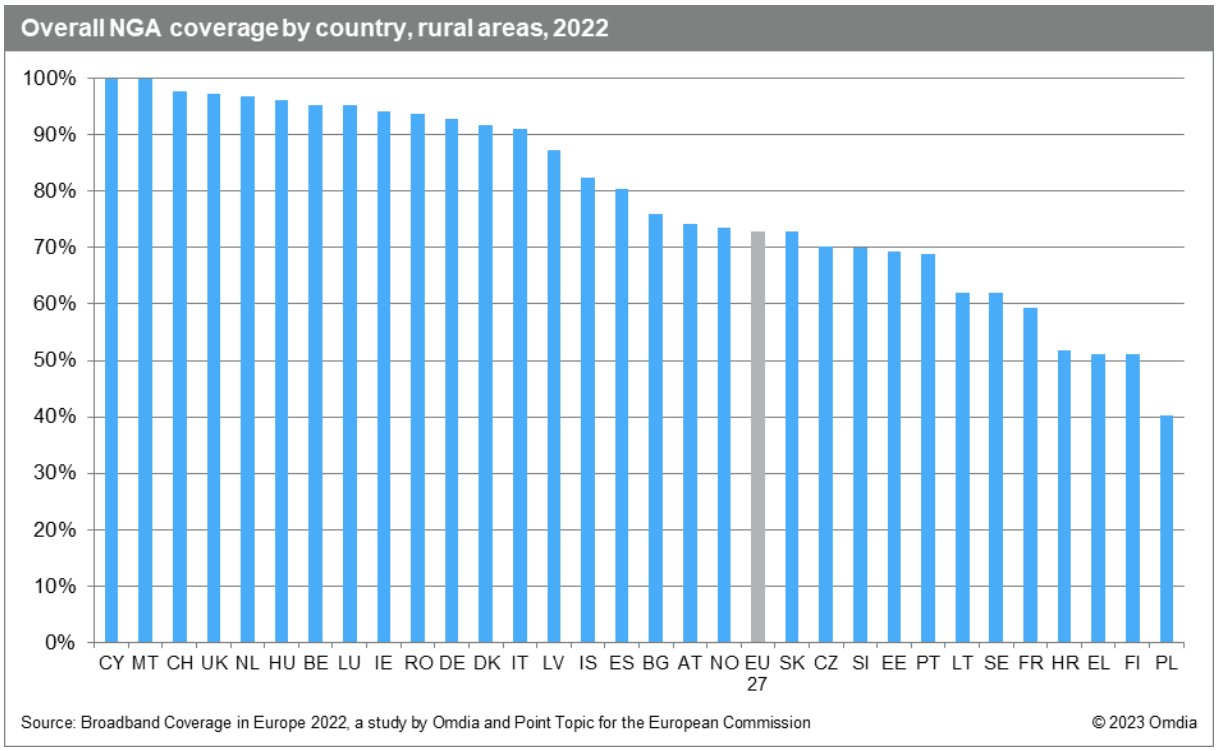
At the end of June 2022, DOCSIS 3.1 was absent from rural regions of twelve study countries. DOCSIS 3.1 was also the fixed broadband technology with the lowest rural coverage at EU level, at 6.4% of rural households. Malta was the only country to record complete rural DOCSIS 3.1 coverage, and only four other countries (the Netherlands, Switzerland, Belgium, and Luxembourg) recorded coverage over 50%.



4.4.2 Rural NGA coverage by country

Ensuring access to high-speed broadband services for rural households is one of the main challenges that European countries face in implementing their national strategies for achieving the Digital Single Market and Digital Decade goals.

At the end of June 2022, the rural EU average for NGA coverage was 72.9%, an increase of 4.3 percentage points compared to mid-2021. Although rural NGA coverage was 18.5 percentage points below total NGA coverage (91.5%), the gap between the two categories continued to close during the study period. For comparison, the coverage difference between national and rural NGA coverage was 26.5 percentage points in mid-2020, and 34.8 percentage points in mid-2018. This indicates that network deployment is shifting towards rural areas, as urban areas start to reach saturation for NGA coverage.



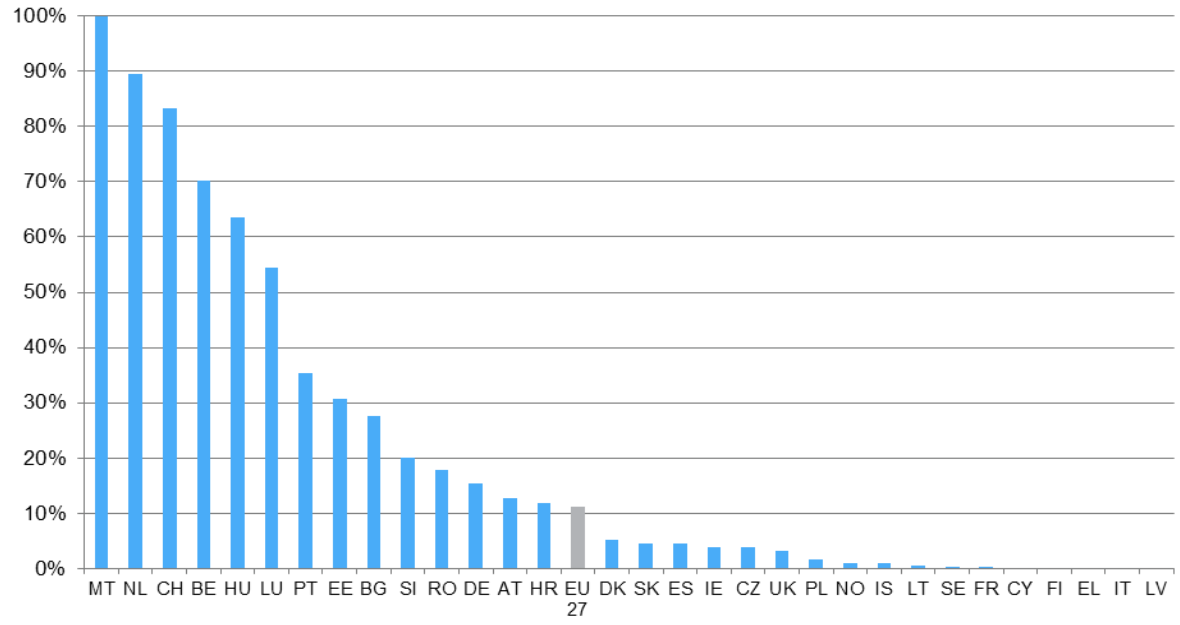
By mid-2022, both Cyprus and Malta recorded universal rural NGA coverage. Six other countries recorded rural NGA coverage exceeding 95%: Switzerland, the UK, the Netherlands, Hungary, Belgium, and Luxembourg. Three countries reported double-digit increases in rural NGA availability, with Croatia recording the largest increase, at 12.9 percentage points since mid-2021.

In total, twelve countries recorded NGA availability below the EU average of 72.9%. Poland is now the country with the lowest rural NGA availability levels (40.3%), due to the almost complete lack of rural cable coverage and low rate of VDSL upgrade to the rural DSL network.

4.4.2.1 Rural DOCSIS 3.0 coverage by country

Malta remained the leader in terms of rural DOCSIS 3.0 coverage (100.0%). Apart from Malta, only the Netherlands, Switzerland, Belgium, Hungary and Luxembourg recorded rural DOCSIS 3.0 availability higher than 50%.

Cable modem DOCSIS 3.0 coverage by country, rural areas, 2022



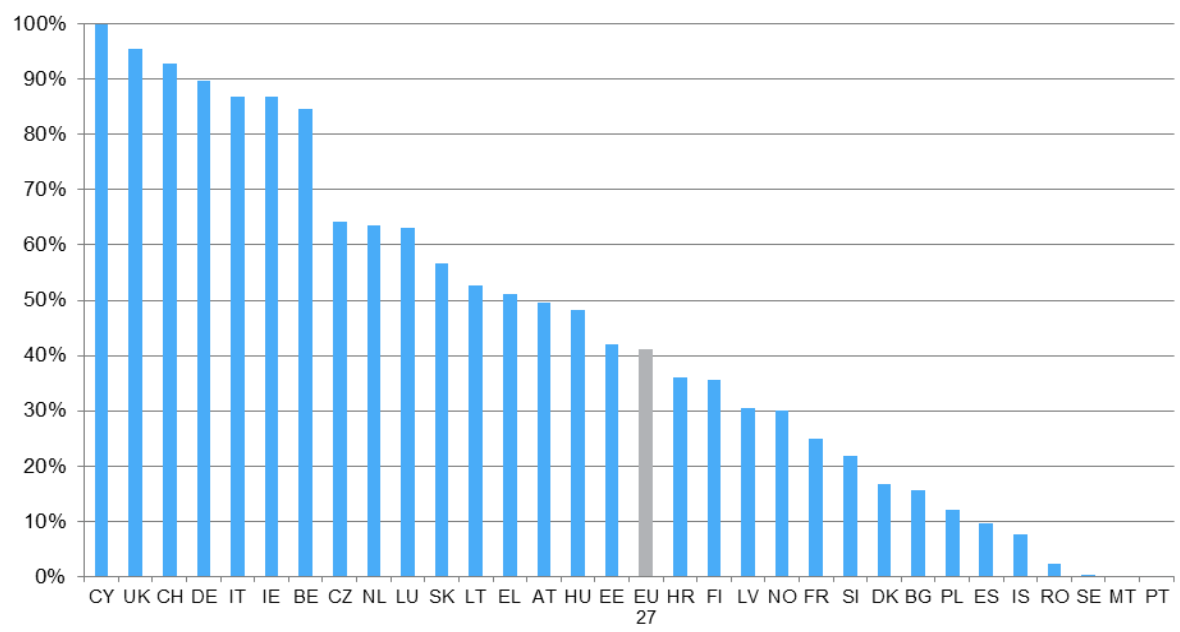
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

4.4.2.2 Rural VDSL coverage by country

In previous years, VDSL was by far the most widespread rural NGA technology, but in 2022 rural coverage of FTTP surpassed VDSL for the first time. Rural VDSL networks passed 41.2% of rural homes in the EU, a 1.6 percentage point increase during the twelve months to mid-2022, whereas FTTP reached 41.4% of rural households.

Cyprus was the only country to record universal rural VDSL coverage, whilst in six other countries (the UK, Switzerland, Germany, Italy, Ireland, and Belgium) VDSL services were available to more than 80% of rural households. On the other hand, VDSL remained absent from rural regions of Malta and Portugal.

VDSL coverage by country, rural areas, 2022

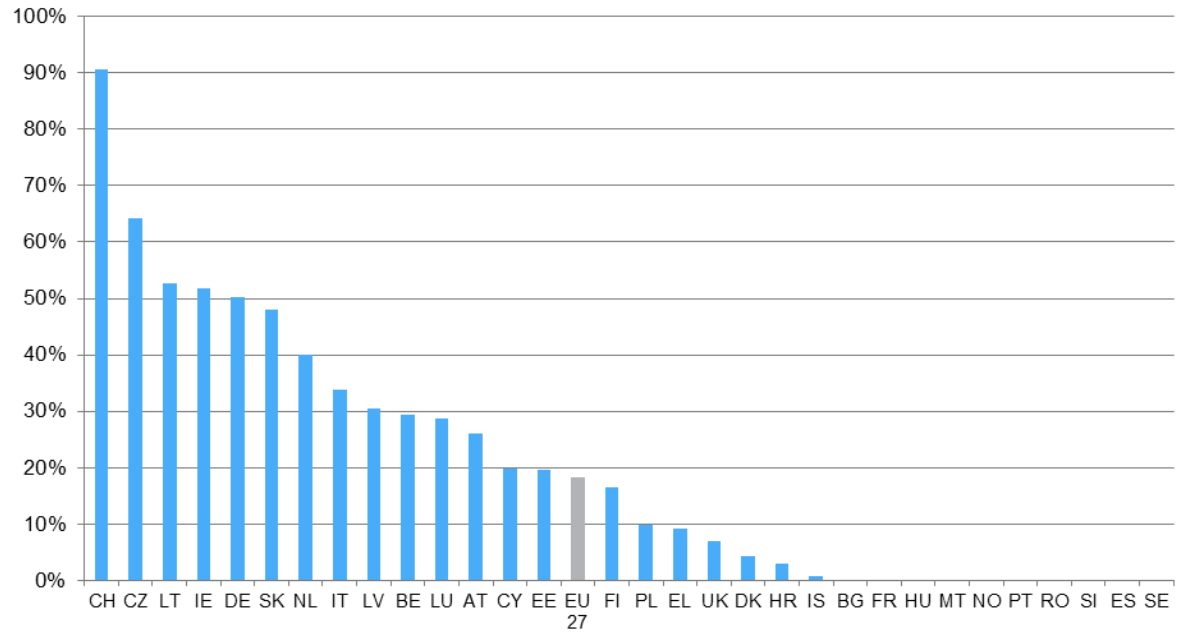


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

4.4.2.3 Rural VDSL2 Vectoring coverage by country

At the end of June 2022, VDSL2 Vectoring remained absent from rural regions of ten study countries. The EU27 average stood at 18.4%, with Switzerland recording the highest coverage level, at 90.6%. It was followed by Czechia, where 64.2% of rural households had access to VDSL2 Vectoring services with the incumbent's infrastructure company completing the upgrade of the whole of its legacy network to the standard.

VDSL2 Vectoring coverage by country, rural areas, 2022

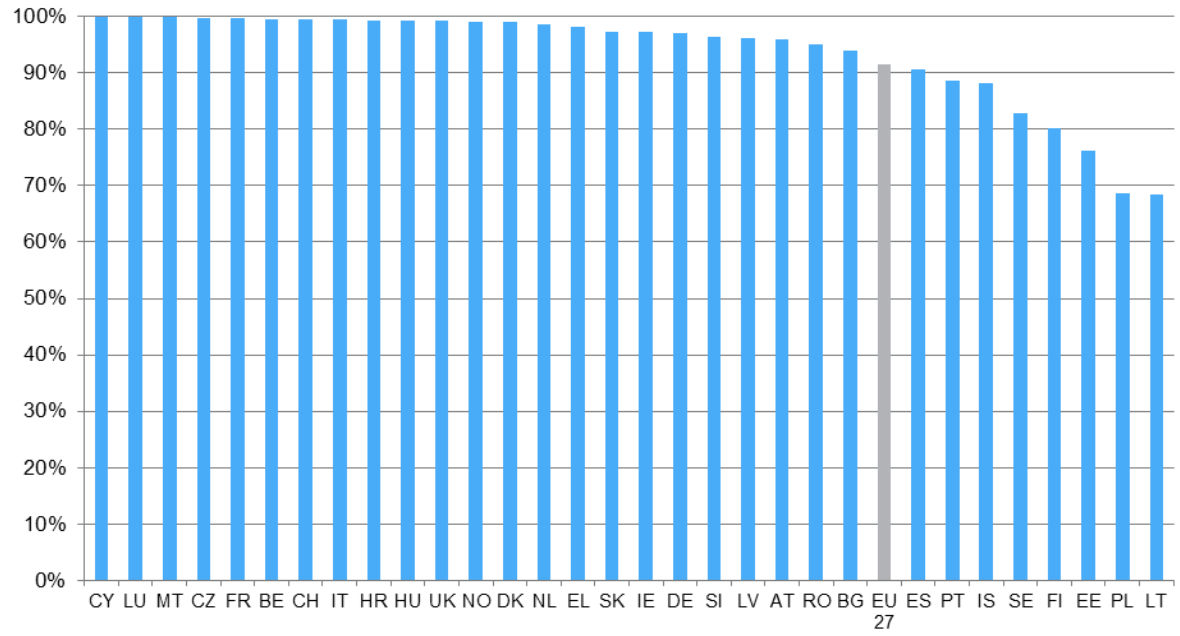


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

4.4.3 Rural overall fixed broadband coverage by country

Rural fixed coverage continued to be lower than national fixed coverage, except in instances where universal coverage levels were recorded. By mid-2022, rural fixed broadband coverage reached 91.4% of rural households compared to national coverage of 97.3%.

Overall fixed broadband coverage by country, rural areas, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

However, the gap between total fixed coverage and rural fixed coverage continues to close at 5.9 percentage points compared to 6.4 percentage points in mid-2021. Moreover, in mid-2018, the recorded gap between total and rural fixed broadband coverage at the EU level was 9.1 percentage points.

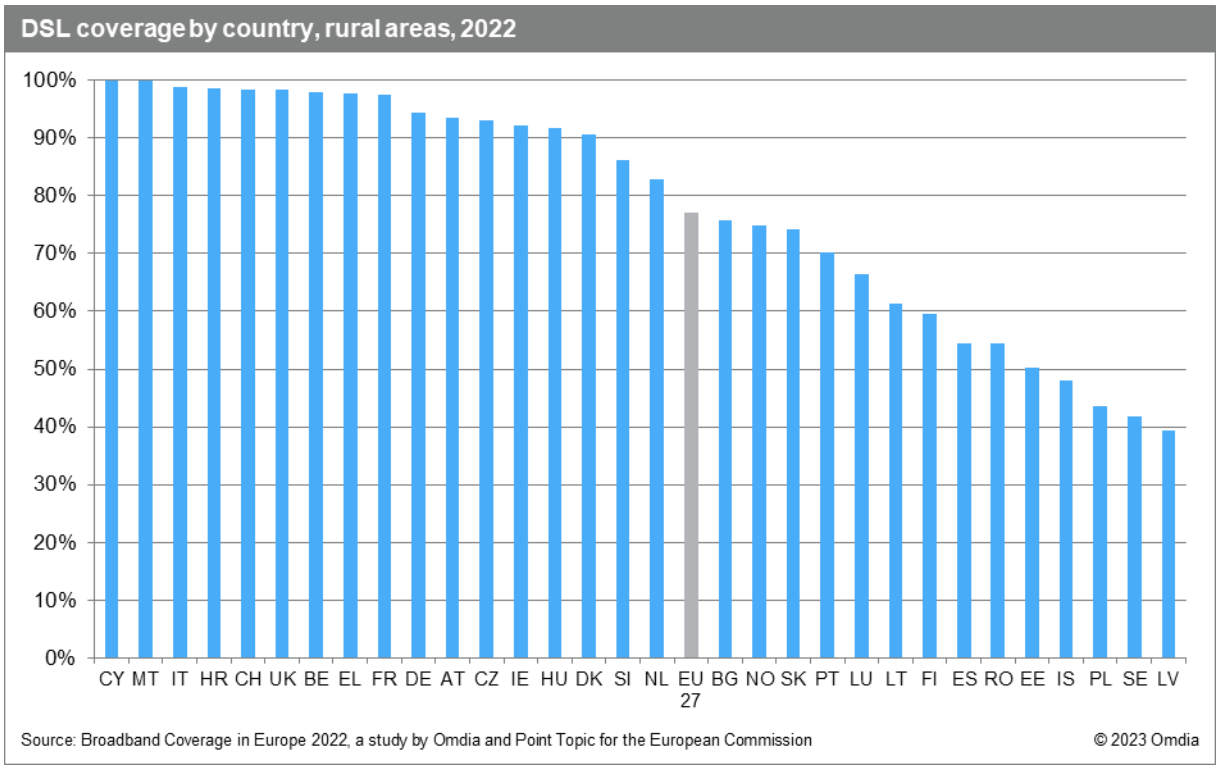
Eight countries reported rural fixed broadband coverage below the EU average (91.4%), with only three countries (Lithuania, Poland, and Estonia) recording levels below 80%. Lithuania recorded the lowest rural fixed broadband coverage of the study, with 68.4% of rural homes passed, up from 64.0% in mid-2021. Rural fixed broadband coverage was universal in Cyprus, Luxembourg, and Malta.

It should be noted that data on rural coverage collected from NRAs and individual operators was not always as comprehensive as total market-level data. In cases when information on rural coverage was incomplete, the research team estimated rural coverage. These estimations assume that roll-out of a new technology will be focussed on urban and sub-urban areas first before rural roll-out gets underway.

4.4.3.1 Rural DSL coverage by country

DSL continued to be by far the most pervasive fixed broadband technology in terms of the number of rural homes passed, reaching 77.0% of rural EU households. When compared to the total EU27 DSL coverage, rural DSL coverage was 9.6 percentage points lower and the difference between total and rural DSL coverage remained considerable in some countries, such as Iceland and Sweden (41.0 percentage points for both countries).

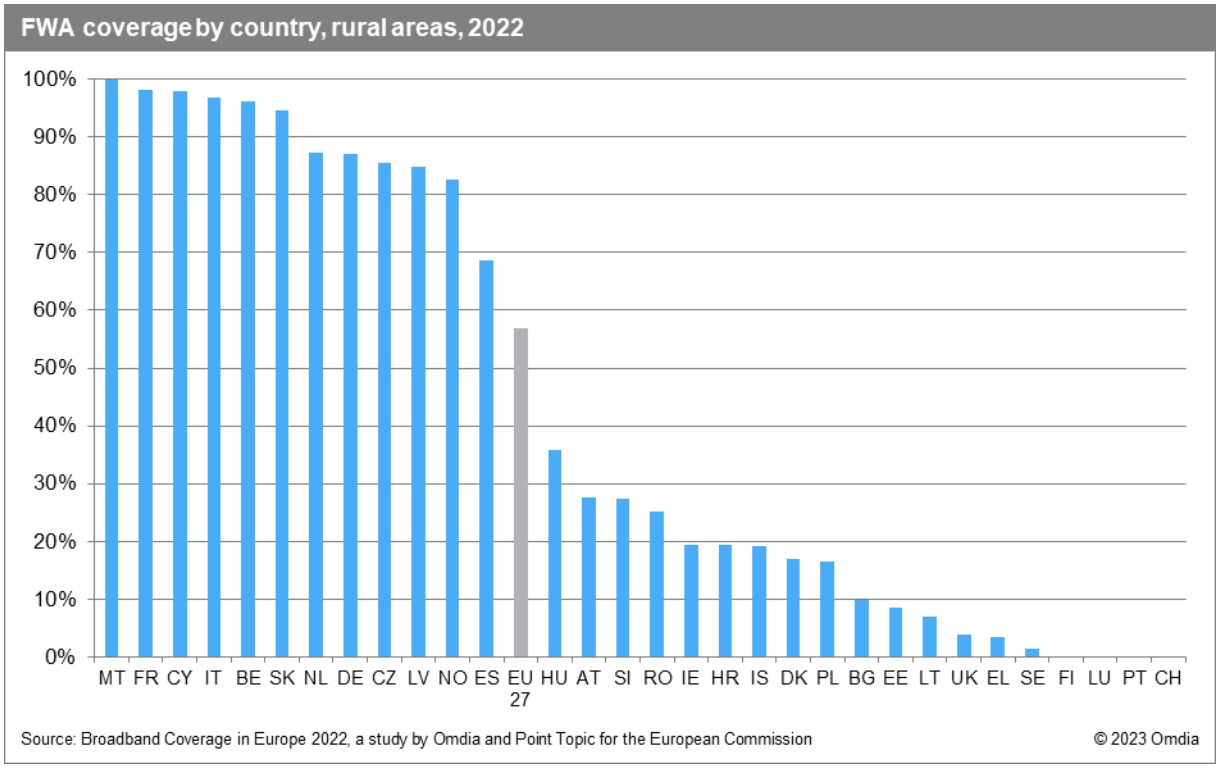
In mid-2022, fourteen countries recorded rural DSL coverage levels below the EU average. As was the case last year, Latvia reported the lowest rural DSL coverage levels, at 31.1%. Decommissioning of legacy copper lines is under way in many places, and in ten study countries (Croatia, Denmark, Finland, France, Hungary, Latvia, Luxembourg, the Netherlands, Romania, and Slovakia) rural DSL coverage now reaches higher levels than total DSL coverage. This trend is a result of the pace of legacy lines decommissioning and replacement being faster on a total level (i.e., is primarily targeted at urban areas), whereas DSL remains a key technology in rural areas.



However, other technologies can serve as a partial substitute for DSL in rural areas meaning that countries with low DSL coverage in rural areas are often among the leaders in terms of coverage by other technologies. For instance, Latvia recorded the lowest rural DSL coverage at 39.4% but one of the highest FTTP coverage of rural areas of all study countries, at 80.0% of rural homes passed.

4.4.3.2 Rural FWA coverage by country

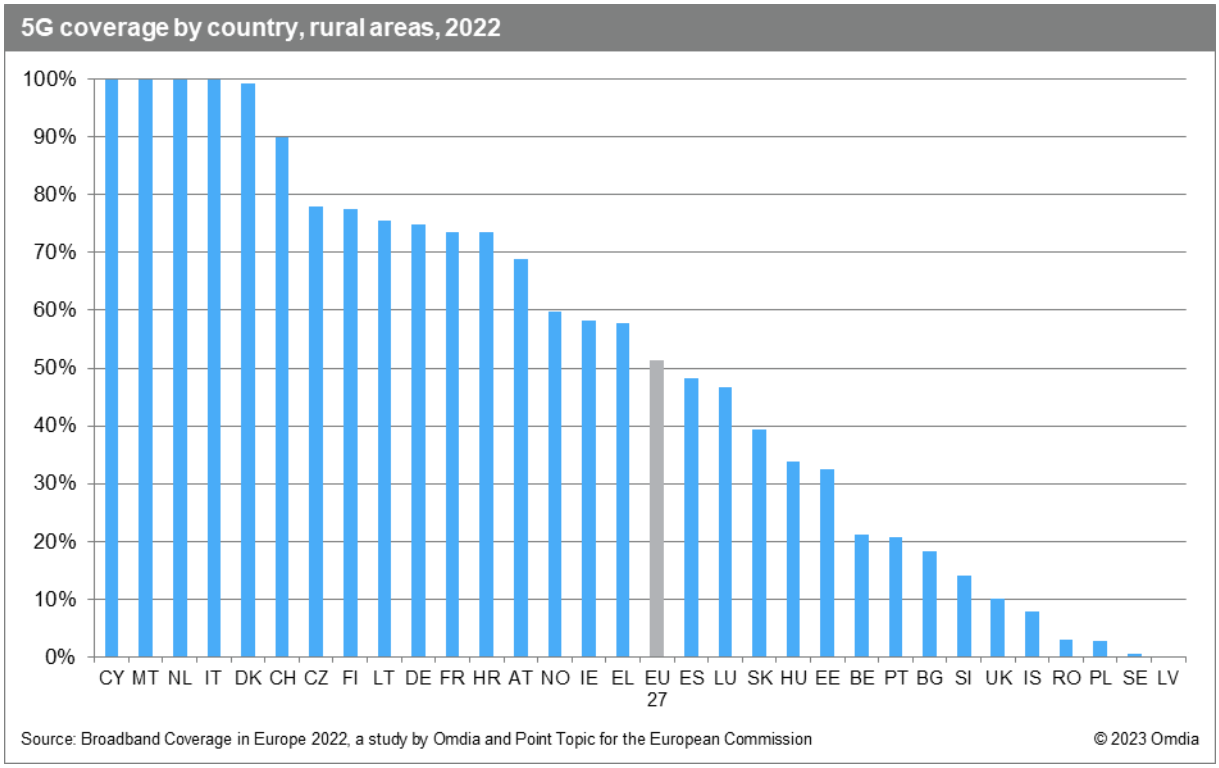
In some countries, Fixed Wireless Access (FWA) services provide a significant boost to rural connectivity, especially in areas where deployment of other fixed technologies is challenging from both a technical and an economic perspective.



4.4.4 Rural mobile broadband coverage by country

4.4.4.1 Rural 5G coverage by country

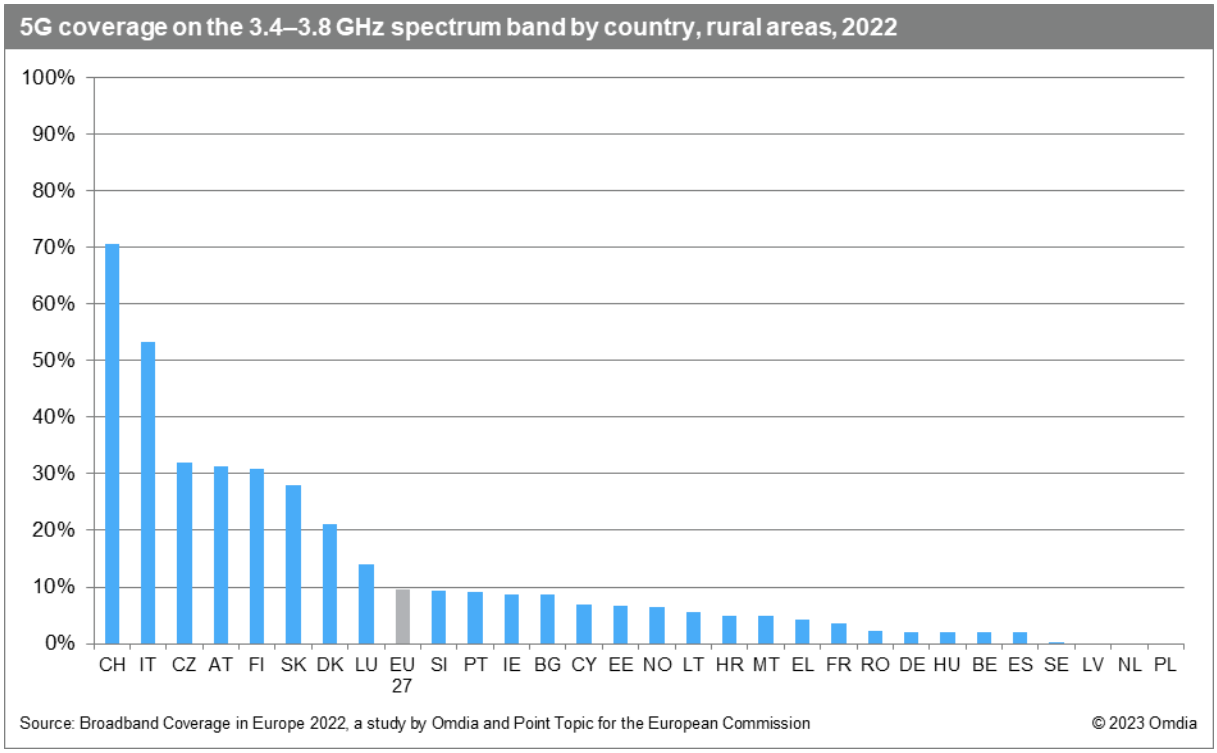
By using Dynamic Spectrum Sharing technology (DSS), operators in some countries have been able to achieve very high levels of rural 5G coverage, helping to increase the rural 5G coverage to 51.5% at EU level, an increase of 18.7 p.p. on the previous year. Three countries (Cyprus, Malta and the Netherlands) achieved universal rural 5G coverage during the year. Conversely, five countries recorded rural 5G coverage below 10% of households, including Latvia which recorded zero rural 5G coverage.



Note: 5G coverage includes coverage provided using Dynamic Spectrum Sharing (DSS)

4.4.4.2 Rural 5G coverage on the 3.4–3.8 GHz spectrum band by country

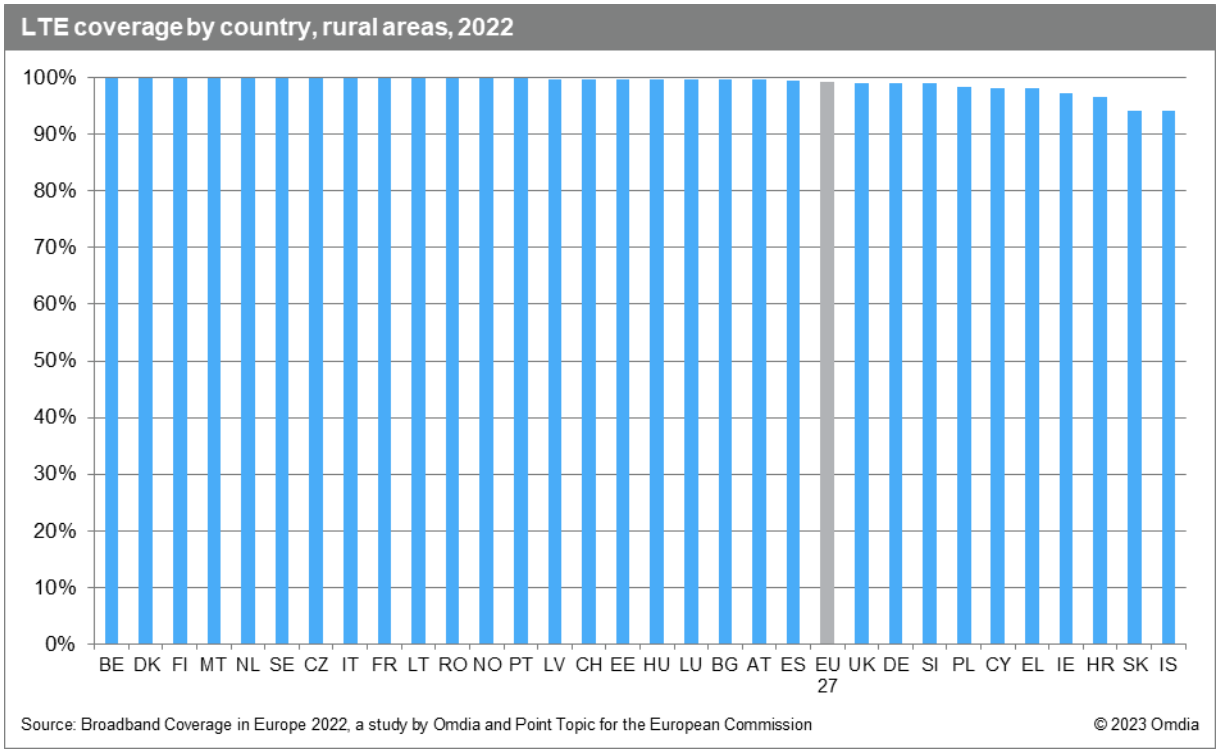
5G coverage on the 3.4–3.8 GHz spectrum band reached only 9.6% of rural households in the EU as of June 2022. The relatively high frequency of the 3.4–3.8 GHz band makes it more suitable for providing high-capacity services in urban and suburban areas, whereas the 700 MHz band is a better fit for rural coverage, due to its superior propagation characteristics over long distances. Most countries recorded coverage lower than the EU total, with three recording zero coverage for this metric (Latvia, the Netherlands and Poland). Only Switzerland and Italy recorded coverage greater than 35%, though Switzerland's leading figure of 70.6% does not contribute to the EU average.



Note: Data on 5G coverage on the 3.4–3.8 GHz spectrum band is not available for Iceland and the UK

4.4.4.3 Rural LTE coverage by country

By mid-2022, the EU average for rural LTE coverage was 99.2%, down slightly on the previous year.

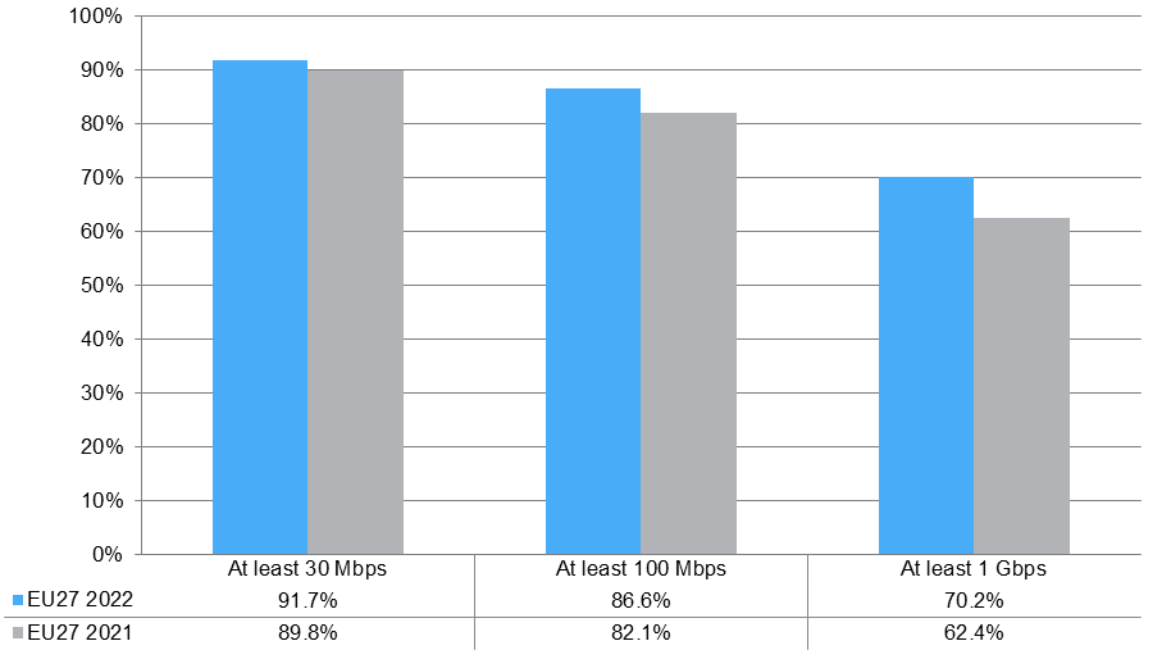


4.5 Coverage by speed categories

4.5.1 Europe-wide coverage by speed categories

In 2021 a new category determining actual 1Gbps upload and download speed was added among the speed categories tracked by the BCE study. However, as data for this metric remains unavailable for some countries, it has again not been possible to calculate the EU27 average coverage value and data is presented for individual countries later on in this chapter.

EU27: Coverage by speed categories, 2021 & 2022



	At least 30 Mbps	At least 100 Mbps	At least 1 Gbps
EU27 2022	91.7%	86.6%	70.2%
EU27 2021	89.8%	82.1%	62.4%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Note: Data for 2022 is defined as “expected peak download speeds”, whereas data for 2021 depicts previous definition of “actual achievable speeds”.

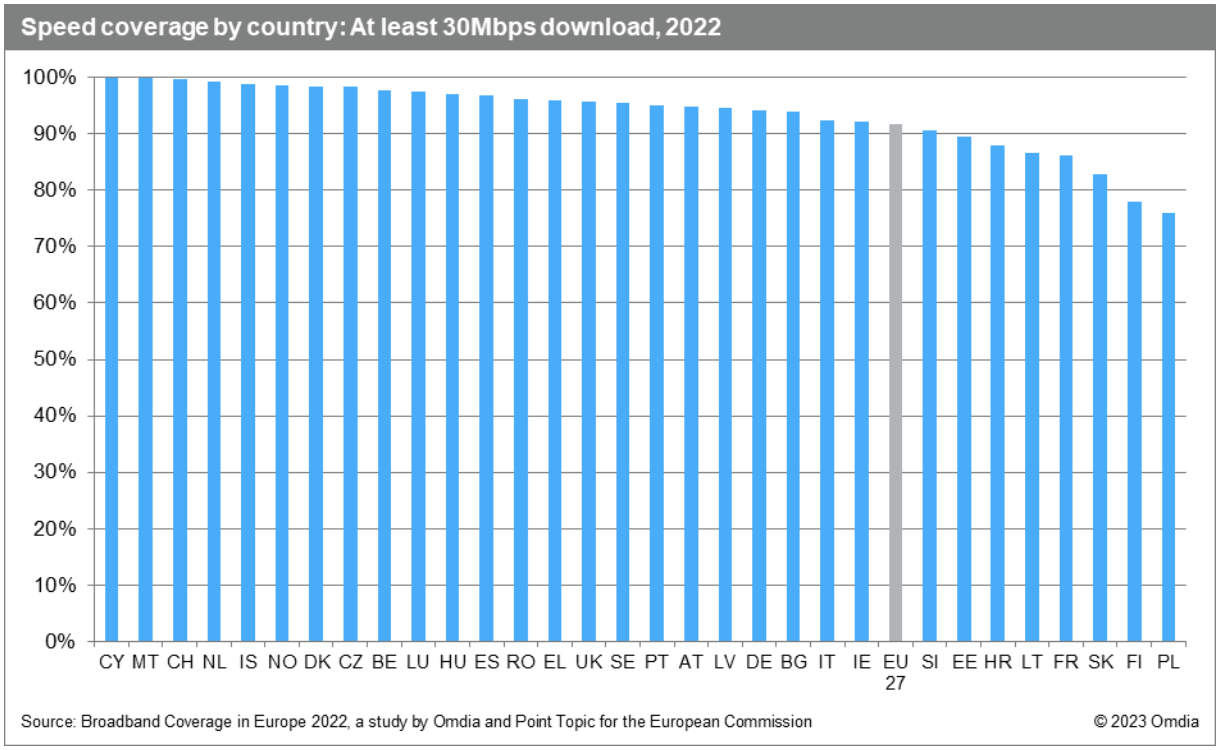
By mid-2022, 91.7% of EU households had access to at least one fixed broadband service that provided actual download speeds of at least 30Mbps, a 1.9 percentage point increase since mid-2021. This increase was driven by the overall growth in NGA coverage as well as the technological advancements that resulted in a higher number of VDSL networks being capable of supporting 30Mbps download speeds.

Coverage of networks supporting at least 100Mbps grew by 4.5 percentage points year-on-year. This is a result of growth in FTTP coverage across the continent. At the end of June 2022, 86.6% of EU households had access to broadband services capable of providing at least 100Mbps actual download speeds.

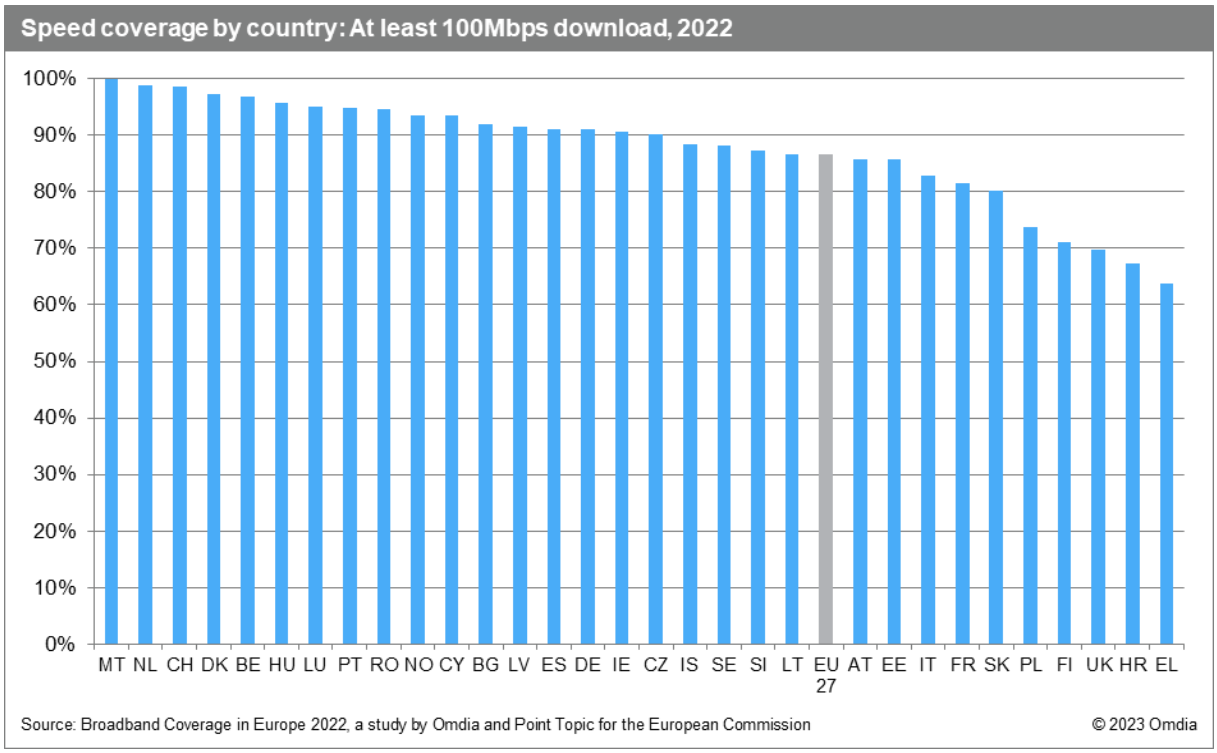
At the end of June 2022, more than seven in ten EU households (70.2%) had access to broadband services capable of providing at least 1Gbps actual download speeds, following a significant 7.8 percentage point growth again driven by progress in FTTP deployments.

4.5.2 Country comparison of coverage by speed categories

At the end of June 2022, fixed broadband services capable of at least 30Mbps download speeds passed more than 75% of households in all study countries. Malta and Cyprus recorded universal at least 30Mbps coverage and in six other countries (Switzerland, the Netherlands, Iceland, Norway, Denmark, and Czechia), high-speed broadband service capable of delivering at least 30Mbps download speeds were available to more than 98% of households. France registered the highest growth with at least 30Mbps coverage expanding by 11.7 percentage points in the twelve-month period to the end of June 2022.

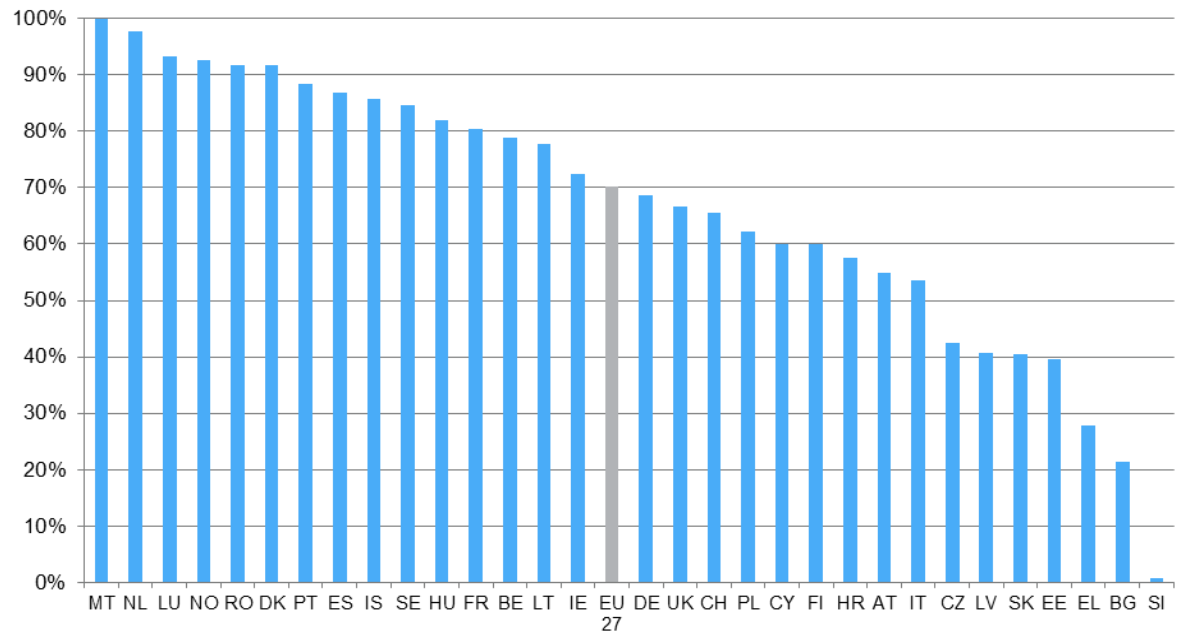


Whilst significant improvements have been made in high-speed broadband connectivity in recent years, examining availability of at least 100Mbps speeds shows that achieving universal coverage by 2025 will be challenging. At the end of June 2022, 86.6% of EU households had access to broadband services capable of providing at least 100Mbps actual download speeds.



Some considerable differences remain among individual countries. By mid-2022, over 95% of homes in seven study countries (Malta, the Netherlands, Switzerland, Denmark, Belgium, Hungary, and Luxembourg) were passed with a fixed broadband service capable of reaching at least 100Mbps actual download speeds. Moreover, France and Cyprus both recorded double-digit growth in availability of at least 100Mbps speed coverage by mid-2022. Conversely, only 63.9% of homes in Greece had access to broadband services capable of delivering at least 100Mbps actual download speeds.

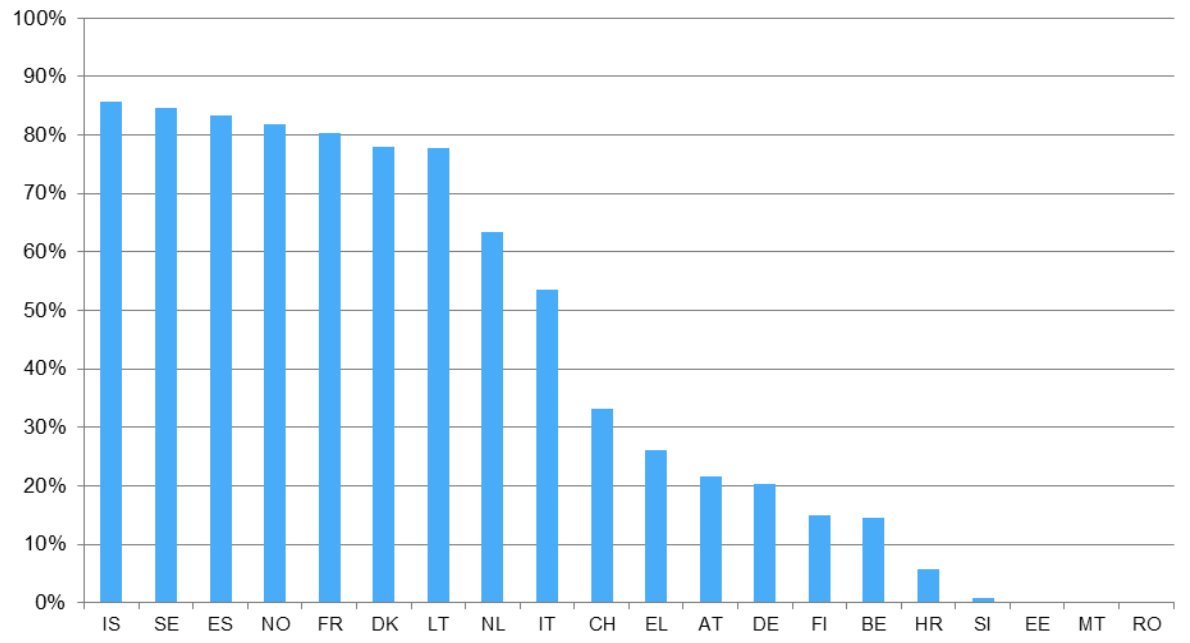
Speed coverage by country: At least 1Gbps download, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Great disparities also remain when analysing availability of services providing gigabit connectivity. At the end of June 2022, Malta was the only study country to record universal coverage by broadband services capable of providing at least 1Gbps. The Netherlands recorded 97.8% coverage, and a further four countries (Luxembourg, Norway, Romania, and Denmark) surpassed 90%. Services capable of offering at least 1Gbps were available in all study countries, albeit only 0.9% of Slovenian household had access to these. In two other countries (Bulgaria, and Greece) less than 30% of households had access to at least 1Gbps broadband services.

Speed coverage by country: At least 1Gbps upload and download, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

As in the previous year's study, this year the BCE research team included the 'At least 1Gbps upload and download' speed category in the survey questionnaire. For 2022, the team received responses from twenty NRAs, an increase from fourteen in last year's study. However, we have again decided not to estimate values for this speed category for the remainder of the study countries and present the results as a best effort analysis for those countries where NRA data is available.

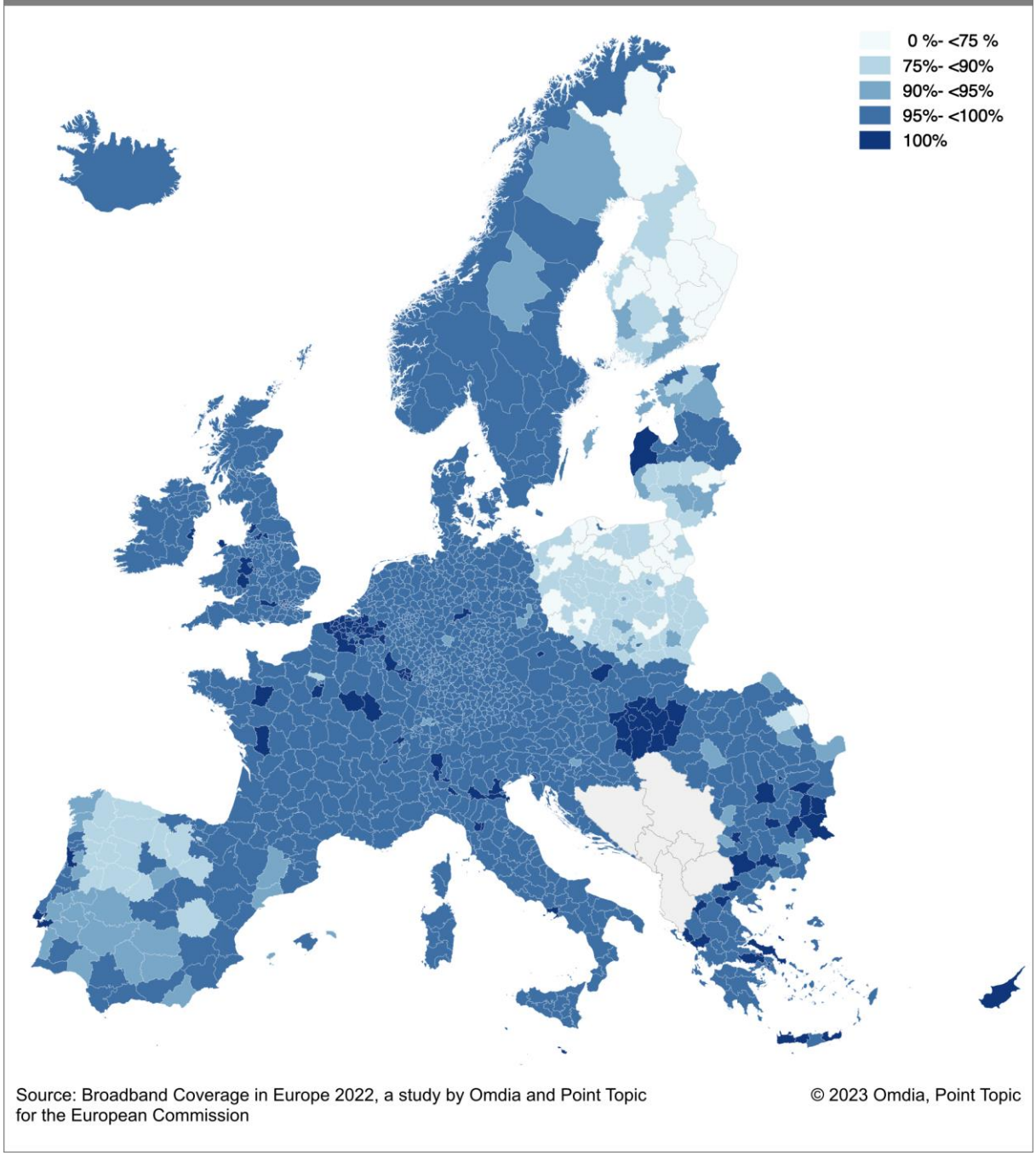
Among the twenty countries, Iceland reported the highest number of households having access to broadband services capable of delivering actual upload and download speeds of at least 1Gbps – 85.6% of households at the end of June 2022. In Malta and Romania, NRAs reported no available gigabit upload and download residential coverage was available in mid-2022.

4.6 NUTS 3 level coverage

The maps included in this chapter indicate the distribution of broadband coverage across Europe's regions and demonstrate the study results discussed in the previous chapters of this report. Five maps are presented, for three metrics – total fixed broadband (total and rural coverage), FTTP & DOCSIS 3.1 (total and rural coverage), and FTTP (total coverage).

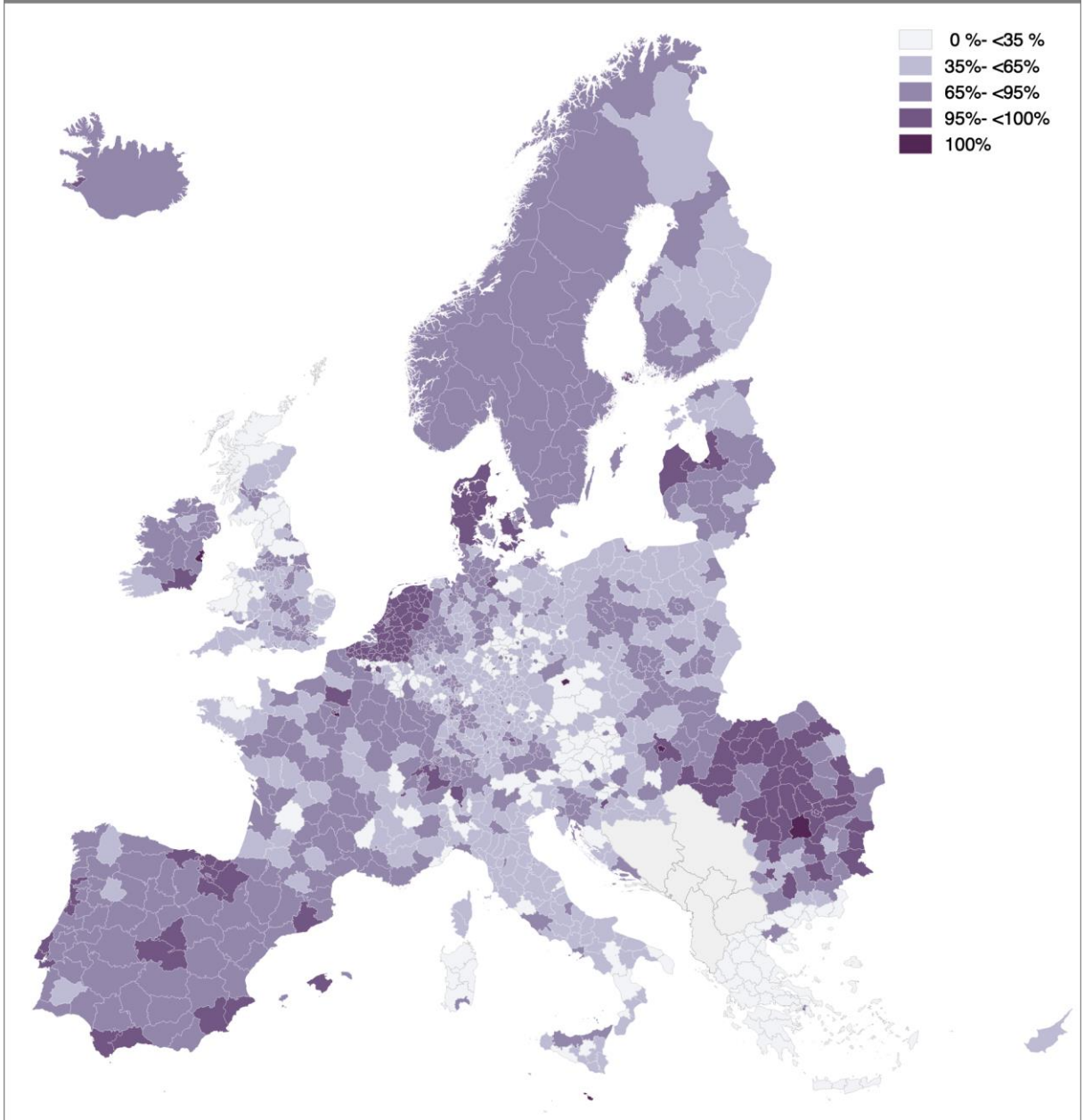
4.6.1 Total fixed broadband coverage at NUTS 3 level

Europe: Overall fixed broadband coverage, 2022



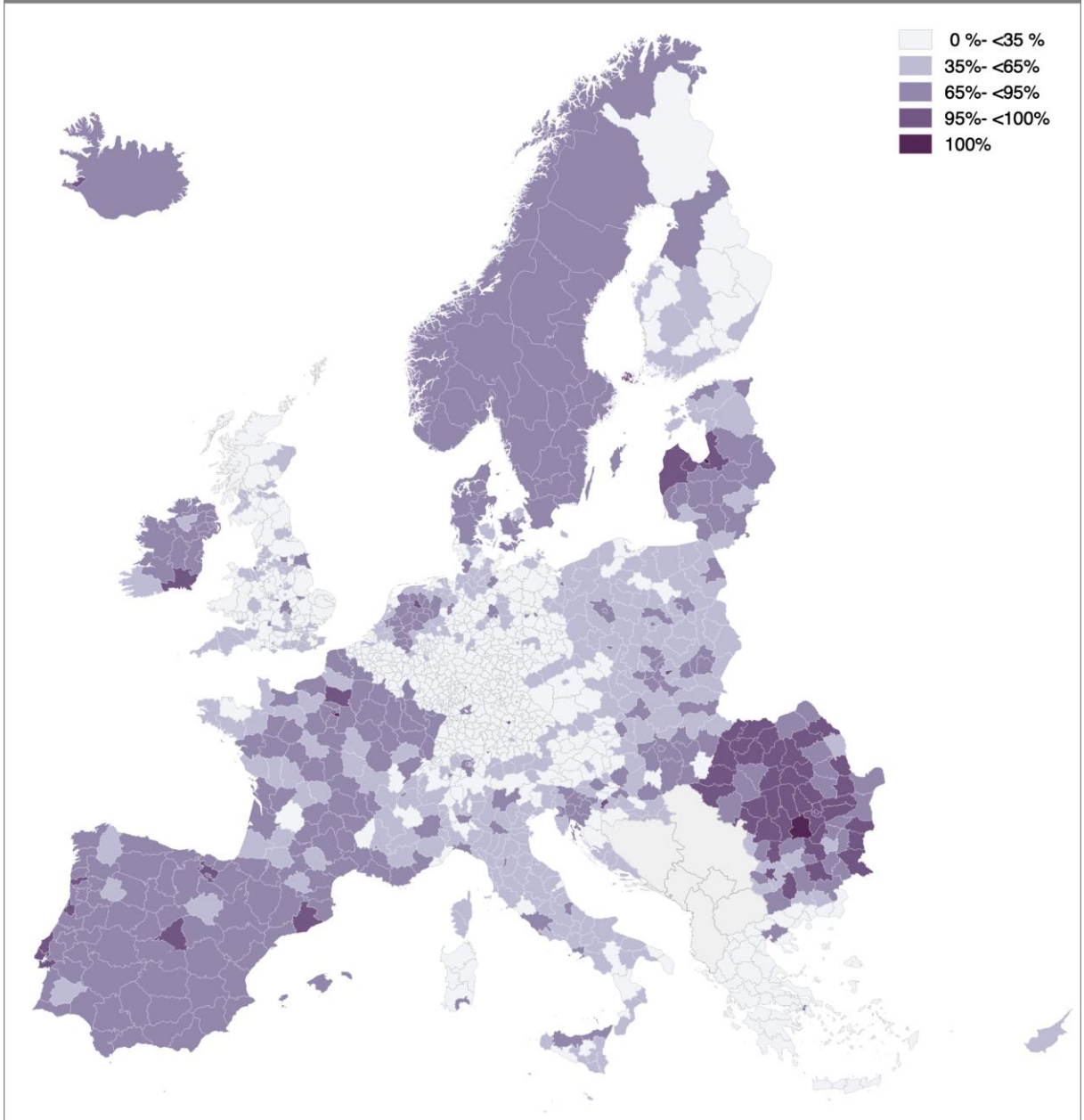
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Europe: Overall FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Europe: Overall FTTP coverage, 2022

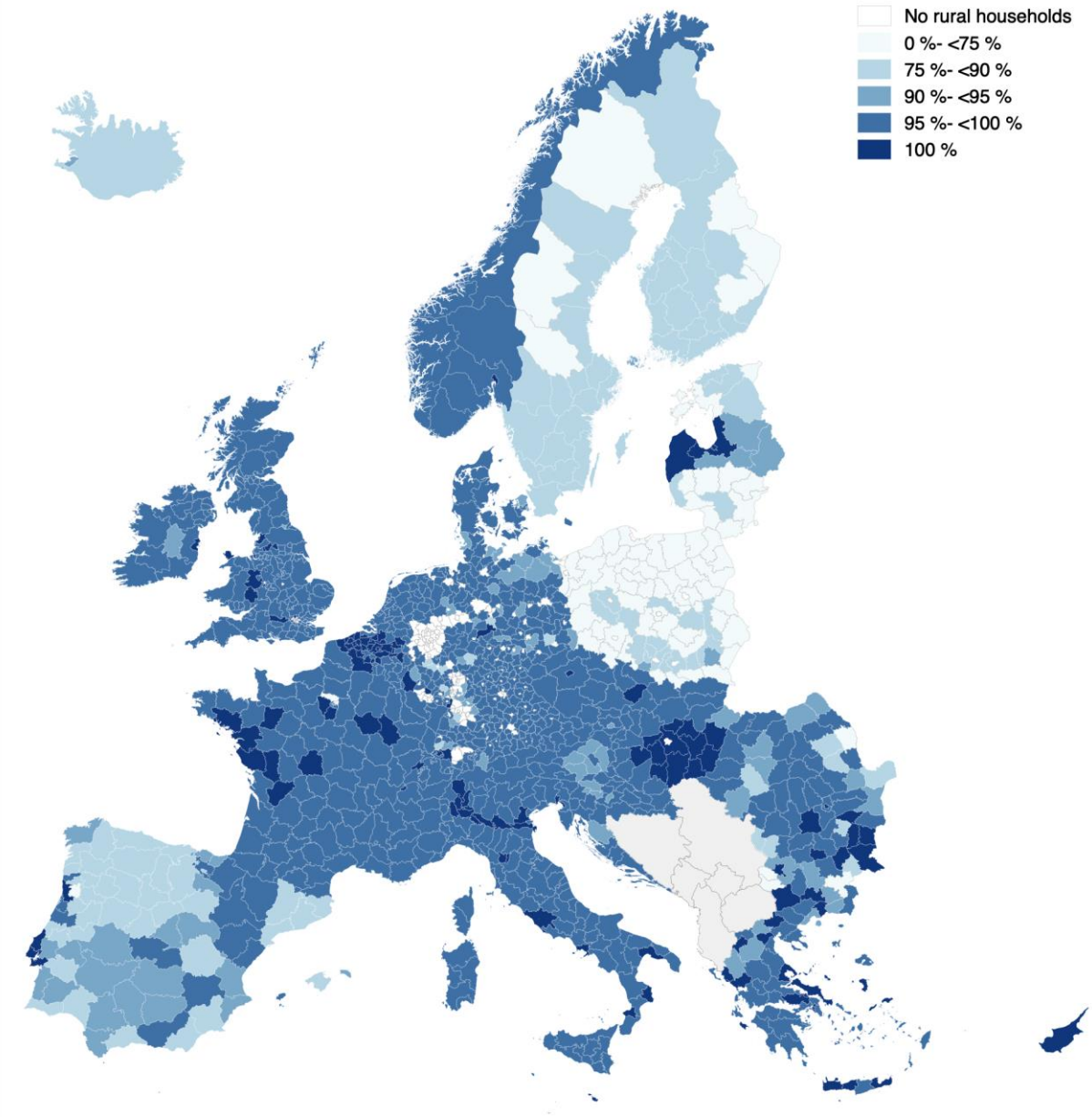


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

4.6.2 Rural fixed broadband coverage at NUTS 3 level

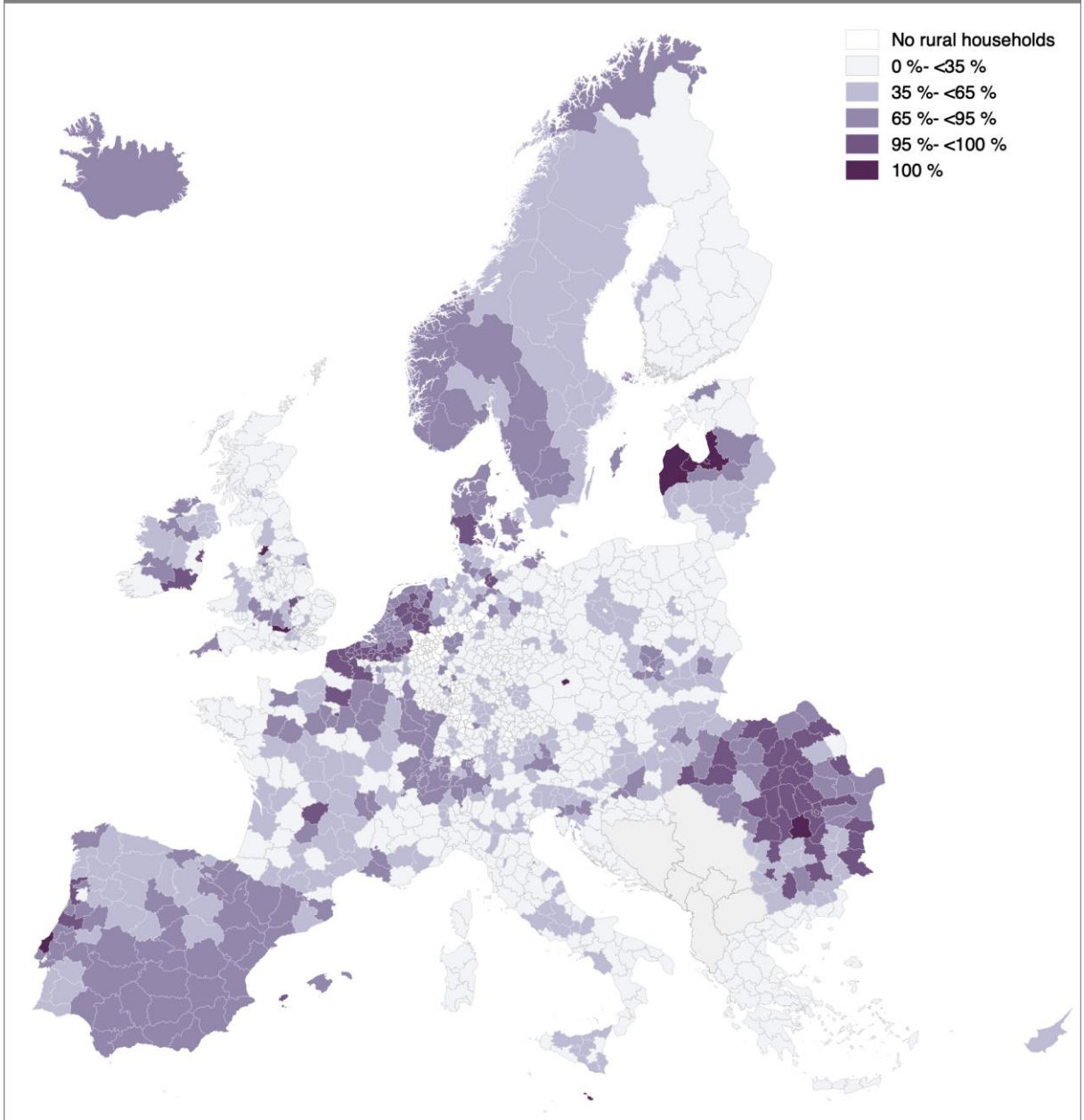
It is important to note that Germany, Hungary, the Netherlands, Poland, Switzerland, and the UK all have some NUTS 3 regions which do not have any rural households. These NUTS 3 regions are represented by the white areas on the rural coverage maps.

Europe: Overall fixed rural broadband coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Europe: Overall rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5. Coverage by Country

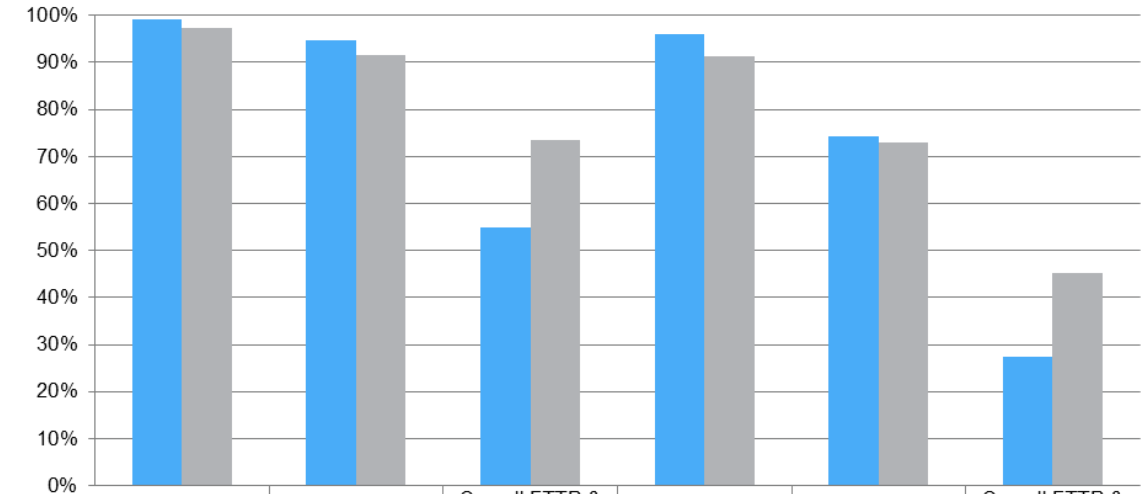
5.1 Austria

5.1.1 National coverage by broadband technology

99.1% of Austrian households were covered by at least one broadband technology by the end of June 2022, up by 0.1 percentage points on a year-on-year comparison. In rural Austria, fixed broadband coverage improved by 0.4 percentage points and stood at 96.0%. An increase of 1.6 percentage points was recorded in NGA coverage, enabling 94.7% of Austrian households to access high-speed broadband services. In rural regions, NGA coverage improved by 6.5 percentage points.

While Austria exceeded the EU average across the fixed and NGA metrics, it remained below the EU average in terms of 1Gbps-capable networks (DOCSIS 3.1 and FTTP). Austria accelerated its rollout pace in 2022 which led to a year-on-year growth of 9.5 percentage points and 11.8 percentage points on national and rural level, respectively.

Austria: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Austria	99.1%	94.7%	54.8%	96.0%	74.2%	27.4%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

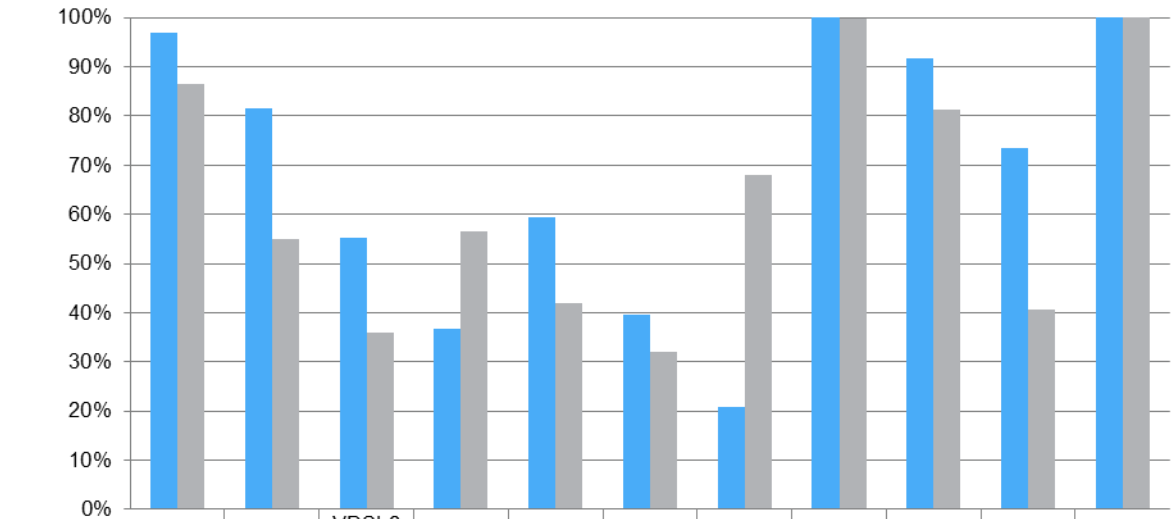
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the most prevalent broadband technology, covering 97.0% of households by the end of June 2022. Austrian operators continued to upgrade to VDSL and VDSL2 Vectoring, which grew by 2.9 percentage points and 4.6 percentage points, respectively. FWA was available to 20.7% of Austrian households, up by 0.8 percentage points compared to mid-2021.

FTTP was the fastest growing broadband technology in Austria, recording an increase of 10.0 percentage points on a year-on-year comparison, and passing 36.6% of homes. Despite this major improvement, Austria remained below the EU average of 56.5%, but narrowed its gap compared to previous years. DOCSIS 3.0 networks passed 59.3% of homes, unchanged from last year, while DOCSIS 3.1 coverage improved by 7.5 percentage points and covered 39.5% of households.

5G coverage grew by 14.9 percentage points which enabled Austria to score well above the EU average of 81.2%, with 91.7% of households covered. Looking at 5G in the 3.4–3.8 GHz band, Austria also exceeded the EU average and covered 73.6% of households.

Austria: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Austria	97.0%	81.6%	55.3%	36.6%	59.3%	39.5%	20.7%	99.9%	91.7%	73.6%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

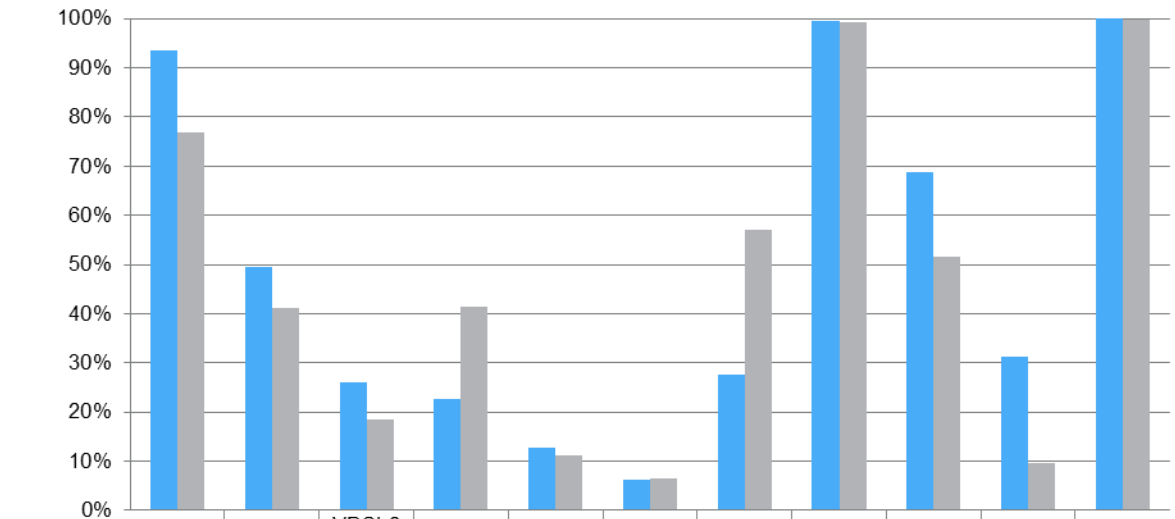
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL was also the most prevalent broadband technology in rural Austria, with 93.6% of households covered, while 49.6% and 26.1% of households were also covered by VDSL and VDSL2 Vectoring networks, respectively. As network upgrades progressed, VDSL and VDSL2 Vectoring increased by 6.6 percentage points and 2.0 percentage points compared to the prior year, respectively.

As seen on national level, FTTP was also the strongest growing technology in rural regions, recording an increase of 7.7 percentage points and passing 22.6% of rural homes by mid-2022. DOCSIS 3.1 upgrades accelerated, with 6.3% of rural homes passed, up by 5.3 percentage points year-on-year.

More than two thirds (68.9%) of rural households were covered by 5G networks by mid-2022, an improvement of 32.6 percentage points, while 31.3% of households were covered the 3.4–3.8 GHz 5G band.

Austria: Coverage by technology, rural areas, 2022



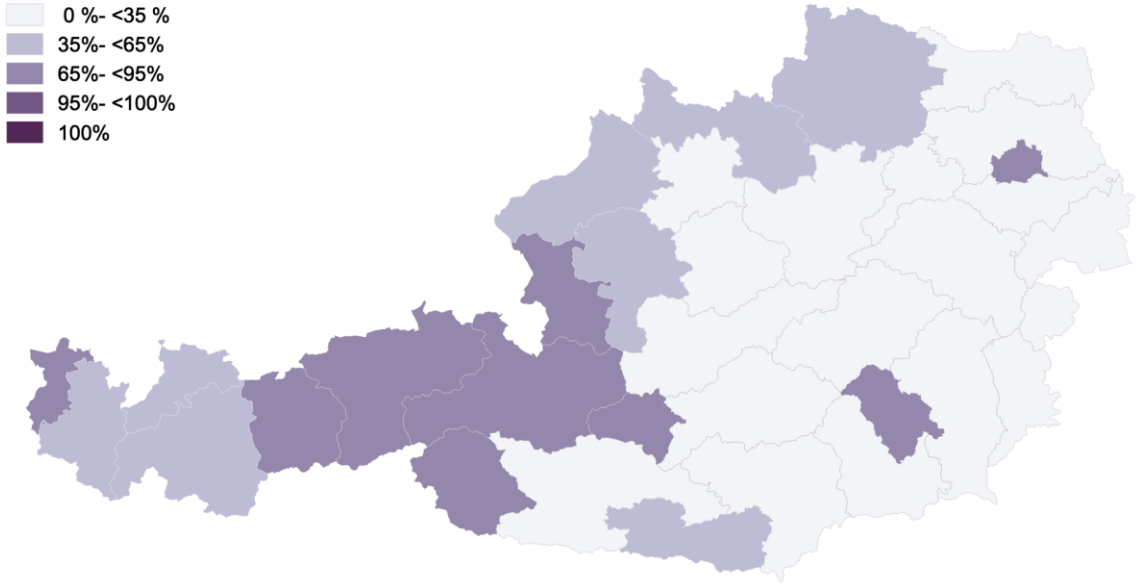
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Austria	93.6%	49.6%	26.1%	22.6%	12.8%	6.3%	27.6%	99.6%	68.9%	31.3%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.1.2 Regional coverage by broadband technology

Austrian FTTP & DOCSIS 3.1 coverage ranged from 5.0% in Südburgenland to 93.4% in Wien. None of the Austrian regions exceeded the 95% threshold.

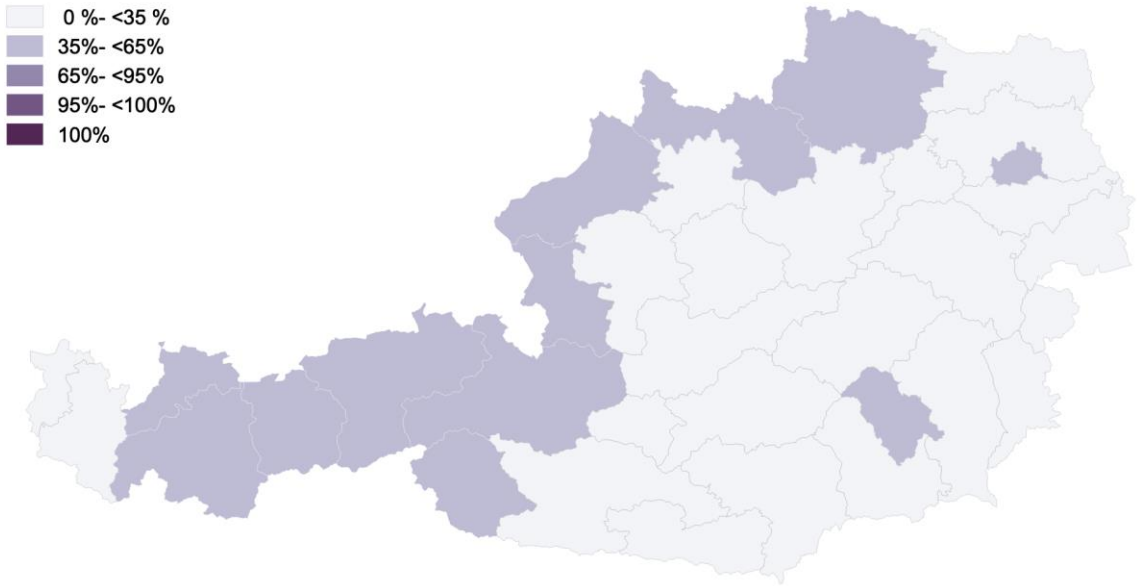
Austria: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

All Austrian regions performed below the 65% threshold in terms of FTTP coverage. The highest availability of FTTP networks was reported in Tiroler Oberland (63.2%), Wien (61.6%), and Osttirol (61.5%).

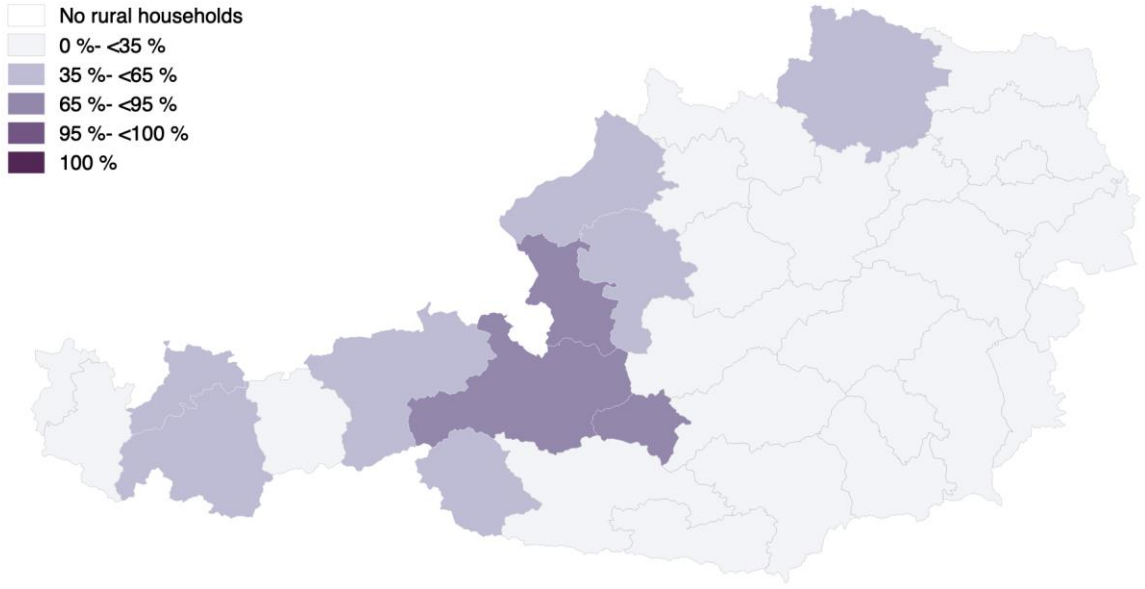
Austria: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Three Austrian regions (Lungau, Pinzgau-Pongau, and Salzburg und Umgebung) exceeded the 65% threshold in terms of rural FTTP & DOCSIS 3.1, while 25 regions recorded coverage below 35%.

Austria: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.1.3 Data tables for Austria

Statistic	National
Population	8,978,929
Persons per household	2.2
Rural proportion	14.7%

	Austria 2022		Austria 2021		Austria 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.0%	93.6%	97.3%	93.7%	95.3%	96.2%	86.6%	77.0%
VDSL	81.6%	49.6%	78.7%	43.0%	63.2%	16.3%	54.9%	41.2%
VDSL2 Vectoring	55.3%	26.1%	50.7%	24.2%	34.7%	4.0%	35.9%	18.4%
FTTP	36.6%	22.6%	26.6%	14.9%	20.5%	10.6%	56.5%	41.4%
Cable modem DOCSIS 3.0	59.3%	12.8%	59.3%	12.6%	58.3%	21.2%	41.8%	11.1%
Cable modem DOCSIS 3.1	39.5%	6.3%	32.0%	0.9%	26.7%	0.6%	31.9%	6.4%
FWA	20.7%	27.6%	19.9%	26.2%	16.2%	25.1%	67.9%	57.0%
LTE	99.9%	99.6%	100.0%	99.7%	100.0%	99.9%	99.8%	99.2%
5G	91.7%	68.9%	76.8%	36.3%	50.0%	7.5%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	73.6%	31.3%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.1%	96.0%	99.0%	95.6%	98.9%	98.0%	97.3%	91.4%
Overall NGA broadband	94.7%	74.2%	93.1%	67.7%	86.6%	37.7%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	54.8%	27.4%	45.4%	15.7%	39.3%	12.0%	73.4%	45.1%
At least 30Mbps	94.8%	-	93.3%	-	86.6%	-	91.7%	-
At least 100Mbps	85.8%	-	82.8%	-	72.2%	-	86.6%	-
At least 1Gbps	54.8%	-	45.4%	-	36.9%	-	70.2%	-
At least 1Gbps upload and download	21.6%	-	17.5%	-	-	-	-	-

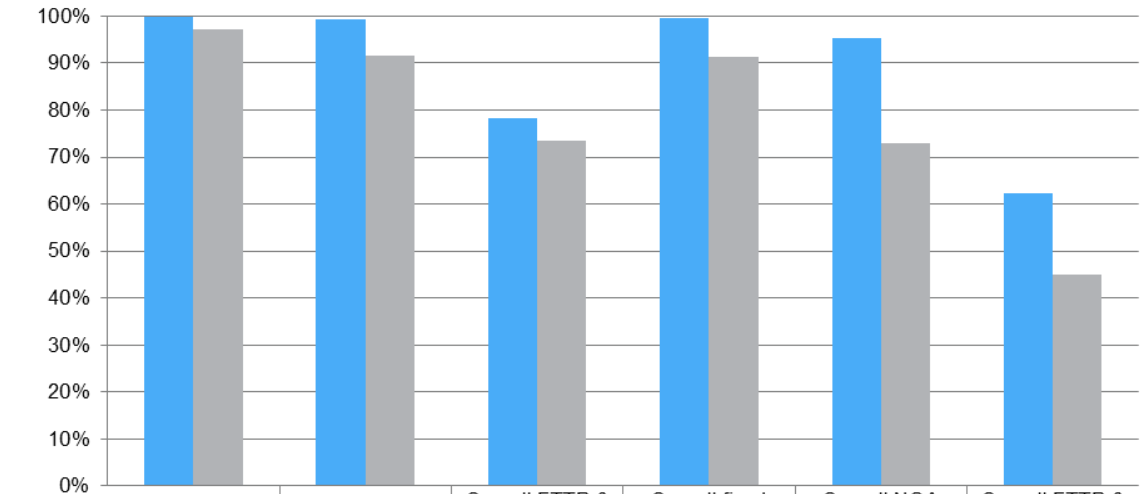
Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

5.2 Belgium

5.2.1 National coverage by broadband technology

As of mid-2022, all Belgian households had access to at least one fixed broadband service, and NGA coverage was near-universal, reaching 99.4% of total households, compared with the EU average of 91.5%, and 95.3% of rural households – well above the EU average of 72.9%. Additionally, 78.3% of Belgian homes were passed by FTTP & DOCSIS 3.1 networks, above the EU average (73.4%) and recording a 10 percentage point growth compared to mid-2021. Rural coverage of these gigabit speed capable networks reached 62.2% of rural households, above the EU average of 45.1%.

Belgium: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Belgium	100.0%	99.4%	78.3%	99.6%	95.3%	62.2%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

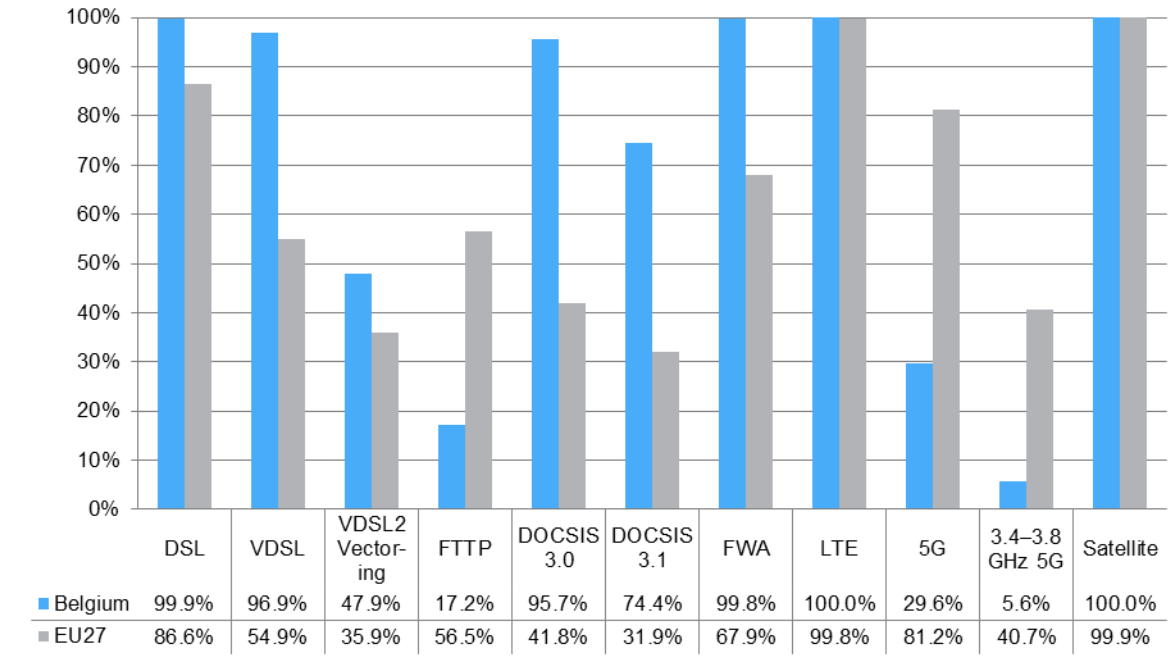
Regarding individual technology coverage at a national level, DSL availability remained near universal with 99.9% of homes passed by DSL networks. The Belgian incumbent operator has upgraded substantial portions of its legacy copper networks to new technology standards offering higher speeds, so that by mid-2022, VDSL and VDSL2 Vectoring technologies passed 96.9% and 47.9% of Belgian homes, respectively – representing much higher coverage levels than those observed in the EU, where VDSL services were available to 54.9% of total households while just 35.9% had access to VDSL2 Vectoring high-speed broadband services.

As of mid-2022, cable modem DOCSIS 3.0 was the second most widely available fixed technology in Belgium, with services available to 95.7% of households, while Belgium was also one of the study countries where operators have made considerable progress with DOCSIS 3.1 network upgrades. By mid-2022 nearly three quarters (74.4%) of Belgian homes were passed by DOCSIS 3.1 networks, well above the EU average of 31.9%.

With Belgian operators having historically focused on upgrading their legacy copper and cable networks, Belgium's FTTP coverage remains the lowest among all study countries, passing 17.2% of homes at the end of June 2022, representing a coverage increase of 7.1 percentage points, since the previous study.

For mobile broadband coverage, Belgium has had universal LTE coverage since 2017. 5G services were available to nearly a third (29.6%) of Belgians with Telenet and Orange both activating their 5G networks in the twelve months to mid-2022 and joining Proximus, which launched Belgium's first 5G services in April 2020. Coverage of 5G networks in the 3.4–3.8 GHz frequency bands reached 5.6%, below the EU average of 40.7%.

Belgium: Coverage by technology, total, 2022

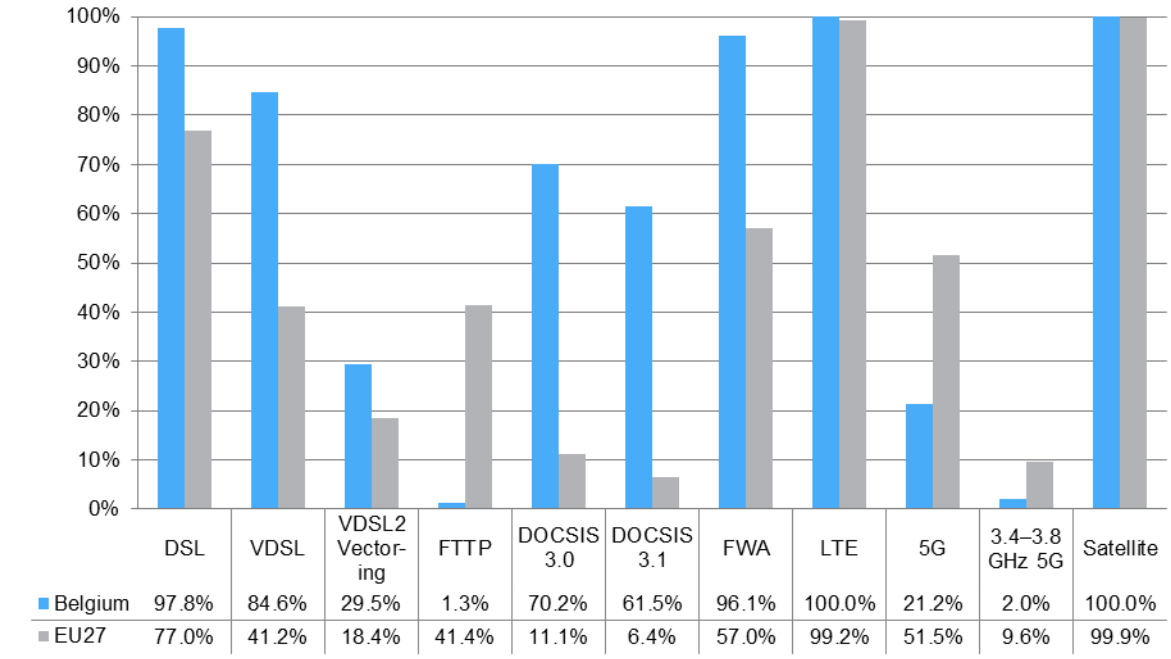


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Belgium	99.9%	96.9%	47.9%	17.2%	95.7%	74.4%	99.8%	100.0%	29.6%	5.6%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Within the rural regions of Belgium, DSL remained the most widely deployed fixed broadband technology, with 97.8% of rural homes passed – more than 20 percentage points above the EU average of 77.0%. Moreover, VDSL (84.6%) was more than double the average EU level (41.2%). Cable modem DOCSIS 3.0 was available to 70.2% of rural households – almost seven times higher than the EU average (11.1%). Cable networks in rural areas have all been upgraded to the DOCSIS 3.1 standard, with coverage of 61.5%, well ahead of the EU average for rural coverage (6.4%). However, rural FTTP coverage remains very limited with just 1.3% of rural homes passed by FTTP networks at the end of June 2022.

Belgium: Coverage by technology, rural areas, 2022



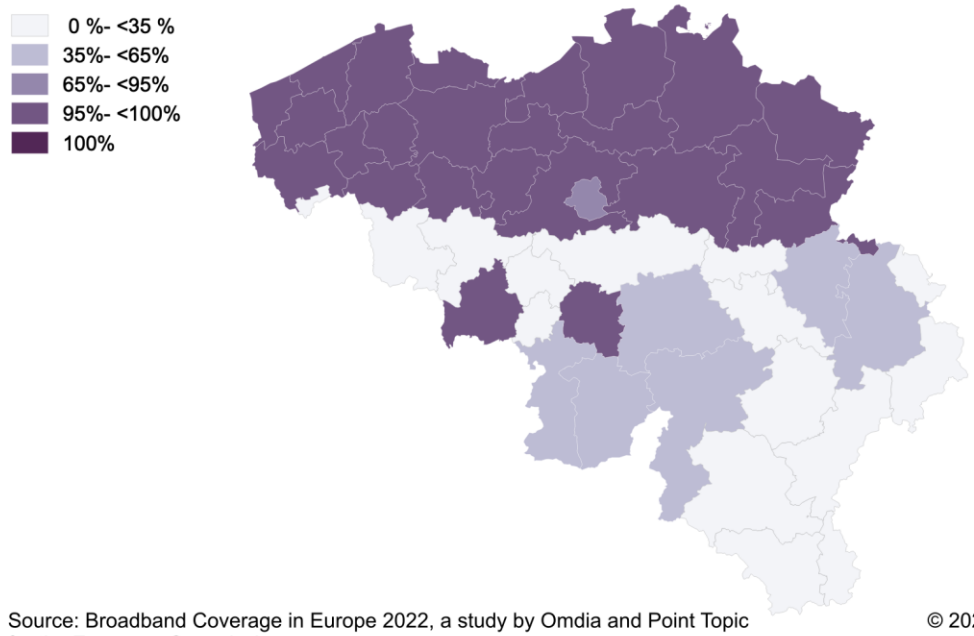
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Belgium	97.8%	84.6%	29.5%	1.3%	70.2%	61.5%	96.1%	100.0%	21.2%	2.0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.2.2 Regional coverage by broadband technology

There is a clear contrast in the availability of the gigabit-capable FTTP & DOCSIS 3.1 service along regional lines. While nearly all Flemish regions over 99%, availability across the various Walloon regions was much lower and more varied.

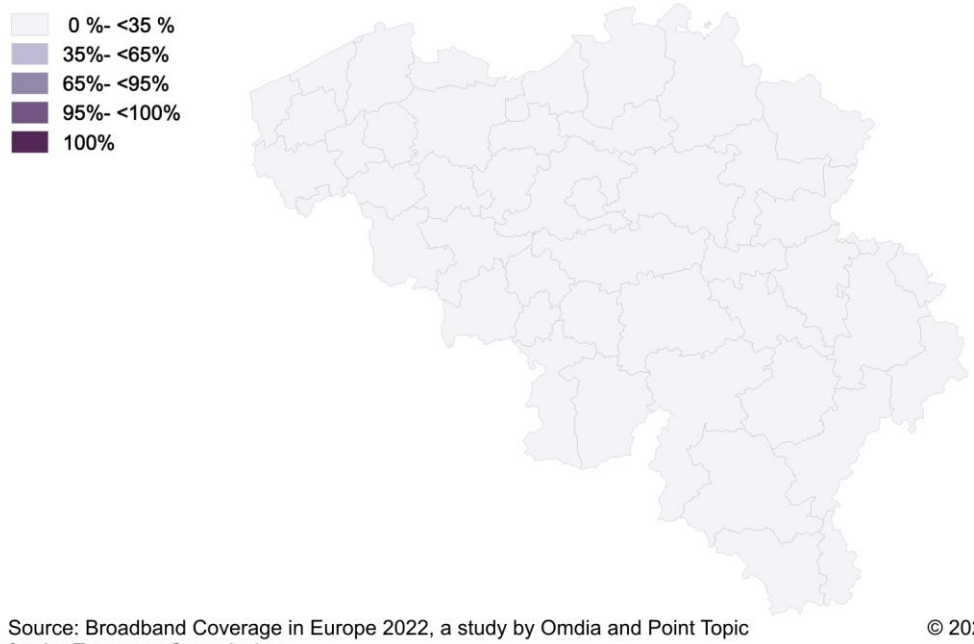
Belgium: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP coverage remains low across all Belgian regions, ranging from less than one percent to close to 35% in Brussels and the Oostende regions.

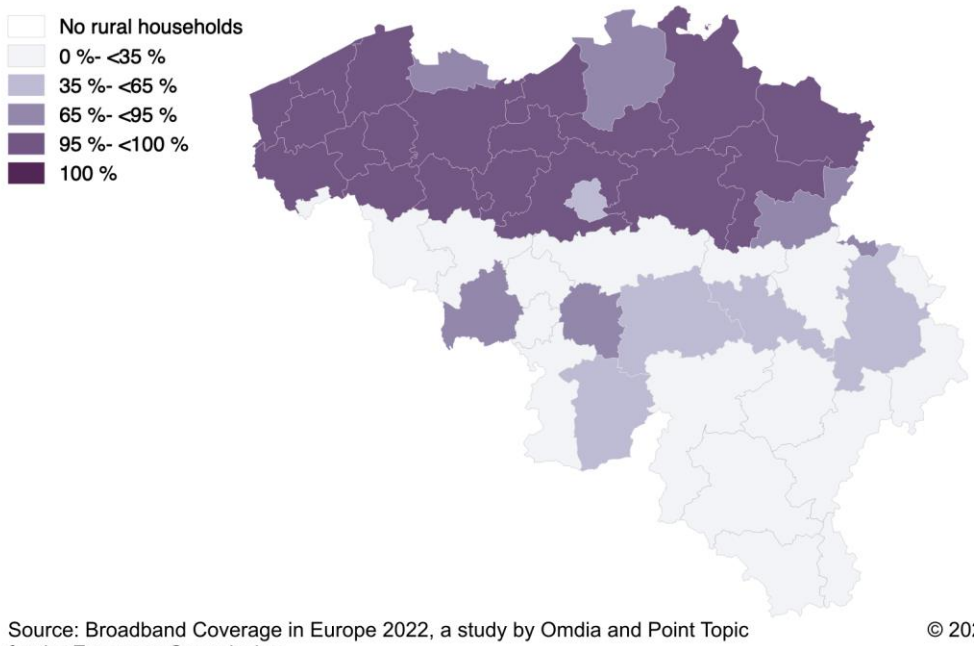
Belgium: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of rural coverage of FTTP & DOCSIS 3.1 networks, similar to the total coverage levels Flemish regions again record much higher coverage than Walloon regions, where coverage ranges from less than one percent coverage to 79.8% of rural households in the Charleroi region.

Belgium: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.2.3 Data tables for Belgium

Statistic	National
Population	11,554,767
Persons per household	2.3
Rural proportion	4.9%

	Belgium 2022		Belgium 2021		Belgium 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.9%	97.8%	*99.8%*	*97.0%*	99.9%	97.8%	86.6%	77.0%
VDSL	96.9%	84.6%	*96.8%*	*80.1%*	96.8%	87.3%	54.9%	41.2%
VDSL2 Vectoring	47.9%	29.5%	51.6%	*31.9%*	54.6%	31.3%	35.9%	18.4%
FTTP	17.2%	1.3%	*10.1%*	0.7%	6.5%	0.4%	56.5%	41.4%
Cable modem DOCSIS 3.0	95.7%	70.2%	96.5%	54.6%	93.6%	48.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	74.4%	61.5%	67.7%	54.6%	65.8%	10.3%	31.9%	6.4%
FWA	99.8%	96.1%	97.7%	94.9%	0%	0%	67.9%	57.0%
LTE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.8%	99.2%
5G	29.6%	21.2%	4.2%	0%	4.4%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	5.6%*	2.0%*	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	100.0%	99.6%	99.7%	97.7%	99.9%	98.8%	97.3%	91.4%
Overall NGA broadband	99.4%	95.3%	99.1%	91.4%	99.3%	94.7%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	78.3%	62.2%	68.9%	55.1%	67.5%	10.6%	73.4%	45.1%
At least 30Mbps	97.8%	-	99.1%	-	98.5%	-	91.7%	-
At least 100Mbps	96.9%	-	97.2%	-	96.5%	-	86.6%	-
At least 1Gbps	78.8%	-	69.0%	-	49.4%	-	70.2%	-
At least 1Gbps upload and download	14.6%	-	*9.0%*	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

* 5G coverage on the 3.4–3.8 GHz spectrum band metric depicts situation in October 2022, rather than end of June 2022.

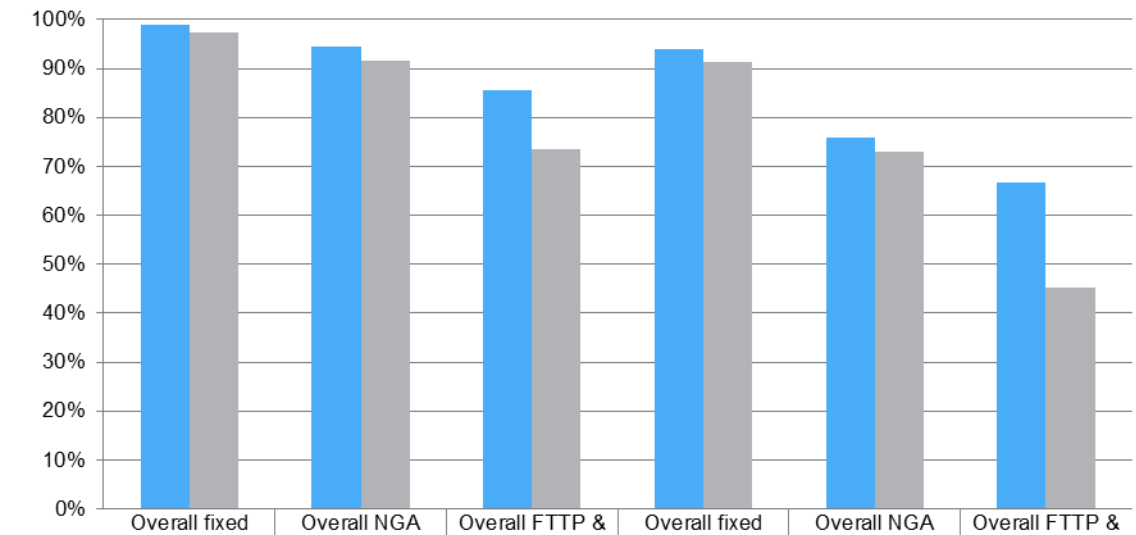
All restatements are highlighted in italics.

5.3 Bulgaria

5.3.1 National coverage by broadband technology

Fixed broadband coverage in Bulgaria increased by 1.9 p.p. with 98.9% of national and 93.9% of rural households covered by the end of June 2022. As there were no DOCSIS 3.1 launches by mid-2022, Bulgaria's coverage in the 1Gbps-capable network category (FTTP & DOCSIS 3.1) was identical to the FTTP coverage of 85.6%. Rural FTTP deployment continued to grow strongly, reaching 66.6% in June 2022, well ahead of the EU average (45.1%). An increase of 2.3 percentage points was recorded in terms of NGA coverage, enabling 94.4% of households to access high speed broadband services. In rural regions, NGA coverage increased by 6.8 percentage points and passed 75.9% of homes.

Bulgaria: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Bulgaria	98.9%	94.4%	85.6%	93.9%	75.9%	66.6%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

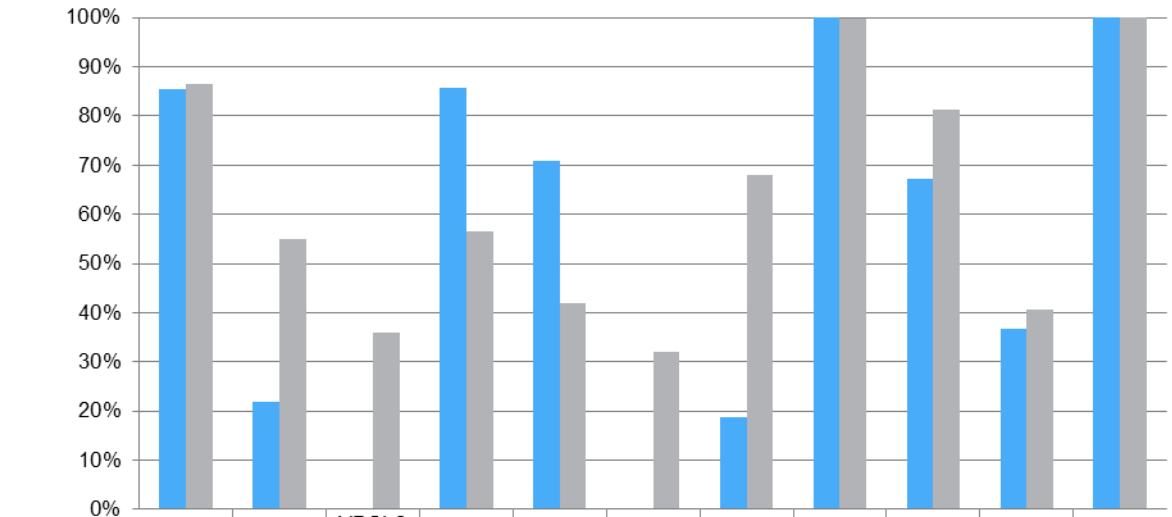
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

When looking at individual broadband technologies, FTTP grew by almost 4.2 p.p. to become the most prevalent fixed broadband technology, with 85.6% of households covered, ahead of DSL on 85.4%. FTTP coverage in Bulgaria remains well ahead of the EU average (56.5%).

As in previous years, cable modem DOCSIS 3.0 grew slightly, and covered 70.9% of households by June 2022, exceeding the EU average by 29.1 percentage points. However, no advancement in terms of DOCSIS 3.1 upgrades were made yet. Meanwhile the gradual upgrade to VDSL networks continued with a total of 21.9% homes passed by mid-2022. However, VDSL2 Vectoring remained absent from the Bulgarian market.

In terms of mobile broadband technologies, overall 5G coverage increased significantly over the year (from 40.1% in 2021 to 67.2% in 2022) but remains 14 p.p. below the EU27 average of 81.2%. 5G coverage on the 3.4–3.8 GHz spectrum band reached 36.7% of the population, meaning that more than half of the 5G coverage area is using the 3.4–3.8 GHz frequency band.

Bulgaria: Coverage by technology, total, 2022



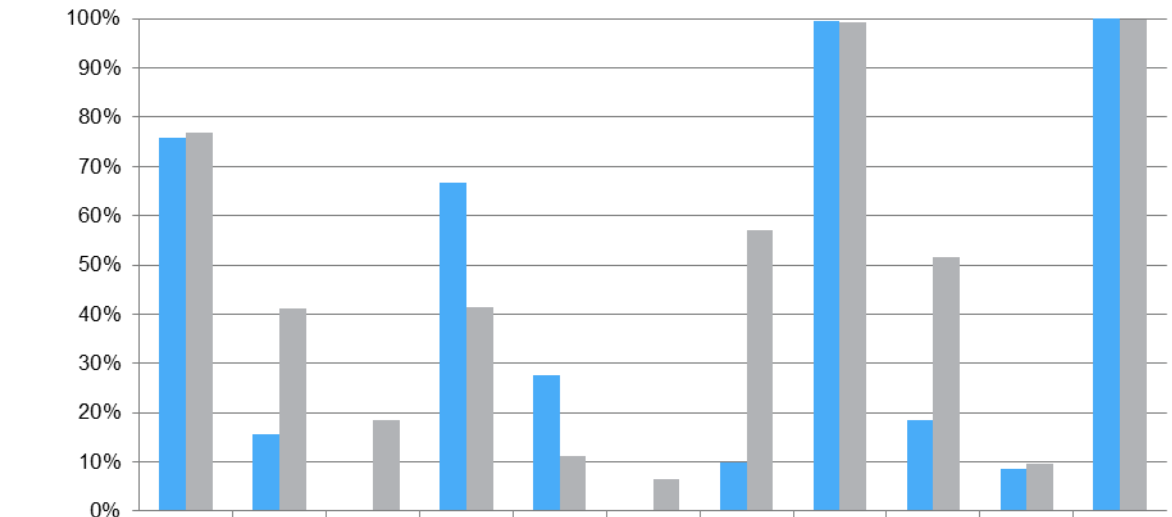
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Bulgaria	85.4%	21.9%	0%	85.6%	70.9%	0%	18.8%	99.9%	67.2%	36.7%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural regions, DSL remained the leading technology with 75.7% of rural homes passed, in line with the previous year. VDSL deployments progressed in rural regions, though coverage remains well below the national figure. Following an increase of 6.8 percentage points, 15.6% of rural households could access VDSL services. Meanwhile rural FTTP coverage grew by almost 9 p.p., reaching 66.6%. Bulgaria continued to sit well above the EU average in the cable DOCSIS 3.0 category, covering 27.6% of rural households.

Rural LTE coverage remained stable at 99.7% of rural homes. 5G deployments were primarily focussed on urban areas, and rural 5G coverage was estimated at 18.4%, with less than half of this believed to be using the 3.4–3.8 GHz frequency band.

Bulgaria: Coverage by technology, rural areas, 2022



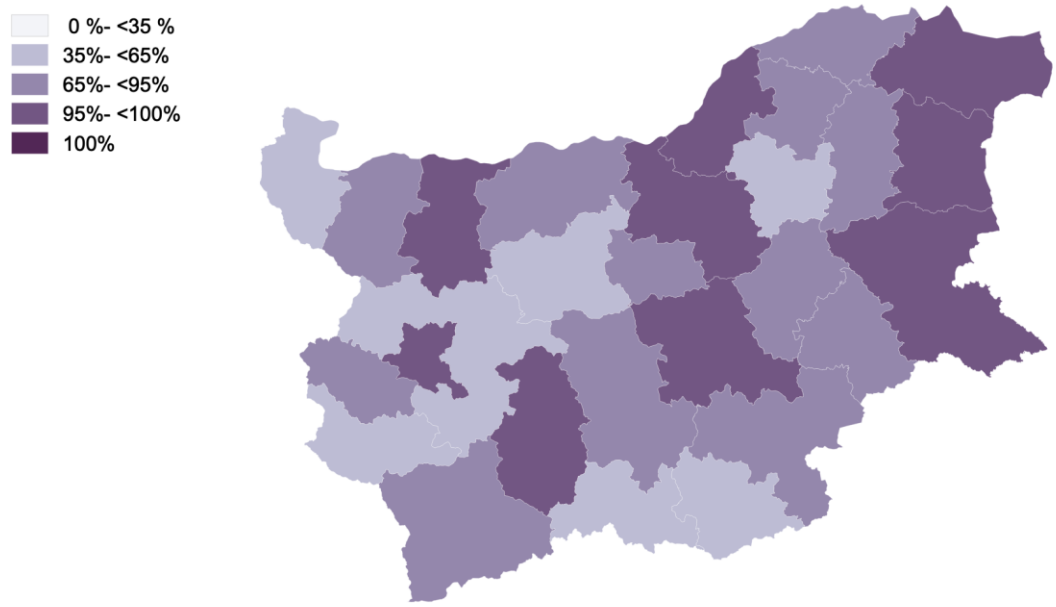
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Bulgaria	75.7%	15.6%	0%	66.6%	27.6%	0%	9.8%	99.7%	18.4%	8.6%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.3.2 Regional coverage by broadband technology

Nine Bulgarian provinces recorded coverage of FTTP & DOCSIS 3.1 greater than 95%, while only seven failed to reach 65% coverage.

Bulgaria: FTTP & DOCSIS 3.1 coverage, 2022

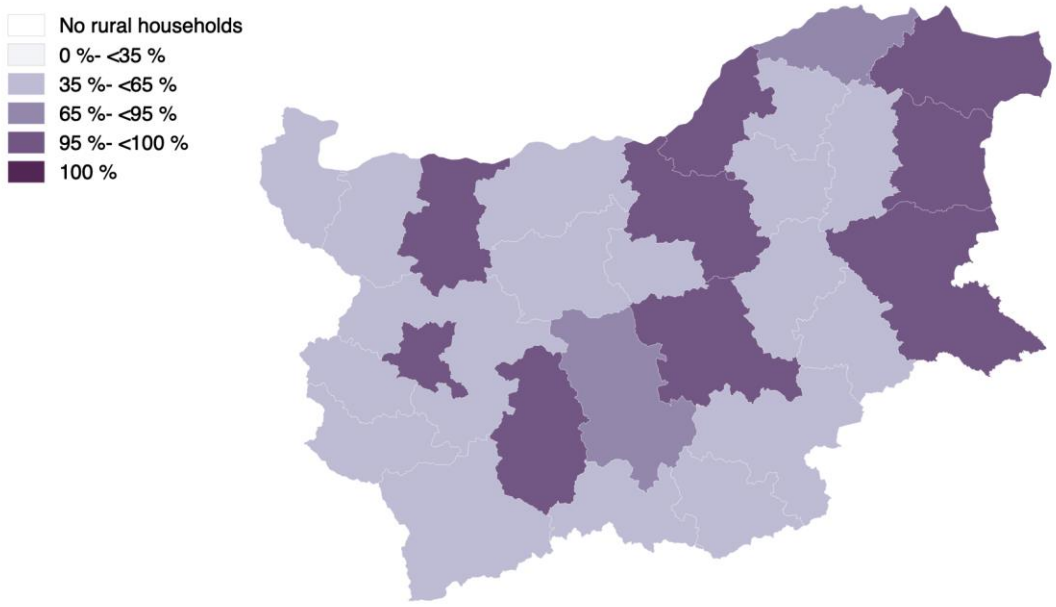


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since there are no DOCSIS 3.1 services in Bulgaria, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

Rural FTTP coverage varies more widely. The nine provinces with total coverage above 95% also recorded rural FTTP coverage above 95%, but of the remaining 19 provinces, only 2 (Plovdiv and Silistra) recorded rural FTTP coverage above 65%.

Bulgaria: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.3.3 Data tables for Bulgaria

Statistic	National
Population	6,838,937
Persons per household	2.4
Rural proportion	17.9%

	Bulgaria 2022		Bulgaria 2021		Bulgaria 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	85.4%	75.7%	85.4%	75.7%	85.5%	75.8%	86.6%	77.0%
VDSL	21.9%	15.6%	18.2%	8.8%	13.3%	4.5%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	85.6%	66.6%	*81.4%*	*57.6%*	75.2%	48.7%	56.5%	41.4%
Cable modem DOCSIS 3.0	70.9%	27.6%	70.5%	26.5%	70.0%	26.0%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	18.8%	9.8%	18.8%	9.8%	18.8%	9.8%	67.9%	57.0%
LTE	99.9%	99.7%	99.9%	99.7%	99.9%	99.7%	99.8%	99.2%
5G	67.2%	18.4%	40.1%	8.6%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	36.7%	8.6%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	98.9%	93.9%	*97.0%*	*91.8%*	95.7%	87.9%	97.3%	91.4%
Overall NGA broadband	94.4%	75.9%	*92.1%*	*69.0%*	87.6%	63.9%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	85.6%	66.6%	*81.4%*	*57.6%*	75.2%	48.7%	73.4%	45.1%
At least 30Mbps	93.9%	-	*92.1%*	-	87.6%	-	91.7%	-
At least 100Mbps	91.9%	-	*89.4%*	-	80.9%	-	86.6%	-
At least 1Gbps	21.4%	-	*16.3%*	-	8.6%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

All restatements are highlighted in italics.

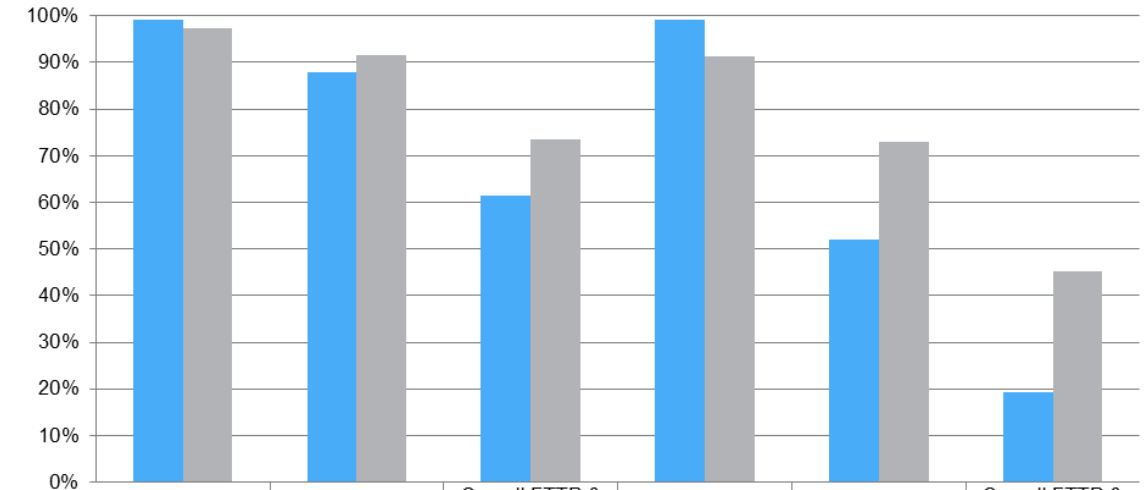
5.4 Croatia

5.4.1 National coverage by broadband technology

Croatia exceeded the EU average in terms of fixed broadband coverage, with 99.0% of total households and 99.3% of rural households covered. The availability of NGA in rural regions grew by 12.9 percentage points over the study period and was available to more than half (51.9%) of rural households by mid-2022. On national level, coverage grew by 0.1 percentage points to 87.9%. 1Gbps-capable networks (FTTP & DOCSIS 3.1) were available to 61.5% of households which represents an increase of 9.8 percentage points compared to mid-2021. In rural Croatia, coverage grew by 5.2 percentage points and was available to 19.2% of households.

Despite strong growth momentum across the NGA and FTTP & DOCSIS 3.1 metrics, Croatia continued to perform below EU averages in 2022, and recorded the third lowest rural FTTP & DOCSIS 3.1 coverage among study countries.

Croatia: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Croatia	99.0%	87.9%	61.5%	99.3%	51.9%	19.2%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

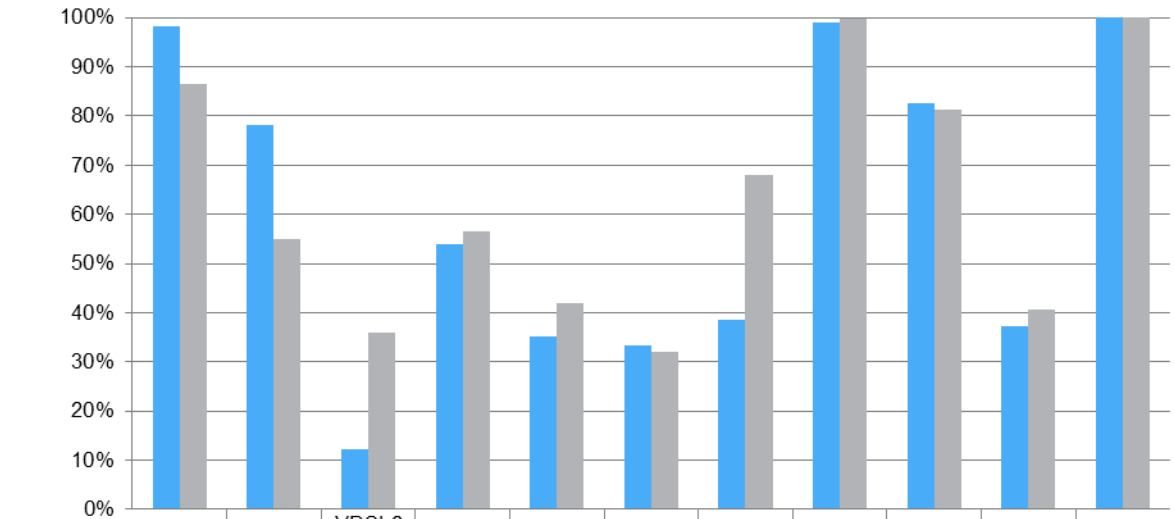
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the most prevalent individual broadband technology in Croatia, with 98.1% of homes passed, but recorded a slight decline of 1.6 percentage points compared to the prior year. VDSL was available to 78.1% of households, while 12.1% of households were also covered by VDSL2 Vectoring networks. Almost the entire cable network (94.8%) had been upgraded to DOCSIS 3.1 standard by mid-2022, covering one third of Croatian households (33.3%).

FWA recorded the strongest growth among broadband technologies in this year's study which was driven by the introduction of 5G FWA by Croatian operators. Coverage increased by 34.0 percentage points and stood at 38.4% by the end of June 2022. The second largest growth was recorded in FTTP coverage which grew by 15.2 percentage points and was available to more than half (53.9%) of Croatian households. Despite the strong growth, Croatia remained just below the EU average of 56.5%.

The availability of 5G grew rapidly over the twelve-month period as commercial services from all three MNOs were available from 2H21. Croatian operators covered 82.5% of households by mid-2022, up by 48.7 percentage points on a year-on-year basis, and unlike last year, Croatia exceeded the EU average. Looking at 5G services provided via the 3.4–3.8 GHz frequency band, Croatia remained slightly below the EU average with 37.2% of households covered.

Croatia: Coverage by technology, total, 2022



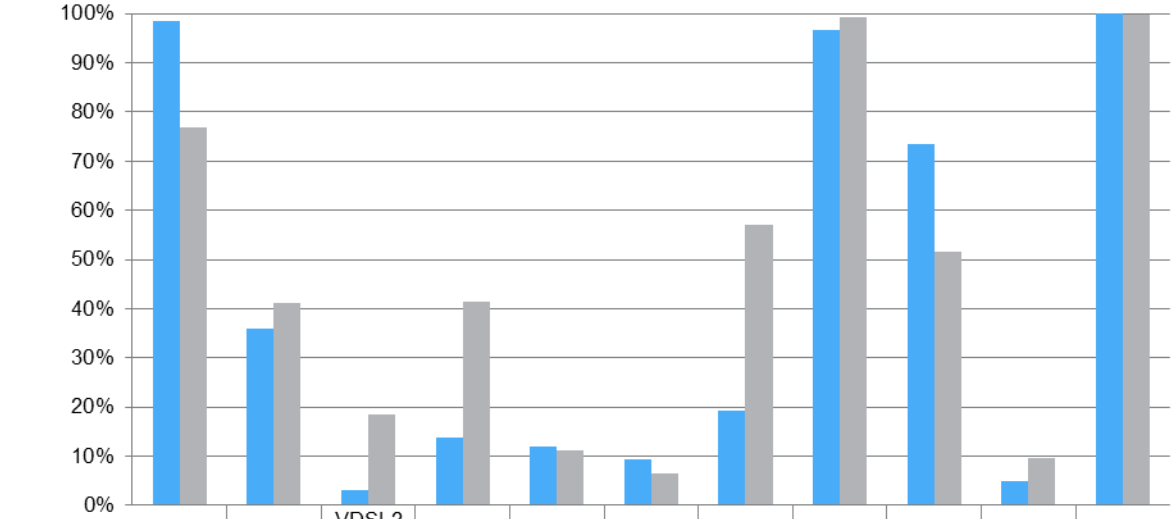
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Croatia	98.1%	78.1%	12.1%	53.9%	35.1%	33.3%	38.4%	99.0%	82.5%	37.2%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural Croatia, DSL coverage stood at 98.5% by mid-2022, making it the most prevalent technology. Upgrades to VDSL and VDSL2 Vectoring progressed which was reflected in coverage increases of 7.8 percentage points and 0.4 percentage points, respectively. FTTP coverage almost doubled compared to mid-2021, with 13.7% of rural homes passed, but remained below the EU average. DOCSIS 3.1 was available to 9.4% of rural households, with 79.2% of the entire cable network upgraded to DOCSIS 3.1. As seen on national level, the launch of FWA 5G also led to a sharp increase in rural FWA coverage, covering 19.3% of rural households by mid-2022, up by 12.6 percentage points.

Croatian operators accelerated the pace of rural 5G deployment rapidly over the twelve-month period, and covered 73.5% of rural households by mid-2022, up by 64.2 percentage points. 5.0% of households were covered by 5G services on the 3.4–3.8 GHz spectrum band, which was below the EU average.

Croatia: Coverage by technology, rural areas, 2022



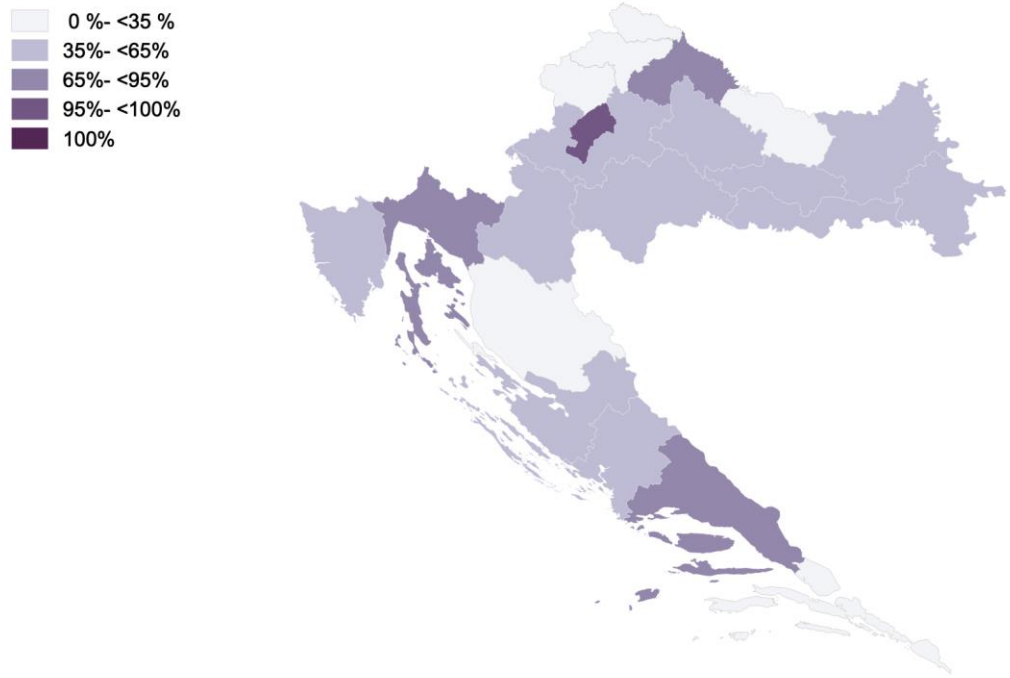
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Croatia	98.5%	36.0%	3.1%	13.7%	11.9%	9.4%	19.3%	96.7%	73.5%	5.0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.4.2 Regional coverage by broadband technology

The highest FTTP & DOCSIS 3.1 coverage across Croatian regions was reported in Zagreb, with 99.4% of households covered. Out of the remaining 20 regions, three exceeded the 65% threshold, while coverage across the other 17 regions remained below 65%.

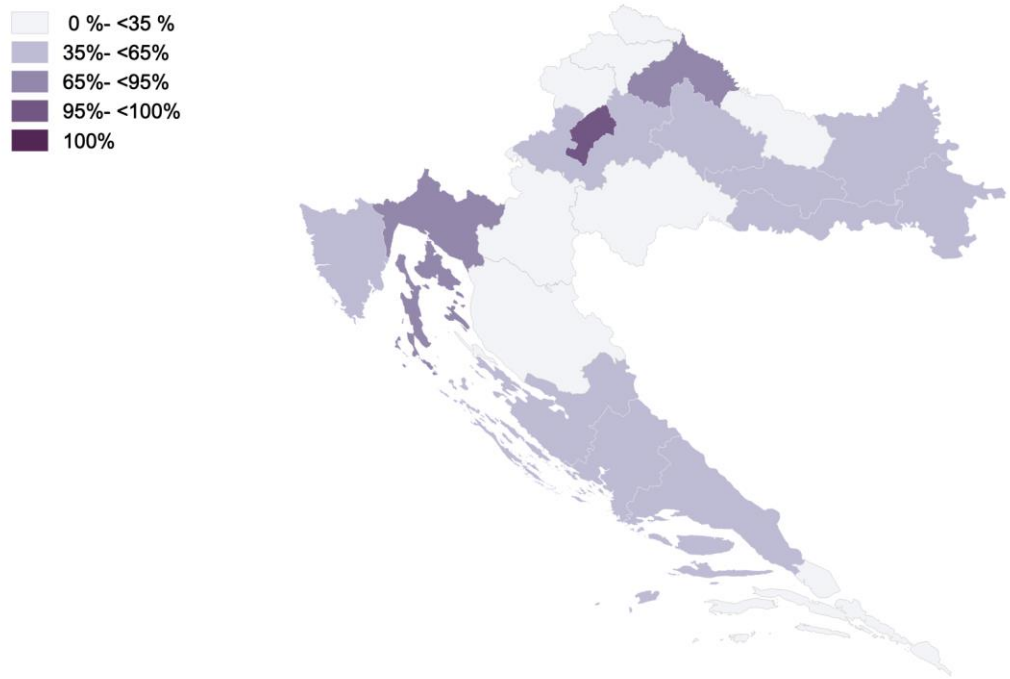
Croatia: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Zagreb recorded the largest FTTP coverage and was the only region to exceed the 95% threshold.

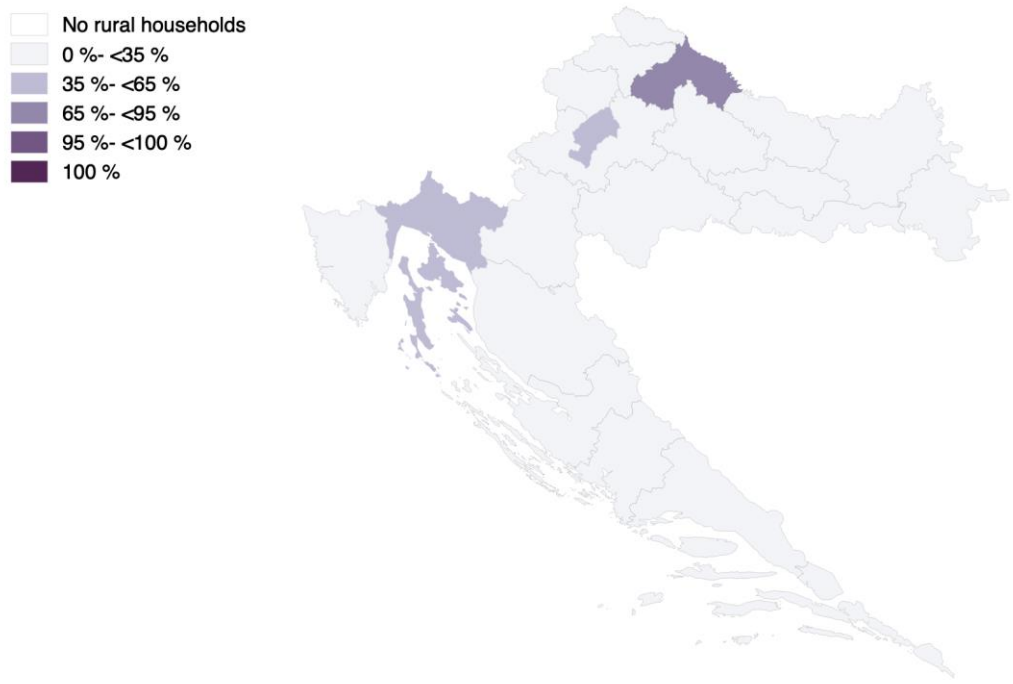
Croatia: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The highest rural FTTP & DOCSIS 3.1 coverage was reported in Koprivničko-križevačka županija which was also the only region to exceed the 65% threshold. FTTP & DOCSIS 3.1 coverage across 18 regions remained below 35%.

Croatia: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.4.3 Data tables for Croatia

Statistic	National
Population	4,036,355
Persons per household	2.9
Rural proportion	22.6%

	Croatia 2022		Croatia 2021		Croatia 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	98.1%	98.5%	99.7%	98.9%	99.8%	98.9%	86.6%	77.0%
VDSL	78.1%	36.0%	78.2%	28.2%	81.1%	22.7%	54.9%	41.2%
VDSL2 Vectoring	12.1%	3.1%	11.3%	2.7%	10.0%	2.0%	35.9%	18.4%
FTTP	53.9%	13.7%	38.7%	7.1%	35.6%	6.8%	56.5%	41.4%
Cable modem DOCSIS 3.0	35.1%	11.9%	36.3%	*13.3%*	35.7%	*14.6%*	41.8%	11.1%
Cable modem DOCSIS 3.1	33.3%	9.4%	34.5%	9.3%	34.0%	5.4%	31.9%	6.4%
FWA	38.4%	19.3%	4.4%	6.7%	5.4%	6.7%	67.9%	57.0%
LTE	99.0%	96.7%	99.5%	97.8%	99.5%	97.6%	99.8%	99.2%
5G	82.5%	73.5%	33.8%	9.3%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	37.2%	5.0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.0%	99.3%	99.9%	99.4%	99.9%	99.4%	97.3%	91.4%
Overall NGA broadband	87.9%	51.9%	87.8%	*39.0%*	86.3%	*34.5%*	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	61.5%	19.2%	51.7%	14.0%	46.5%	10.6%	73.4%	45.1%
At least 30Mbps	88.0%	-	87.8%	-	86.3%	-	91.7%	-
At least 100Mbps	67.4%	-	62.1%	-	46.2%	-	86.6%	-
At least 1Gbps	57.6%	-	52.3%	-	21.8%	-	70.2%	-
At least 1Gbps upload and download	5.7%	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

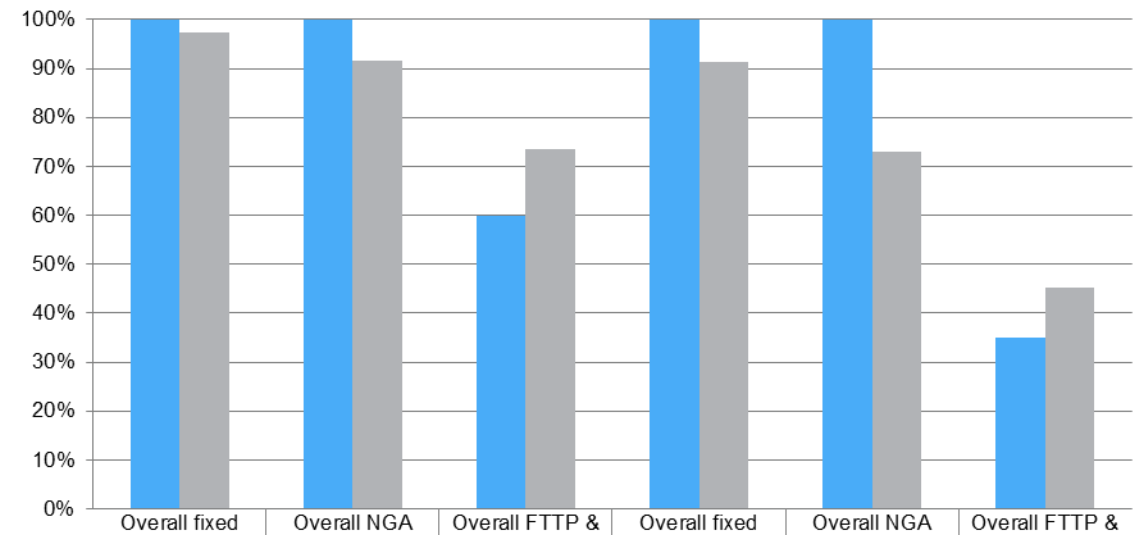
All restatements are highlighted in italics.

5.5 Cyprus

5.5.1 National coverage by broadband technology

Coverage of 1Gbps-capable networks (FTTP & DOCSIS 3.1) in Cyprus increased substantially in 2022, reaching 60.0% of homes by mid-2022, though this represented a substantial increase from the 41.4% recorded in 2021. As there were no DOCSIS 3.1 deployments by mid-2022, gigabit-capable networks were limited to FTTP. Cyprus has had complete fixed broadband coverage at both national and rural levels since 2012 and in mid-2019, became the second country in the study to achieve universal NGA broadband coverage, having increased its VDSL reach to 100.0% of households in the preceding twelve months.

Cyprus: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Cyprus	100.0%	100.0%	60.0%	100.0%	100.0%	35.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

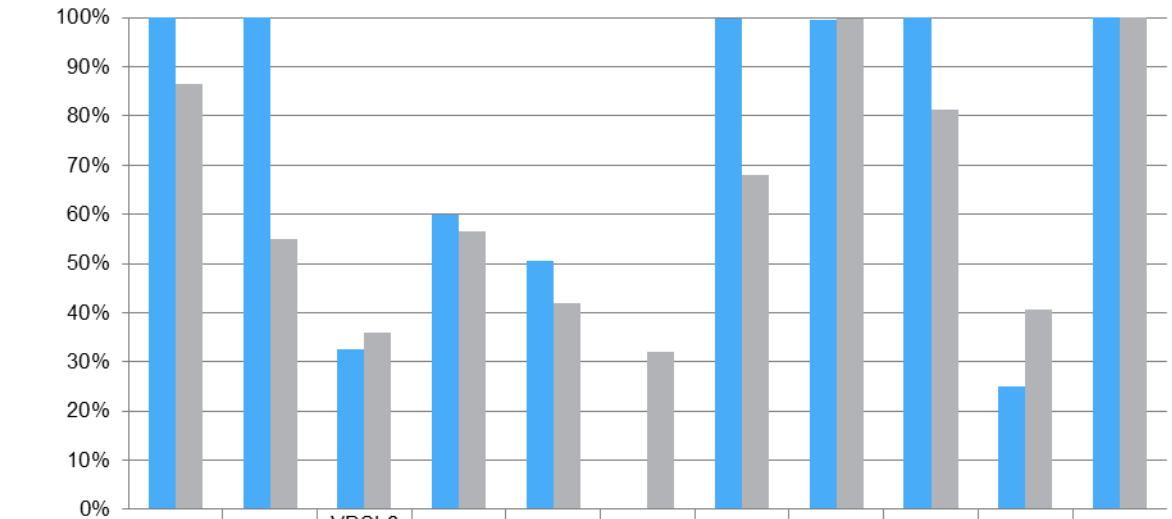
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The strong growth in FTTP coverage over the year means that Cyprus is now 3.5 p.p. ahead of the EU27 average for FTTP coverage (60.0% versus 56.5%), having lagged by 8.5 p.p. in 2021. The 18.6 p.p. increase since 2021 is the highest of the countries in this year's study.

Cable modem DOCSIS 3.0 services are available to around half of homes (50.6%), but as of mid-2022 cable operators in Cyprus had not implemented any DOCSIS 3.1 upgrades. Thus, FTTP remains the only available technology capable of supporting gigabit speed services. VDSL services remain available to all households in Cyprus, with high-speed VDSL2 Vectoring services covering almost one third (32.6%) of Cypriot households. Meanwhile Fixed Wireless Access coverage reached 99.7% of households nationally at the end of June 2022.

Cyprus saw its first 5G services in early 2021; by June 2022 coverage had reached 100.0% of households in Cyprus, one of three countries to achieve this milestone. But 5G coverage on the 3.4–3.8 GHz spectrum band was well below the EU27 average (25.0% vs 40.7%).

Cyprus: Coverage by technology, total, 2022



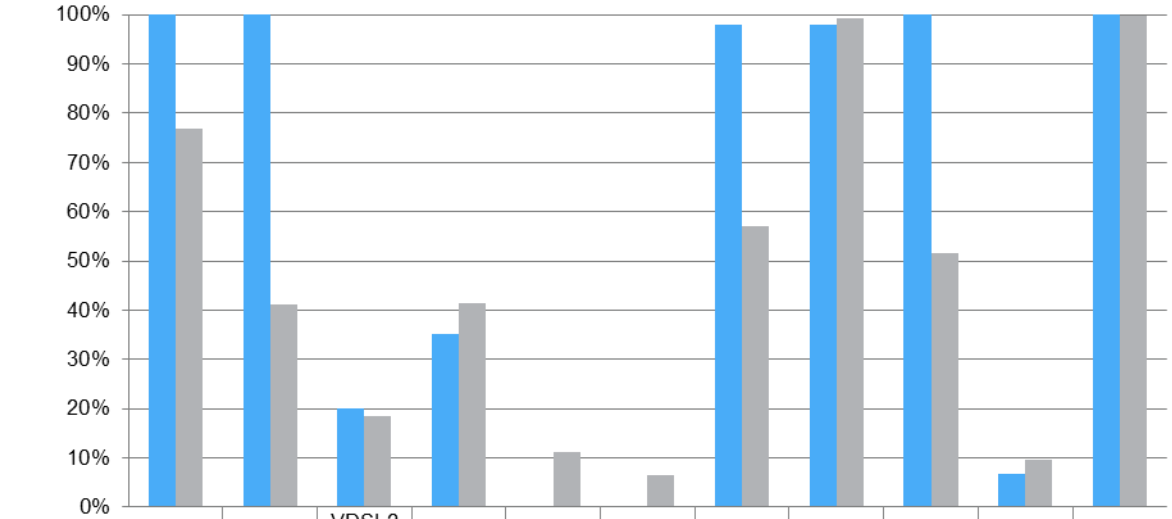
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Cyprus	100.0%	100.0%	32.6%	60.0%	50.6%	0%	99.7%	99.5%	100.0%	25.0%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural areas, FTTP coverage also increased significantly in the year to June 2022 to reach 35.0% of households (+12.6 p.p.), though it remains below the EU average (41.4%). DOCSIS 3.0 networks are limited to urban areas in Cyprus, with zero rural coverage, but DSL and VDSL broadband continued to provide universal rural coverage, and VDSL2 Vectoring reached a fifth of rural homes (19.9%). Rural FWA coverage is near-universal, with the technology reaching 98.0% of households.

Rural 5G coverage reached 100% of households, but coverage of 5G using the 3.4–3.8 GHz band was below the EU average at just 6.8% of households, indicating a strong reliance on the 700 MHz band for rural 5G coverage in Cyprus.

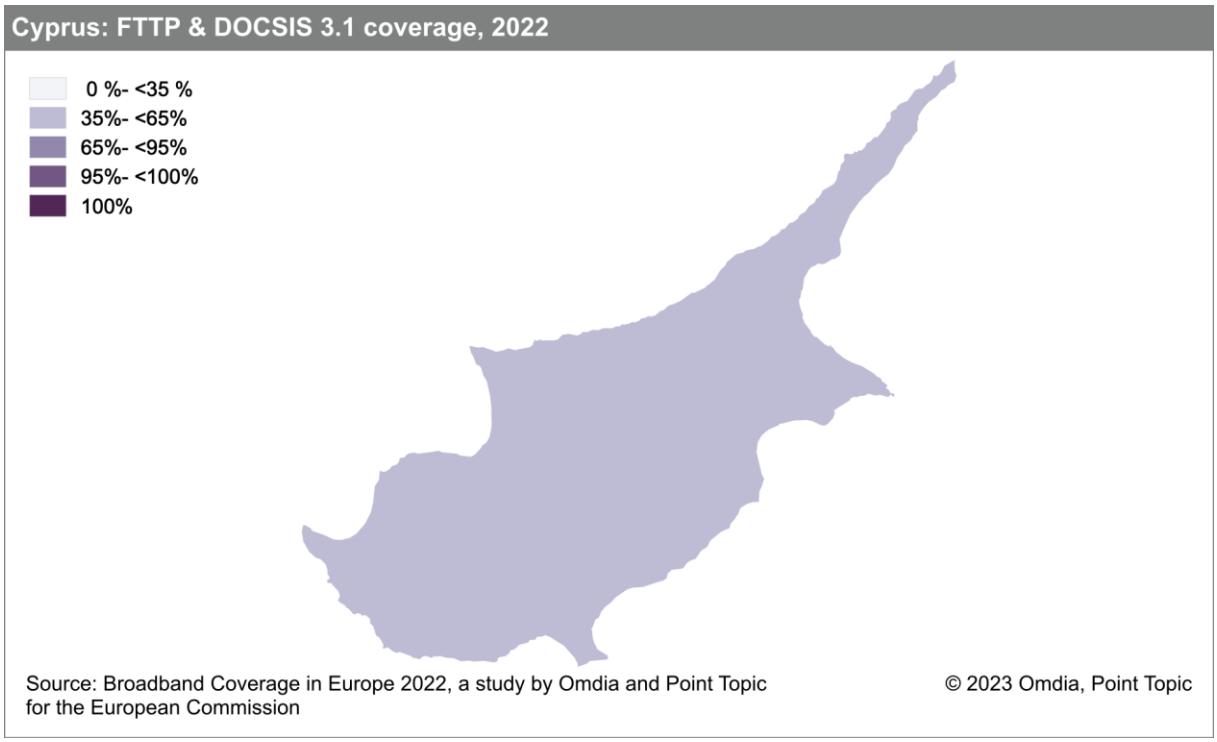
Cyprus: Coverage by technology, rural areas, 2022



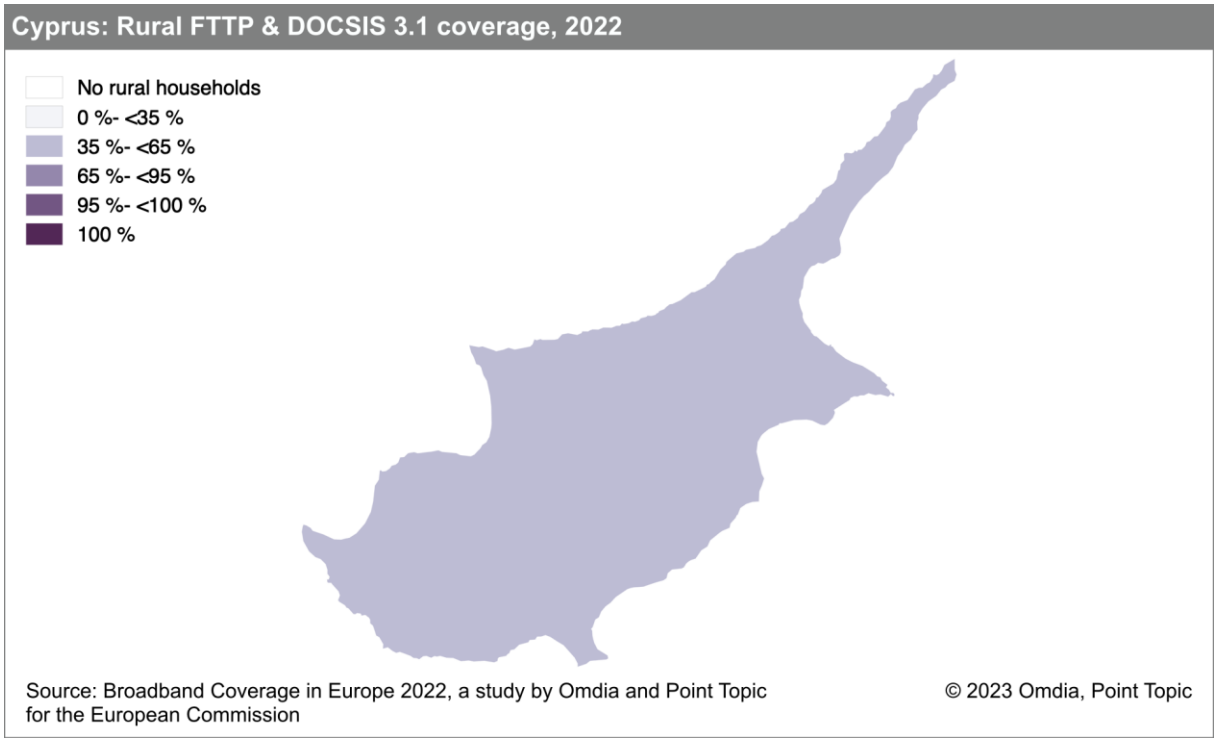
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Cyprus	100.0%	100.0%	19.9%	35.0%	0%	0%	98.0%	98.1%	100.0%	6.8%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.5.2 Regional coverage by broadband technology[15]



Since there are no DOCSIS 3.1 services in Cyprus, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.



[15] Please note that even though the map depicts the area of the whole island, the data on broadband coverage concern only the areas under the effective control of the Republic of Cyprus.

5.5.3 Data tables for Cyprus

Statistic	National
Population	896,007
Persons per household	2.8
Rural proportion	11.3%

	Cyprus 2022		Cyprus 2021		Cyprus 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	86.6%	77.0%
VDSL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	54.9%	41.2%
VDSL2 Vectoring	32.6%	19.9%	43.5%	25.7%	46.7%	19.8%	35.9%	18.4%
FTTP	60.0%	35.0%	41.4%	22.4%	26.2%	19.5%	56.5%	41.4%
Cable modem DOCSIS 3.0	50.6%	0%	65.9%	0%	57.8%	0%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	99.7%	98.0%	88.8%	4.2%	88.8%	4.0%	67.9%	57.0%
5G	99.5%	98.1%	99.5%	97.4%	99.6%	97.3%	99.8%	99.2%
5G coverage on the 3.4–3.8 GHz spectrum band	100.0%	100.0%	75.0%	32.2%	0%	0%	81.2%	51.5%
5G	25.0%	6.8%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.3%	91.4%
Overall NGA broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	60.0%	35.0%	41.4%	22.4%	26.2%	19.5%	73.4%	45.1%
At least 30Mbps	100.0%	-	100.0%	-	100.0%	-	91.7%	-
At least 100Mbps	93.5%	-	82.9%	-	78.9%	-	86.6%	-
At least 1Gbps	60.0%	-	41.4%	-	26.2%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

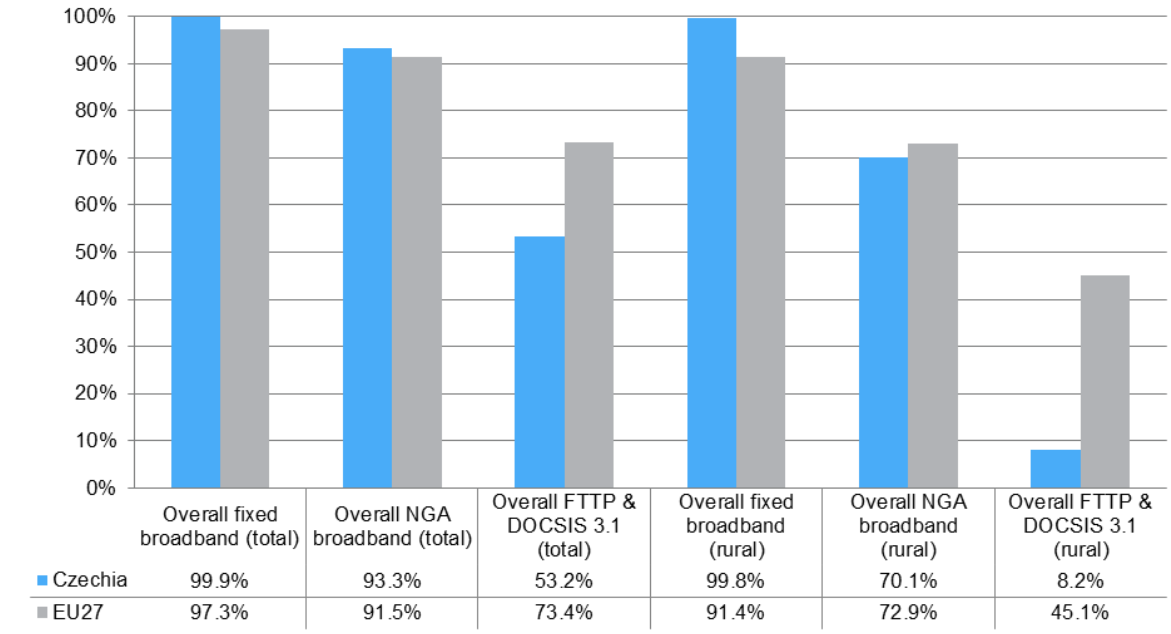
5.6 Czechia

5.6.1 National coverage by broadband technology

Almost all (99.9%) Czech households had access to at least one fixed broadband technology by mid-2022, while fixed broadband coverage also neared universal coverage (99.8%) in rural regions. NGA broadband services were available to 93.3% of households and 70.1% of rural households.

While Czechia outperformed the EU figure in fixed broadband and NGA categories, availability of 1Gbps-capable networks (FTTP & DOCSIS 3.1) remained below the EU average, with little over a half of Czech homes (53.2%) passed. In rural areas, only 8.2% of homes were passed by either FTTP or DOCSIS 3.1 networks.

Czechia: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Czechia	99.9%	93.3%	53.2%	99.8%	70.1%	8.2%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of individual technologies, DSL remained the most widespread technology, passing a total of 97.6% of Czech homes. The infrastructure arm of the Czech incumbent operator, CETIN, has upgraded most of its legacy copper networks to new technology standards offering higher speeds in previous years, so that by mid-2022, VDSL and VDSL2 Vectoring networks passed 86.1% and 86.0% of Czech homes, respectively, outperforming the EU average in both categories.

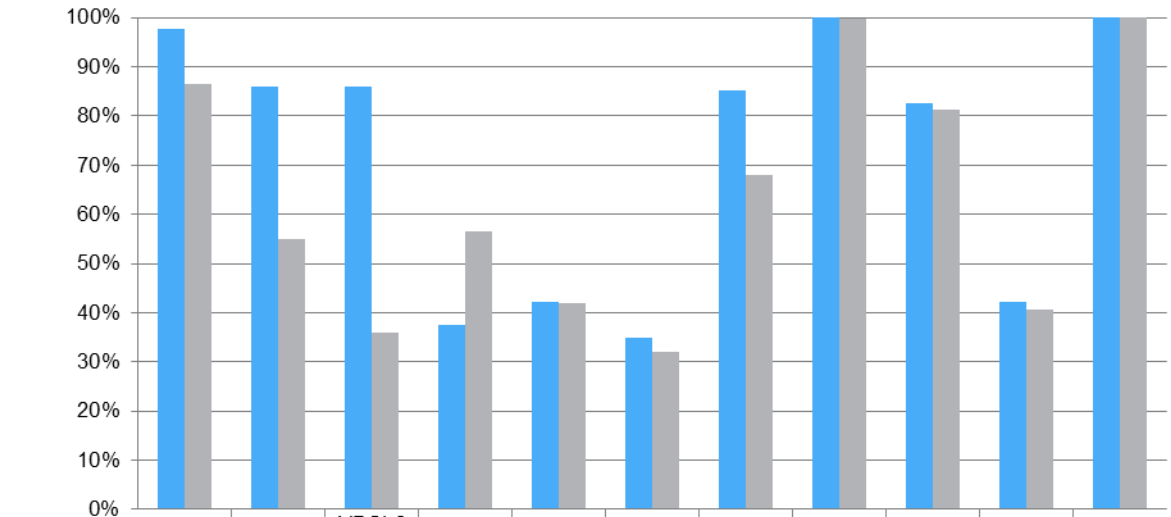
The Czech broadband market is characterized by a large number of small local fixed wireless providers, which is reflected in the high FWA coverage of 85.1%, compared to the EU average of 67.9%.

Cable modem DOCSIS 3.0 coverage reached 42.1% of Czech households at the end of June 2022. As cable companies have traditionally limited their presence to big cities across Czechia, the majority of households covered by cable networks were located in urban areas. DOCSIS 3.1 network rollout commenced in the second half of 2020 and by the end of June 2022, over a third (34.9%) of households had access to DOCSIS 3.1 broadband services.

FTTP coverage grew by 2.4 percentage points over the study period and passed 37.4% of Czech homes by the end of June 2022. While in the past most of the FTTP rollouts were attributed to smaller and local operators deploying these networks, leading players in the market have now also begun to invest significantly in fiber networks deployment.

Availability of LTE services is universal across Czechia and more than eight in ten households (82.6%) are covered by 5G networks after recording a 33.2 percentage point growth year on year. 5G networks utilizing the 3.4–3.8 GHz frequency band passed 42.3% of Czech homes.

Czechia: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Czechia	97.6%	86.1%	86.0%	37.4%	42.1%	34.9%	85.1%	100.0%	82.6%	42.3%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

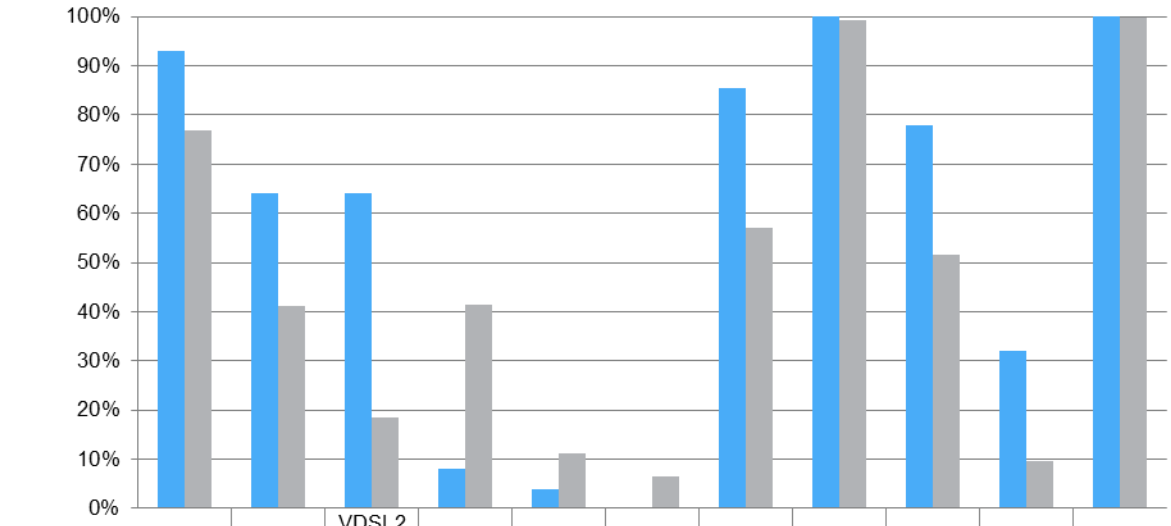
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural regions, DSL remained the prevalent technology with 93.1% of rural homes passed. Similar to national level, large proportion of the legacy networks have been upgraded to VDSL and VDSL2 Vectoring standards, covering 64.2% of Czech households (for both technologies).

DOCSIS 3.1 upgrades were focused on urban regions and no rural households were reported to be covered by mid-2022. FTTP services were available to 8.1% of rural households, while DOCSIS 3.0 passed 3.8% of rural homes. Czechia performed below the EU average across all three categories.

Fixed Wireless Access (FWA) networks passed 85.4% of rural Czech homes – well above the EU average (57.0%). 5G networks covered 78.0% of Czech rural households, while 5G coverage on the 3.4–3.8 GHz spectrum band was available to 32% of rural households, standing well above the EU average for both metrics.

Czechia: Coverage by technology, rural areas, 2022



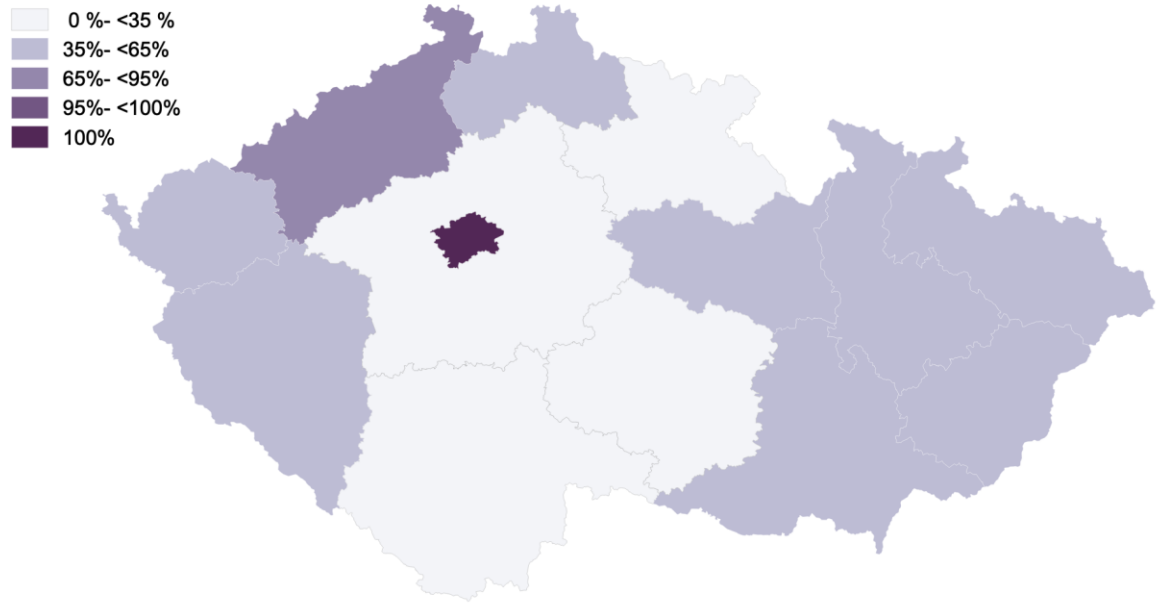
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Czechia	93.1%	64.2%	64.2%	8.1%	3.8%	0.0%	85.4%	100.0%	78.0%	32.0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.6.2 Regional coverage by broadband technology

The combined FTTP & DOCSIS 3.1 coverage recorded very varied levels, ranging from universal coverage in the capital region Prague to 25.9% in Kraj Vysočina region.

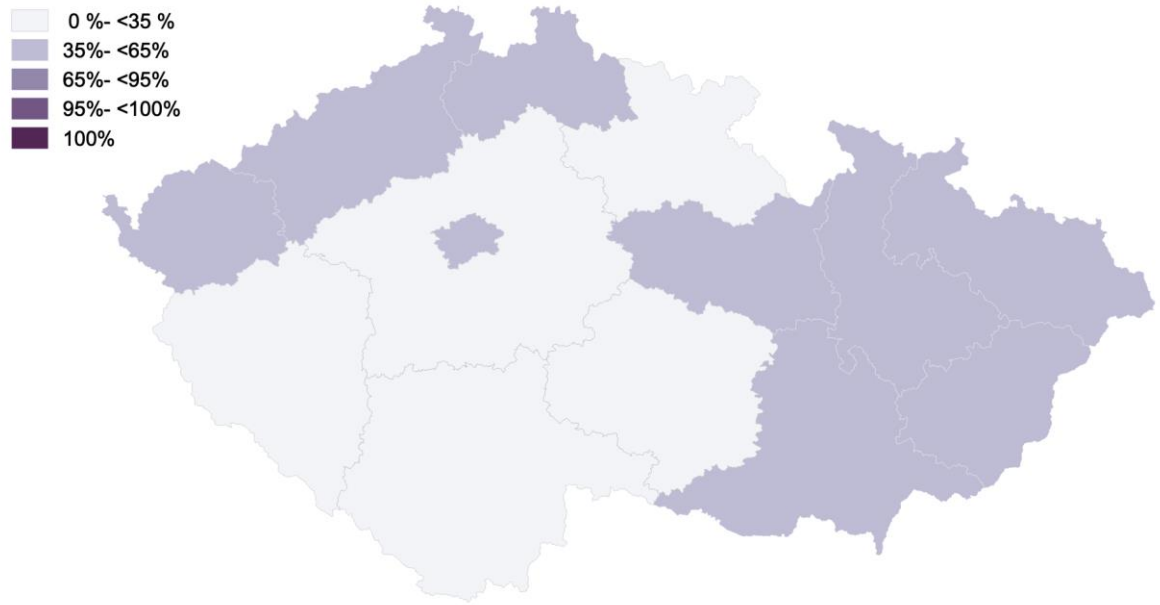
Czech Republic: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP coverage levels also vary quite significantly among regions ranging from nearly half of households in Karlovarský kraj region and the capital, Prague having access to FTTP broadband services to just 19.6% of households in Plzeňský kraj region having the same opportunity.

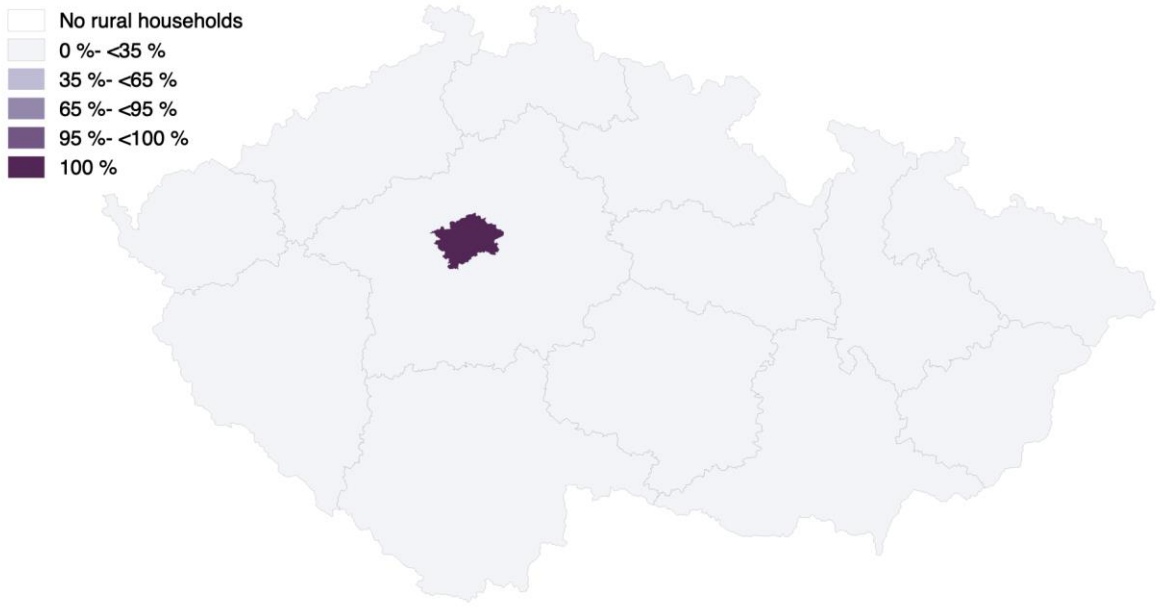
Czech Republic: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Given the overall universal FTTP and DOCSIS 3.1 availability in the capital Prague region, rural coverage for this category also recorded 100% coverage, though the number of households classified as rural in this region is very limited. For the rest of the regions, availability of gigabit-speed-capable services remained limited.

Czech Republic: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.6.3 Data tables for Czechia

Statistic	National
Population	10,701,777
Persons per household	2.5
Rural proportion	13.9%

	Czechia 2022		Czechia 2021		Czechia 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.6%	93.1%	97.6%	92.9%	96.1%	88.2%	86.6%	77.0%
VDSL	86.1%	64.2%	84.7%	63.2%	83.7%	61.1%	54.9%	41.2%
VDSL2 Vectoring	86.0%	64.2%	84.6%	63.2%	83.7%	61.1%	35.9%	18.4%
FTTP	37.4%	8.1%	35.8%	6.9%	33.3%	6.4%	56.5%	41.4%
Cable modem DOCSIS 3.0	42.1%	3.8%	41.9%	3.6%	41.6%	3.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	34.9%	0.0%	33.3%	0.1%	0%	0%	31.9%	6.4%
FWA	85.1%	85.4%	81.4%	85.3%	69.5%	82.0%	67.9%	57.0%
LTE	100.0%	100.0%	99.8%	99.8%	99.8%	99.8%	99.8%	99.2%
5G	82.6%	78.0%	49.4%	43.3%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	42.3%	32.0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.9%	99.8%	99.9%	99.6%	99.8%	99.2%	97.3%	91.4%
Overall NGA broadband	93.3%	70.1%	92.6%	68.5%	91.8%	66.0%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	53.2%	8.2%	52.5%	7.0%	33.3%	6.4%	73.4%	45.1%
At least 30Mbps	98.3%	-	98.1%	-	96.9%	-	91.7%	-
At least 100Mbps	90.2%	-	89.2%	-	86.4%	-	86.6%	-
At least 1Gbps	42.5%	-	38.1%	-	7.6%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

Despite being able to provide up to 30Mbps download speeds, the FWA technology is not included in the Overall NGA broadband combination category. Given that the FWA technology provided at a fixed location represents about 1/3 of the market in Czechia, the non-inclusion of this technology leads to a noticeable lower indicator value.

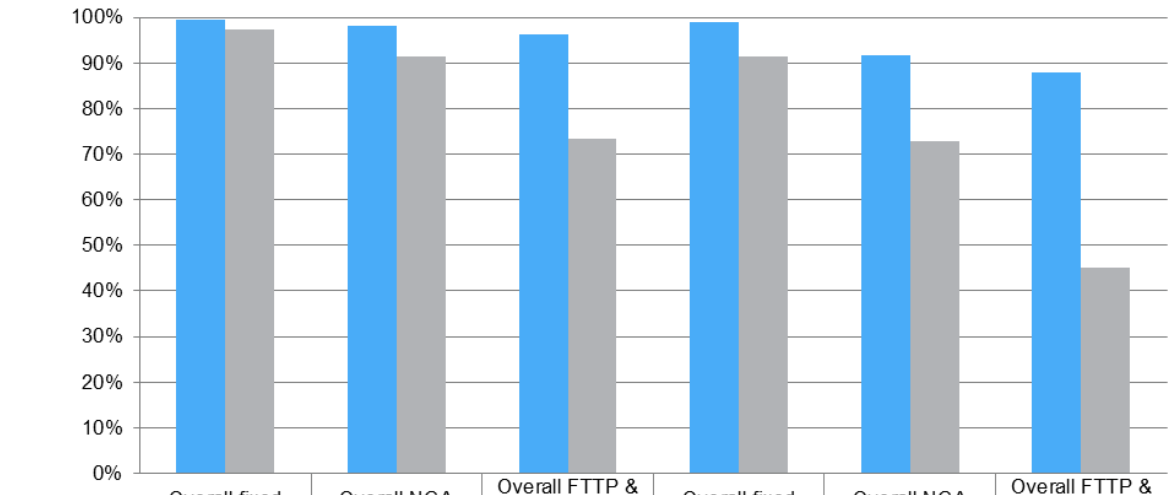
5.7 Denmark

5.7.1 National coverage by broadband technology

As in previous years, Denmark exceeded the EU average for all combination categories on national and rural level (fixed, NGA, and overall FTTP & DOCSIS 3.1). 99.5% of Danish households were covered by at least one broadband technology, while 98.0% of households were covered by NGA technologies by mid-2022. In rural Denmark, fixed broadband and NGA coverage grew by 0.5 percentage points and 5.3 percentage points, respectively.

Denmark was among the participating countries with the highest FTTP & DOCSIS 3.1 coverage, with 96.3% of households covered, up by 1.4 percentage points. On rural level, coverage improved by 8.9 percentage points and stood at 88.0% by the end of June 2022.

Denmark: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Denmark	99.5%	98.0%	96.3%	99.0%	91.7%	88.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

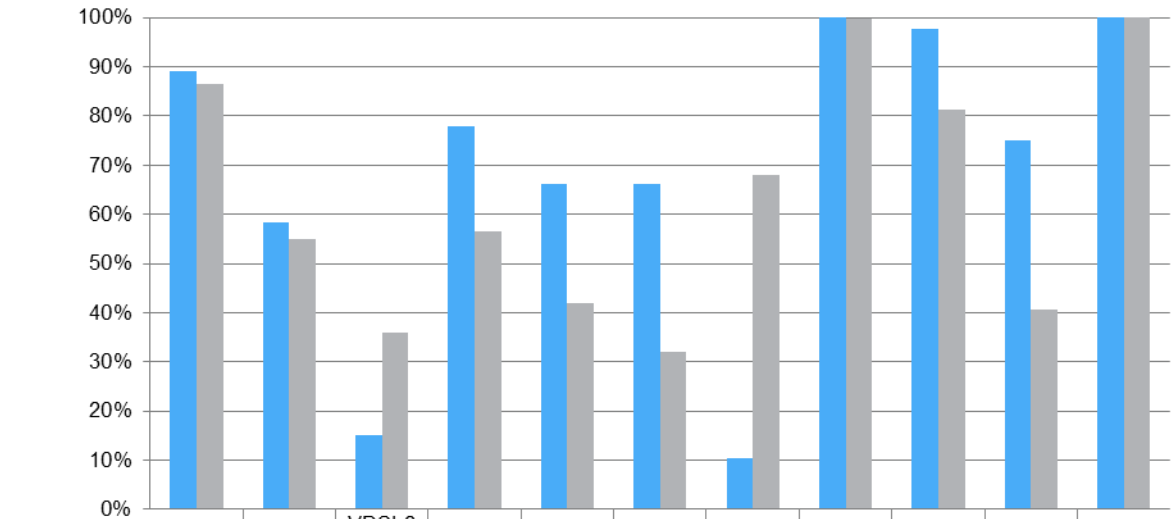
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the most prevalent individual broadband technology, covering 89.2% of households by mid-2022, but it continued its downward trend seen since 2015, with coverage declining by 1.4 percentage points. VDSL also continued to decline slowly (by 0.9 percentage points) and was available to 58.5% of households, while VDSL2 Vectoring was available to 15.1% of households.

FTTP was the fastest growing technology in Denmark and passed 77.9% of homes by mid-2022, up by 3.7 percentage points year-on-year. DOCSIS 3.0 coverage stood at 66.2% and almost the entire network had been upgraded to DOCSIS 3.1 standard by mid-2022. FWA was available to 10.4% of households, up by 0.6 percentage points compared to the prior year.

5G was available to 97.8% of households and Denmark performed clearly above the EU average which reflects its fast-paced rollout. 5G via the 3.4–3.8 GHz band was estimated to stand at 75.0% which significantly exceeded the EU average of 40.7%.

Denmark: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Denmark	89.2%	58.5%	15.1%	77.9%	66.2%	66.1%	10.4%	100.0%	97.8%	75.0%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

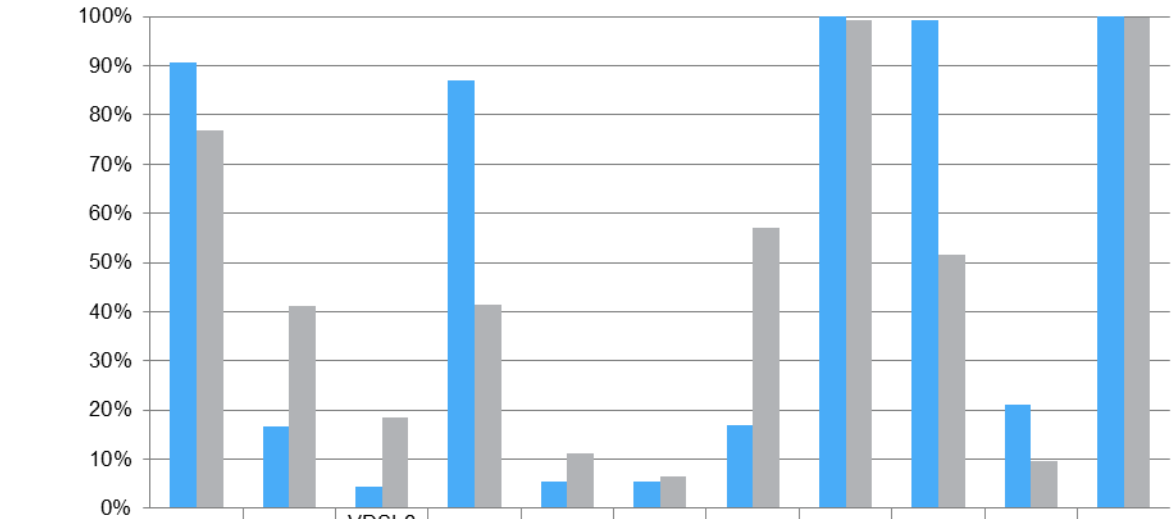
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural Denmark, DSL remained the most prevalent technology, with 90.6% of homes passed, while VDSL was available to 16.7% of rural households. VDSL2 Vectoring coverage remained unchanged at 4.4%.

As seen on national level, FTTP was also the fastest growing technology in rural regions, expanding by 9.3 percentage points, and passing 87.0% of rural homes by mid-2022. DOCSIS 3.0 and DOCSIS 3.1 coverage remained unchanged at 5.3%. FWA coverage grew by 1.4 percentage points and was available to 17.0% of rural households by the end of June 2022.

5G coverage grew by 1.2 percentage points and was available to 99.2% of rural households by mid-2022, 47.7 percentage points above the EU average. 5G coverage on the 3.4–3.8 GHz spectrum band was estimated to stand at 21.1%.

Denmark: Coverage by technology, rural areas, 2022



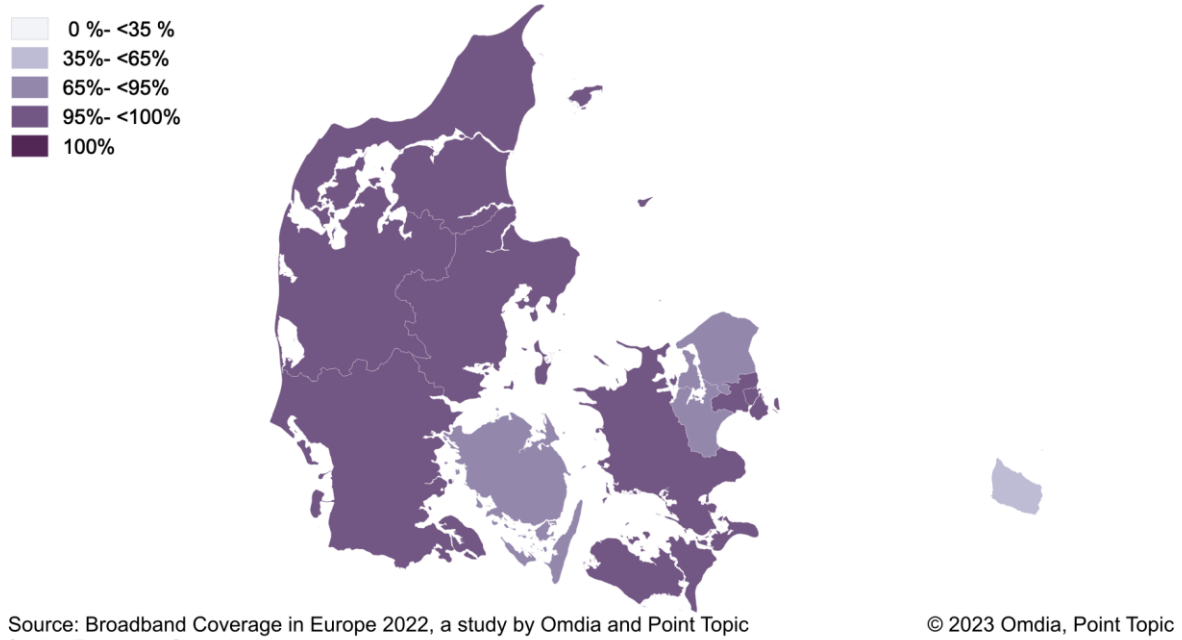
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Denmark	90.6%	16.7%	4.4%	87.0%	5.3%	5.3%	17.0%	100.0%	99.2%	21.1%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.7.2 Regional coverage by broadband technology

7 out of 11 regions in Denmark exceeded the 95% coverage threshold in FTTP & DOCSIS 3.1. The highest coverage was achieved in Sydjylland (99.4%), Østjylland (98.3%), and Nordjylland (98.3%). Bornholm was the only region in which FTTP & DOCSIS 3.1 coverage was below 65%.

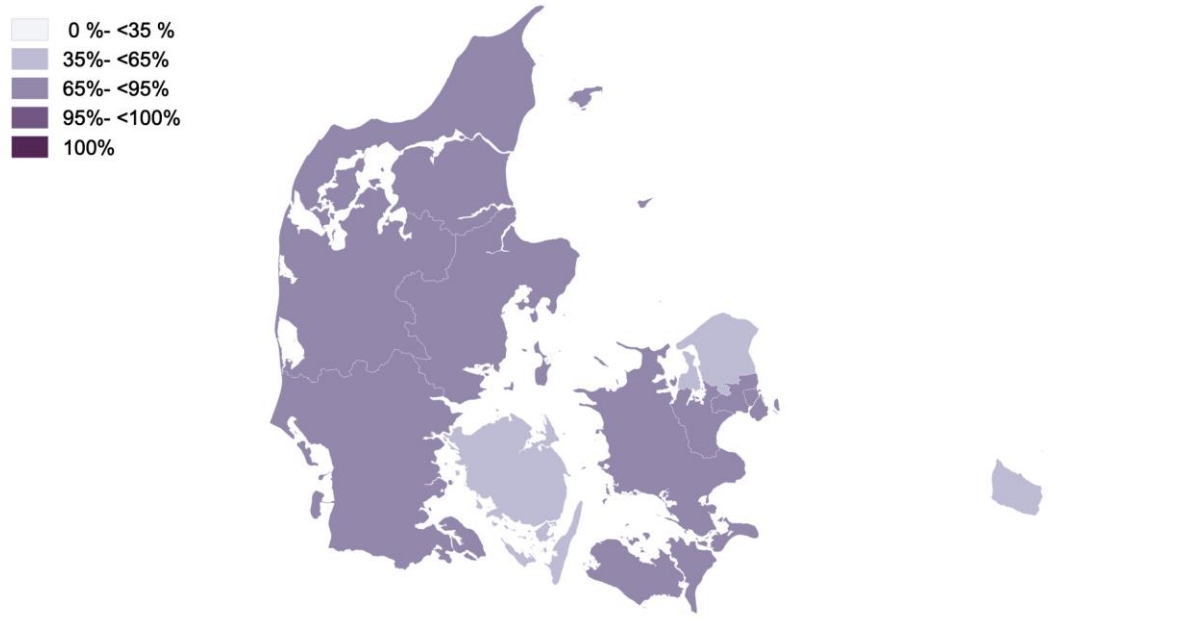
Denmark: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Sydjylland (92.0%) and Nordjylland (91.7%) achieved the highest level of FTTP coverage among Danish regions, while Nordsjælland (53.6%) and Bornholm (52.5%) ranked at the bottom.

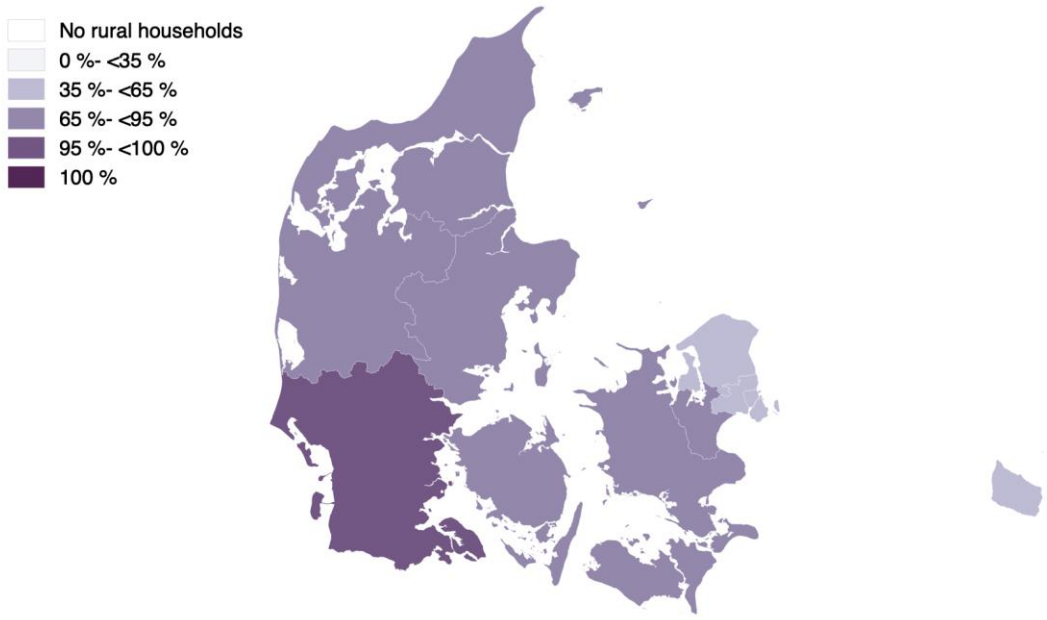
Denmark: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Sydjylland was the only region that exceeded the 95% threshold in rural FTTP & DOCSIS 3.1 coverage, while four regions remained below 65% (Byen København, Københavns omegn, Nordsjælland, and Bornholm).

Denmark: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.7.3 Data tables for Denmark

Statistic	National
Population	5,883,562
Persons per household	2.1
Rural proportion	10.3%

	Denmark 2022		Denmark 2021		Denmark 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	89.2%	90.6%	90.6%	90.2%	93.3%	92.1%	86.6%	77.0%
VDSL	58.5%	16.7%	59.4%	16.9%	60.9%	17.1%	54.9%	41.2%
VDSL2 Vectoring	15.1%	4.4%	15.3%	4.4%	15.7%	4.4%	35.9%	18.4%
FTTP	77.9%	87.0%	74.1%	77.8%	70.1%	70.9%	56.5%	41.4%
Cable modem DOCSIS 3.0	66.2%	5.3%	67.5%	5.3%	68.1%	5.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	66.1%	5.3%	67.1%	5.3%	68.1%	5.5%	31.9%	6.4%
FWA	10.4%	17.0%	9.8%	15.6%	5.6%	15.3%	67.9%	57.0%
LTE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.8%	99.2%
5G	97.8%	99.2%	98.0%	98.0%	80.0%	75.0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	75.0%	21.1%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.5%	99.0%	99.6%	98.6%	99.6%	98.4%	97.3%	91.4%
Overall NGA broadband	98.0%	91.7%	97.7%	86.4%	96.4%	76.3%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	96.3%	88.0%	94.9%	79.1%	93.8%	72.6%	73.4%	45.1%
At least 30Mbps	98.4%	-	97.7%	-	97.1%	-	91.7%	-
At least 100Mbps	97.3%	-	96.3%	-	95.3%	-	86.6%	-
At least 1Gbps	91.6%	-	90.7%	-	86.5%	-	70.2%	-
At least 1Gbps upload and download	78.0%	-	73.9%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

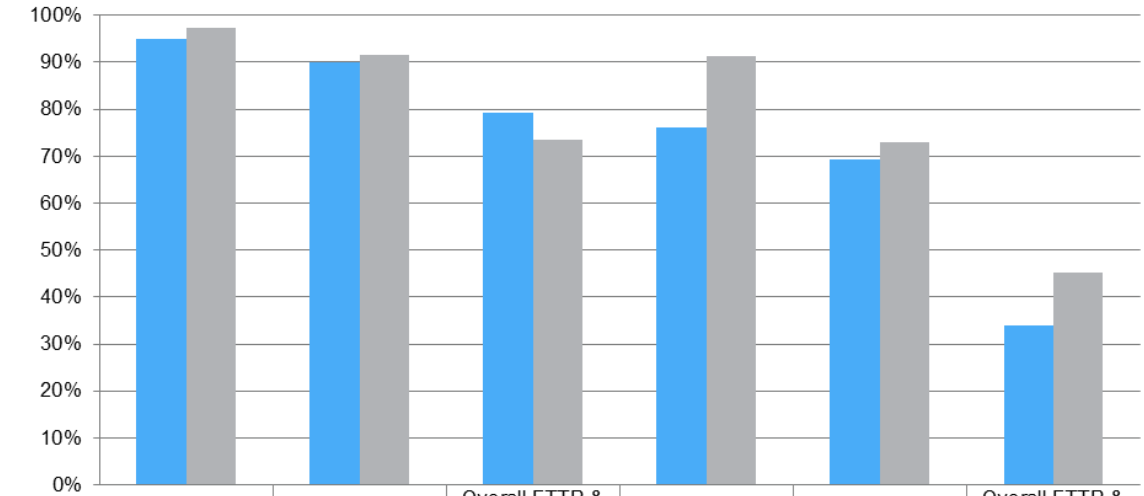
5.8 Estonia

5.8.1 National coverage by broadband technology

94.9% of Estonian households had access to at least one fixed broadband technology by mid-2022, an improvement of 1.9 percentage points compared to the prior year, but below the EU average. In rural regions, fixed broadband coverage ranked 15.3 percentage points below the EU average, with around three quarters (76.1%) of households covered. NGA broadband was available to 89.9% and 69.4% of households on national and rural level, respectively.

Estonia ranked well above the EU average in the FTTP & DOCSIS 3.1 category, covering 8 out of 10 Estonian households (79.2%) with 1Gbps-capable networks. The strong performance reflects the country's widespread availability of FTTP networks as DOCSIS 3.1 had not been deployed as of mid-2022. In rural regions, one third (33.9%) of rural homes were passed.

Estonia: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Estonia	94.9%	89.9%	79.2%	76.1%	69.4%	33.9%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

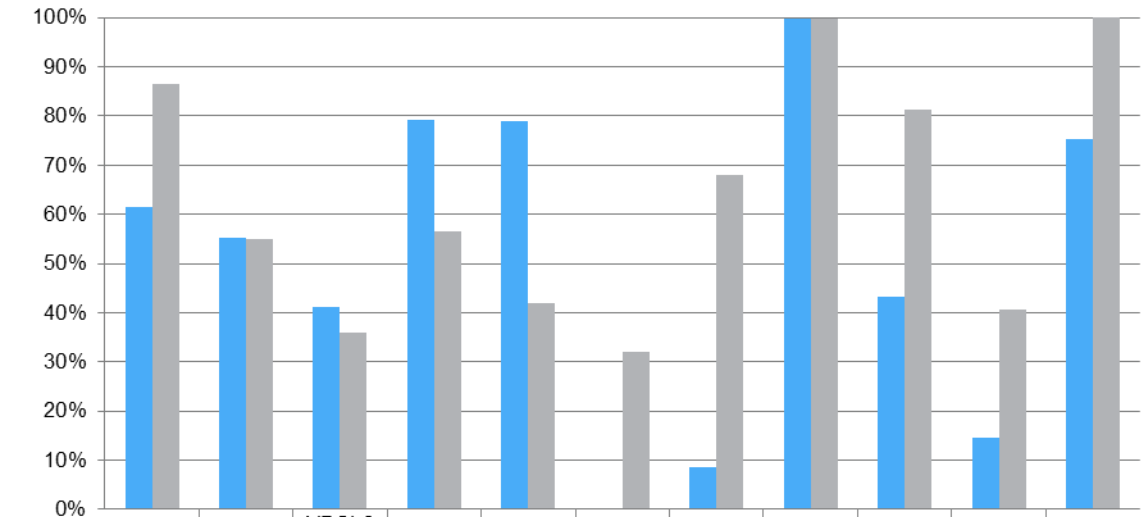
Widespread and fast-paced FTTP rollouts continued to take place over the twelve-month period, which enabled FTTP to overtake DOCSIS 3.0 as the most widespread broadband technology by the end of June 2022. FTTP coverage grew by 5.8 percentage points, while DOCSIS 3.0 improved by 0.5 percentage points. Estonian operators had not deployed DOCSIS 3.1 as of mid-2022 as the primary focus lies on FTTP.

DSL coverage declined by 4.0 percentage points and covered 61.4% of Estonian households by mid-2022 reflecting the decommissioning of legacy copper networks. VDSL coverage remained broadly stable and stood at 55.3%, while VDSL2 Vectoring coverage grew by 3.7 percentage points and was available to 41.2% of households.

5G coverage grew by 25.0 percentage points over the twelve-month period and was accessible to 43.3% of Estonian households. 14.5% of Estonian households were covered by 5G networks using the 3.4–3.8 GHz band specifically. Despite good progress, Estonia remained below EU average across both categories. LTE coverage was universal (99.9%) as of mid-2022.

Satellite broadband coverage remained unchanged in 2022, reaching 75.4% of Estonia, due to technical requirements for larger dishes to receive the satellite signal in some areas.

Estonia: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Estonia	61.4%	55.3%	41.2%	79.2%	79.0%	0%	8.4%	99.9%	43.3%	14.5%	75.4%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

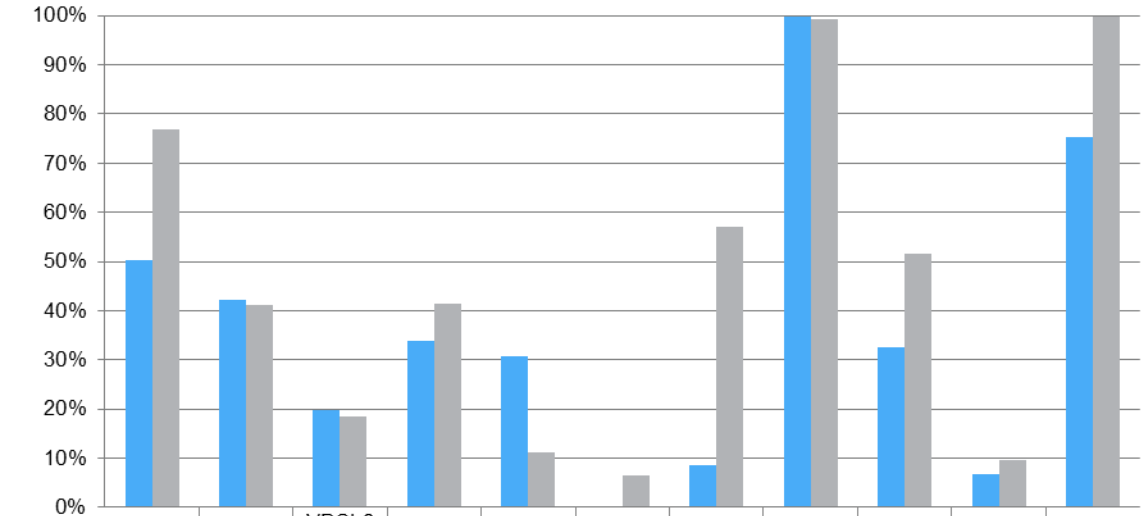
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural Estonia, FTTP coverage increased by 12.8 percentage points and was available to a third (33.9%) of rural households by mid-2022. DOCSIS 3.0 coverage grew by 7.0 percentage points and was available to 30.7% of households which was well above the EU average.

Estonian operators are decommissioning legacy copper networks in rural regions which led to a 3.2 percentage point decline in DSL coverage compared to mid-2021. Despite a shift towards FTTP, DSL remained the most prevalent individual broadband technology as of mid-2022. Estonia exceeded the EU average in terms of VDSL and VDSL2 Vectoring coverage as large parts of the networks have been upgraded.

One third of rural households (32.5%) were covered by 5G networks by mid-2022, an improvement of 31.0 percentage points compared to the prior year. 6.7% of households were covered by 5G networks using the 3.4–3.8 GHz band.

Estonia: Coverage by technology, rural areas, 2022



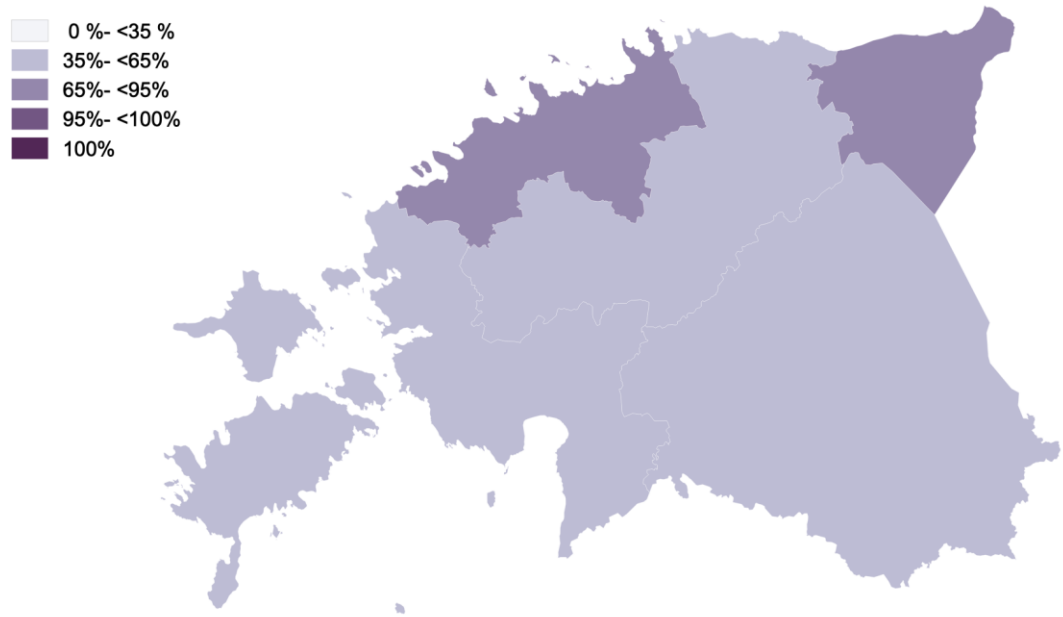
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Estonia	50.2%	42.1%	19.6%	33.9%	30.7%	0%	8.4%	99.8%	32.5%	6.7%	75.4%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.8.2 Regional coverage by broadband technology

FTTP & DOCSIS 3.1 coverage ranged from 93.9% in Põhja-Eesti to 61.3% in Kesk-Eesti.

Estonia: FTTP & DOCSIS 3.1 coverage, 2022

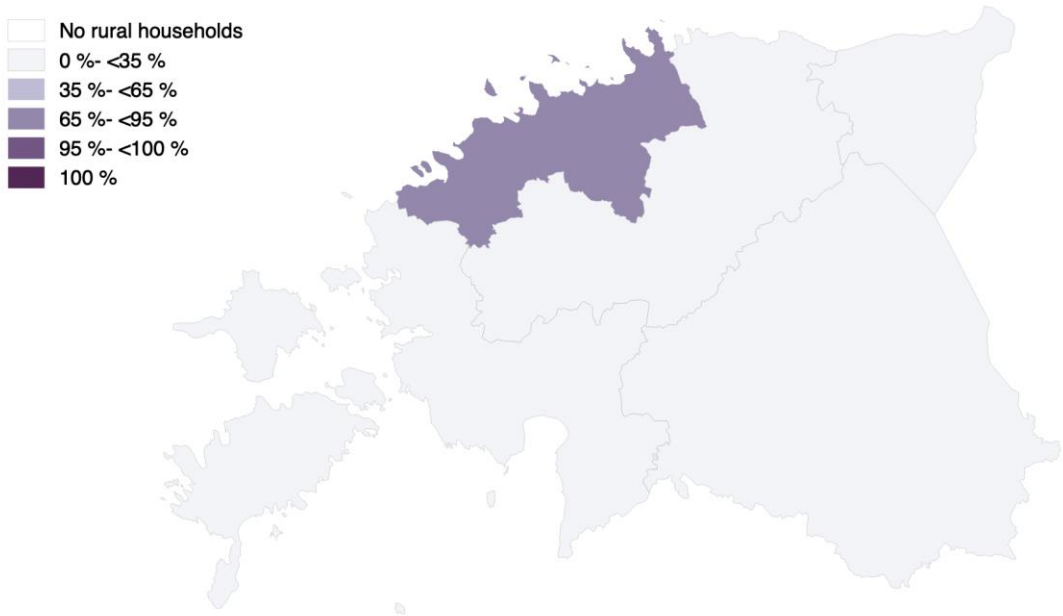


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since there are no DOCSIS 3.1 services in Estonia, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

Põhja-Eesti was the only Estonian region to exceed the 65% threshold in rural FTTP & DOCSIS 3.1 coverage, while the rest of regions remained below 35%.

Estonia: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.8.3 Data tables for Estonia

Statistic	National
Population	1,330,068
Persons per household	2.4
Rural proportion	21.2%

	Estonia 2022		Estonia 2021		Estonia 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	61.4%	50.2%	*65.4%*	*53.4%*	*71.2%*	47.0%	86.6%	77.0%
VDSL	55.3%	42.1%	*55.6%*	*40.9%*	*59.1%*	35.3%	54.9%	41.2%
VDSL2 Vectoring	41.2%	19.6%	*37.4%*	*13.4%*	*31.4%*	7.0%	35.9%	18.4%
FTTP	79.2%	33.9%	73.4%	21.1%	70.9%	20.5%	56.5%	41.4%
Cable modem DOCSIS 3.0	79.0%	30.7%	78.5%	23.7%	76.7%	23.6%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	8.4%	8.4%	8.6%	9.1%	7.9%	6.1%	67.9%	57.0%
LTE	99.9%	99.8%	99.7%	99.4%	100.0%	100.0%	99.8%	99.2%
5G	43.3%	32.5%	18.3%	1.5%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	14.5%	6.7%	-	-	-	-	40.7%	9.6%
Satellite	75.4%	75.4%	75.4%	75.4%	75.4%	75.4%	99.9%	99.9%
Overall fixed broadband	94.9%	76.1%	93.0%	*80.1%*	93.0%	77.3%	97.3%	91.4%
Overall NGA broadband	89.9%	69.4%	90.2%	*67.0%*	88.8%	63.4%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	79.2%	33.9%	73.4%	21.1%	70.9%	20.5%	73.4%	45.1%
At least 30Mbps	89.5%	-	89.2%	-	88.3%	-	91.7%	-
At least 100Mbps	85.6%	-	83.5%	-	81.9%	-	86.6%	-
At least 1Gbps	39.6%	-	36.7%	-	35.4%	-	70.2%	-
At least 1Gbps upload and download	0.1%	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

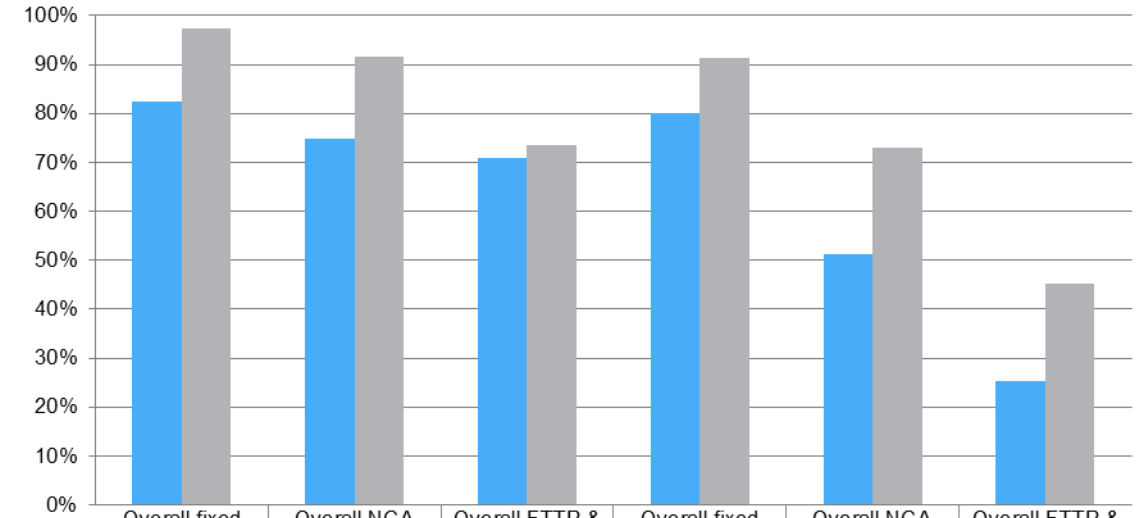
All restatements are highlighted in italics.

5.9 Finland

5.9.1 National coverage by broadband technology

The decline in overall fixed broadband coverage in Finland has accelerated, which is largely the result of continued DSL decommissioning. This iteration of the study sees a decrease in fixed broadband coverage of 7.5 percentage points at a national level to reach 82.4% of households. At a rural level 80.1% of homes were passed by at least one fixed broadband network. But the combined coverage of DOCSIS 3.1 & FTTP grew by 2.8 percentage points, passing 70.8% of homes, although Finland remains below the EU average (73.4%) on this metric. In rural areas the gap is even wider, with coverage in Finland of only one in four households (25.4%), versus 45.1% at EU level. NGA coverage remained stable nationally at three-quarters (74.9%) of households, but reached only half of rural households (51.1%), down slightly since the previous year.

Finland: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Finland	82.4%	74.9%	70.8%	80.1%	51.1%	25.4%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

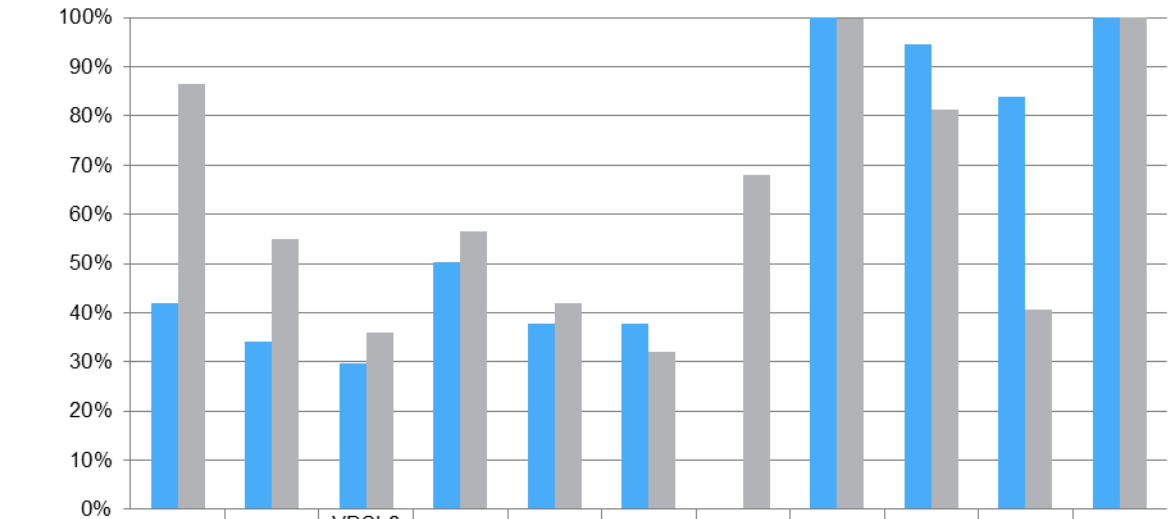
Among the individual fixed broadband technologies, FTTP coverage rose by 10 p.p. over the year, to reach half of households (50.3%) – closing the gap versus the EU to just 6.2 percentage points. FTTP is now the most prevalent technology at national level, following a sharp reduction in DSL coverage as the decommissioning programme gathered momentum. DSL coverage fell by 18.2 percentage points year-on-year, reaching 42.0% of Finnish households, the largest such drop in this year's study by a significant margin.

Availability of Cable DOCSIS 3.1 technology increased by 0.9 percentage points during the study period, covering 37.9% of all households. Finnish cable operators were among early adopters of NGA technologies and all cable networks in the country had been upgraded to the DOCSIS 3.1 standard by the end of June 2019.

In line with the overall reduction in DSL coverage, availability of VDSL and VDSL2 Vectoring services fell in this year's study. VDSL was available to 34.0% of homes (a 10.8 p.p. decrease on the previous year), while VDSL2 Vectoring services were available to 29.6% of Finnish households.

Regarding mobile broadband coverage, 5G coverage reached 94.7%, up by 23.1 p.p. on the previous year. 5G coverage on the 3.4–3.8 GHz spectrum band was the highest in this year's study at 83.9% (more than double the EU figure), indicating the strength of Finland's mobile sector.

Finland: Coverage by technology, total, 2022

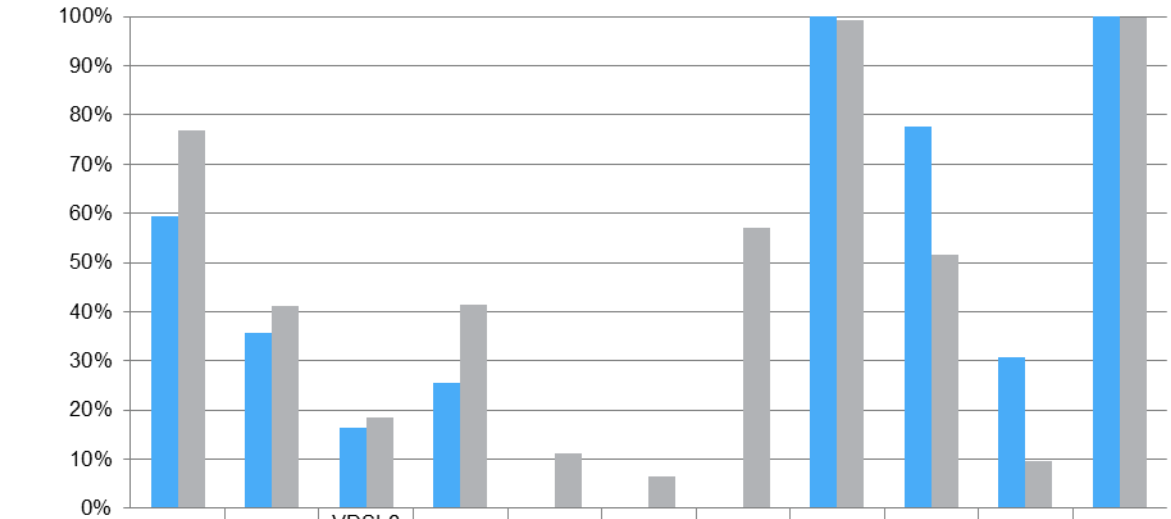


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Finland	42.0%	34.0%	29.6%	50.3%	37.9%	37.9%	0%	100.0%	94.7%	83.9%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Rural broadband coverage in Finland saw a continued transition from DSL to FTTP during the study period. DSL covered 59.5% of households, down by 14.9 p.p., while rural FTTP coverage more than doubled over the year, to reach 25.4% of rural homes. DOCSIS technologies remained absent in rural areas, but VDSL was available to 35.6% of rural households, and VDSL2 Vectoring to 16.5%. Meanwhile rural 5G rollouts accelerated during the year, with coverage reaching three quarters (77.6%) of households. 30.8% of rural households had access to 5G using the 3.4–3.8 GHz band.

Finland: Coverage by technology, rural areas, 2022



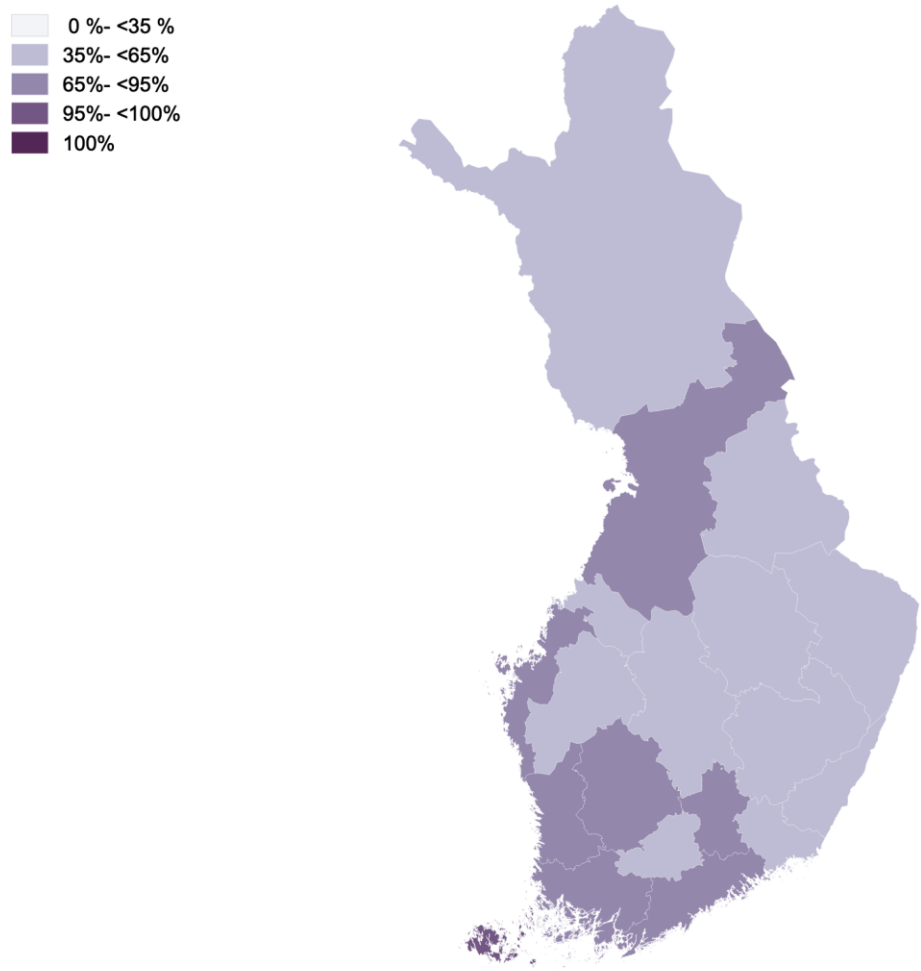
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Finland	59.5%	35.6%	16.5%	25.4%	0%	0%	0%	100.0%	77.6%	30.8%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.9.2 Regional coverage by broadband technology

In this iteration of the study, only 1 Finnish region recorded FTTP & DOCSIS 3.1 coverage above 95% – the small autonomous island region of Åland. Of the remaining 18 regions, 7 surpassed 65% coverage, with the remainder between 35% and 65%.

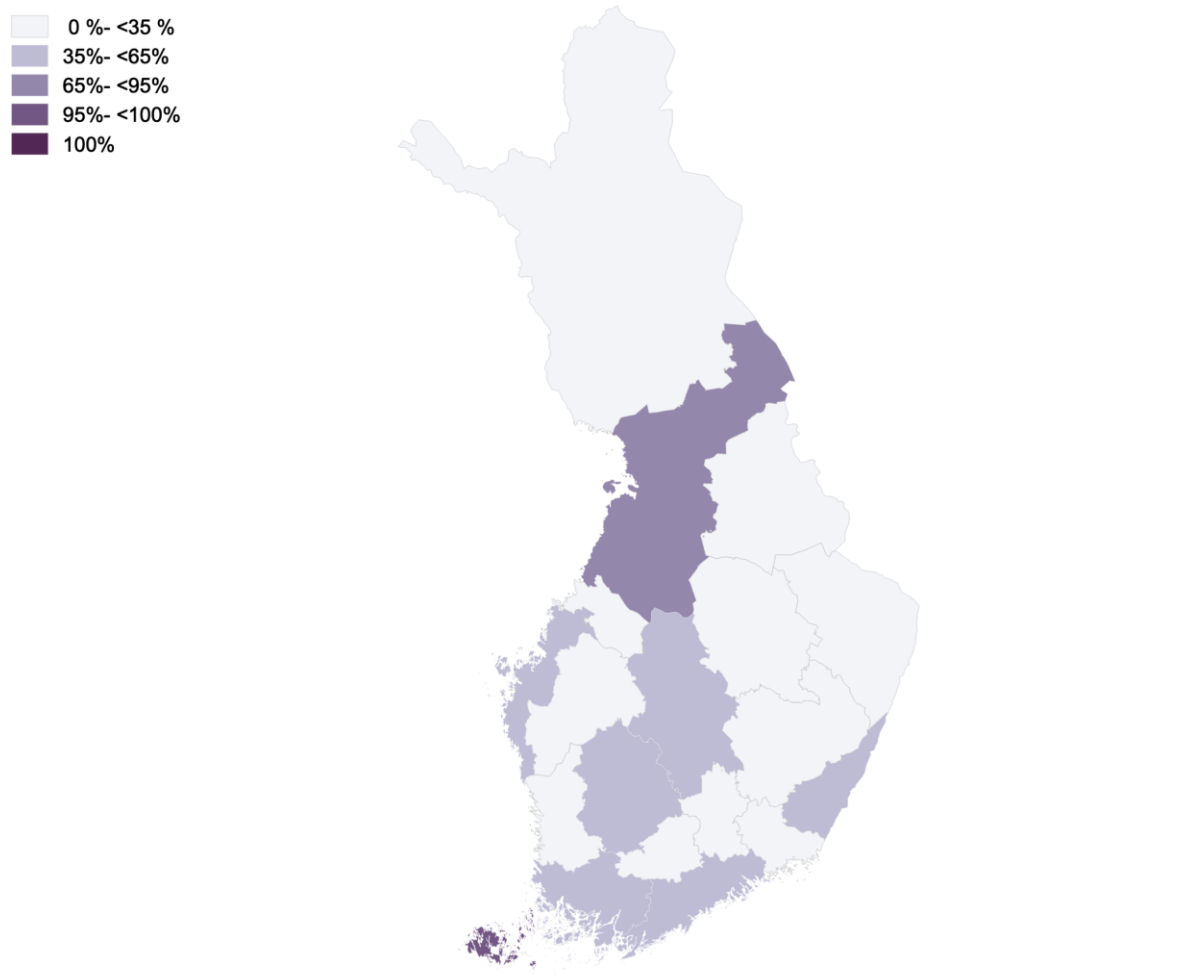
Finland: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP coverage is below 35% in 11 of Finland's 19 regions. Only two regions have FTTP coverage above 65% – Åland (97%), and Pohjois-Pohjanma (65%).

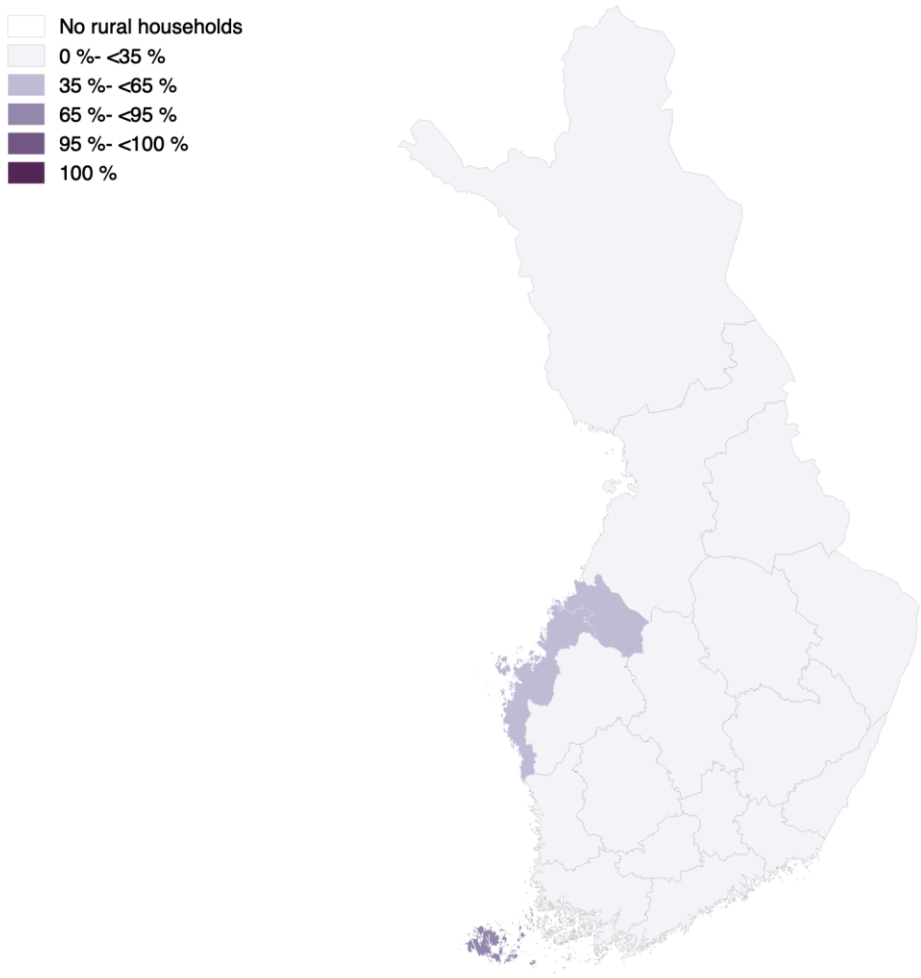
Finland: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

As mentioned in previous iterations of this study, Finland is atypical in the sense that broadband coverage levels are not strongly correlated to the degree of urbanisation. None of the three regions with the most rural households is among those with the lowest fixed broadband coverage.

Finland: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.9.3 Data tables for Finland

Statistic	National
Population	5,533,793
Persons per household	2.0
Rural proportion	17.6%

	Finland 2022		Finland 2021		Finland 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	42.0%	59.5%	60.2%	74.4%	71.0%	78.3%	86.6%	77.0%
VDSL	34.0%	35.6%	*44.8%*	*40.7%*	48.7%	*42.7%*	54.9%	41.2%
VDSL2 Vectoring	29.6%	16.5%	*38.7%*	*14.4%*	41.9%	*11.0%*	35.9%	18.4%
FTTP	50.3%	25.4%	40.0%	12.4%	37.7%	9.4%	56.5%	41.4%
Cable modem DOCSIS 3.0	37.9%	0%	36.9%	0%	37.8%	0%	41.8%	11.1%
Cable modem DOCSIS 3.1	37.9%	0%	36.9%	0%	37.8%	0%	31.9%	6.4%
FWA	0%	0%	0%	0%	0%	0%	67.9%	57.0%
LTE	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.8%	99.2%
5G	94.7%	77.6%	71.6%	18.9%	12.4%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	83.9%	30.8%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	82.4%	80.1%	89.9%	82.4%	93.5%	83.1%	97.3%	91.4%
Overall NGA broadband	74.9%	51.1%	*74.0%*	*52.9%*	75.0%	*53.2%*	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	70.8%	25.4%	68.0%	12.4%	66.7%	9.4%	73.4%	45.1%
At least 30Mbps	78.0%	-	77.0%	-	75.0%	-	91.7%	-
At least 100Mbps	71.0%	-	65.0%	-	64.0%	-	86.6%	-
At least 1Gbps	60.0%	-	51.0%	-	47.0%	-	70.2%	-
At least 1Gbps upload and download	15.0%	-	-	-	-	-	-	-

Note: Due to the Finnish NRA's data collection and reporting cycles, the 2022 figures represent the state of broadband coverage at the end of December 2021, instead of June 2022. The 2021 and 2020 figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic, and are likewise for the end of December the previous year.

All restatements are highlighted in italics.

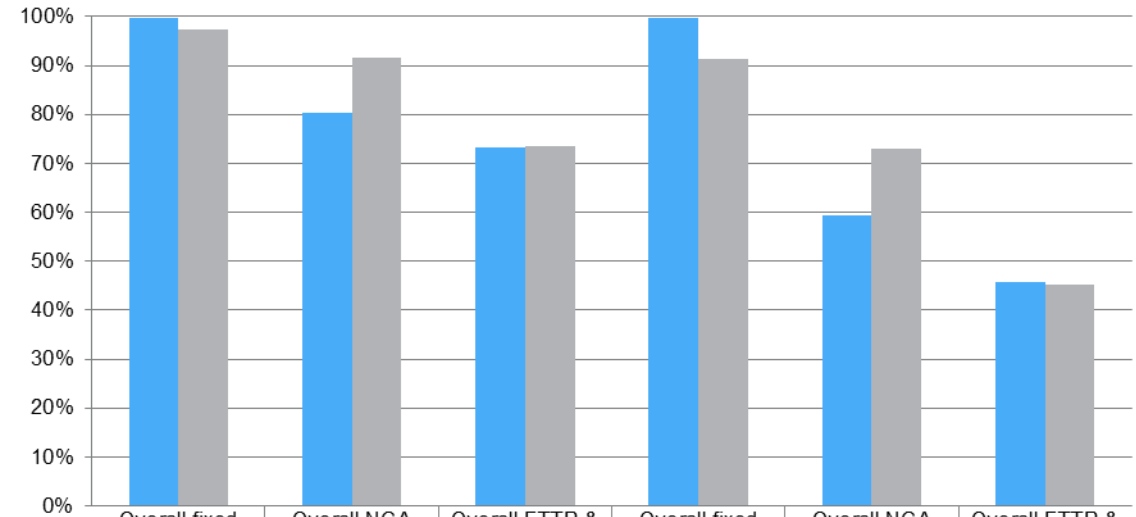
5.10 France

5.10.1 National coverage by broadband technology

Since achieving universal fixed broadband coverage at national and rural level in 2017, operators in France have focused on improving the availability of the faster broadband technologies. When considering networks which have a potential to deliver gigabit speeds (FTTP & DOCSIS 3.1), France has lagged below the EU average, but the gap has been narrowing. Overall coverage for this metric increased by 9.9 p.p. in the year to June 2022, putting France just 0.1 p.p. below the EU average. At rural level France surpassed the EU average for the first time, with coverage increasing by 16.9 p.p. to 45.7%, driven by the government's national broadband plan.

By the end of June 2022, NGA broadband services were available to four in five (80.2%) French households, following an increase of 6.5 percentage points year-on-year, the third lowest level among the study countries. In rural regions, NGA coverage improved by 12.2 percentage points to 59.4% of rural homes, but remained well below the EU average of 72.9%.

France: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
France	99.6%	80.2%	73.3%	99.7%	59.4%	45.7%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

On an individual technology level, FTTP recorded the strongest increase among technologies within the twelve-month period of the study. By mid-2022, FTTP services were available to almost three quarters (73.3%) of French households, following an increase of 9.9 percentage points.

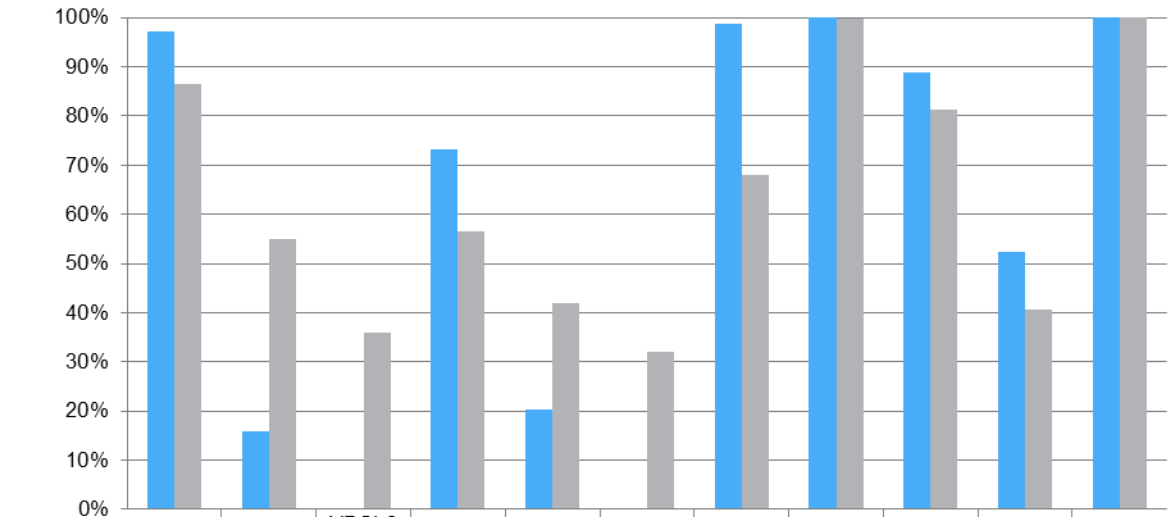
DSL remained the most widespread service in France, with 97.3% of homes passed, despite a drop of 1.5 p.p. as copper decommissioning gathered pace, while VDSL coverage remained flat at 15.9% of households. Coverage of DOCSIS 3.0 also fell over the year, reaching 20.2% of homes passed. As French operators have focused on the deployment of fibre rather than upgrading existing networks, DOCSIS 3.1 and VDSL2 Vectoring both remained absent from the French market as of mid-2022. Use of FWA technology is encouraged by the French government and offered by all four main French operators[16]. Coverage at mid-2022 was near-universal, reaching 98.8% of households.

The major mobile operators all launched 5G services in the fourth quarter of 2020, and by June 2022 coverage had reached 88.8% of households nationwide, an increase of 14.4 percentage points. 5G services using the 3.4–3.8 GHz band were available to over half of French households (52.3%)[17].

[16] https://www.amenagement-numerique.gouv.fr/fr/bonhautdebit-aidefinanciere

[17] Note that in France the production of 5G coverage maps is not yet subject to a verification protocol validated by Arcep. Currently the only data available comes from the operators and is purely declarative. Arcep's 5G deployment Observatory highlights the operators' different strategies with respect to the frequency bands they use: if all four operators have deployed cell sites using the 3.4–3.8 GHz band, they are also employing lower frequencies to supplement that band. One of them stands out for its use of the 700 MHz band. As of 31 December 2022, 40,002 base stations were equipped with 5G (using the 700 MHz, 2100 MHz and 3.4–3.8 GHz bands), of which 20,221 were using the 3.4–3.8 GHz band.

France: Coverage by technology, total, 2022



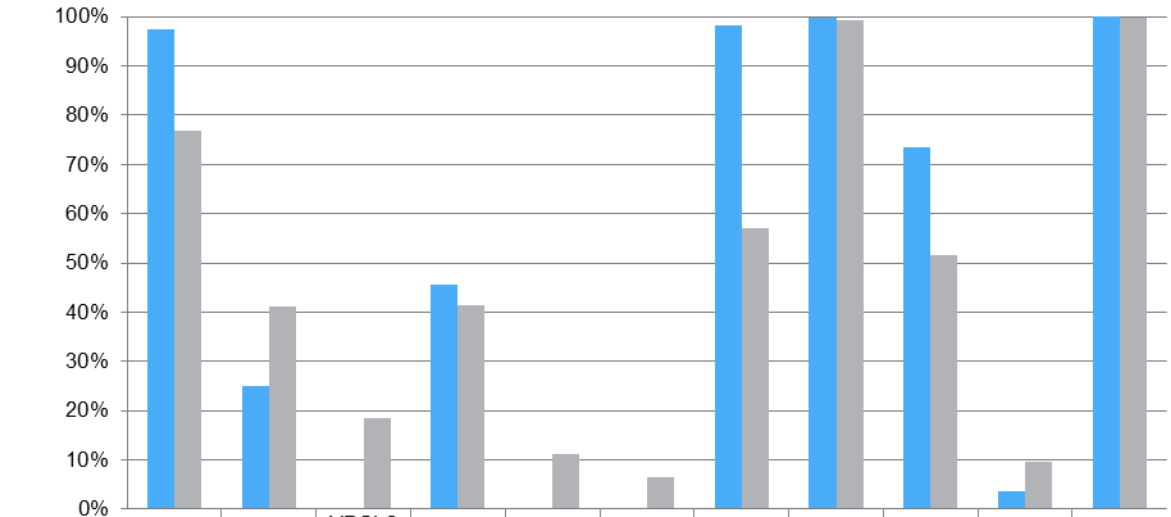
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
France	97.3%	15.9%	0%	73.3%	20.2%	0%	98.8%	100.0%	88.8%	52.3%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP coverage in rural areas of France grew significantly over the year (+16.9 p.p.), and rural FTTP availability is now ahead of the EU average for the first time. 45.7% of rural French households have access to FTTP service, compared with the EU average of 41.4%. However, DSL remained the most widespread fixed broadband technology in rural areas, despite a fall of 0.8 p.p. since the previous year. France recorded one of the highest rural DSL coverages in the study and performed 20.4 percentage points above the EU average. VDSL also remains an important technology, passing 24.8% of rural homes, unchanged from the previous year. Cable modem DOCSIS 3.0 coverage in rural areas is minimal, at only 0.3% of households. Rural areas are the main beneficiaries of the French state initiative promoting FWA, and coverage is thus much higher than the EU average, reaching 98.2% of households.

Since launch in 2020, 5G coverage has grown to reach almost three quarters (73.5%) of rural households, 25.3 p.p. ahead of the EU average. But 5G coverage using the 3.4–3.8 GHz band is minimal in rural areas, at only 3.5%, versus 9.6% for the EU as a whole.

France: Coverage by technology, rural areas, 2022

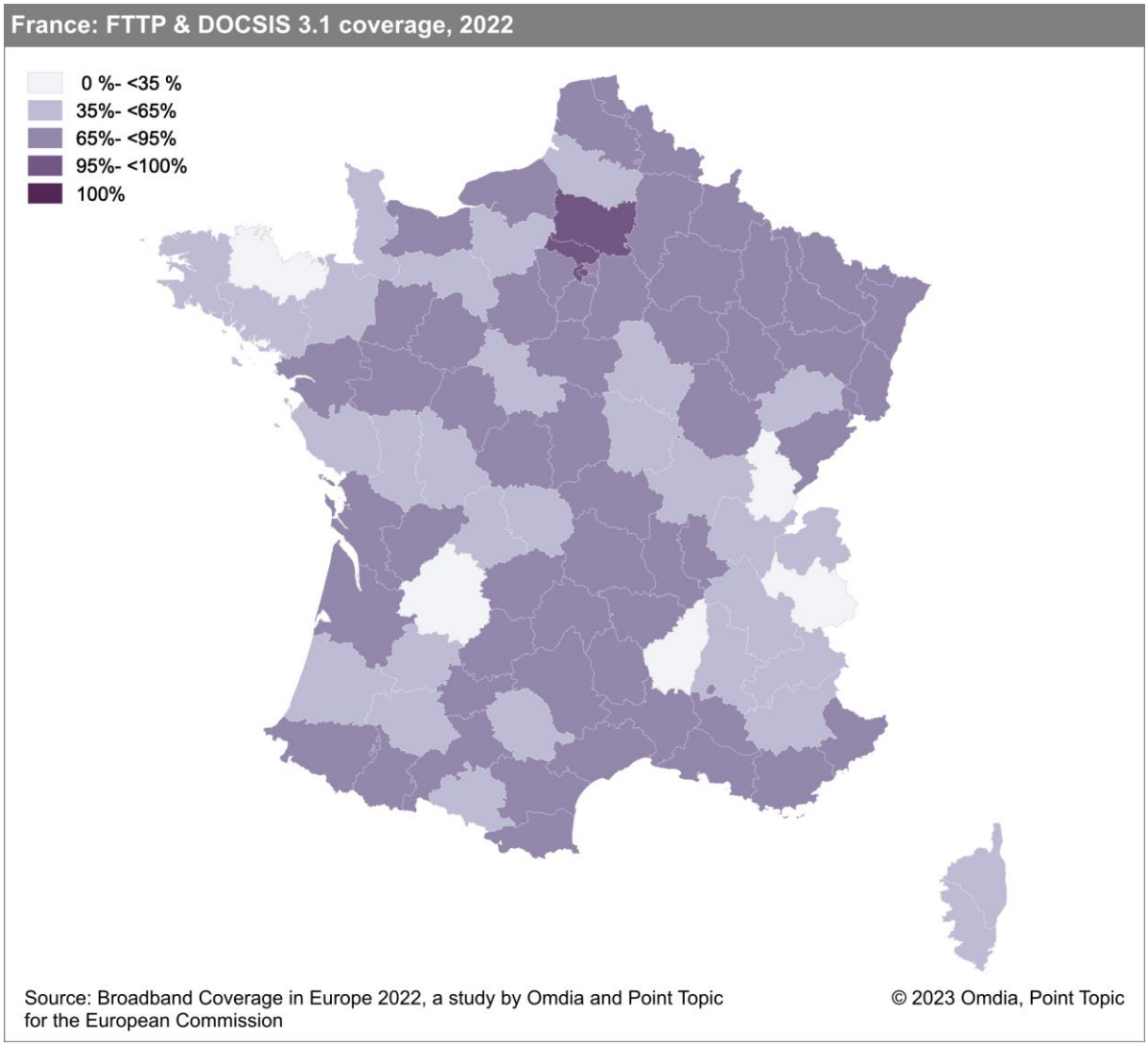


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
France	97.4%	24.8%	0%	45.7%	0.3%	0%	98.2%	99.9%	73.5%	3.5%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.10.2 Regional coverage by broadband technology

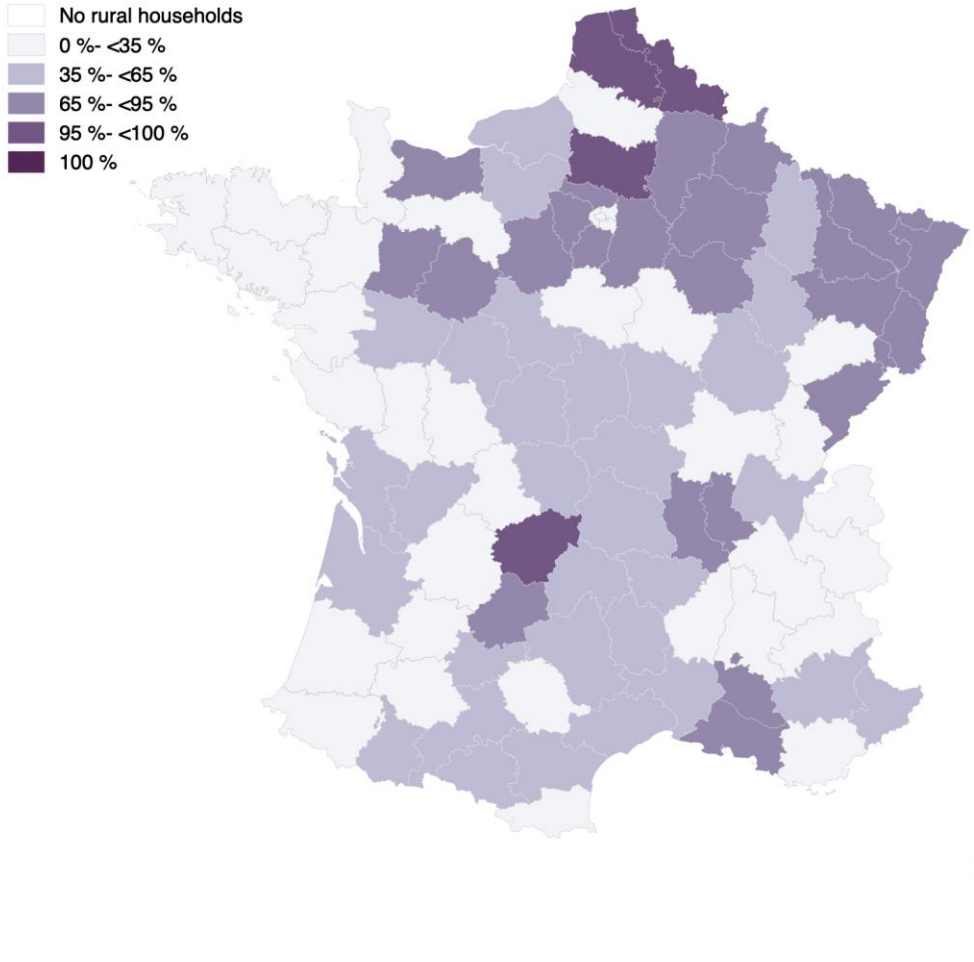
Most parts of France achieved FTTP & DOCSIS 3.1 coverage of 65%–95% in 2022, with only four departments surpassing this – Paris, Hauts-de-Seine, Oise, and Val d'Oise. Eight departments failed to reach the 35% threshold – Jura, Côtes-d'Armor, Dordogne, Ardèche, Savoie, and the overseas departments of Guadeloupe, Martinique and Mayotte.



Since there are no DOCSIS 3.1 services in France, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

In rural areas, four departments achieved FTTP & DOCSIS 3.1 coverage of greater than 95%: Nord, Pas-de-Calais, Oise, and Corrèze. 41 out of 101 departments failed to reach 35% coverage, including all the overseas departments apart from La Réunion.

France: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The following broadband coverage levels were recorded in French regions outside mainland Europe:

Coverage data for French NUTS 3 areas outside mainland Europe

NUTS 3	Description	Total FTTP & DOCSIS 3.1	Total FTTP	Rural FTTP & DOCSIS 3.1
FRA10	Guadeloupe	0% – <35%	0% – <35%	0% – <35%
FRA20	Martinique	0% – <35%	0% – <35%	0% – <35%
FRA30	Guyane	35% – <65%	35% – <65%	0% – <35%
FRA40	La Réunion	65% – <95%	65% – <95%	65% – <95%
FRA50	Mayotte	0% – <35%	0% – <35%	0% – <35%

5.10.3 Data tables for France

Statistic	National
Population	67,656,682
Persons per household	2.3
Rural proportion	15.6%

	France 2022		France 2021		France 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.3%	97.4%	98.8%	98.3%	99.2%	99.0%	86.6%	77.0%
VDSL	15.9%	24.8%	15.7%	24.8%	20.4%	24.5%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	73.3%	45.7%	63.4%	28.8%	52.6%	18.4%	56.5%	41.4%
Cable modem DOCSIS 3.0	20.2%	0.3%	23.1%	0.3%	27.0%	0.7%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	98.8%	98.2%	58.1%	91.2%	56.5%	88.4%	67.9%	57.0%
LTE	100.0%	99.9%	99.9%	99.7%	99.8%	99.1%	99.8%	99.2%
5G	88.8%	73.5%	74.4%	48.2%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	52.3%	3.5%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.6%	99.7%	99.9%	99.9%	100.0%	100.0%	97.3%	91.4%
Overall NGA broadband	80.2%	59.4%	73.7%	47.2%	69.0%	37.5%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	73.3%	45.7%	63.4%	28.8%	52.6%	18.4%	73.4%	45.1%
At least 30Mbps	86.1%	-	74.4%	-	64.8%	-	91.7%	-
At least 100Mbps	81.5%	-	65.3%	-	55.8%	-	86.6%	-
At least 1Gbps	80.4%	-	63.8%	-	52.2%	-	70.2%	-
At least 1Gbps upload and download	80.4%	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

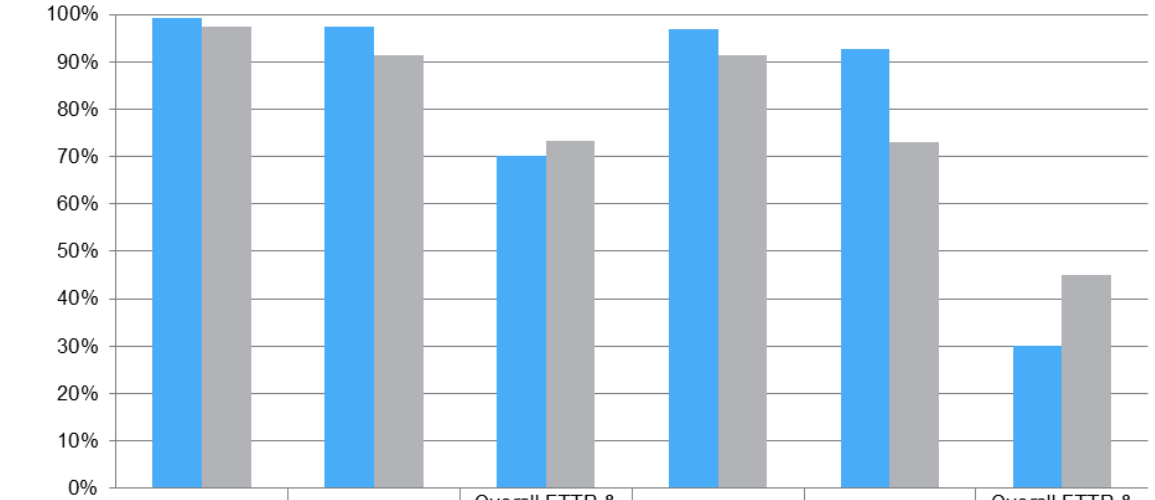
5.11 Germany

5.11.1 National coverage by broadband technology

Germany provided almost universal broadband coverage (99.2%) by the end of June 2022, while 97.0% of rural households were covered by at least one broadband technology. NGA broadband connectivity was available to 97.4% of households on national level and to 92.8% of households on rural level, which represents an improvement of 1.5 percentage points and 7.5 percentage points compared to mid-2021, respectively. Like in previous years, Germany performed above the EU average in the fixed broadband and NGA categories.

1Gbps-capable networks (FTTP and DOCSIS 3.1) were available to 70.1% of households, while 30.1% of rural households were covered by mid-2022. Despite an improvement of 7.7 percentage points in rural FTTP & DOCSIS 3.1 coverage, Germany ranked among the bottom 10 study countries, holding a gap of 15.0 percentage points to the EU average.

Germany: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Germany	99.2%	97.4%	70.1%	97.0%	92.8%	30.1%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

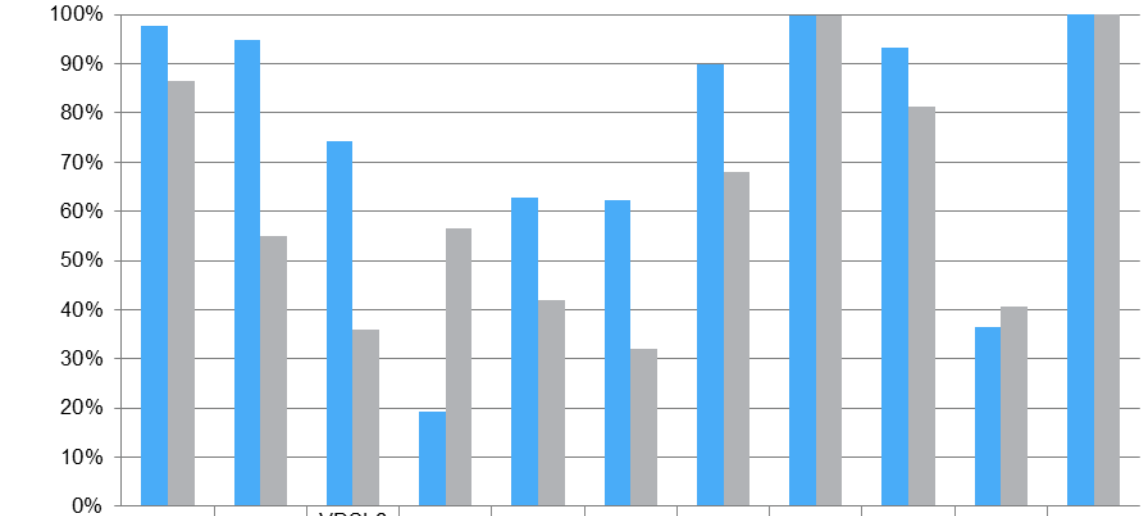
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the most prevalent individual fixed broadband technology in Germany which was available to 97.7% of households by mid-2022. As in previous years, Germany ranked among the top countries across all copper categories (DSL, VDSL, VDSL2 Vectoring), and held a gap of almost 40 percentage points to the EU average in the VDSL and VDSL2 Vectoring categories. In contrast, Germany remained the country with the second lowest FTTP coverage, slightly better than Belgium, with only one fifth (19.3%) of homes passed. Compared to previous years, the pace of FTTP deployment accelerated, and grew by 3.9 percentage points over the twelve-month period.

Cable DOCSIS 3.0 networks passed 62.8% of German homes, and 99% of the entire cable footprint had been upgraded to the DOCSIS 3.1 standard, covering 62.3% of households by mid-2022. Germany ranked among the top 10 countries across the two cable categories.

The availability of 5G rose by 6.7 percentage points and with 93.2% of households covered, Germany exceeded the EU average by more than 10 percentage points. Looking at 5G coverage provided via the 3.4–3.8 GHz band, however, Germany remained below the EU average of 40.7%, with 36.5% of households covered. German operators use a mix of frequency bands for 5G services.

Germany: Coverage by technology, total, 2022



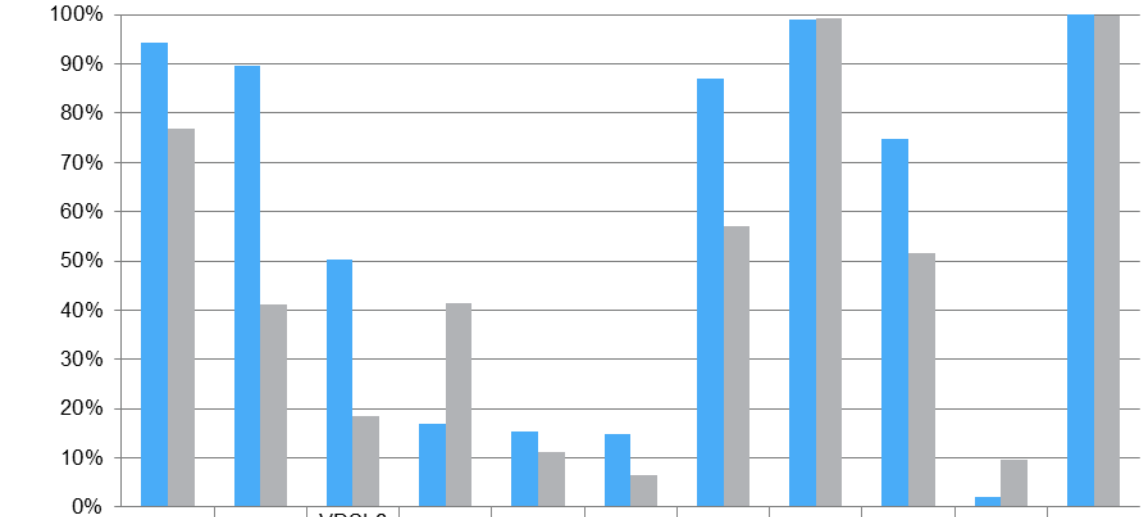
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Germany	97.7%	94.8%	74.2%	19.3%	62.8%	62.3%	89.8%	99.8%	93.2%	36.5%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural Germany, DSL was available to 94.4% of rural households, while 89.7% and 50.3% of rural households were covered by VDSL and VDSL2 Vectoring networks, respectively. The pace of FTTP deployment also accelerated in rural regions and resulted in a coverage improvement of 5.6 percentage points compared to mid-2021, the strongest growth seen to-date. However, with only 16.9% of homes passed, Germany performed well below the EU average of 41.4%.

Rural 5G was available to three quarters (74.8%) of German households by mid-2022, an improvement of 25.4 percentage points compared to the prior year. 5G coverage on the 3.4–3.8 GHz spectrum band stood at 2.1%, which unlike the overall 5G, was below the EU average.

Germany: Coverage by technology, rural areas, 2022

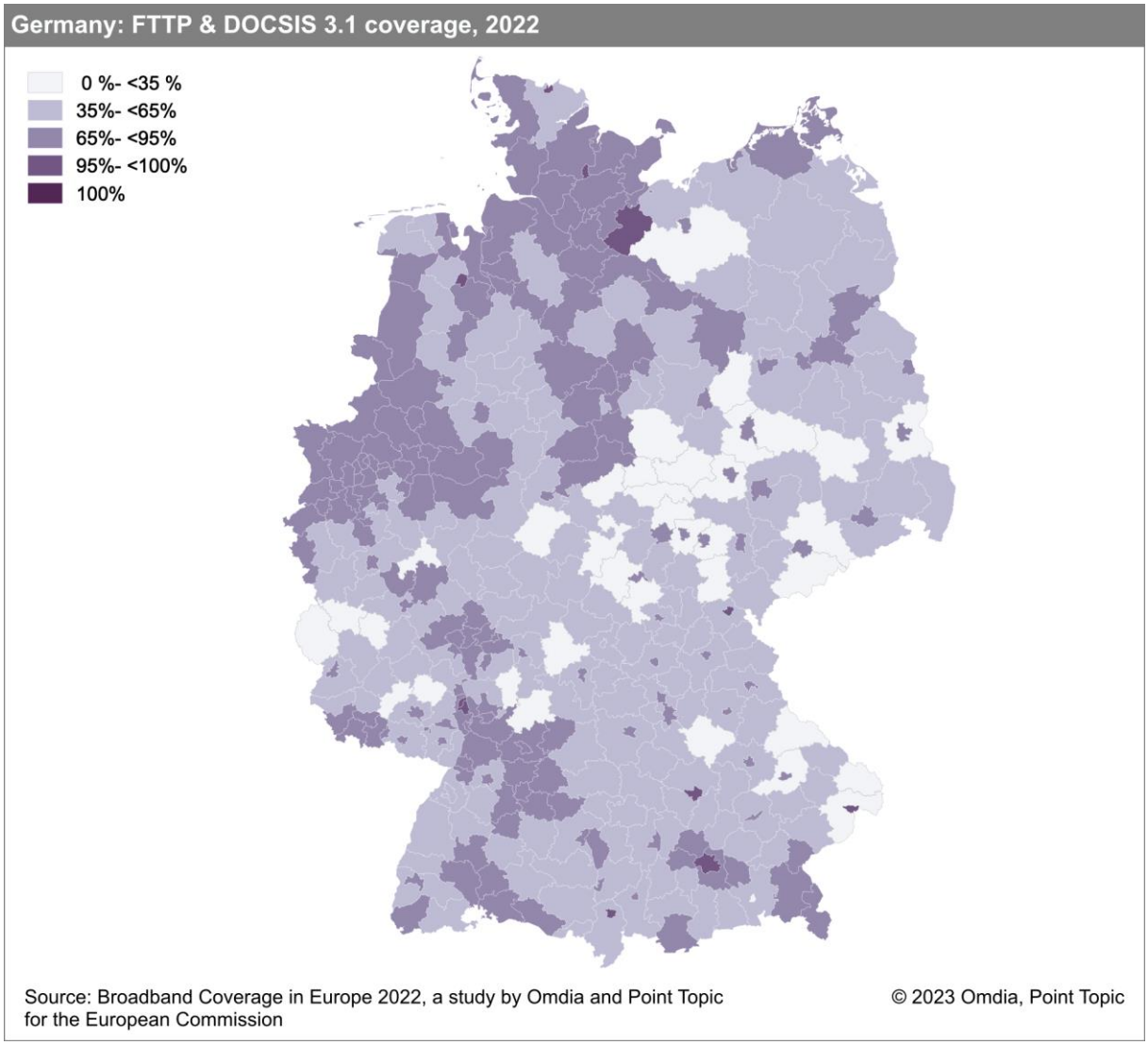


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Germany	94.4%	89.7%	50.3%	16.9%	15.3%	14.8%	87.1%	99.0%	74.8%	2.1%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

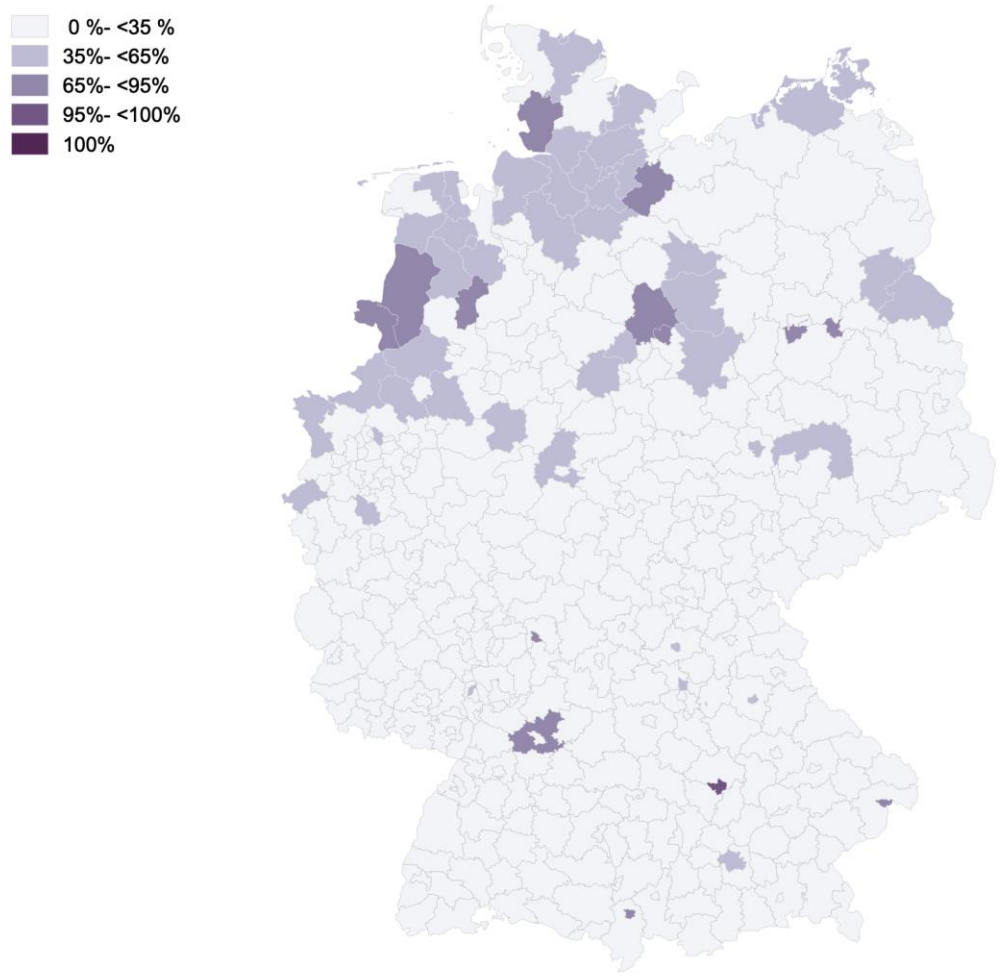
5.11.2 Regional coverage by broadband technology

FTTP & DOCSIS 3.1 coverage in eleven German regions exceeded 95%, and Ingolstadt reached the overall highest coverage (99.9%). 37 regions failed to exceed the 35% threshold, and the overall lowest coverage was recorded in Vulkaneifel (14.5%), Cham (14.4%), and Rosenheim, Kreisfreie Stadt (10.5%).



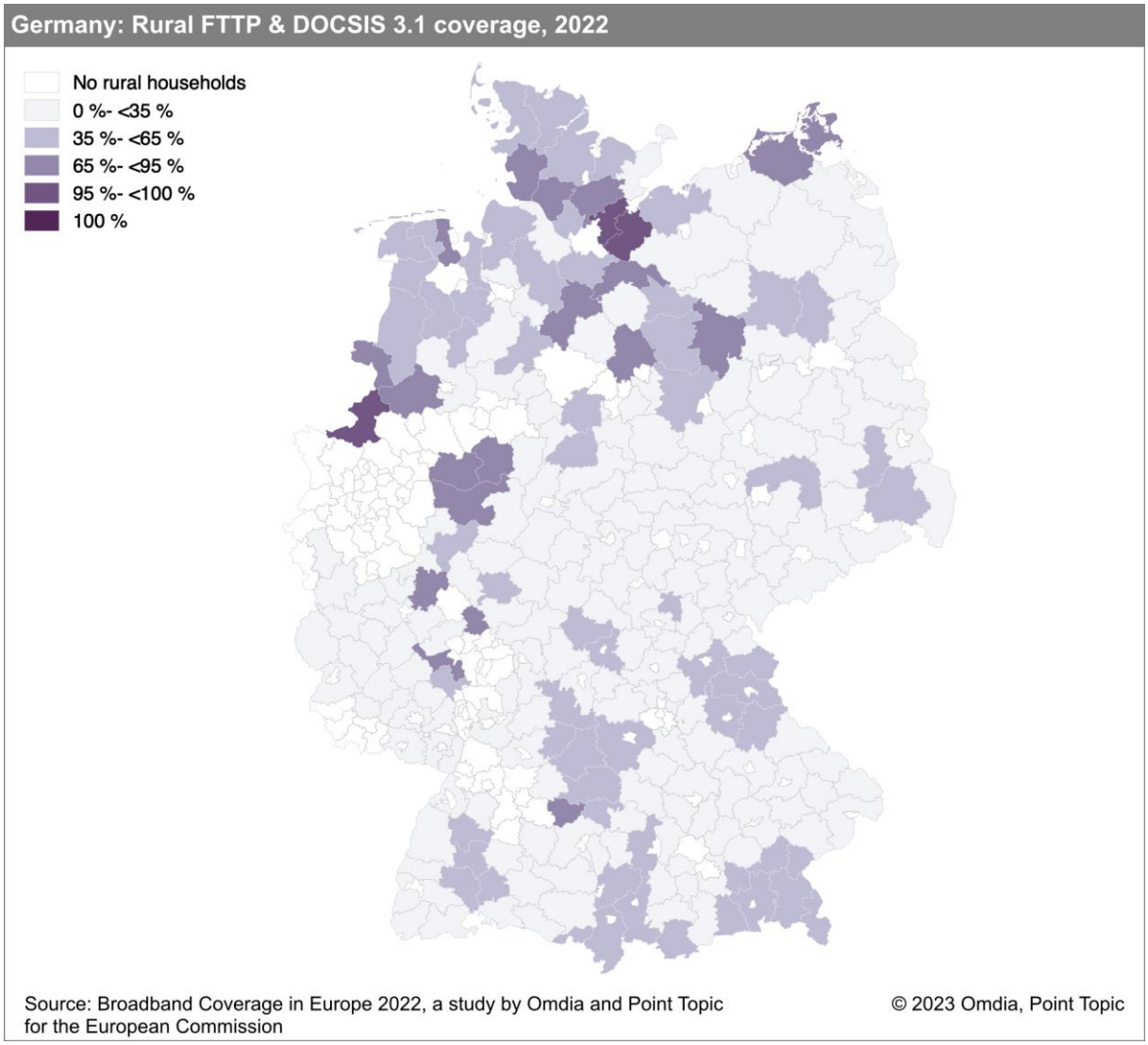
The majority of German regions (340 out of 401) recorded FTTP coverage below 35%. 13 regions reached coverage of 65%–95%, while Ingolstadt was the only region to surpass the 95% threshold.

Germany: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Borken (95.9%), Stormarn (96.8%), and Herzogtum Lauenburg (98.2%) reported the highest rural FTTP & DOCSIS 3.1 coverage, while 168 regions failed to reach the 35% threshold.



5.11.3 Data tables for Germany

Statistic	National
Population	83,155,033
Persons per household	2.0
Rural proportion	10.8%

	Germany 2022		Germany 2021		Germany 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.7%	94.4%	99.4%	97.3%	98.7%	94.6%	86.6%	77.0%
VDSL	94.8%	89.7%	91.3%	79.3%	89.2%	76.6%	54.9%	41.2%
VDSL2 Vectoring	74.2%	50.3%	79.4%	59.3%	72.7%	51.3%	35.9%	18.4%
FTTP	19.3%	16.9%	15.4%	11.3%	13.8%	10.6%	56.5%	41.4%
Cable modem DOCSIS 3.0	62.8%	15.3%	67.9%	17.5%	66.9%	16.9%	41.8%	11.1%
Cable modem DOCSIS 3.1	62.3%	14.8%	67.2%	16.8%	50.3%	7.0%	31.9%	6.4%
FWA	89.8%	87.1%	90.0%	87.9%	89.7%	86.7%	67.9%	57.0%
LTE	99.8%	99.0%	100.0%	99.9%	99.7%	98.6%	99.8%	99.2%
5G	93.2%	74.8%	86.5%	49.4%	17.8%	0.8%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	36.5%	2.1%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.2%	97.0%	99.5%	97.5%	99.0%	94.9%	97.3%	91.4%
Overall NGA broadband	97.4%	92.8%	95.9%	85.3%	94.7%	81.2%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	70.1%	30.1%	74.9%	22.5%	55.9%	16.4%	73.4%	45.1%
At least 30Mbps	94.2%	-	95.9%	-	94.7%	-	91.7%	-
At least 100Mbps	91.0%	-	89.6%	-	85.7%	-	86.6%	-
At least 1Gbps	68.6%	-	62.1%	-	55.9%	-	70.2%	-
At least 1Gbps upload and download	20.2%	-	-	-	-	-	-	-

Note: FWA coverage for total and rural is estimated. The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

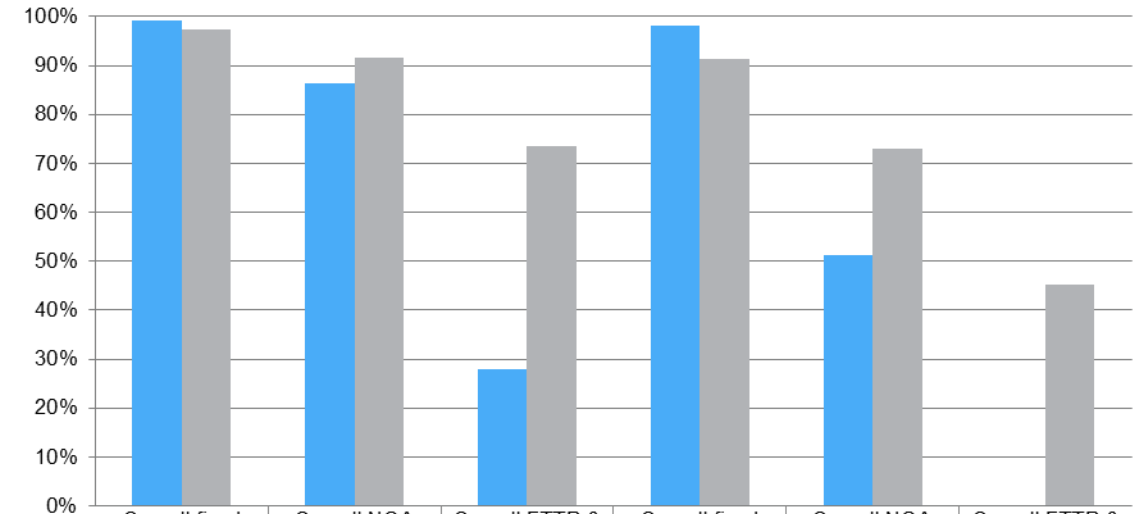
5.12 Greece

5.12.1 National coverage by broadband technology

Greece again recorded the lowest coverage among member states in the combined FTTP & DOCSIS 3.1 category. With no cable networks in the country, high-speed broadband services relied on FTTP deployment which remained slow and concentrated solely on urban areas. Despite an increase of 8.0 percentage points, by mid-2022, only 27.8% of Greek households had access to FTTP services, while rural coverage remained at 0.0%.

However, Greece outperformed the EU average on both national and rural levels in terms of total fixed broadband coverage, with 99.0% and 98.1% of households covered, respectively. In the NGA category 86.3% of Greek households had access to high-speed broadband services by mid-2022, including around half of rural homes (51.1%). This figure is much reduced since last year's study because of a decision by the incumbent to stop offering VDSL services in areas where it cannot meet the promised minimum speeds.

Greece: Coverage by technology combination, 2022



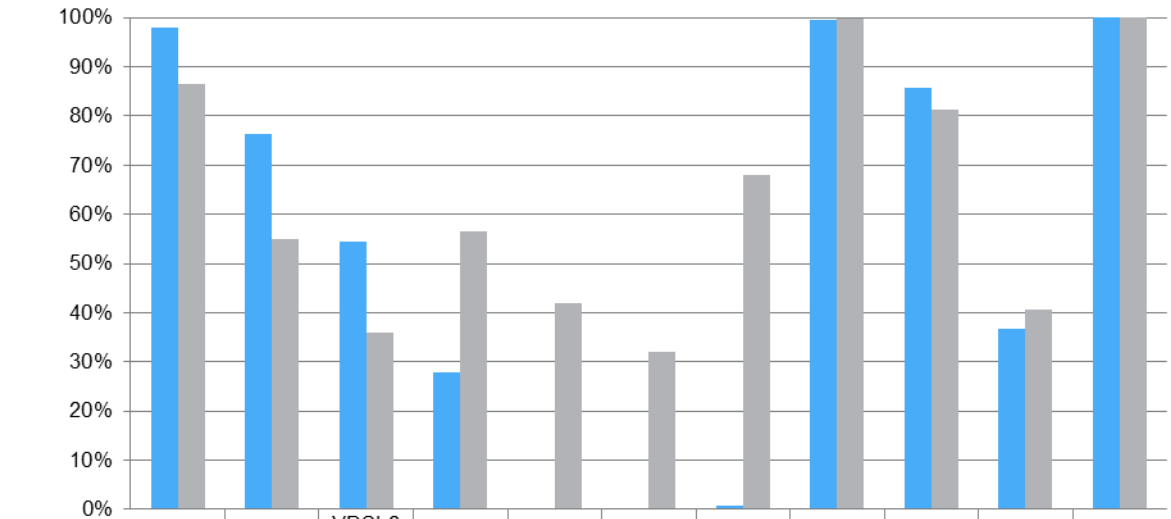
	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Greece	99.0%	86.3%	27.8%	98.1%	51.1%	0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at individual technologies, coverage of FTTP continued to grow significantly in Greece, from 19.8% to 27.8%. But DSL remained the most prevalent fixed broadband technology, with 97.9% of households covered at the end of June 2022. In terms of NGA technologies, VDSL and VDSL2 Vectoring remained the most widely accessible services in Greece, with 76.3% and 54.5% of homes passed, respectively. VDSL coverage reduced by 5.1 percentage points since 2021, because of the aforementioned decision by the incumbent. Coverage of VDSL2 Vectoring increased only slightly, by 0.8 percentage points, as operators turned their focus to FTTP rollout. As in the previous year, FWA is a niche technology with 0.7% of households covered.

Greece's three mobile network operators have all launched commercial 5G services, and overall coverage increased by 19.6 p.p. to reached 85.7% by June 2022, slightly ahead of the EU average. But 5G coverage using the 3.4–3.8 GHz band lags the EU slightly, at 36.8% of households.

Greece: Coverage by technology, total, 2022



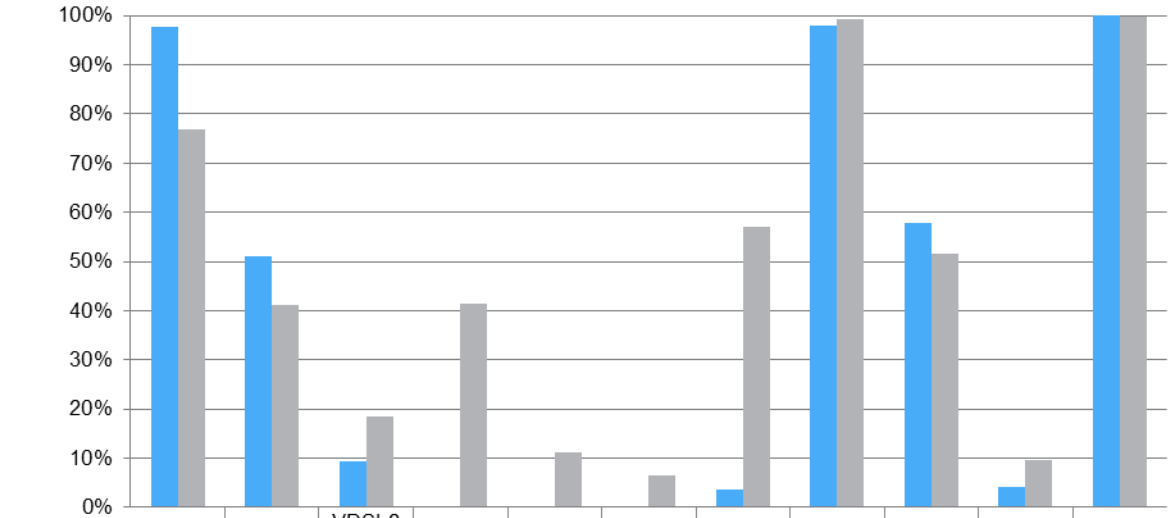
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Greece	97.9%	76.3%	54.5%	27.8%	0%	0%	0.7%	99.6%	85.7%	36.8%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

As of June 2022, FTTP and cable (DOCSIS 3.0 and 3.1) remained absent from rural Greek regions, meaning that DSL services were the only available choice for wireline broadband. Rural DSL coverage increased by 2.5 p.p. over the year, with 97.8% of rural homes passed. But rural VDSL coverage fell sharply following the incumbent's decision to stop selling it to households which would be unable to meet the minimum speed. As of June 2022, just over half (51.1%) of rural households were able to access VDSL services, while VDSL2 Vectoring coverage fell fractionally and covered one tenth (9.3%) of rural households.

By June 2022 more than half of rural households (57.8%) had access to 5G networks, ahead of the EU average figure (51.5%). But rural coverage of 5G using the 3.4–3.8 GHz band was less than half the EU average, at just 4.2%.

Greece: Coverage by technology, rural areas, 2022

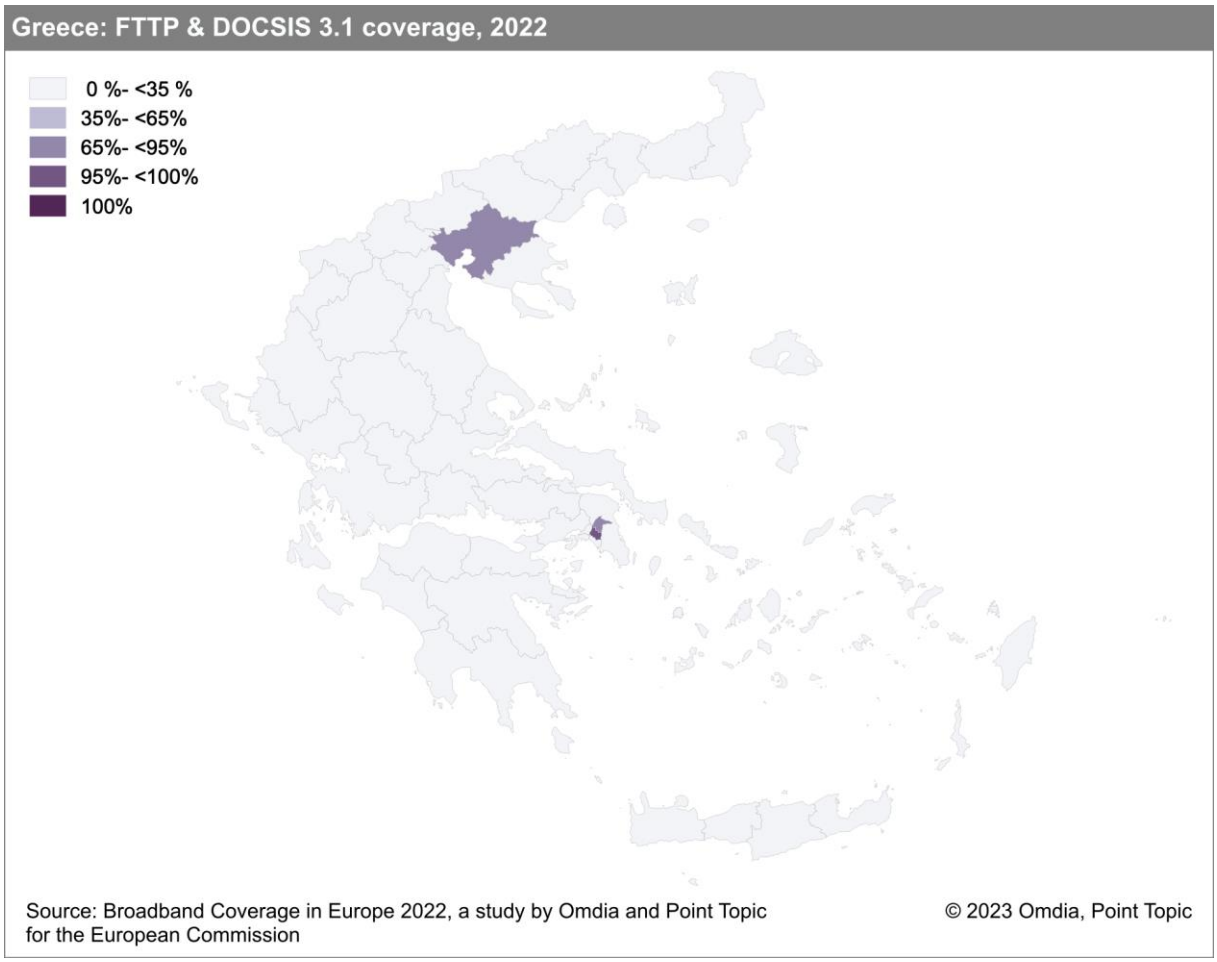


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Greece	97.8%	51.1%	9.3%	0%	0%	0%	3.5%	98.1%	57.8%	4.2%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.12.2 Regional coverage by broadband technology

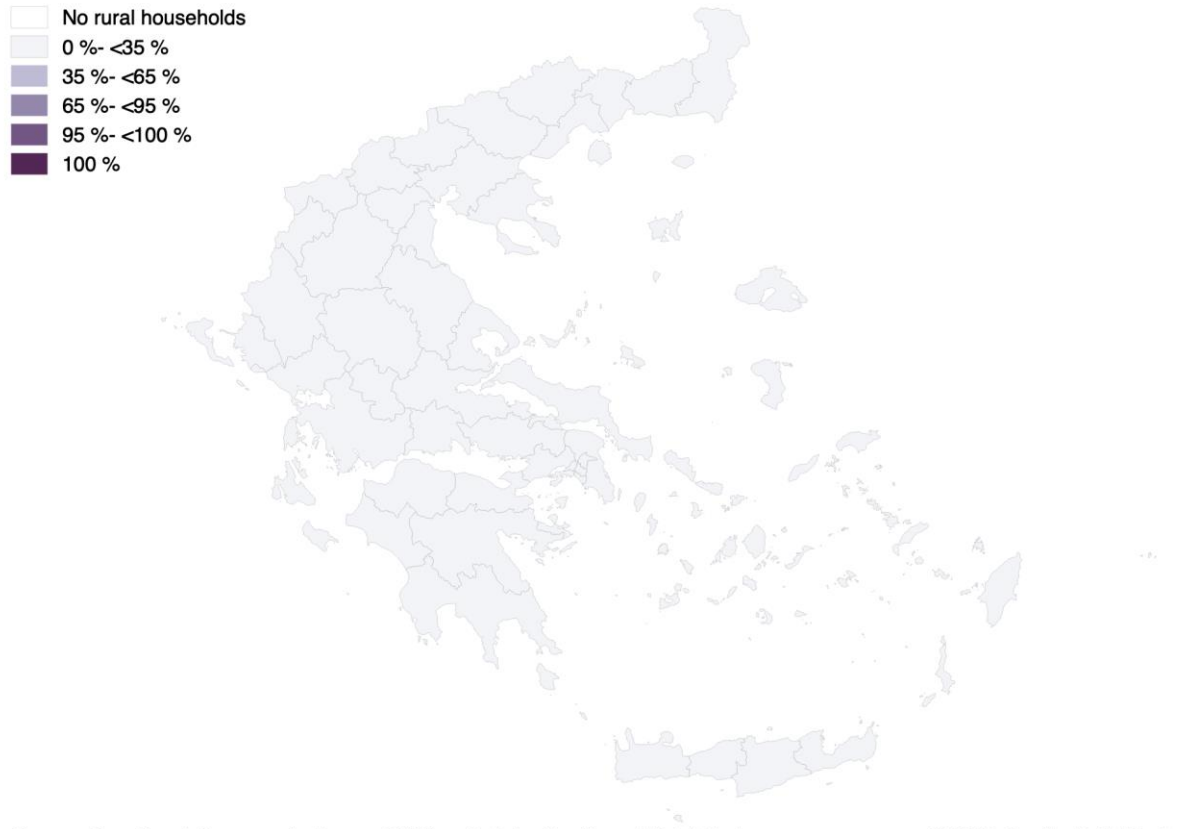
Looking at Greek regions, only three regions scored higher than 65% coverage of FTTP & DOCSIS 3.1 – Thessaloniki and parts of the capital, Athens. Elsewhere the low coverage of FTTP and absence of any cable networks meant that coverage remained below 35%.



Since there are no DOCSIS 3.1 services in Greece, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

The absence of any rural fibre coverage meant that rural coverage for FTTP & DOCSIS 3.1 was zero for all regions of Greece in 2022.

Greece: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.12.3 Data tables for Greece

Statistic	National
Population	10,678,632
Persons per household	2.5
Rural proportion	20.5%

	Greece 2022		Greece 2021		Greece 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.9%	97.8%	98.8%	95.3%	98.8%	95.2%	86.6%	77.0%
VDSL	76.3%	51.1%	81.3%	65.9%	80.3%	55.4%	54.9%	41.2%
VDSL2 Vectoring	54.5%	9.3%	53.7%	10.0%	52.7%	9.9%	35.9%	18.4%
FTTP	27.8%	0%	19.8%	0%	10.2%	0.0%	56.5%	41.4%
Cable modem DOCSIS 3.0	0%	0%	0%	0%	0.6%	0%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	0.7%	3.5%	0.8%	3.9%	0.9%	4.3%	67.9%	57.0%
LTE	99.6%	98.1%	99.5%	97.6%	99.2%	96.1%	99.8%	99.2%
5G	85.7%	57.8%	66.1%	17.3%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	36.8%	4.2%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.0%	98.1%	99.4%	96.1%	99.2%	96.5%	97.3%	91.4%
Overall NGA broadband	86.3%	51.1%	91.7%	66.3%	86.7%	55.4%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	27.8%	0%	19.8%	0%	10.2%	0.0%	73.4%	45.1%
At least 30Mbps	96.0%	-	96.6%	-	86.8%	-	91.7%	-
At least 100Mbps	63.9%	-	54.6%	-	48.9%	-	86.6%	-
At least 1Gbps	27.9%	-	19.0%	-	10.2%	-	70.2%	-
At least 1Gbps upload and download	26.1%	-	18.6%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

5.13 Hungary

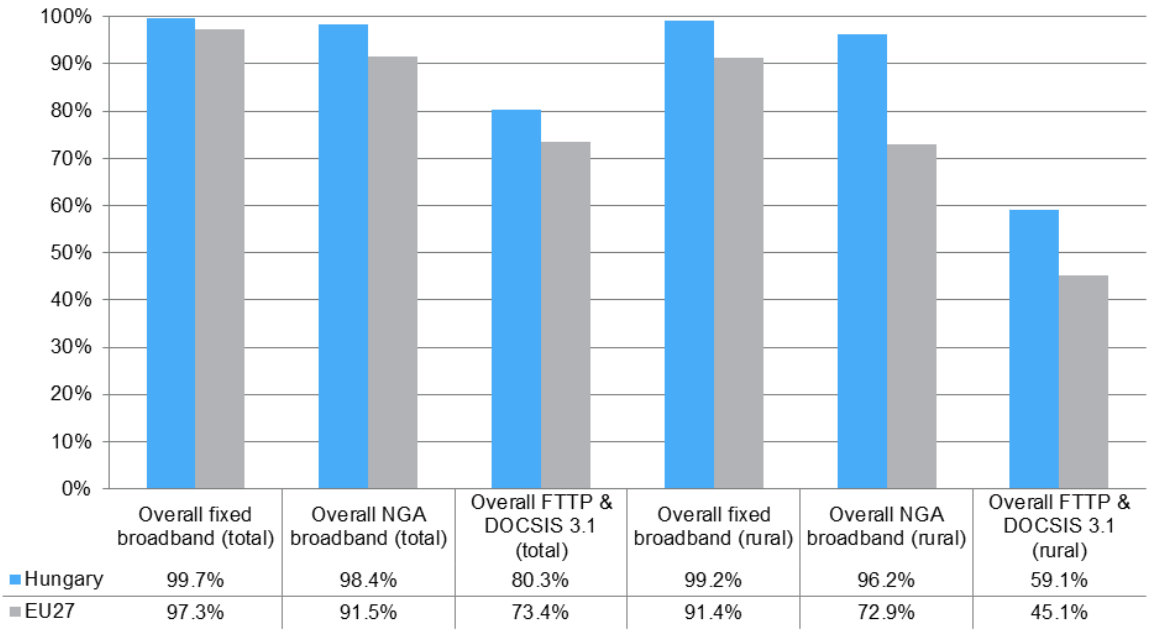
5.13.1 National coverage by broadband technology

Fixed broadband coverage in Hungary has become almost universal as 99.7% of households were covered by at least one broadband technology by the end of June 2022, up by 1.3 percentage points. In rural Hungary, fixed broadband coverage rose by 3.0 percentage points and stood at 99.2%. NGA coverage increased by 1.6 percentage points and 4.1 percentage points on national and rural level, respectively.

1Gbps-capable networks (FTTP & DOCSIS 3.1) were available to 80.3% of Hungarian households and 59.1% of rural households which represents an increase of 8.4 percentage points and 20.8 percentage points compared to mid-2021, respectively. The strong growth was driven by fast-paced FTTP rollouts and upgrades to DOCSIS 3.1.

Hungary outperformed the EU averages across all technology combination categories and exceeded the rural NGA average by 23.3 percentage points.

Hungary: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Hungary	99.7%	98.4%	80.3%	99.2%	96.2%	59.1%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

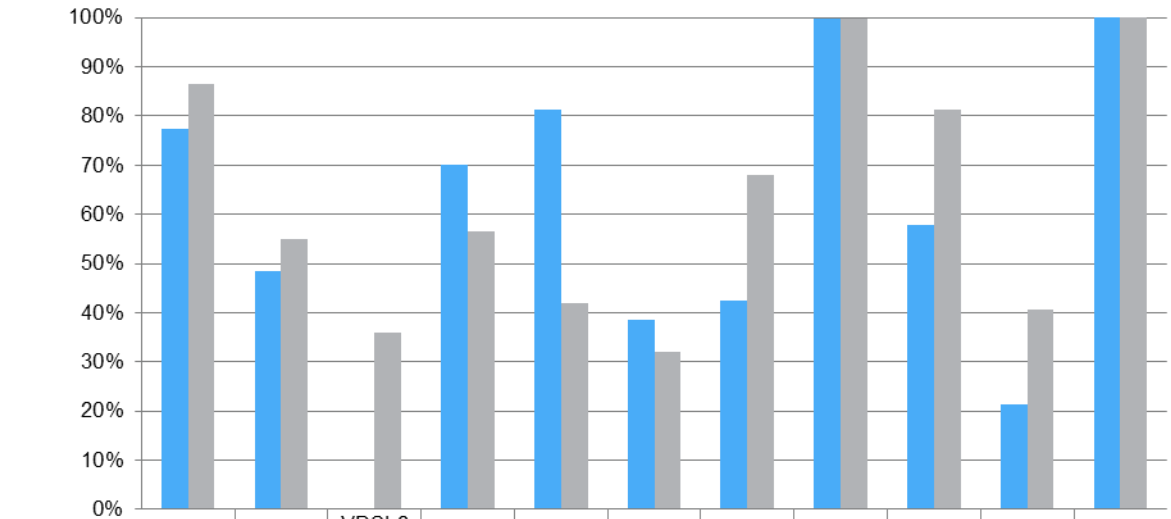
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Among the individual broadband technologies, DOCSIS 3.0 overtook DSL as the most prevalent technology, covering 81.2% of households by mid-2022, while DSL coverage declined by 6.9 percentage points and became the second largest broadband technology. Hungarian operators also progressed with DOCSIS 3.1 upgrades and coverage rose by 16.9 percentage points compared to mid-2021, making DOCSIS 3.1 available to 38.6% of households. VDSL coverage stood at 48.4% while VDSL2 Vectoring upgrades had not started by the end of June 2022.

FTTP coverage increased by 5.9 percentage points and stood at 70.1% by the end of June 2022, well above the EU average of 56.5%. FWA coverage stood at 42.3%.

Hungarian operators accelerated the pace of 5G deployments and covered 57.9% of households by mid-2022, an improvement of 40.3 percentage points compared to the previous year. Despite strong growth, 5G coverage remained below the EU average, but Hungary narrowed its gap to the EU average from 48.2 percentage points in 2021 to 23.3 percentage points in 2022. 5G coverage on the 3.4–3.8 GHz spectrum band stood at 21.4%.

Hungary: Coverage by technology, total, 2022



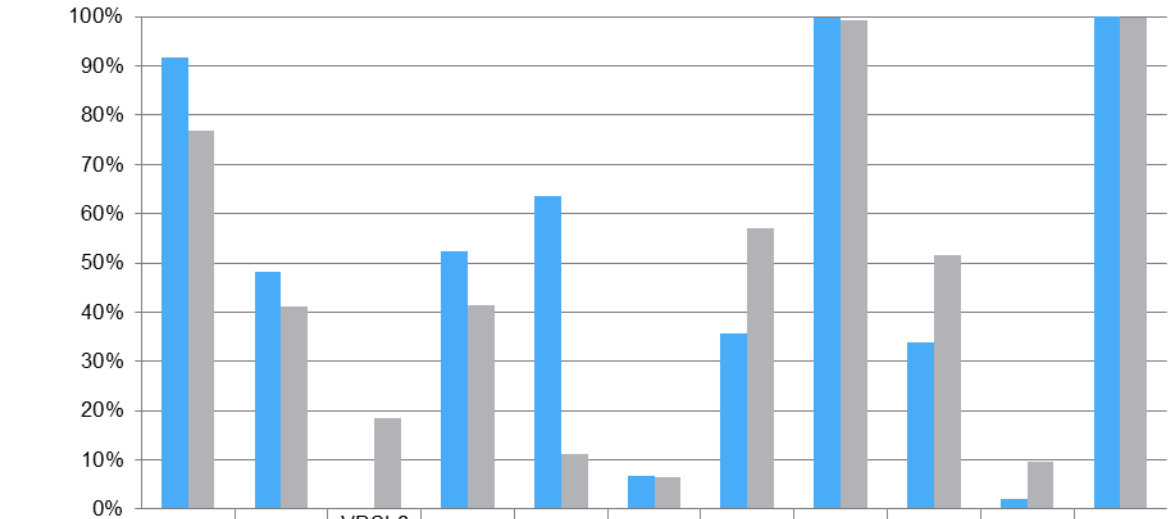
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Hungary	77.3%	48.4%	0%	70.1%	81.2%	38.6%	42.3%	99.9%	57.9%	21.4%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural Hungary, DSL remained the most prevalent technology with 91.7% of homes passed, while VDSL was available to 48.2% of households. Hungary ranked among the top five countries in DOCSIS 3.1 coverage, holding a gap of 52.5 percentage points to the EU average. The pace of DOCSIS 3.1 upgrades in rural regions accelerated over the last twelve months and coverage stood at 6.6% by the end of June 2022, up from 0.8% in the prior year. More than half (52.4%) of rural homes were passed by FTTP networks which represents an improvement of 14.5 percentage points year-on-year.

One third (33.8%) of rural households were covered by 5G networks, an increase of 26.7 percentage points compared to mid-2021. 5G coverage in the 3.4–3.8 GHz band stood at 2.0%. Hungary remained below the EU average across both 5G metrics.

Hungary: Coverage by technology, rural areas, 2022



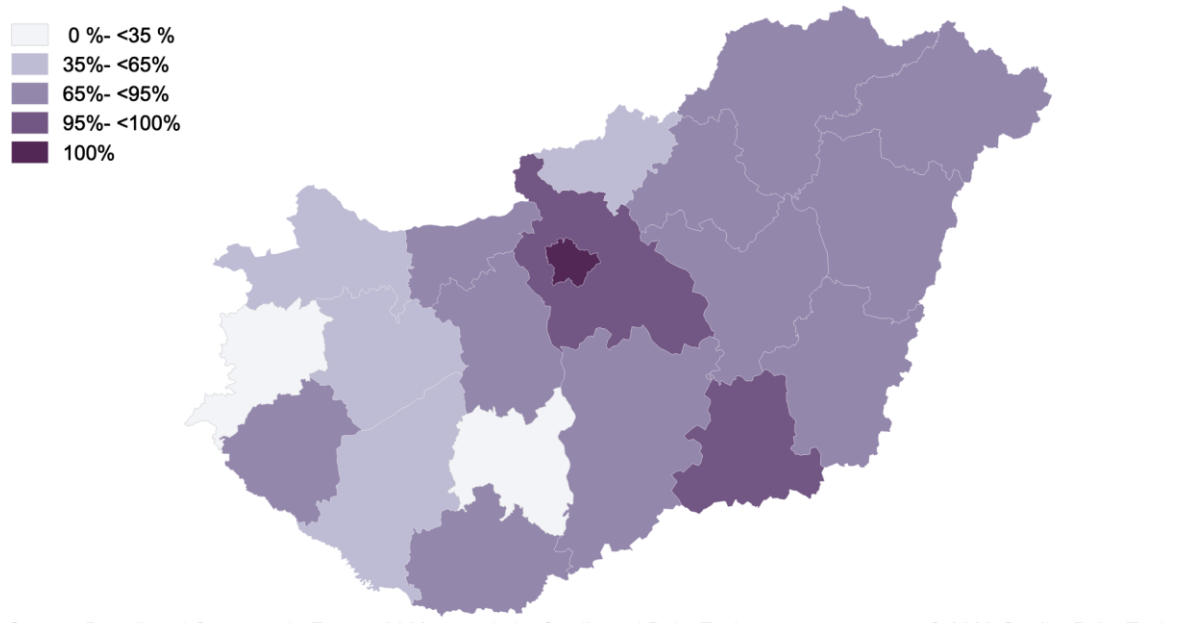
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Hungary	91.7%	48.2%	0%	52.4%	63.6%	6.6%	35.8%	99.8%	33.8%	2.0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.13.2 Regional coverage by broadband technology

The highest FTTP & DOCSIS 3.1 coverage was recorded in Budapest (100%), Csongrád (97.9%), and Pest (96.0%) which were the only three regions to exceed the 95% threshold. Vas and Tolna were the only two regions with FTTP & DOCSIS 3.1 coverage below 35%.

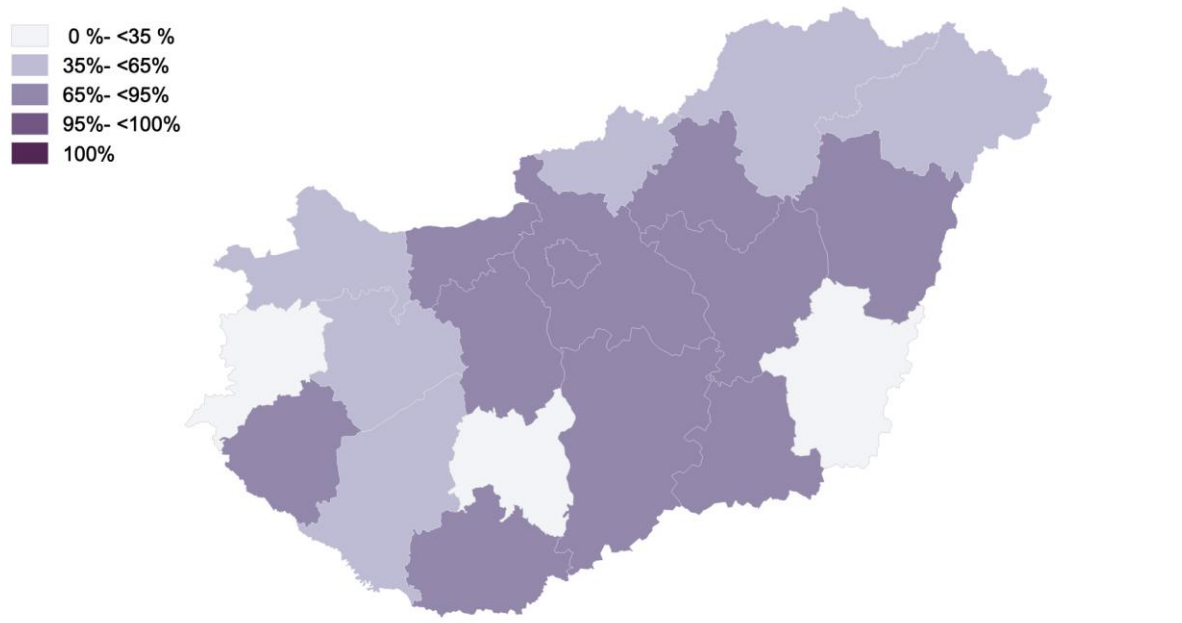
Hungary: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP coverage ranged from 85.9% in Budapest and Baranya to 15.2% in Tolna.

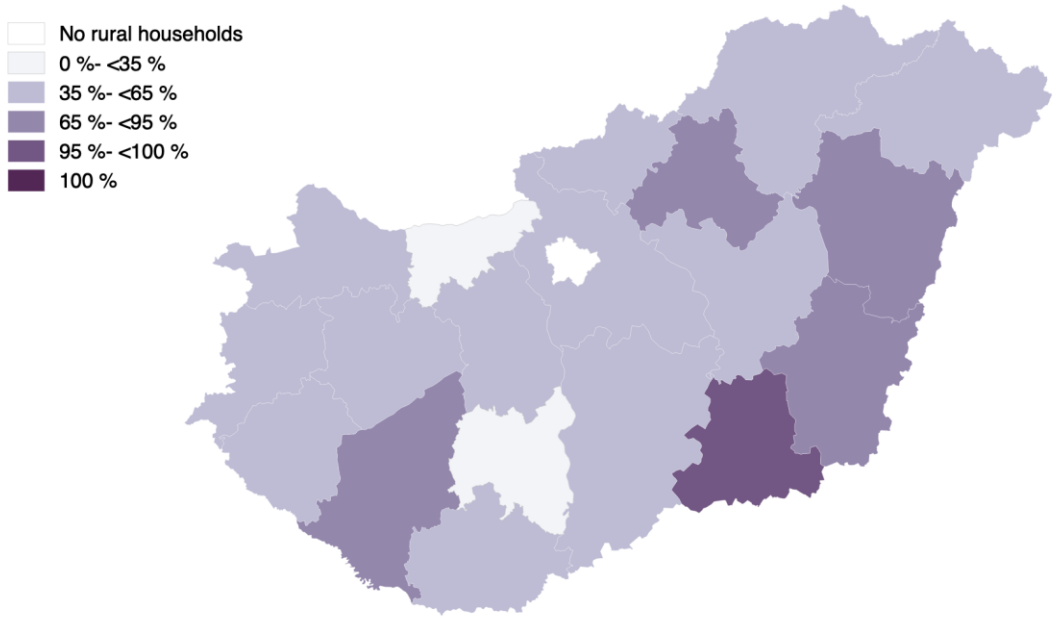
Hungary: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Csongrád was the only Hungarian region that recorded more than 95% coverage in rural FTTP & DOCSIS 3.1. Komárom-Esztergom and Tolna did not reach the 35% threshold. Budapest was excluded from this category due to the absence of rural households.

Hungary: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.13.3 Data tables for Hungary

Statistic	National
Population	9,689,010
Persons per household	2.1
Rural proportion	31.3%

	Hungary 2022		Hungary 2021		Hungary 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	77.3%	91.7%	84.2%	91.1%	84.6%	89.6%	86.6%	77.0%
VDSL	48.4%	48.2%	50.8%	48.4%	50.1%	46.5%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	70.1%	52.4%	64.2%	37.9%	48.6%	35.6%	56.5%	41.4%
Cable modem DOCSIS 3.0	81.2%	63.6%	78.2%	*57.7%*	76.0%	*53.3%*	41.8%	11.1%
Cable modem DOCSIS 3.1	38.6%	6.6%	21.7%	0.8%	0%	0%	31.9%	6.4%
FWA	42.3%	35.8%	0%	0%	0%	0%	67.9%	57.0%
LTE	99.9%	99.8%	99.7%	99.6%	99.3%	98.2%	99.8%	99.2%
5G	57.9%	33.8%	17.6%	7.0%	7.3%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	21.4%	2.0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.7%	99.2%	98.4%	*96.2%*	97.5%	*95.7%*	97.3%	91.4%
Overall NGA broadband	98.4%	96.2%	96.7%	*92.1%*	89.5%	*80.7%*	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	80.3%	59.1%	*71.8%*	38.3%	48.6%	35.6%	73.4%	45.1%
At least 30Mbps	97.0%	-	94.9%	-	87.6%	-	91.7%	-
At least 100Mbps	95.6%	-	88.7%	-	85.5%	-	86.6%	-
At least 1Gbps	81.9%	-	44.8%	-	35.9%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

All restatements are highlighted in italics.

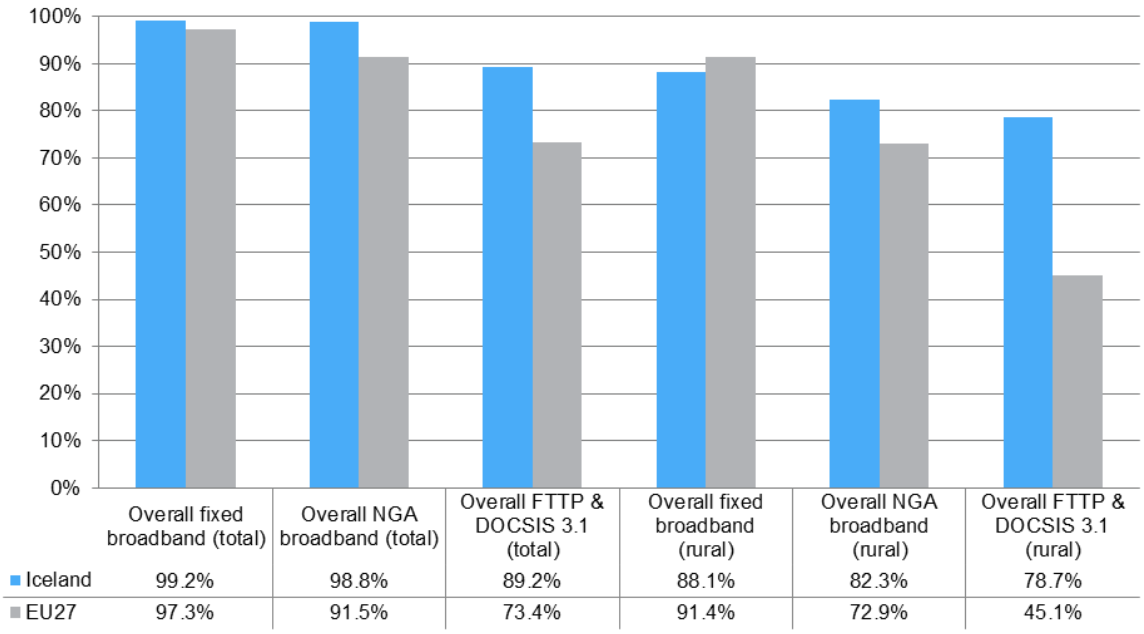
5.14 Iceland

5.14.1 National coverage by broadband technology

Overall fixed broadband coverage in Iceland remained stable and nearing universal coverage with 99.2% of Icelandic homes passed by at least one fixed broadband network. At a rural level, fixed broadband coverage reached 88.1% of rural homes. High-speed NGA broadband services were available to 98.8% of Icelandic households, and to 82.3% of rural households.

Due to the high proliferation of FTTP networks, Iceland ranked as one of the leaders in terms of overall FTTP & DOCSIS 3.1 coverage. At the end of June 2022, 89.2% of all households and 78.7% of rural households were passed by fixed networks capable of delivering gigabit speed connectivity.

Iceland: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Iceland	99.2%	98.8%	89.2%	88.1%	82.3%	78.7%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at individual broadband technologies in Iceland, DSL remained the most common fixed broadband technology available to Icelandic households, accessible to 89.0% of households.

FTTP networks passed 88.2% of Icelandic homes, well ahead of the EU average (56.5%). VDSL coverage remained high, with 84.1% of households having access to VDSL services at the end of June 2022. VDSL2 Vectoring was available to 65.4% of households.

Only a small number of homes (3.1%) were passed by cable DOCSIS 3.0 network. Even though limited, the DOCSIS 3.0 footprint was fully upgraded to the DOCSIS 3.1 standard. Fixed Wireless Access is also a niche technology in Iceland, available to 2.0% of households.

In terms of mobile broadband, LTE coverage remained almost universal, at 99.7% of households covered. Commercial 5G services were launched in 2021, and by June 2022 coverage reached 41.6% of households.

Iceland: Coverage by technology, total, 2022

	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Iceland	89.0%	84.1%	65.4%	88.2%	3.1%	3.1%	2.0%	99.7%	41.6%	-	0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

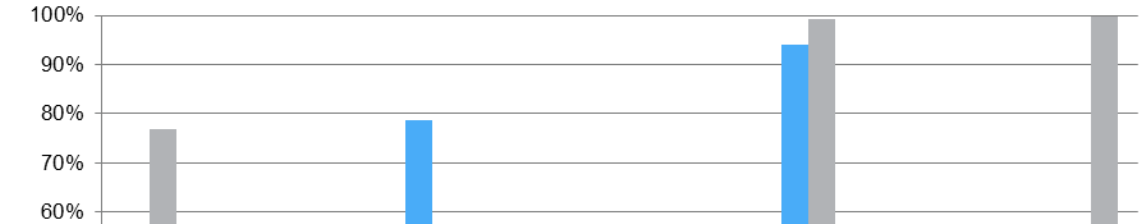
FTTP is the leading technology in rural areas, with 78.7% of rural households passed, more than double the EU average. FTTP rollout has been accompanied by a reduction in availability of DSL services, which reached less than half of rural households (48.0%).

VDSL services were available to 7.6% of rural households, whilst only 0.8% of rural households had access to VDSL2 Vectoring services. Cable modem DOCSIS 3.0 and DOCSIS 3.1 remained negligible in rural areas with only 1.0% coverage.

FWA was accessible to 19.1% of rural households, a substantially higher coverage level than reported at a national level, which can be explained by the low number of rural households in Iceland, and the common use of Fixed Wireless Access in remote and hard to reach areas.

Over the study period, LTE coverage was available to 94.1% of rural Icelandic homes, while 5G reached 7.9% of households.

Iceland: Coverage by technology, rural areas, 2022



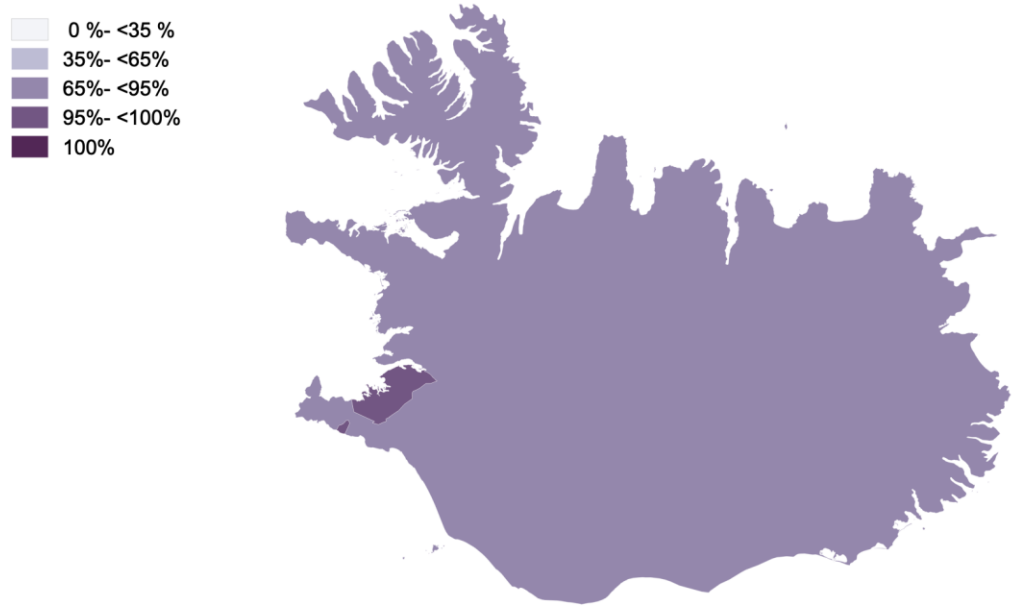
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Iceland	48.0%	7.6%	0.8%	78.7%	0.9%	0.9%	19.1%	94.1%	7.9%	-	0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.14.2 Regional coverage by broadband technology

In this iteration of the study, combined FTTP & DOCSIS 3.1 coverage was nearly universally available in the Höfudborgarsvædi region, while fewer than 70% of households in the more sparsely populated Landsbyggd region were passed by these networks.

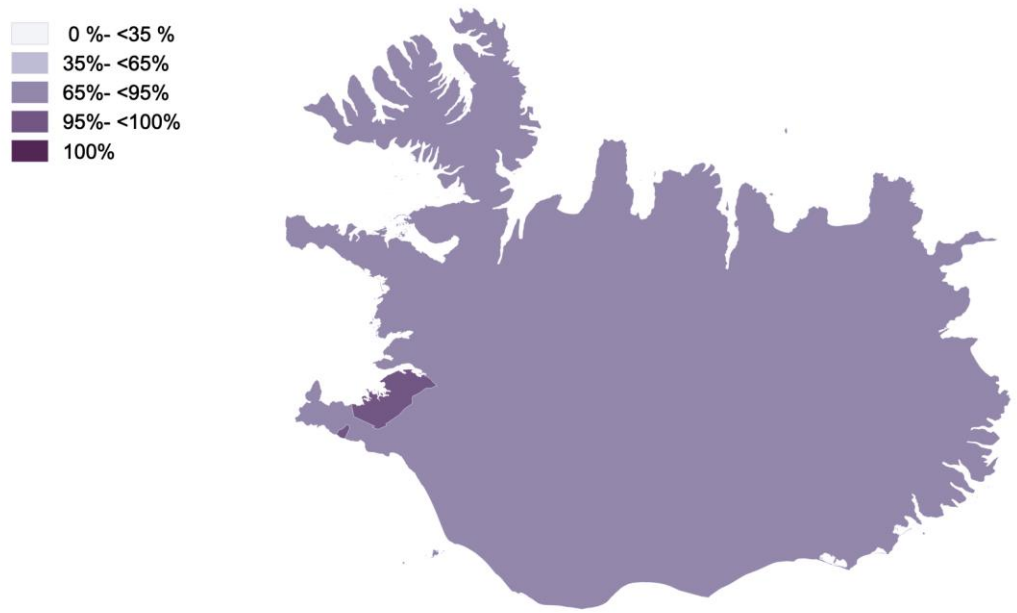
Iceland: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

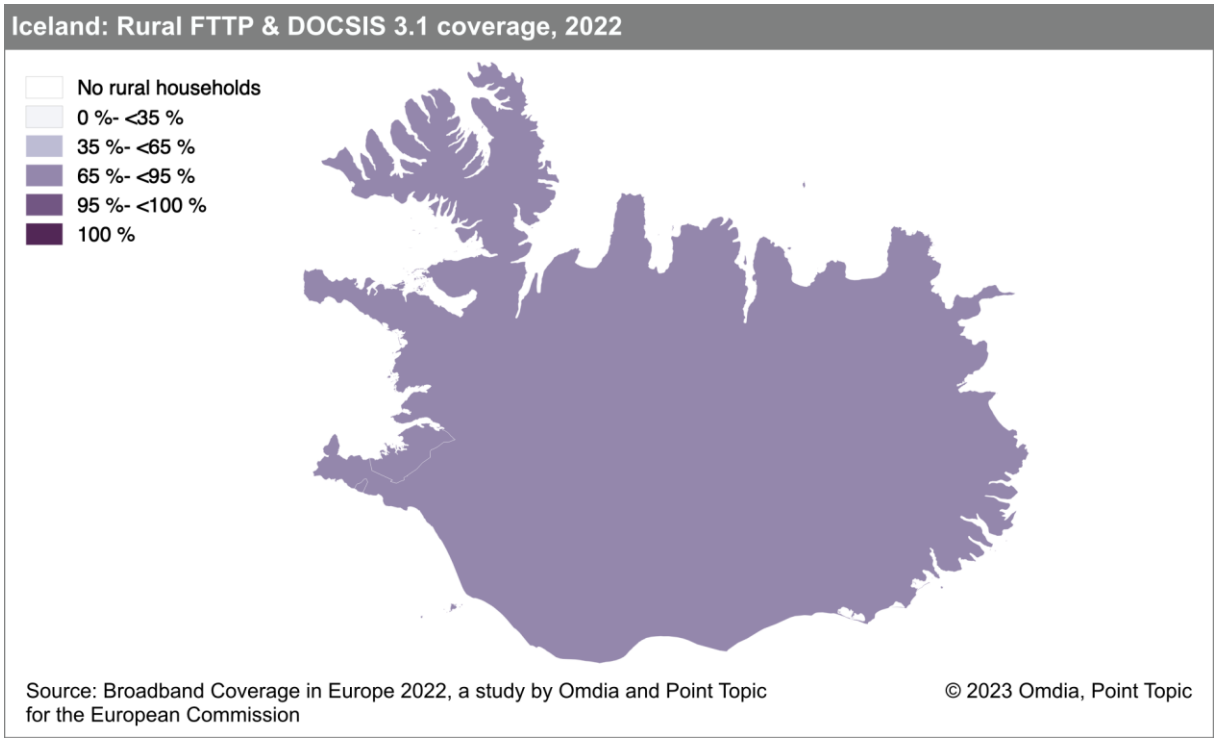
Given the limited reach of cable networks in Iceland, FTTP coverage regional levels mirror closely those of the FTTP & DOCSIS 3.1 category.

Iceland: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of rural FTTP & DOCSIS 3.1 coverage, both Höfudborgarsvædi and Landsbyggd recorded coverage levels below 90%.



5.14.3 Data tables for Iceland

Statistic	National
Population	368,792
Persons per household	2.7
Rural proportion	4.3%

	Iceland 2022		Iceland 2021		Iceland 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	89.0%	48.0%	89.0%	48.9%	93.2%	57.5%	86.6%	77.0%
VDSL	84.1%	7.6%	84.0%	7.6%	87.2%	14.8%	54.9%	41.2%
VDSL2 Vectoring	65.4%	0.8%	64.3%	0.7%	65.3%	1.0%	35.9%	18.4%
FTTP	88.2%	78.7%	87.6%	78.4%	83.5%	66.3%	56.5%	41.4%
Cable modem DOCSIS 3.0	3.1%	0.9%	3.3%	1.0%	0.3%	0%	41.8%	11.1%
Cable modem DOCSIS 3.1	3.1%	0.9%	3.3%	1.0%	0.3%	0%	31.9%	6.4%
FWA	2.0%	19.1%	2.1%	19.6%	2.2%	20.6%	67.9%	57.0%
LTE	99.7%	94.1%	99.7%	93.9%	99.9%	99.1%	99.8%	99.2%
5G	41.6%	7.9%	41.0%	6.7%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	-	-	-	-	-	-	40.7%	9.6%
Satellite	0%	0%	0%	0%	0%	0%	99.9%	99.9%
Overall fixed broadband	99.2%	88.1%	99.2%	88.0%	99.7%	93.5%	97.3%	91.4%
Overall NGA broadband	98.8%	82.3%	98.8%	82.1%	97.6%	60.4%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	89.2%	78.7%	88.7%	78.4%	83.6%	66.3%	73.4%	45.1%
At least 30Mbps	98.8%	-	98.8%	-	96.3%	-	91.7%	-
At least 100Mbps	88.3%	-	88.3%	-	83.9%	-	86.6%	-
At least 1Gbps	85.6%	-	85.6%	-	78.5%	-	70.2%	-
At least 1Gbps upload and download	85.6%	-	85.6%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

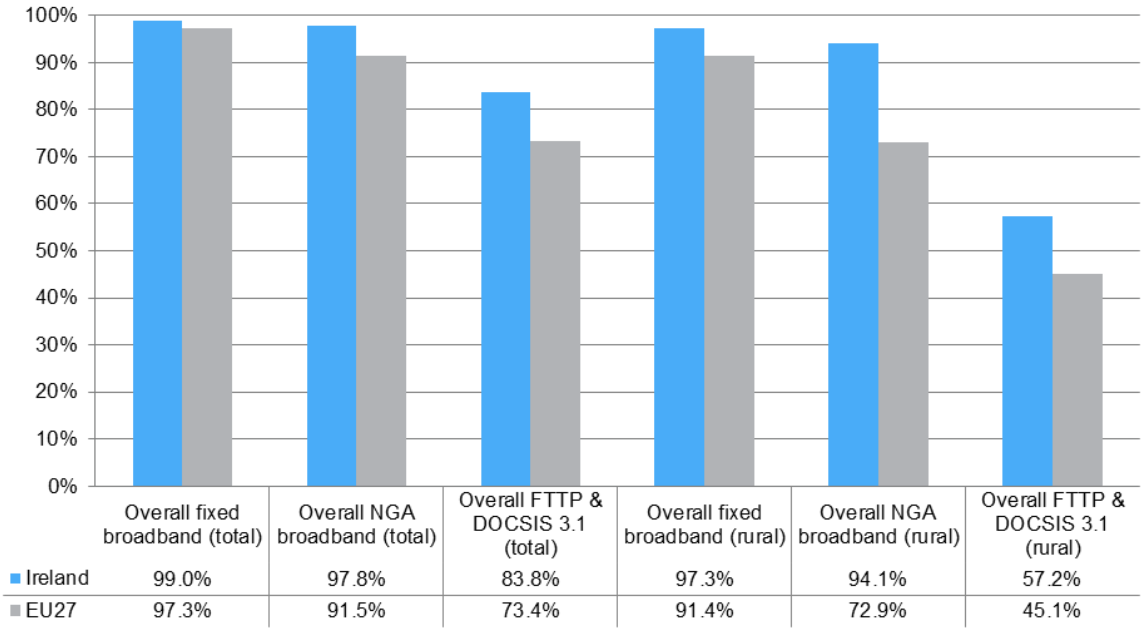
5.15 Ireland

5.15.1 National coverage by broadband technology

By the end of June 2022, 99.0% of Irish households had access to at least one fixed broadband network. Rural fixed broadband coverage grew slightly, reaching 97.3% of rural households. NGA services were available to 97.8% of all Irish households and 94.1% of rural homes were passed by NGA networks.

Overall FTTP & DOCSIS 3.1 coverage reached 83.8% of households at a national level, 10 percentage points above the EU average. Due to a steady progression in FTTP rollouts, rural FTTP & DOCSIS 3.1 coverage grew by 11.4 percentage points, reaching 57.2% of rural households.

Ireland: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Ireland	99.0%	97.8%	83.8%	97.3%	94.1%	57.2%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

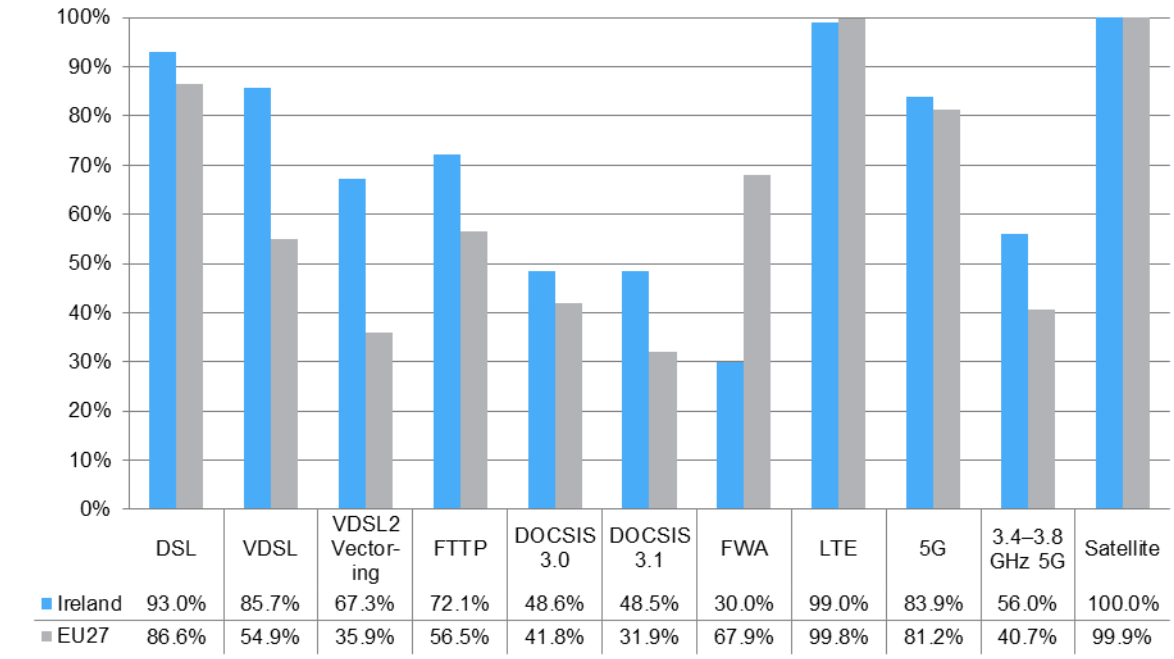
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the most prevalent fixed broadband technology, reaching 99.0% of households, while FWA was available to just under a third (30.0%) of Irish households. VDSL remains the most common NGA technology, with 85.7% of households covered, unchanged compared to mid-2021. VDSL2 Vectoring was available to more than two-thirds (67.3%) of Irish households.

Cable modem DOCSIS 3.0 coverage remained steady at just under a half (48.6%) of households, almost all of which supported DOCSIS 3.1. FTTP again recorded a significant increase in coverage (+9.9 p.p.), to reach 72.1% of homes at the end of June 2022. Moreover, as many FTTP rollouts have been focused in areas with limited cable network presence, coverage of both networks is more complementary than overlapping.

In terms of mobile broadband, LTE services were available to 99.0% of Irish households. 5G coverage grew by 11.8 percentage points, hitting 83.9% in June 2022. 5G networks utilizing the 3.4–3.8 GHz frequency band passed 56.0% of Irish households.

Ireland: Coverage by technology, total, 2022

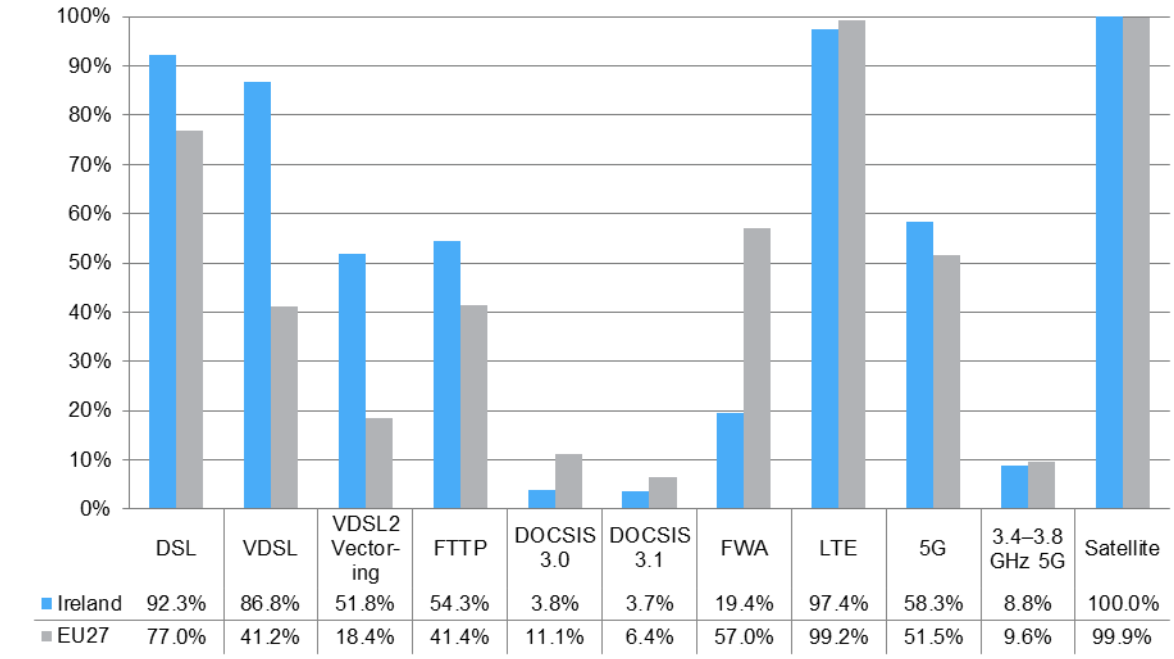


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Ireland	93.0%	85.7%	67.3%	72.1%	48.6%	48.5%	30.0%	99.0%	83.9%	56.0%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural areas, DSL coverage remained stable, reaching 92.3% of households. Almost all of the DSL network supported VDSL services, which were available to 86.8% of households. The Irish government's National Broadband Plan continued to lead to significant growth in rural FTTP coverage over the year (+11.2 p.p.), with more than half (54.3%) of rural homes passed by FTTP networks at the end of June 2022. Rural cable DOCSIS 3.0 coverage remained limited at 3.8%. Rural LTE reached 97.4% of rural households, below the EU average of 99.2%, whereas rural 5G coverage was slightly ahead of the EU average, at 58.3%. 5G coverage on the 3.4–3.8 GHz spectrum band was available to 8.8% of rural Irish households.

Ireland: Coverage by technology, rural areas, 2022



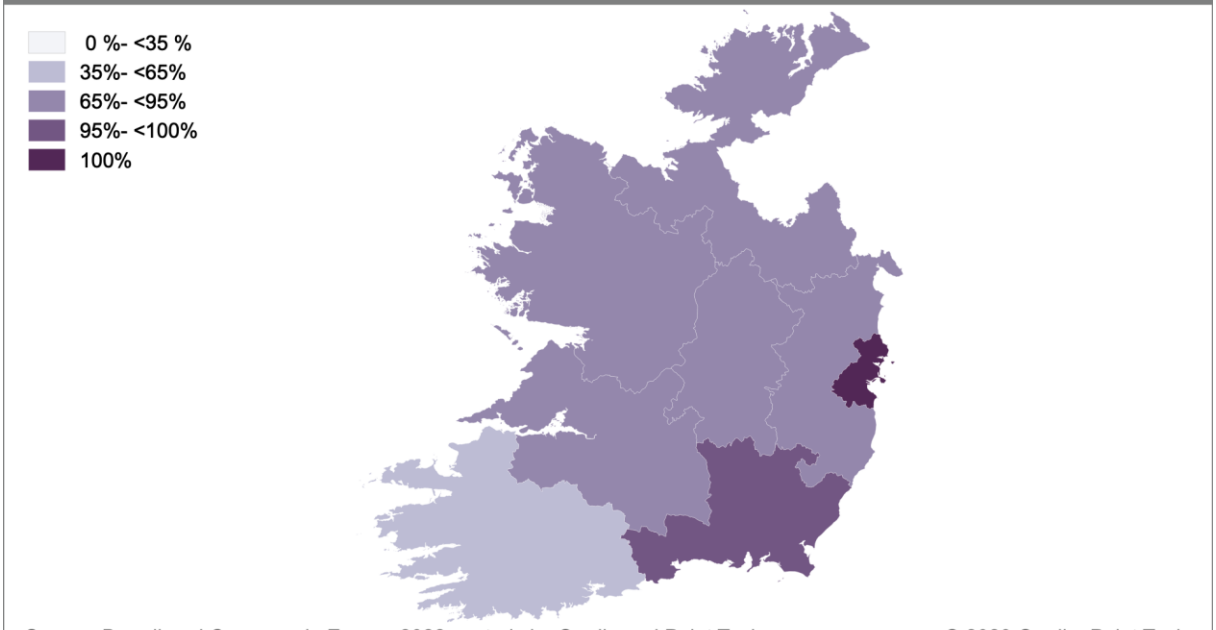
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Ireland	92.3%	86.8%	51.8%	54.3%	3.8%	3.7%	19.4%	97.4%	58.3%	8.8%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.15.2 Regional coverage by broadband technology

Combined FTTP & DOCSIS 3.1 coverage in Ireland varies across regions, with Dublin having universal coverage (100.0%) and South-West Ireland recording the lowest fixed broadband coverage level, at 62.4%.

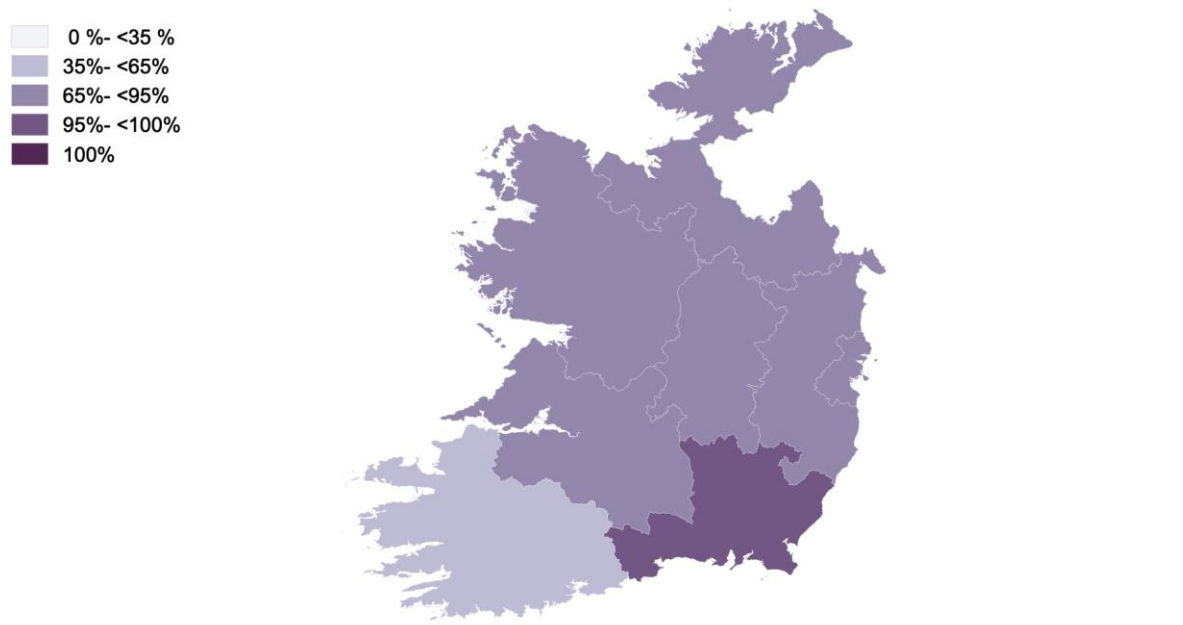
Ireland: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Equally, FTTP coverage also recorded varied regional levels, reaching over 90% coverage the Border and South-East regions and less than 55% coverage in the South-West region.

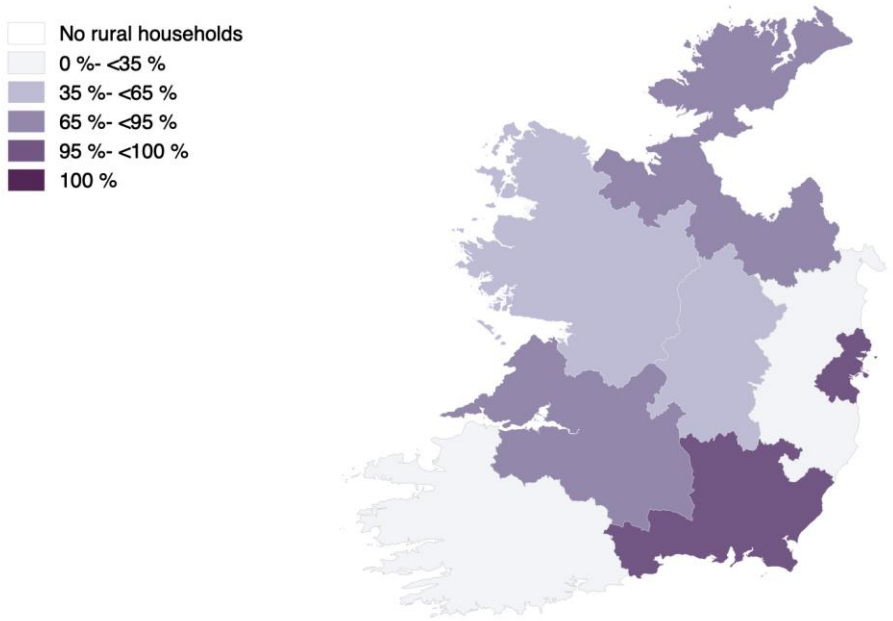
Ireland: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Rural FTTP & DOCSIS 3.1 coverage is even more varied than on a total level, with the South-West and Mid-East regions recording coverage levels below 20%. While in Dublin and South-East regions nearly all rural households had access to gigabit-speed-capable services.

Ireland: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.15.3 Data tables for Ireland

Statistic	National
Population	5,006,324
Persons per household	2.8
Rural proportion	37.8%

	Ireland 2022		Ireland 2021		Ireland 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	93.0%	92.3%	92.9%	92.3%	93.3%	89.0%	86.6%	77.0%
VDSL	85.7%	86.8%	85.7%	86.8%	92.5%	86.2%	54.9%	41.2%
VDSL2 Vectoring	67.3%	51.8%	64.1%	45.8%	62.9%	24.9%	35.9%	18.4%
FTTP	72.1%	54.3%	62.2%	43.1%	47.7%	20.6%	56.5%	41.4%
Cable modem DOCSIS 3.0	48.6%	3.8%	48.6%	3.8%	49.8%	3.7%	41.8%	11.1%
Cable modem DOCSIS 3.1	48.5%	3.7%	48.5%	3.4%	48.6%	3.6%	31.9%	6.4%
FWA	30.0%	19.4%	30.0%	19.4%	29.8%	17.8%	67.9%	57.0%
LTE	99.0%	97.4%	99.0%	97.4%	99.0%	97.4%	99.8%	99.2%
5G	83.9%	58.3%	72.1%	36.2%	30.5%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	56.0%	8.8%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.0%	97.3%	97.6%	97.0%	97.9%	96.2%	97.3%	91.4%
Overall NGA broadband	97.8%	94.1%	96.4%	93.5%	96.2%	91.2%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	83.8%	57.2%	*78.3%*	45.8%	*66.7%*	24.0%	73.4%	45.1%
At least 30Mbps	92.1%	-	90.1%	-	87.7%	-	91.7%	-
At least 100Mbps	90.7%	-	87.7%	-	72.8%	-	86.6%	-
At least 1Gbps	72.3%	-	67.4%	-	58.1%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

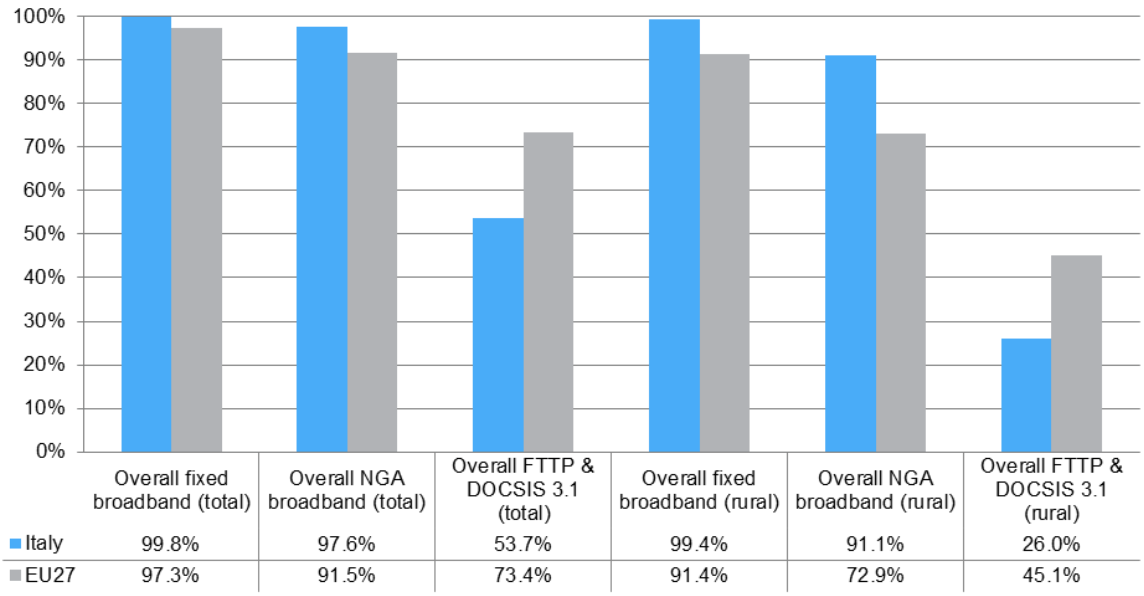
All restatements are highlighted in italics.

5.16 Italy

5.16.1 National coverage by broadband technology

At the end of June 2022, nearly all (99.8%) of Italian households were coverage by at least one fixed broadband network. At a rural level, fixed broadband was available to 99.4% of rural households. In terms of NGA broadband, high speed broadband services based on NGA technologies were available to 97.6% of Italian households, and to 91.1% of rural Italian households. In both categories (fixed broadband and NGA), Italy recorded coverage levels above the EU average. Combined FTTP & DOCSIS 3.1 networks passed 53.7% of Italian households at a national level, and 26.0% of rural households. In the absence of cable networks in Italy, this coverage equals FTTP coverage.

Italy: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Italy	99.8%	97.6%	53.7%	99.4%	91.1%	26.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

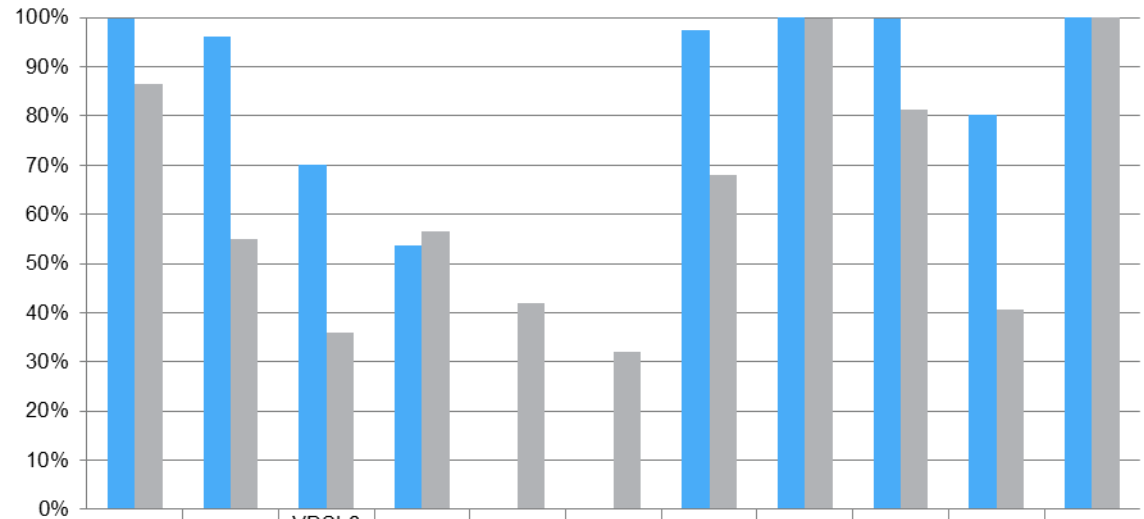
Looking at individual technologies, DSL remained the most widespread broadband technology in Italy, with an almost-universal coverage level (99.8% of households passed). Fixed Wireless Access (FWA) was available to 96.8% of households.

In terms of NGA broadband technologies, the Italian market remained largely dominated by VDSL, which was available to 96.2% of households, largely unchanged since mid-2021. In Italy, the nature of the legacy copper network grid, with large number of cabinets positioned close to customer premises means that the VDSL network is capable of reaching speeds higher than 100Mbps. In order to not skew the results unfavourably the research team has decided to classify those households close enough to the cabinet to receive at least 100Mbps coverage as passed by VDSL2 Vectoring. At the end of June 2022, these services were available to 70.1% of Italian households, recording an 1.8 percentage point increase year-on-year, a slowdown in growth compared to previous years.

Given the absence of cable networks (DOCSIS 3.0 or DOCSIS 3.1) in Italy, FTTP remained the only other NGA technology available to Italian households. FTTP coverage increased by 9.5 percentage points over the study period, reaching 53.7% of households. Despite this increase, FTTP coverage in Italy remained below the EU average of 56.5%.

In terms of mobile broadband coverage, LTE services were available to 99.9% of households. Italy recorded the fourth highest 5G coverage in this year's study, at 99.7% of households, driven by the rapid deployment of Dynamic Spectrum Sharing technology. In terms of 5G coverage in the 3.4–3.8 GHz frequency band, Italy ranked second (behind Finland) with 80.3% homes passed.

Italy: Coverage by technology, total, 2022



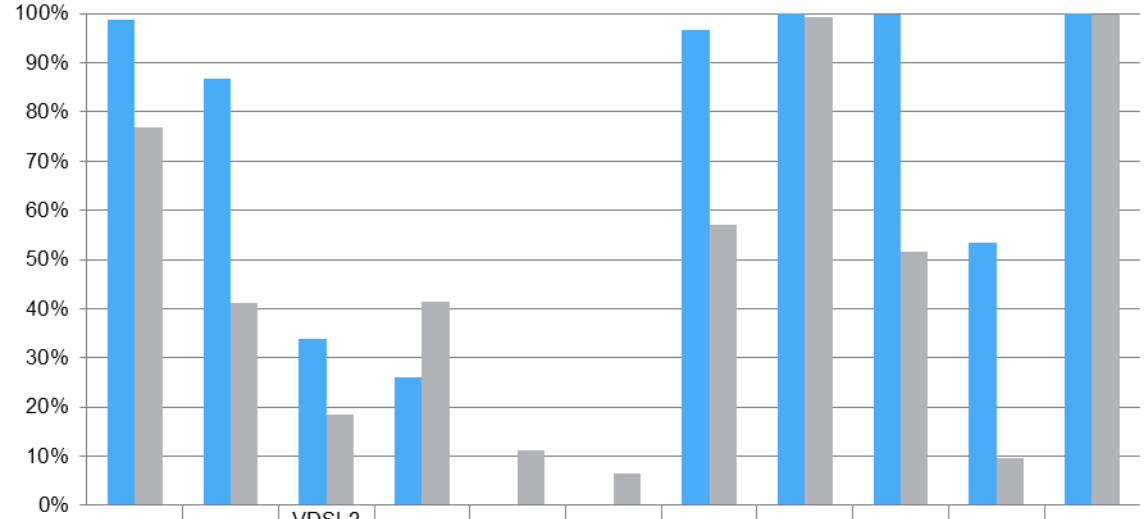
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Italy	99.8%	96.2%	70.1%	53.7%	0%	0%	97.4%	99.9%	99.7%	80.3%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural areas, DSL remained the key technology providing fixed broadband access. At the end of June 2022, DSL was available to 98.8% of rural households, whereas FWA was accessible to 96.8% of rural households. VDSL remains the leading rural NGA technology, increasing by 1.1 percentage points, to reach 86.8% of rural households at the end of June 2022. VDSL2 Vectoring was available to 33.9% of rural households. Rural FTTP coverage increased by 8.7 percentage points over the study period. Yet, despite this increase rural FTTP coverage remained well below the EU average, with 26.0% of rural Italian homes passed.

Rural LTE coverage reached 99.9% of rural homes, closely matched by 5G at 99.8%, driven by the use of DSS technology. Over a half (53.3%) of rural Italian households had access to 5G services utilizing the 3.4–3.8 GHz frequency band.

Italy: Coverage by technology, rural areas, 2022

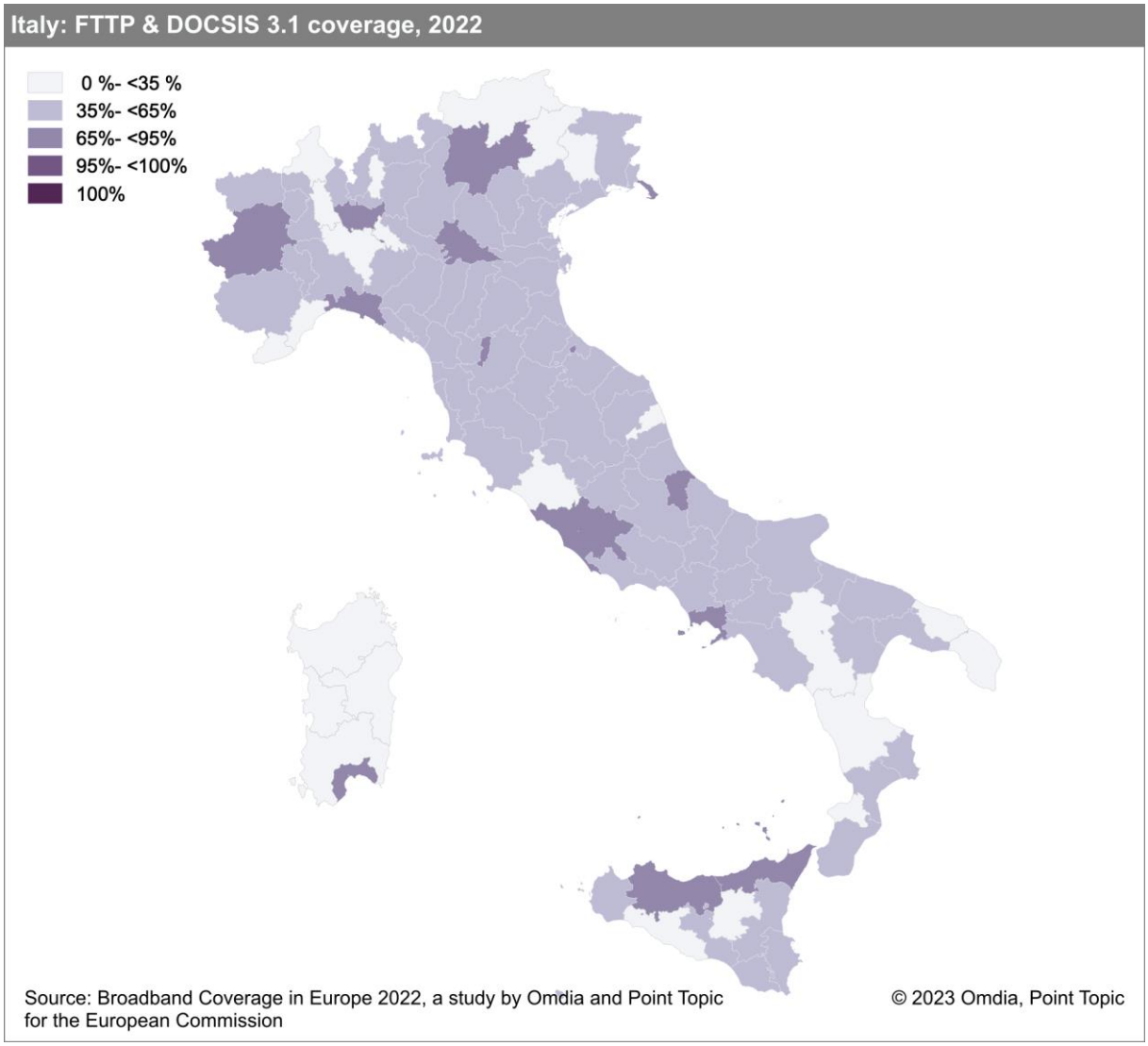


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Italy	98.8%	86.8%	33.9%	26.0%	0%	0%	96.8%	100.0%	99.8%	53.3%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.16.2 Regional coverage by broadband technology

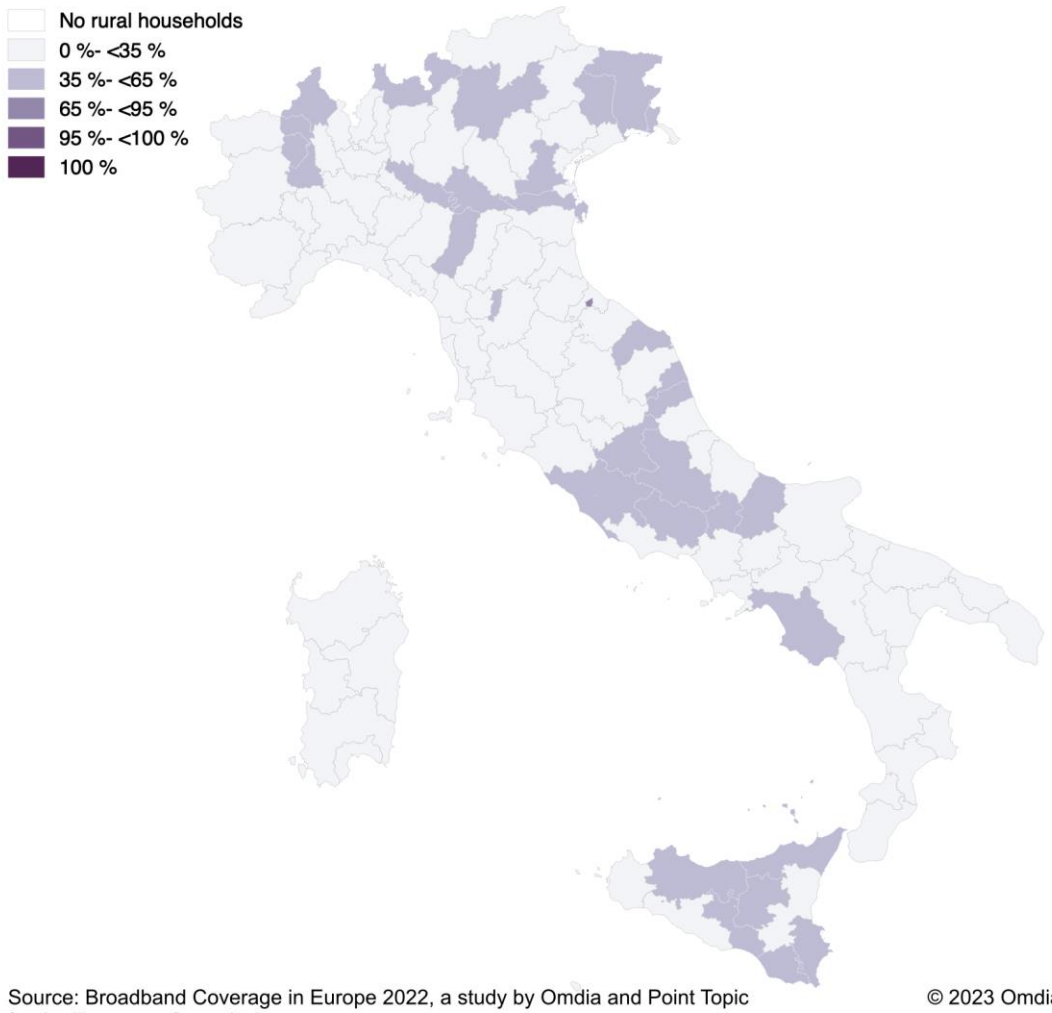
Looking at Italian regions, only 13 regions (out of 108) scored higher than 65% coverage of FTTP & DOCSIS 3.1. Most regions recorded coverage between 35–65%, but in 23 regions (particularly on the island of Sardinia) the low coverage of FTTP and absence of any cable networks meant that coverage remained below 35%.



Since there are no DOCSIS 3.1 services in Italy, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

The limited rural fibre coverage meant that rural coverage for FTTP & DOCSIS 3.1 was below 35% in most Italian regions in mid-2022.

Italy: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.16.3 Data tables for Italy

Statistic	National
Population	59,236,213
Persons per household	2.5
Rural proportion	12.3%

	Italy 2022		Italy 2021		Italy 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.8%	98.8%	99.8%	98.9%	99.6%	98.2%	86.6%	77.0%
VDSL	96.2%	86.8%	96.0%	85.7%	92.7%	76.9%	54.9%	41.2%
VDSL2 Vectoring	70.1%	33.9%	68.3%	28.0%	59.9%	16.7%	35.9%	18.4%
FTTP	53.7%	26.0%	44.2%	17.3%	33.7%	8.4%	56.5%	41.4%
Cable modem DOCSIS 3.0	0%	0%	0%	0%	0%	0%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	97.4%	96.8%	97.3%	97.2%	72.3%	57.9%	67.9%	57.0%
LTE	99.9%	100.0%	99.9%	99.9%	99.3%	94.7%	99.8%	99.2%
5G	99.7%	99.8%	99.7%	99.8%	8.1%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	80.3%	53.3%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.8%	99.4%	99.8%	99.1%	99.6%	98.2%	97.3%	91.4%
Overall NGA broadband	97.6%	91.1%	97.0%	88.4%	92.7%	76.2%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	53.7%	26.0%	44.2%	17.3%	33.7%	8.4%	73.4%	45.1%
At least 30Mbps	92.3%	-	90.6%	-	82.0%	-	91.7%	-
At least 100Mbps	82.8%	-	77.6%	-	67.0%	-	86.6%	-
At least 1Gbps	53.5%	-	44.2%	-	33.7%	-	70.2%	-
At least 1Gbps upload and download	53.5%	-	44.2%	-	-	-	-	-

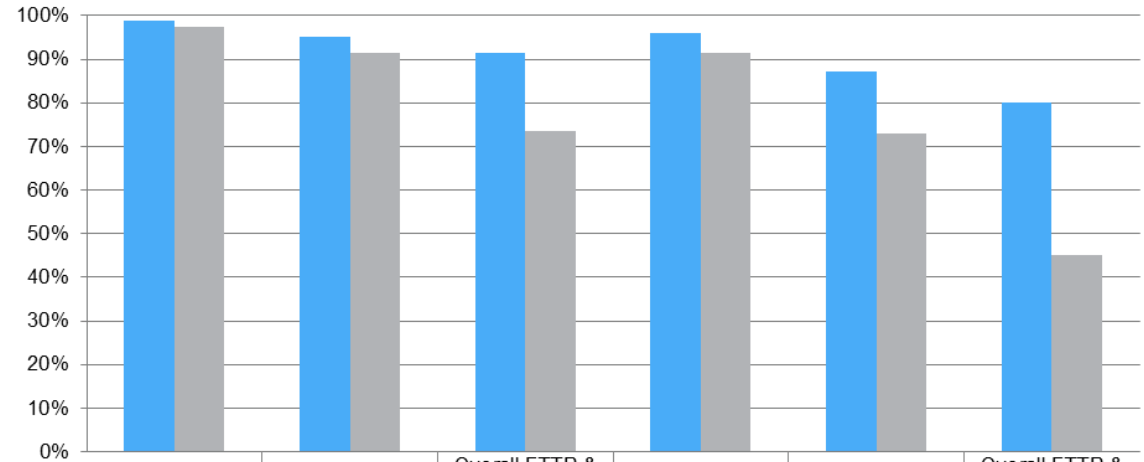
Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

5.17 Latvia

5.17.1 National coverage by broadband technology

By the end of June 2022, overall fixed broadband coverage in Latvia had reached 98.9% at a national level, and at 96.1% at a rural level, both exceeding the EU average. The country also continued to fare well compared with the EU average in terms of NGA broadband availability. NGA broadband was accessible to 95.0% of households at a national level, compared with the EU average of 91.5%, and 87.2% of rural households, well above the EU average of 72.9%. Overall FTTP & DOCSIS 3.1 availability at national level reached 91.5% of Latvian households, still substantially higher than the EU average of 73.4%. Meanwhile rural coverage grew by 4.8 p.p., passing 80.0% of rural Latvian households – nearly double the EU average for rural FTTP & DOCSIS 3.1 availability.

Latvia: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Latvia	98.9%	95.0%	91.5%	96.1%	87.2%	80.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

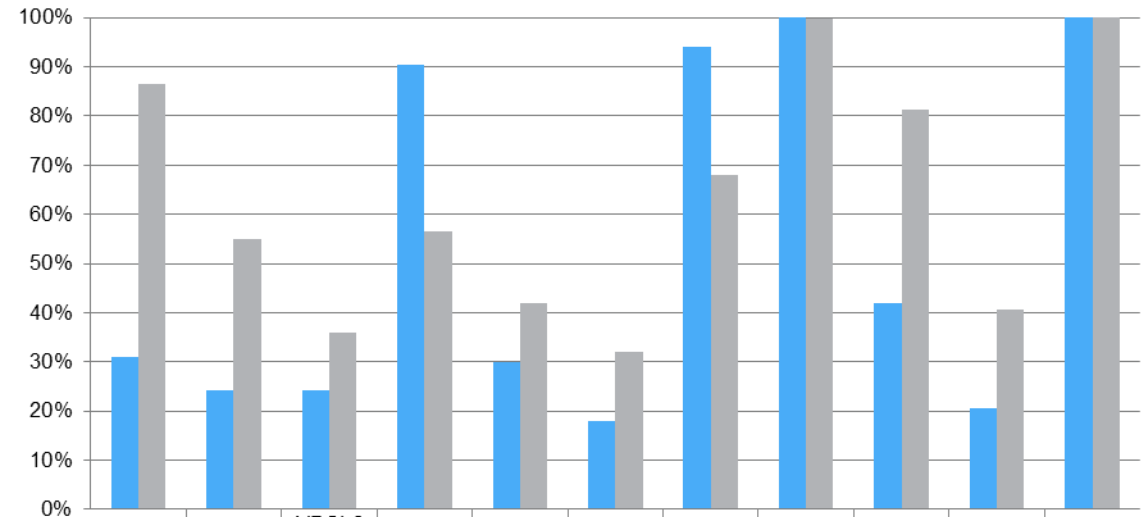
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at individual technologies, with only 31.1% of households having access to DSL broadband services, Latvia remained the study country having the lowest DSL availability. During the same period however, VDSL coverage recorded a 5.2 p.p. increase, reaching 24.3% of households at the end of June 2022. All VDSL networks in Latvia were now enabled with VDSL2 Vectoring by mid-2022. FWA coverage remained stable during the twelve-month study period, covering 94.0 percent of households – well above the EU average.

Widespread availability of FTTP remained the key distinguishing feature of the Latvian market, with coverage increasing by 1.1 p.p. during the year and FTTP services available to 90.5% of all households. This remains one of the highest level of national FTTP coverage in the study, well ahead of the EU average, which stood at 56.5%. As discussed in previous iterations of the study, the structure of Latvia's broadband market is largely shaped by Tet, which has been developing the country's FTTP-dominant infrastructure since 2009. The rapid development of FTTP availability has been at the expense of the remaining NGA technologies, so that just 30.2% of Latvian households had access to DOCSIS 3.0, while DOCSIS 3.1 was available to 18.0% as of mid-2022.

Within the mobile broadband category, national LTE coverage stood at 100.0%, with universal coverage for Latvian homes. In the twelve months to the end of June 2022, Latvian operators have launched commercial 5G services, reaching 42.0% of Latvian households with all spectrum bands and 20.6% were passed by 5G networks utilising the 3.4–3.8 GHz frequency band.

Latvia: Coverage by technology, total, 2022

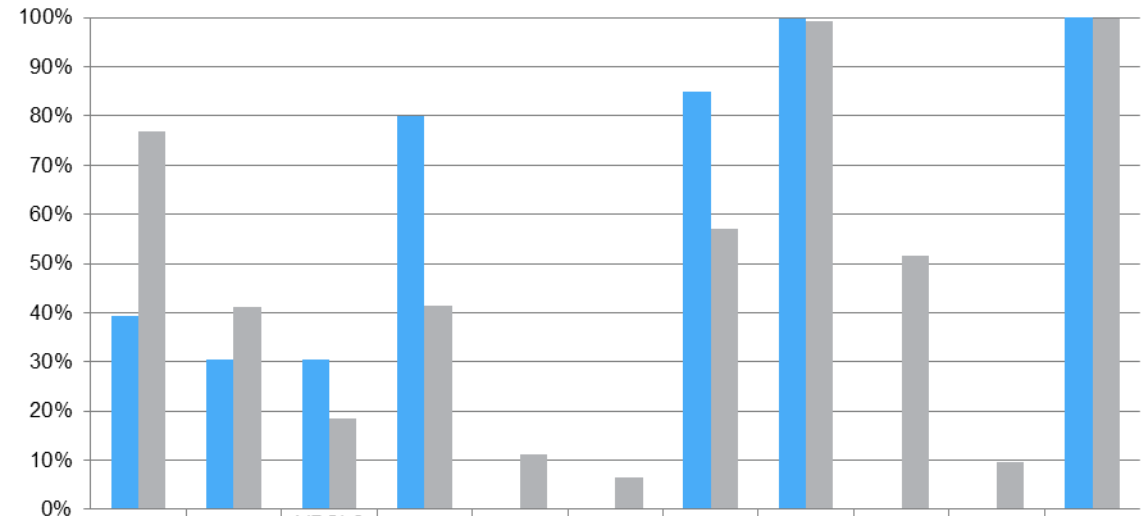


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Latvia	31.1%	24.3%	24.3%	90.5%	30.0%	18.0%	94.0%	100.0%	42.0%	20.6%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

There were 39.4% of rural homes covered by DSL networks at the end of June 2022, including 30.6% covered by VDSL2 Vectoring. Meanwhile FWA was available to 84.9% of rural households. FTTP remained the most widespread NGA technology across the rural regions of Latvia, growing by 4.7 p.p. and covering 80.0% of rural households, substantially higher than the EU average of 41.4%. Meanwhile, both cable modem DOCSIS 3.0 and DOCSIS 3.1 remained absent from Latvia's rural areas. LTE coverage remained static over the study period, reaching 99.8% of rural homes – the same level as in mid-2021. By mid-2022, 5G networks roll-out was limited to urban areas only.

Latvia: Coverage by technology, rural areas, 2022



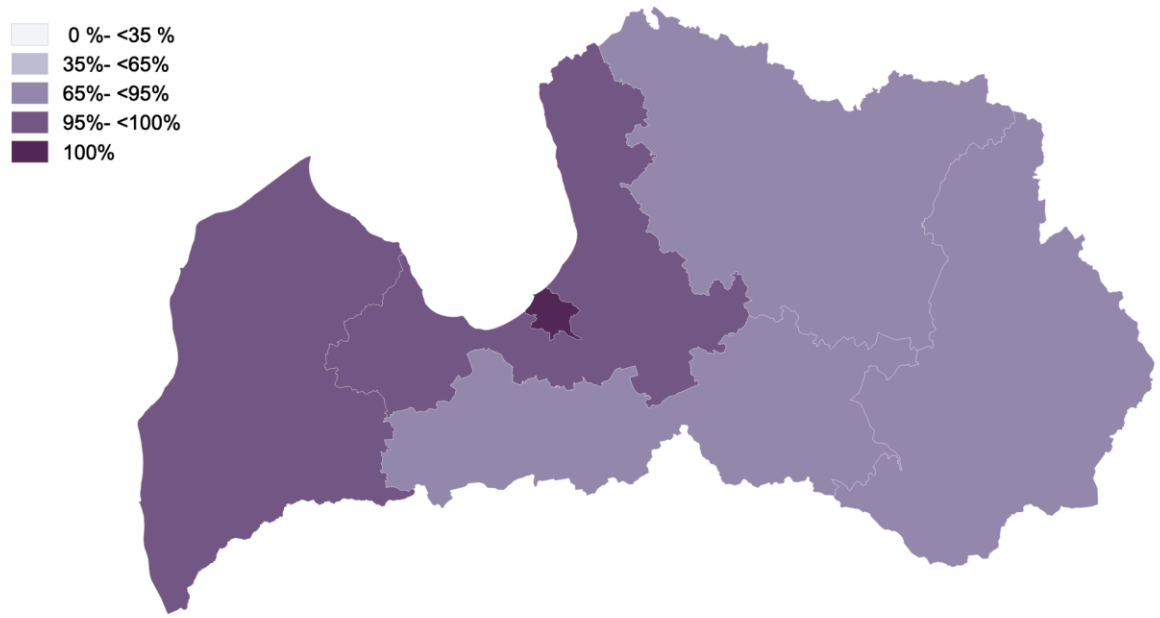
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Latvia	39.4%	30.6%	30.6%	80.0%	0%	0%	84.9%	99.8%	0%	0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.17.2 Regional coverage by broadband technology

Combined FTTP & DOCSIS 3.1 coverage levels varied across the individual region from 70.1% of homes in the Latgale region being passed by the gigabit-speed-capable networks to universal coverage in the capital region, Rīga.

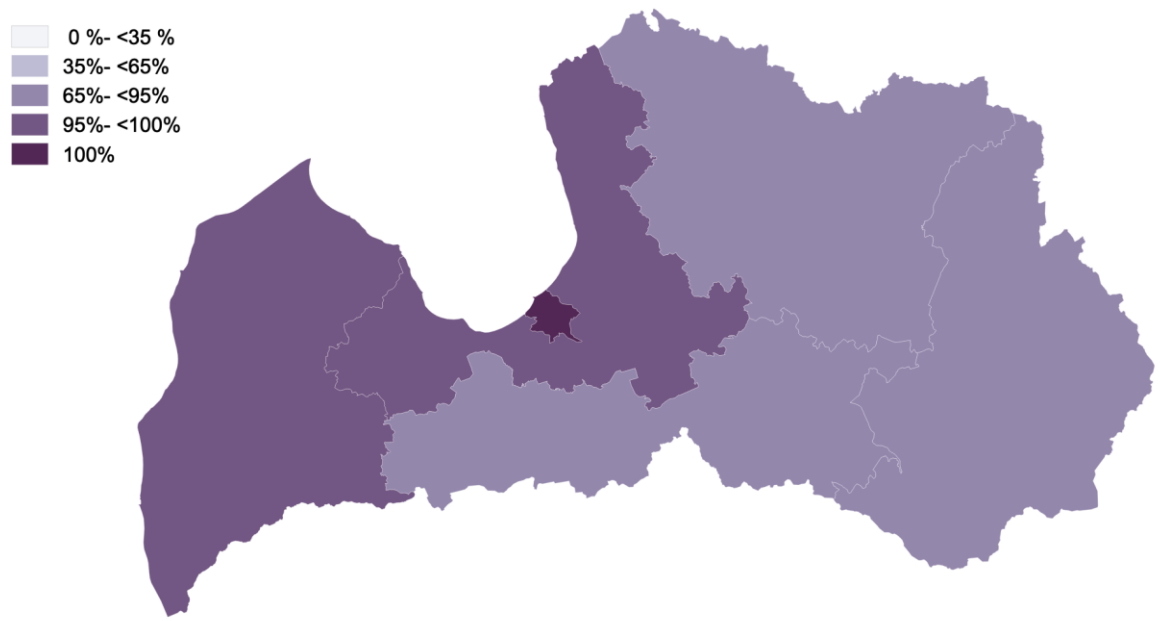
Latvia: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since cable broadband coverage remains limited in Latvia, regional FTTP coverage shows similar regional pattern to the combined FTTP and DOCSIS 3.1 coverage.

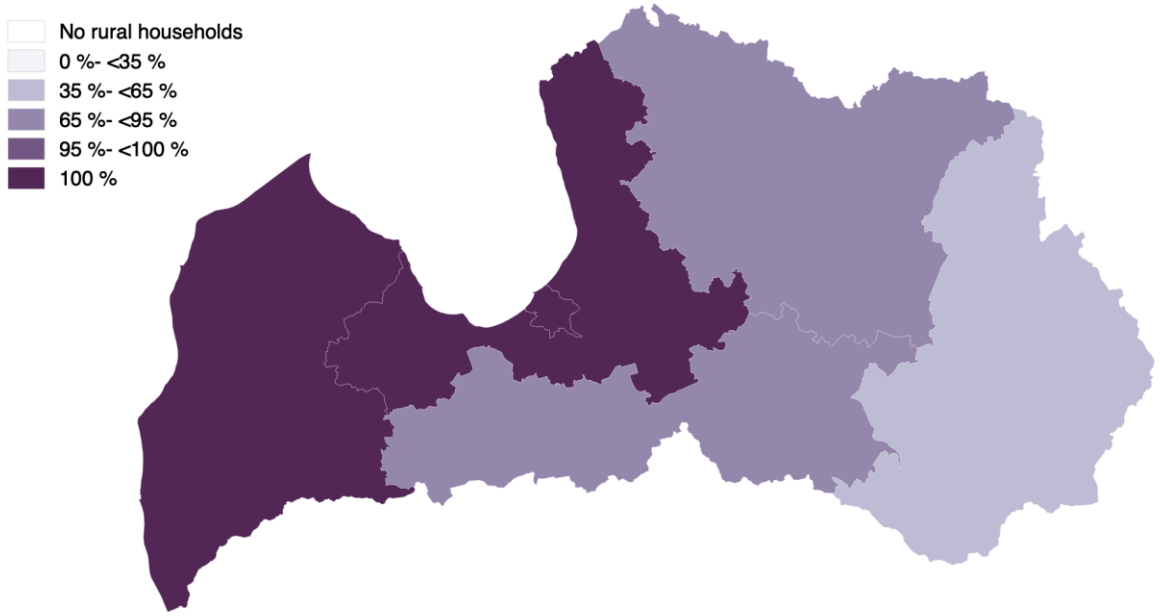
Latvia: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Given the prevalent presence of FTTP networks in Latvia, three regions (Kuzeme, Pierīga, and Rīga) recorded universal rural FTTP & DOCSIS 3.1 coverage.

Latvia: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.17.3 Data tables for Latvia

Statistic	National
Population	1,893,223
Persons per household	2.6
Rural proportion	25.7%

	Latvia 2022		Latvia 2021		Latvia 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	31.1%	39.4%	28.5%	36.6%	31.3%	36.4%	86.6%	77.0%
VDSL	24.3%	30.6%	19.1%	24.2%	19.0%	22.9%	54.9%	41.2%
VDSL2 Vectoring	24.3%	30.6%	19.0%	24.1%	18.9%	22.8%	35.9%	18.4%
FTTP	90.5%	80.0%	89.5%	75.2%	88.1%	73.8%	56.5%	41.4%
Cable modem DOCSIS 3.0	30.0%	0%	30.2%	0%	30.1%	0%	41.8%	11.1%
Cable modem DOCSIS 3.1	18.0%	0%	18.1%	0%	0%	0%	31.9%	6.4%
FWA	94.0%	84.9%	94.0%	84.7%	94.0%	84.4%	67.9%	57.0%
LTE	100.0%	99.8%	100.0%	99.8%	100.0%	99.8%	99.8%	99.2%
5G	42.0%	0%	0%	0%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	20.6%	0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	98.9%	96.1%	98.5%	94.1%	98.2%	93.9%	97.3%	91.4%
Overall NGA broadband	95.0%	87.2%	93.9%	83.4%	93.0%	82.0%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	91.5%	80.0%	90.7%	75.2%	88.1%	73.8%	73.4%	45.1%
At least 30Mbps	94.6%	-	93.5%	-	92.7%	-	91.7%	-
At least 100Mbps	91.5%	-	90.7%	-	89.6%	-	86.6%	-
At least 1Gbps	40.7%	-	40.3%	-	39.6%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

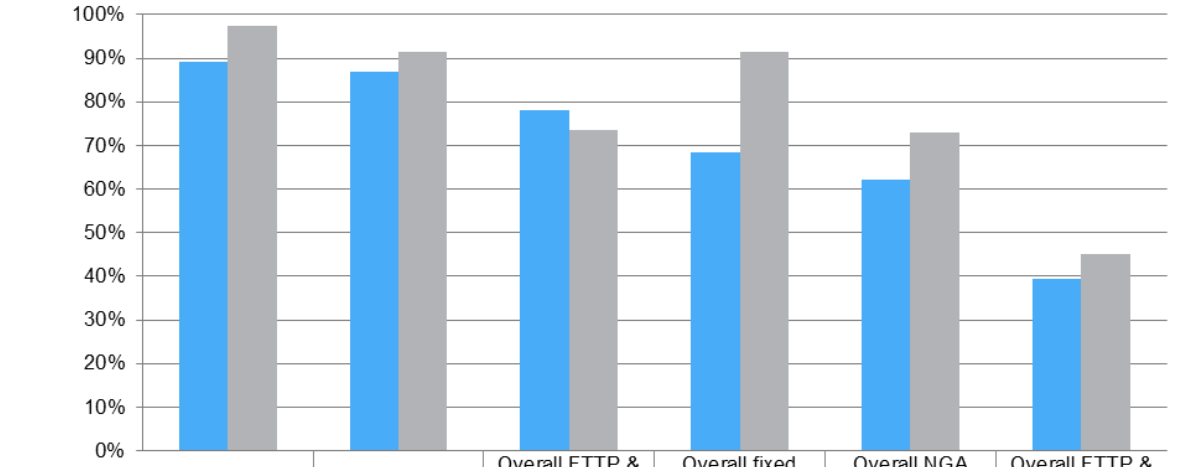
5.18 Lithuania

5.18.1 National coverage by broadband technology

Overall fixed broadband in Lithuania reached 89.2% of Lithuanian households at a national level, and 68.4% of households at a rural level at the end of June 2022, with coverage at both levels remaining below the EU average. A similar situation was observed in terms of NGA coverage, which remained below the EU average on both national and rural level. As of mid-2022, 86.9% of homes were passed by at least one NGA network, while 62.1% of rural households had access to high-speed broadband services.

Despite limited fixed broadband and NGA coverage, when examining the combined FTTP & DOCSIS 3.1 coverage, Lithuania maintained higher than EU average coverage level of these networks, with over three quarters (78.0%) of households covered by networks capable of delivering gigabit speeds owing to the country's widely deployed FTTP network.

Lithuania: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Lithuania	89.2%	86.9%	78.0%	68.4%	62.1%	39.5%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

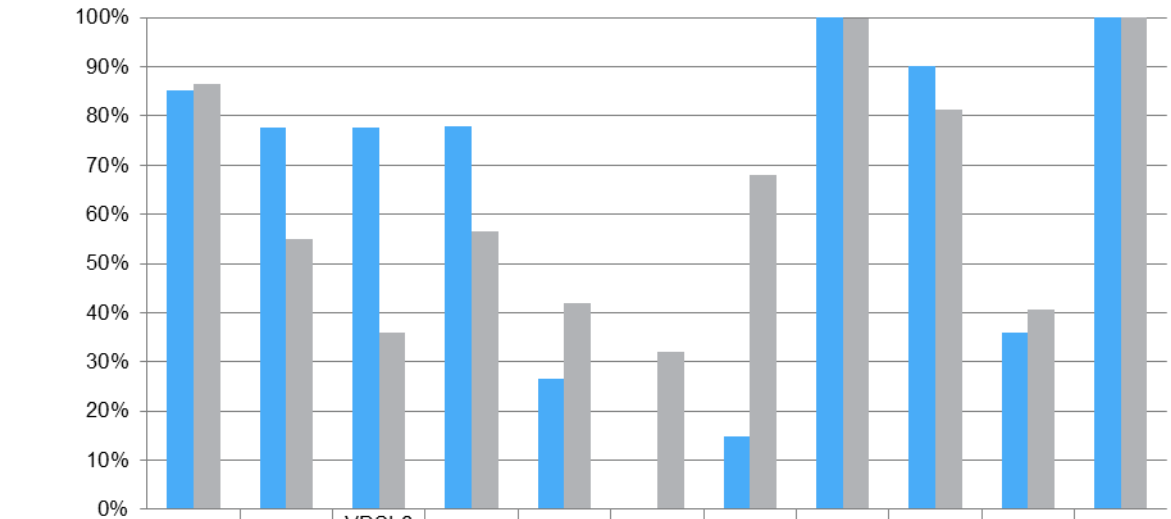
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Among the individual broadband technologies, DSL remained the most prevalent, being available to 85.2% of Lithuanian households. Meanwhile FTTP remained by far the dominant NGA technology in Lithuania, with 78.0% of homes passed at the end of June 2022, well ahead of the EU average. More than 50 service providers offered FWA services in June 2022, but the total coverage was limited to 14.7% of households nationwide.

VDSL coverage nearly doubled in the twelve months to mid-2022 and reached 77.7% of households at the end of June 2022. Moreover, VDSL2 Vectoring has been deployed in the course of the year across the whole VDSL footprint. On the other hand, cable modem DOCSIS 3.0 availability remained stagnant, with services available to 26.5% of Lithuanian households and no DOCSIS 3.1 deployments recorded in Lithuania, yet.

Regarding mobile broadband, LTE coverage remained stable, with the technology having become universally available for the first time to all Lithuanian households during the year to mid-2019. Availability of commercial 5G services grew by a whopping 56.7 p.p. year on year with 90.1% of households covered by mid-2022. However, only a little over a third (35.9%) of homes were passed by 5G networks utilising the 3.4–3.8 GHz frequency band.

Lithuania: Coverage by technology, total, 2022



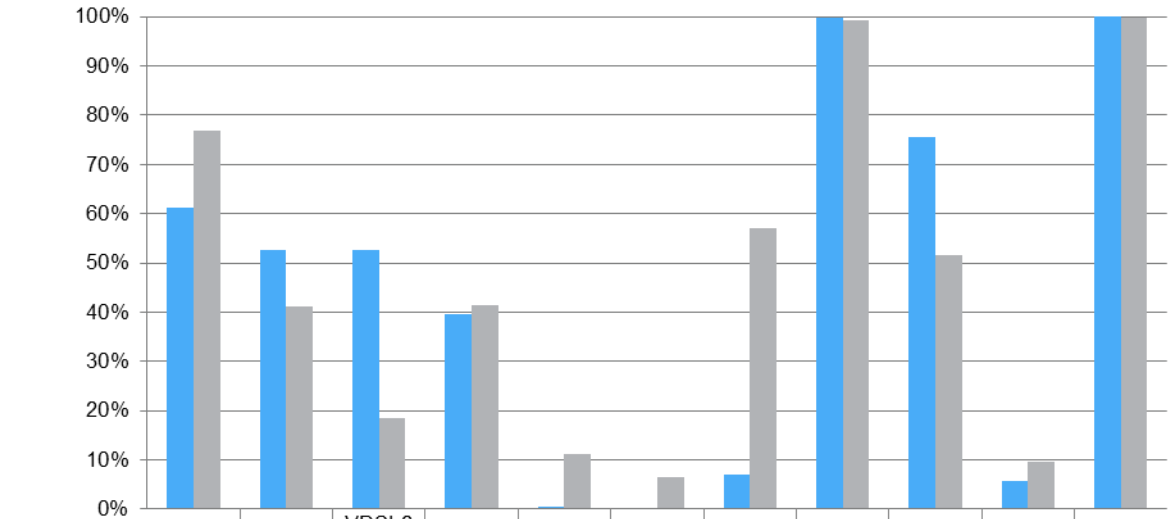
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Lithuania	85.2%	77.7%	77.7%	78.0%	26.5%	0%	14.7%	100.0%	90.1%	35.9%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Within Lithuania's rural areas, DSL remained the most widely available technology over the study period, although the technology was available to just 61.3% of the country's rural households. VDSL and VDSL 2 Vectoring are now the leading rural NGA technologies, covering 52.6% of rural households, followed by FTTP with 39.5% of households covered. Cable DOCSIS 3.0 coverage in rural areas remained minimal, passing just 0.5% of rural households at the end of June 2022. Rural FWA coverage was well below the EU average, at 6.9% of households.

Rural LTE achieved universal coverage during the study period. While initial 5G deployments were focused on urban areas, by mid-2022 more than three-quarters of rural homes were passed by 5G networks. Yet only 5.6% of rural households had access to 5G in the 3.4–3.8 GHz band.

Lithuania: Coverage by technology, rural areas, 2022



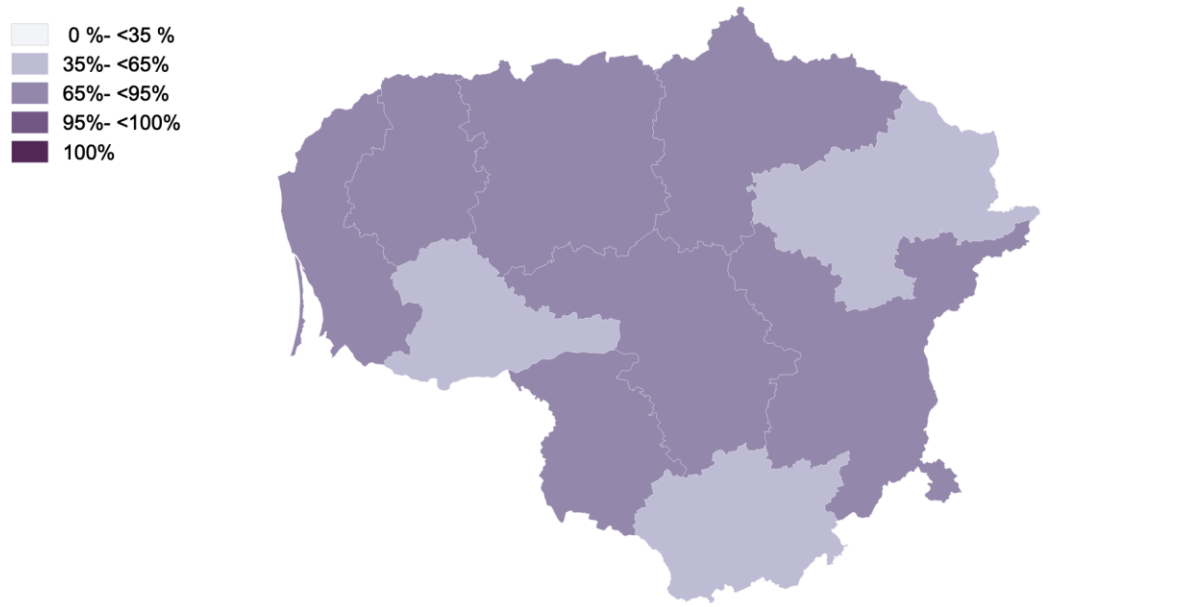
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Lithuania	61.3%	52.6%	52.6%	39.5%	0.5%	0%	6.9%	99.9%	75.6%	5.6%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.18.2 Regional coverage by broadband technology

There is significant variation in the combined FTTP & DOCSIS 3.1 coverage among the different regions of Lithuania. Coverage was the lowest in the Tauragės county with 58.5% of homes covered, and highest in the capital Vilniaus and Kauno counties, with 84.8% of households covered in each.

Lithuania: FTTP & DOCSIS 3.1 coverage, 2022

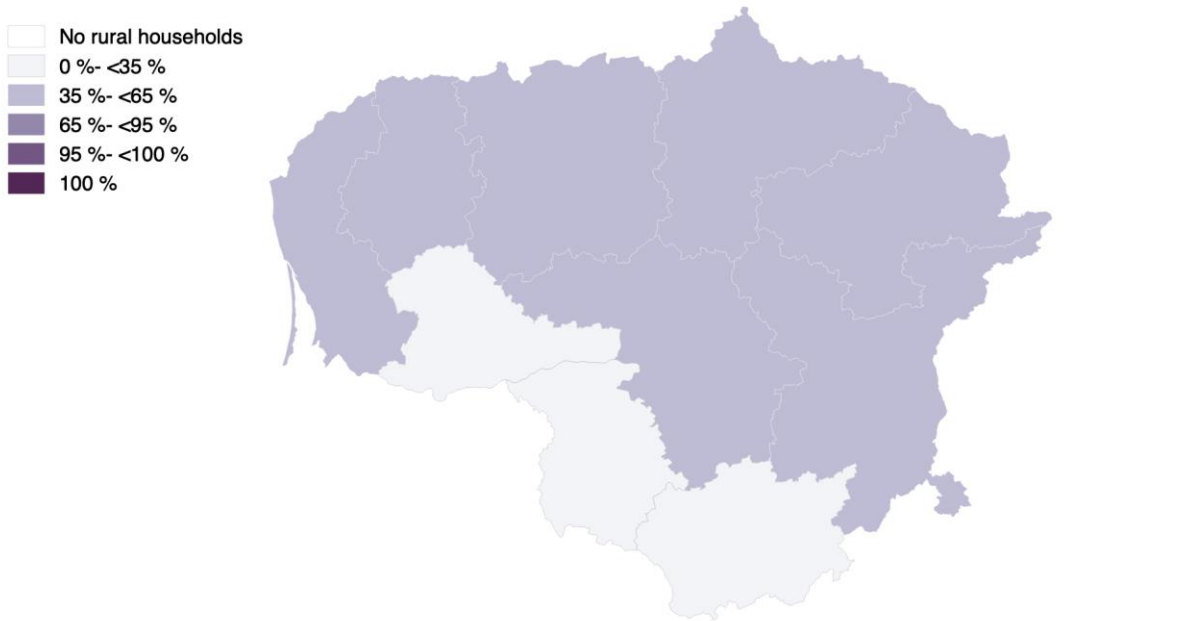


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since there are no DOCSIS 3.1 services in Lithuania, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

Given the absence of DOCSIS 3.1 networks in rural areas, rural FTTP & DOCSIS 3.1 coverage in limited to coverage of FTTP networks which ranged from fewer than 25% of rural households in the Alytaus country to more than a half of rural households in the Kauno county.

Lithuania: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.18.3 Data tables for Lithuania

Statistic	National
Population	2,795,680
Persons per household	2.6
Rural proportion	31.5%

	Lithuania 2022		Lithuania 2021		Lithuania 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	85.2%	61.3%	85.5%	62.6%	72.9%	52.6%	86.6%	77.0%
VDSL	77.7%	52.6%	40.1%	38.5%	4.1%	1.0%	54.9%	41.2%
VDSL2 Vectoring	77.7%	52.6%	0%	0%	0%	0%	35.9%	18.4%
FTTP	78.0%	39.5%	78.2%	*37.5%*	67.1%	23.3%	56.5%	41.4%
Cable modem DOCSIS 3.0	26.5%	0.5%	27.1%	0.5%	19.4%	0.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	14.7%	6.9%	-	-	-	-	67.9%	57.0%
LTE	100.0%	99.9%	100.0%	100.0%	100.0%	99.9%	99.8%	99.2%
5G	90.1%	75.6%	33.3%	0.8%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	35.9%	5.6%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	89.2%	68.4%	88.8%	64.0%	84.8%	66.7%	97.3%	91.4%
Overall NGA broadband	86.9%	62.1%	84.8%	51.8%	70.8%	29.6%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	78.0%	39.5%	78.2%	37.1%	67.1%	23.3%	73.4%	45.1%
At least 30Mbps	86.7%	-	84.6%	-	70.6%	-	91.7%	-
At least 100Mbps	86.7%	-	78.1%	-	67.3%	-	86.6%	-
At least 1Gbps	77.8%	-	78.0%	-	66.9%	-	70.2%	-
At least 1Gbps upload and download	77.8%	-	78.0%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

Coverage data for FWA was not available for Lithuania in 2020 and 2021.

All restatements are highlighted in italics.

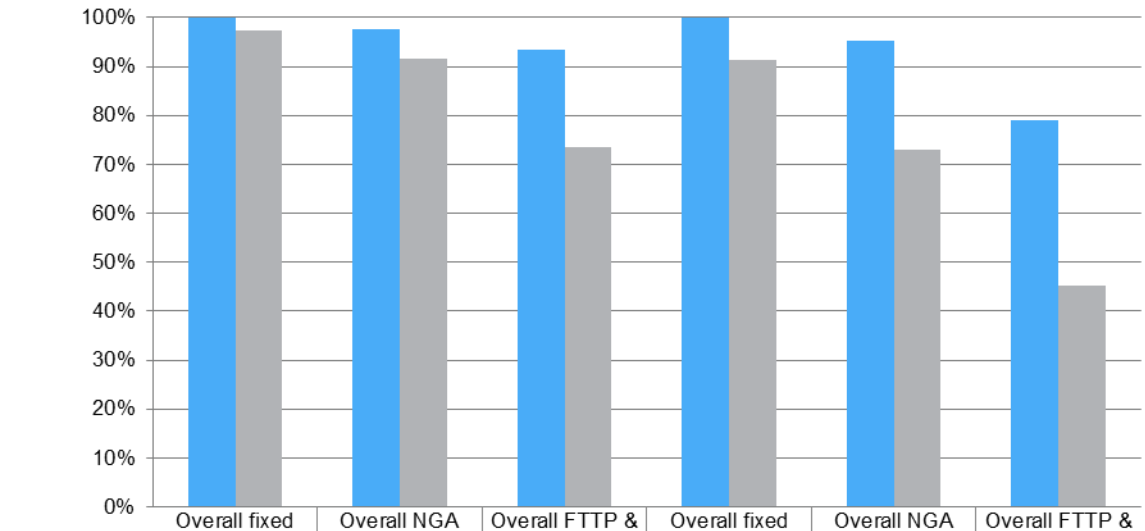
5.19 Luxembourg

5.19.1 National coverage by broadband technology

Since Luxembourg has achieved universal fixed broadband coverage in previous years, and near-universal NGA coverage, operators are focusing on expansion of gigabit-capable networks. At the end of June 2022, FTTP & DOCSIS 3.1 networks passed 93.3% of all Luxembourg homes and 79.1% of rural homes.

It should be noted that Luxembourg benefits from the fact that it covers a geographically small and densely populated area in comparison to its neighbours. Therefore, extending technologies such as FTTP and DOCSIS 3.1 has been somewhat easier in Luxembourg than in other European countries.

Luxembourg: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Luxembourg	100.0%	97.5%	93.3%	100.0%	95.3%	79.1%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

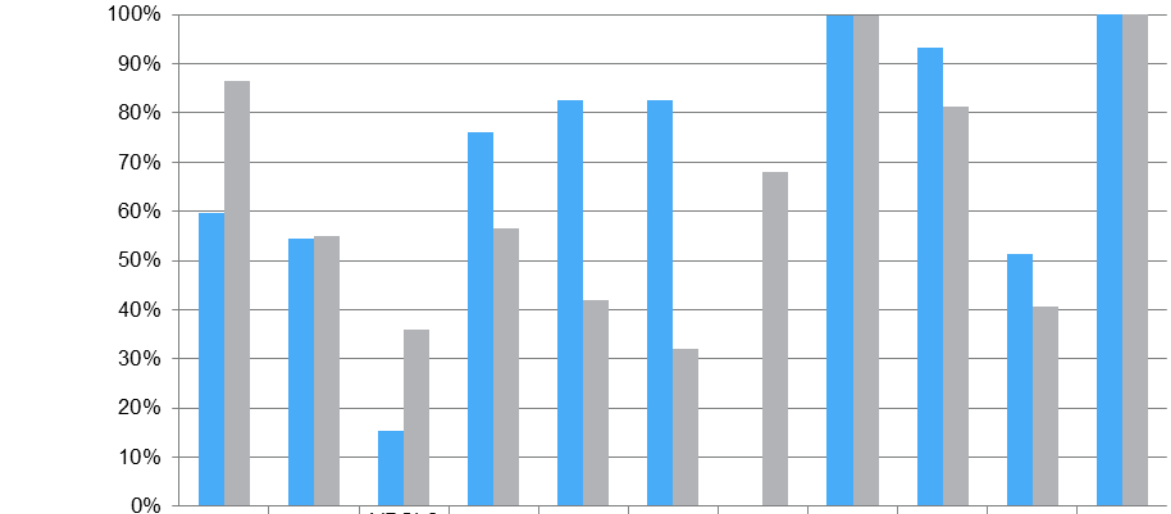
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at individual technologies, FTTP coverage continued to improve and gained 1.0 points of coverage. As a result, 76.2% of Luxembourg households had access to FTTP broadband services at the end of June 2022. As was the case in previous years, cable remained the most prevalent NGA technology, accessible to 82.5% of Luxembourgish households, with the whole network having been updated to the DOCSIS 3.1 standard by mid-2020.

DSL and VDSL switch-offs continued across the country with DSL coverage dropping by 5.9 percentage points, to reach 59.7% of households. VDSL recorded a 5.3 percentage point decrease in coverage with VDSL services available to 54.5% of households. In addition, 15.2% of households had access to services running on VDSL2 Vectoring and capable of delivering at least 100Mbps download speeds.

Commercial 5G services were launched by all three network operators in late 2020, and by mid-2022 coverage had reached 93.2% of households, ahead of the EU average (81.2%). 5G services using the 3.4–3.8 GHz band were available to more than half the country (51.3%).

Luxembourg: Coverage by technology, total, 2022



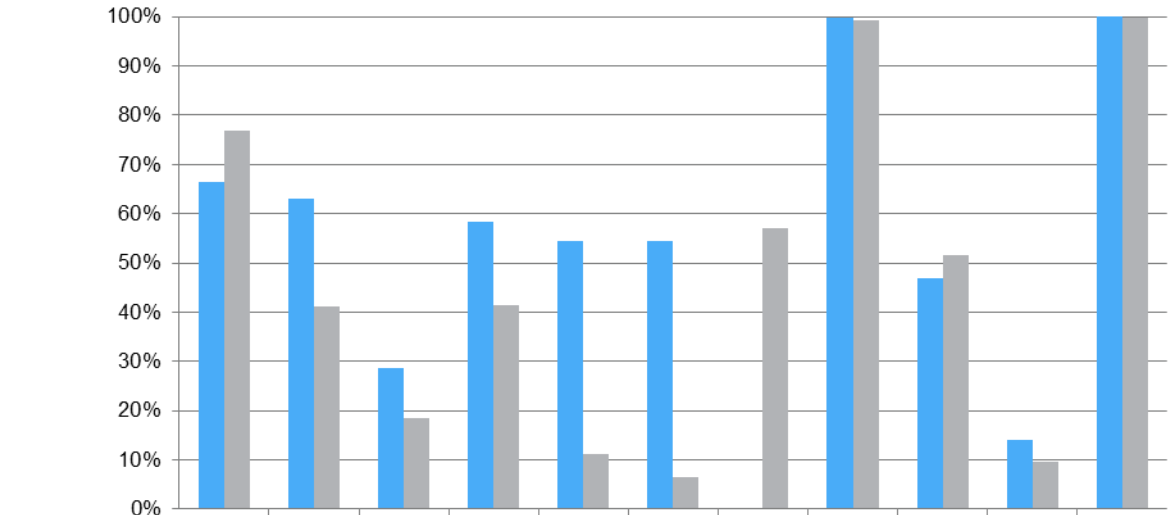
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Luxembourg	59.7%	54.5%	15.2%	76.2%	82.5%	82.5%	0%	99.9%	93.2%	51.3%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of rural broadband availability, FTTP coverage increased by 7.1% to reach 58.2% of rural households, overtaking rural cable coverage for the first time. Cable modem DOCSIS 3.0 and DOCSIS 3.1 services were available to 54.5% of rural households, well ahead of the EU average. As was the case at a national level, DSL technology recorded a sharp decrease in coverage, owing to operators' focus on upgrading copper lines to fibre optic networks. DSL decreased by 16.3 percentage points to 66.5%. VDSL coverage also decreased, by 16.4 percentage points, and VDSL services were available to 63.2% of rural households. As legacy copper lines decommissioning is targeted primarily on urban areas, Luxembourg is one of the countries where rural DSL and VDSL coverage levels exceed national coverage levels. VDSL2 Vectoring was available to 28.7% of rural homes.

Although total 5G coverage in Luxembourg exceeds the EU average, at rural level it lags behind, with less than half (46.7%) of rural households having access to 5G as of June 2022. But 5G coverage of rural areas using the 3.4–3.8 GHz band exceeded the EU average, at 14.0%.

Luxembourg: Coverage by technology, rural areas, 2022

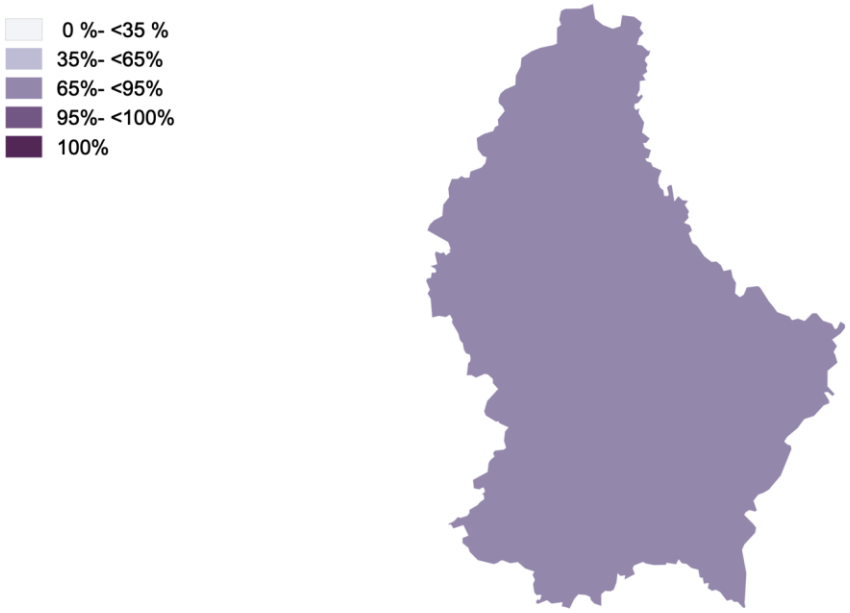


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Luxembourg	66.5%	63.2%	28.7%	58.2%	54.5%	54.5%	0%	99.7%	46.7%	14.0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

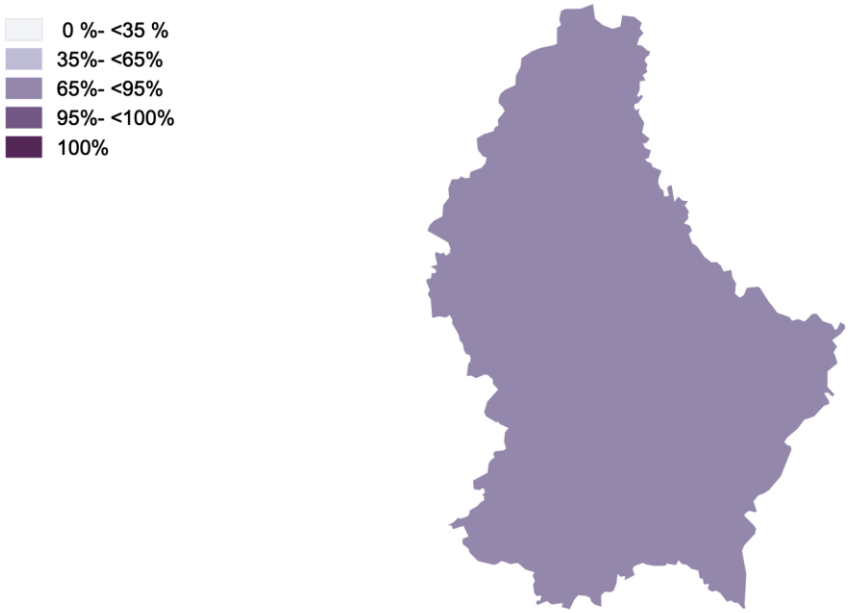
5.19.2 Regional coverage by broadband technology

Luxembourg: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Luxembourg: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Luxembourg: Rural FTTP & DOCSIS 3.1 coverage, 2022

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.19.3 Data tables for Luxembourg

Statistic	National
Population	634,730
Persons per household	2.5
Rural proportion	11.1%

	Luxembourg 2022		Luxembourg 2021		Luxembourg 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	59.7%	66.5%	65.6%	82.8%	72.0%	86.0%	86.6%	77.0%
VDSL	54.5%	63.2%	59.8%	79.6%	65.5%	83.0%	54.9%	41.2%
VDSL2 Vectoring	15.2%	28.7%	13.1%	21.2%	8.8%	15.1%	35.9%	18.4%
FTTP	76.2%	58.2%	75.2%	51.1%	72.1%	48.5%	56.5%	41.4%
Cable modem DOCSIS 3.0	82.5%	54.5%	90.2%	60.1%	88.9%	62.9%	41.8%	11.1%
Cable modem DOCSIS 3.1	82.5%	54.5%	90.2%	60.1%	88.9%	62.9%	31.9%	6.4%
FWA	0%	0%	0%	0%	0%	0%	67.9%	57.0%
LTE	99.9%	99.7%	99.8%	99.8%	99.8%	99.6%	99.8%	99.2%
5G	93.2%	46.7%	12.7%	6.7%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	51.3%	14.0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.3%	91.4%
Overall NGA broadband	97.5%	95.3%	*97.0%*	95.3%	*96.3%*	95.1%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	93.3%	79.1%	*92.6%*	*78.6%*	*91.7%*	*77.9%*	73.4%	45.1%
At least 30Mbps	97.5%	-	99.8%	-	99.7%	-	91.7%	-
At least 100Mbps	95.1%	-	99.4%	-	99.3%	-	86.6%	-
At least 1Gbps	93.3%	-	95.9%	-	95.1%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

All restatements are highlighted in italics.

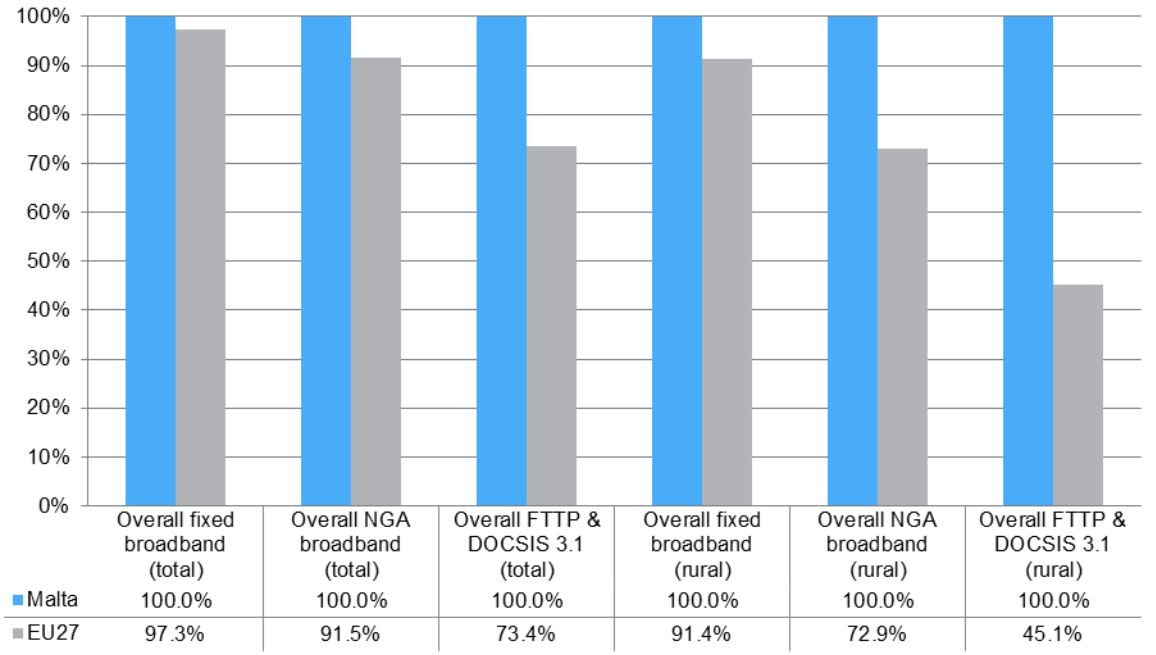
5.20 Malta

5.20.1 National coverage by broadband technology

In line with previous iterations of the study, Malta recorded no change in coverage for any of the three combination categories, having already achieved universal fixed broadband and NGA coverage in past years, both at a national and rural level. As of June 2022, Malta remains the only country in the study to have recorded universal combined FTTP & DOCSIS 3.1 coverage.

As is the case with a number of countries covering a geographically small area, achieving universal broadband coverage has been somewhat easier in Malta than in other, larger European countries. Indeed, Malta is a small, very densely populated island nation with limited rural population (only 0.6% of households were identified as rural).

Malta: Coverage by technology combination, 2022



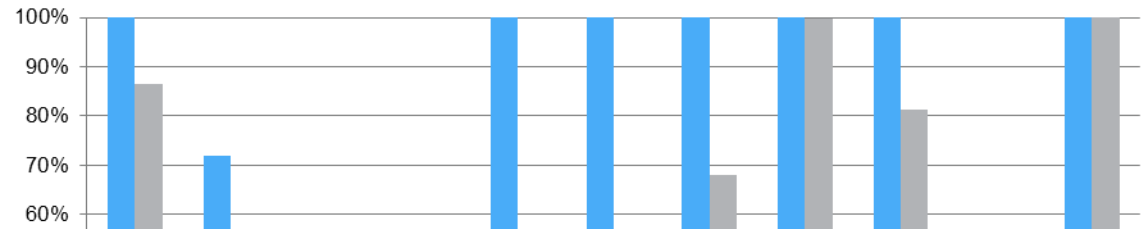
	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Malta	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Examining individual technologies, FTTP was the only individual fixed technology to record a change in coverage, as operators across the island continued to expand their FTTP networks. In the twelve months to mid-2022, FTTP coverage grew by 8.2 percentage points, to reach 56.2% of households, continuing the strong growth recorded in 2021. Meanwhile Malta reported complete coverage across various fixed broadband access technologies, including DSL, cable modem DOCSIS 3.0 and DOCSIS 3.1, and FWA. VDSL coverage has remained stable since 2015 with 72.0% of Maltese households covered, but there are no deployments of VDSL2 Vectoring.

In terms of mobile technologies, commercial 5G services first became available in May 2021, and coverage reached 100.0% by June 2022, making Malta one of three countries to achieve this milestone. But the 5G coverage is highly reliant on the 700 MHz spectrum band – coverage of 5G services using the 3.4–3.8 GHz band was less than half the EU average, at 20.0%.

Malta: Coverage by technology, total, 2022

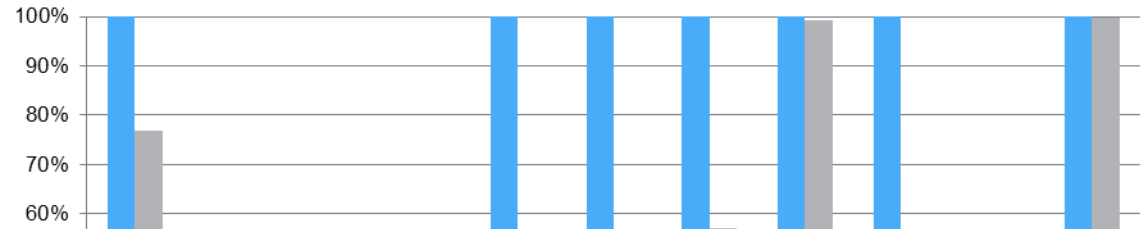


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Malta	100.0%	72.0%	0%	56.2%	100.0%	100.0%	100.0%	100.0%	100.0%	20.0%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at rural regions of Malta, as was the case at a national level, there were almost no changes in terms of coverage of individual fixed broadband technologies. Malta was the only country of this study to record universal rural overall FTTP & DOCSIS 3.1 coverage. VDSL, VDSL2 Vectoring and FTTP were absent in rural areas. Rural 5G coverage is universal, but 5G deployments in the 3.4–3.8 GHz band reached only 4.9% of rural households as of June 2022.

Malta: Coverage by technology, rural areas, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Malta	100.0%	0%	0%	0%	100.0%	100.0%	100.0%	100.0%	100.0%	4.9%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.20.2 Regional coverage by broadband technology

Malta: FTTP & DOCSIS 3.1 coverage, 2022

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Malta: FTTP coverage, 2022

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Malta: Rural FTTP & DOCSIS 3.1 coverage, 2022

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.20.3 Data tables for Malta

Statistic	National
Population	516,100
Persons per household	2.7
Rural proportion	0.6%

	Malta 2022		Malta 2021		Malta 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	86.6%	77.0%
VDSL	72.0%	0%	72.0%	0%	72.0%	0%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	56.2%	0%	48.0%	0%	41.0%	0%	56.5%	41.4%
Cable modem DOCSIS 3.0	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	41.8%	11.1%
Cable modem DOCSIS 3.1	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	31.9%	6.4%
FWA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	67.9%	57.0%
LTE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.8%	99.2%
5G	100.0%	100.0%	20.0%	0%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	20.0%	4.9%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.3%	91.4%
Overall NGA broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	73.4%	45.1%
At least 30Mbps	100.0%	-	100.0%	-	100.0%	-	91.7%	-
At least 100Mbps	100.0%	-	100.0%	-	100.0%	-	86.6%	-
At least 1Gbps	100.0%	-	100.0%	-	100.0%	-	70.2%	-
At least 1Gbps upload and download	0%	-	0%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

5.21 Netherlands

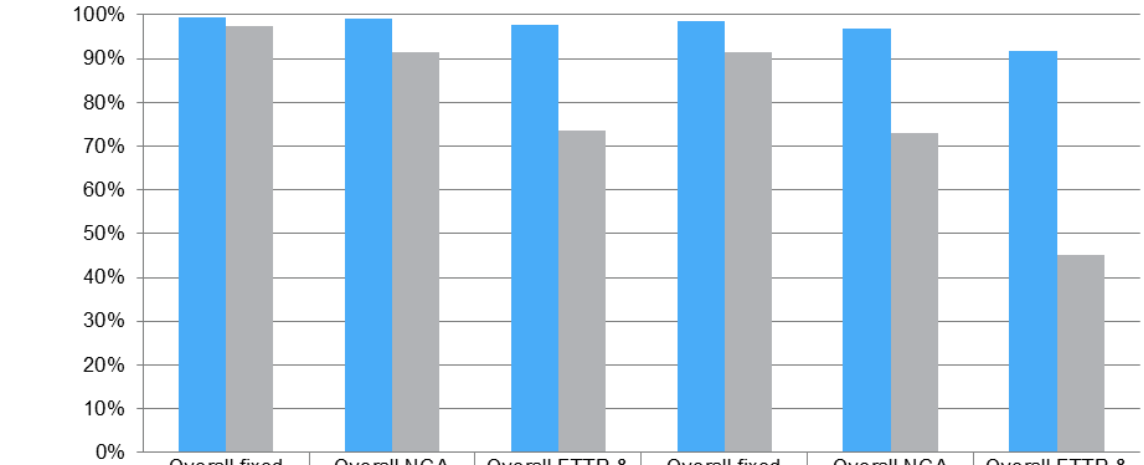
5.21.1 National coverage by broadband technology

Almost all Dutch households (99.3%) could access at least one fixed broadband technology by mid-2022, while NGA networks passed 99.2% of Dutch homes – scoring well above the EU averages of 97.3% and 91.5%, respectively. Broadband coverage also neared universal coverage in rural regions (98.5%). The availability of rural NGA networks reached 96.9% by the end of June 2022.

In terms of FTTP & DOCSIS 3.1 coverage, the Netherlands continued to record impressive coverage levels, with 97.8% of all households and 91.7% of rural homes passed by networks capable of delivering gigabit speeds. Compared to previous year, rural FTTP & DOCSIS 3.1 coverage grew by 7.2 percentage points on a national level and by 12.6 percentage points on a rural level.

Similar to previous years, the Netherlands ranked among the leading countries across all three combination categories.

Netherlands: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Netherlands	99.3%	99.2%	97.8%	98.5%	96.9%	91.7%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

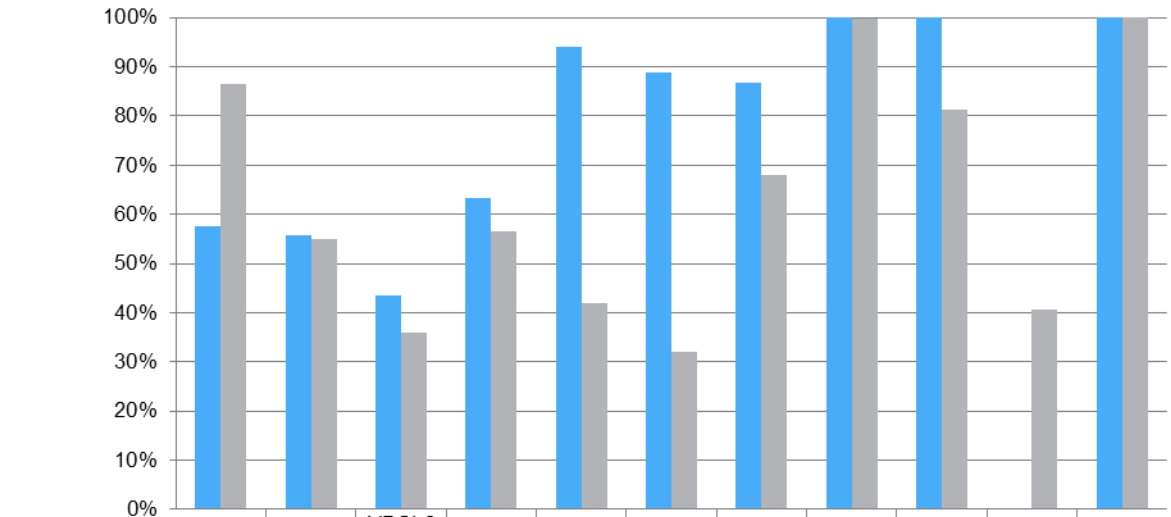
DOCSIS 3.0 remained the prevalent individual broadband technology in the Dutch market, providing coverage for 94.2% of households. In this year's study, the Netherlands recorded the third highest DOCSIS 3.0 coverage among study countries. Cable operators continued to upgrad large parts of their networks to the DOCSIS 3.1 standard which was available to 88.9% of households, a 16.5 p.p. growth compared to the end of June 2021.

As was the case in previous iterations of this study, DSL coverage continued a declining trend. By mid-2022, 57.6% of Dutch homes were covered by DSL networks, down by 3.5 percentage points. VDSL coverage declined by 3.7 percentage points. VDSL2 Vectoring standard passed a total of 43.5% of homes.

FTTP availability grew by 11.5 percentage points since the end of June 2021 and passed 63.4% of Dutch homes, exceeding the EU average in this category. FWA networks were available to 86.7% of Dutch households, unchanged from last year.

LTE services were universally available. The Netherlands was one of three countries (Cyprus and Malta being the other two) also reaching universal 5G coverage by mid-2022. Dutch operators already reached high 5G coverage levels by mid-2020, however, they have not yet launched 5G services in the 3.4–3.8 GHz spectrum band.

Netherlands: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Netherlands	57.6%	55.8%	43.5%	63.4%	94.2%	88.9%	86.7%	100.0%	100.0%	0%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

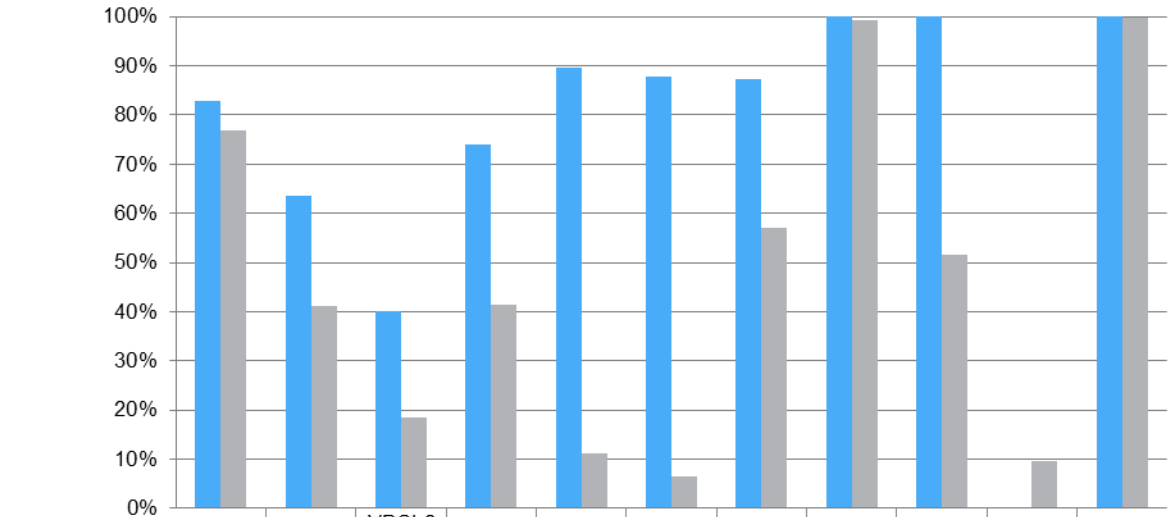
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural regions, DOCSIS 3.0 recorded the highest coverage levels, with 89.5% of rural homes passed by mid-2022, up by 8.1 percentage points. The Netherlands was among the top countries for DOCSIS 3.0 coverage and performed 78.4 percentage points above the EU average. Rural DOCSIS 3.1 coverage recorded a staggering 46.2 percentage point growth, reaching 87.7% of rural households at the end of June 2022. Rural FTTP coverage also recorded an impressive growth, increasing by 19.5 p.p. and FTTP networks covering nearly three quarters (74%) of rural Dutch homes.

DSL, VDSL, and VDSL 2 Vectoring coverage remained largely unchanged, passing 82.8%,63.4%, and 40.0% of rural homes, respectively.

Rural 5G expanded by 3.2 percentage points over the study period as 5G services became universally available.

Netherlands: Coverage by technology, rural areas, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Netherlands	82.8%	63.4%	40.0%	74.0%	89.5%	87.7%	87.3%	100.0%	100.0%	0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.21.2 Regional coverage by broadband technology

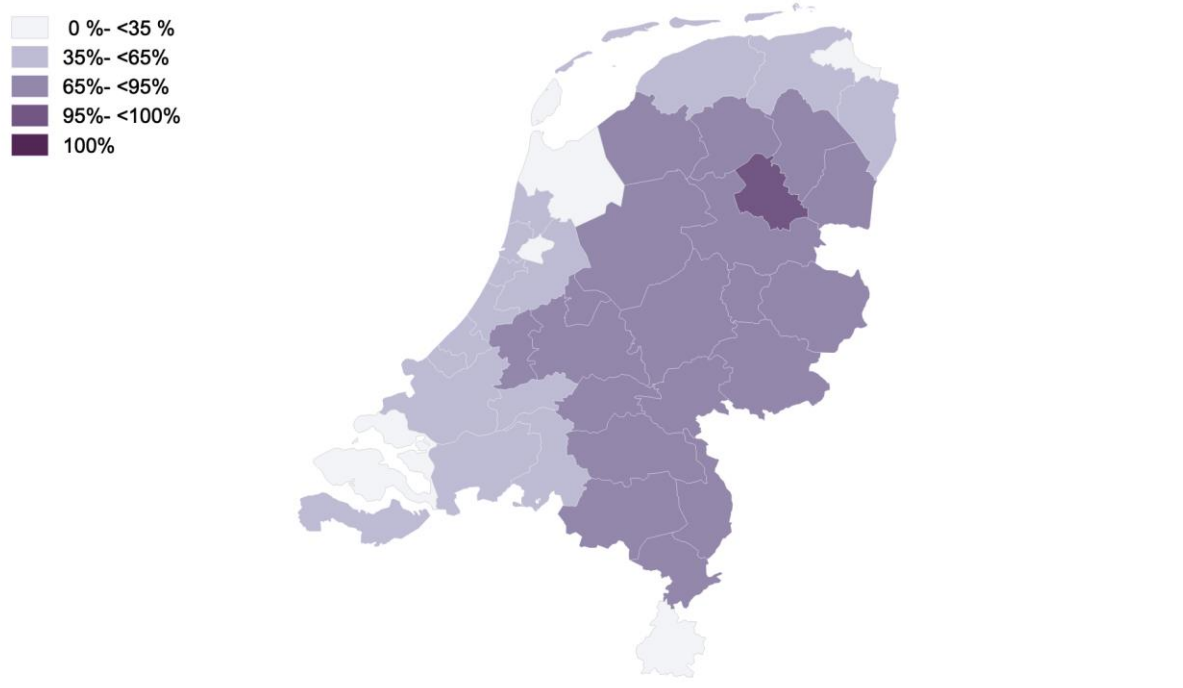
Only four Dutch regions recorded the combined FTTP & DOCSIS 3.1 coverage levels lower than 95% – Delfzijl en omgeving, Oost-Zuid-Holland, Zeeuwsch-Vlaanderen, and Overig Zeeland.

Netherlands: FTTP & DOCSIS 3.1 coverage, 2022

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

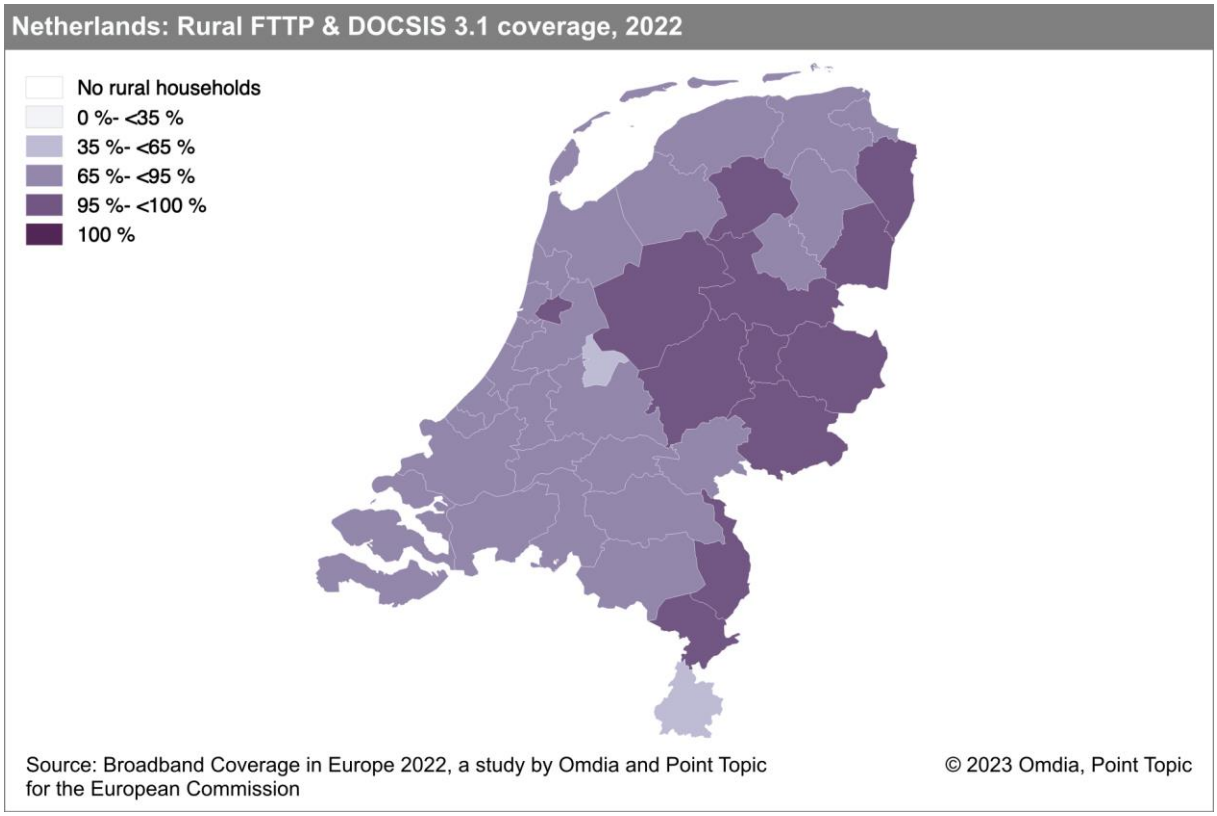
Regional coverage levels are much more varied in terms of FTTP coverage, which ranged from 94.6% in Zuidwest-Overijssel to just 11.1% in Delfzijl en omgeving.

Netherlands: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Similarly, rural FTTP & DOCSIS 3.1 coverage category recorded a much more varied levels with lowest coverage (54.0%) recorded in Zuid-Limburg.



5.21.3 Data tables for Netherlands

Statistic	National
Population	17,407,585
Persons per household	2.4
Rural proportion	8.1%

	Netherlands 2022		Netherlands 2021		Netherlands 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	57.6%	82.8%	61.1%	*82.5%*	69.3%	*82.2%*	86.6%	77.0%
VDSL	55.8%	63.4%	59.5%	*63.1%*	65.2%	*62.2%*	54.9%	41.2%
VDSL2 Vectoring	43.5%	40.0%	44.9%	39.1%	11.1%	4.4%	35.9%	18.4%
FTTP	63.4%	74.0%	51.9%	54.5%	35.6%	27.2%	56.5%	41.4%
Cable modem DOCSIS 3.0	94.2%	89.5%	94.2%	81.4%	95.2%	74.8%	41.8%	11.1%
Cable modem DOCSIS 3.1	88.9%	87.7%	72.3%	41.5%	78.6%	60.0%	31.9%	6.4%
FWA	86.7%	87.3%	86.7%	87.3%	86.7%	87.0%	67.9%	57.0%
LTE	100.0%	100.0%	96.4%	98.6%	99.5%	99.3%	99.8%	99.2%
5G	100.0%	100.0%	97.0%	96.8%	80.0%	29.1%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	0%	0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.3%	98.5%	99.3%	99.6%	99.5%	98.9%	97.3%	91.4%
Overall NGA broadband	99.2%	96.9%	99.2%	98.9%	98.3%	96.9%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	97.8%	91.7%	90.6%	79.1%	89.8%	71.9%	73.4%	45.1%
At least 30Mbps	99.2%	-	99.2%	-	98.3%	-	91.7%	-
At least 100Mbps	98.7%	-	98.5%	-	95.8%	-	86.6%	-
At least 1Gbps	97.8%	-	88.8%	-	16.0%	-	70.2%	-
At least 1Gbps upload and download	63.4%	-	19.3%	-	-	-	-	-

Note: The drop of rural DOCSIS 3.1 coverage in 2021 was caused by a methodology change in the NRA's data collection. The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

All restatements are highlighted in italics.

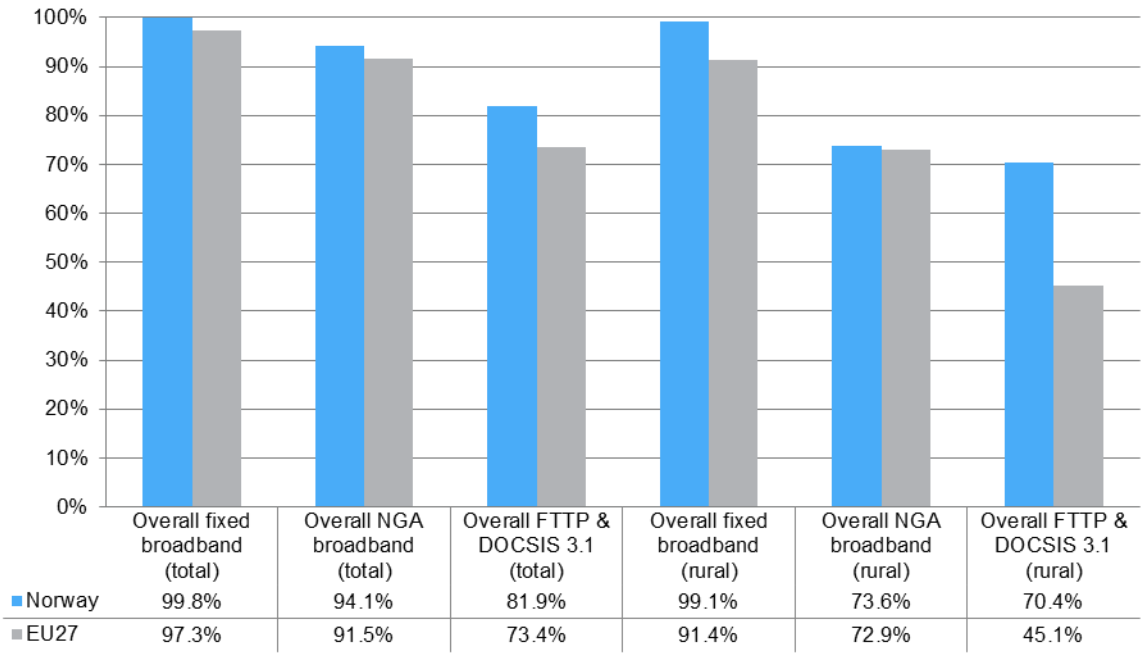
5.22 Norway

5.22.1 National coverage by broadband technology

Combined coverage of FTTP & DOCSIS 3.1 reached 81.9% of Norwegian households by mid-2022, 8.4% ahead of the EU, and up by 6.0 percentage points over the year. In rural areas the difference was even more pronounced – seven in ten (70.4%) of rural households in Norway had access to these networks, compared with less than half in the EU (45.1%).

Total NGA coverage reached 94.1% of homes at national level (up by 2.3 p.p.) and 73.6% in rural areas (up by 4.9 p.p.), slightly ahead of the EU on both counts. Overall fixed broadband coverage is near-universal, even in rural areas which reached 99.1% coverage.

Norway: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Norway	99.8%	94.1%	81.9%	99.1%	73.6%	70.4%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

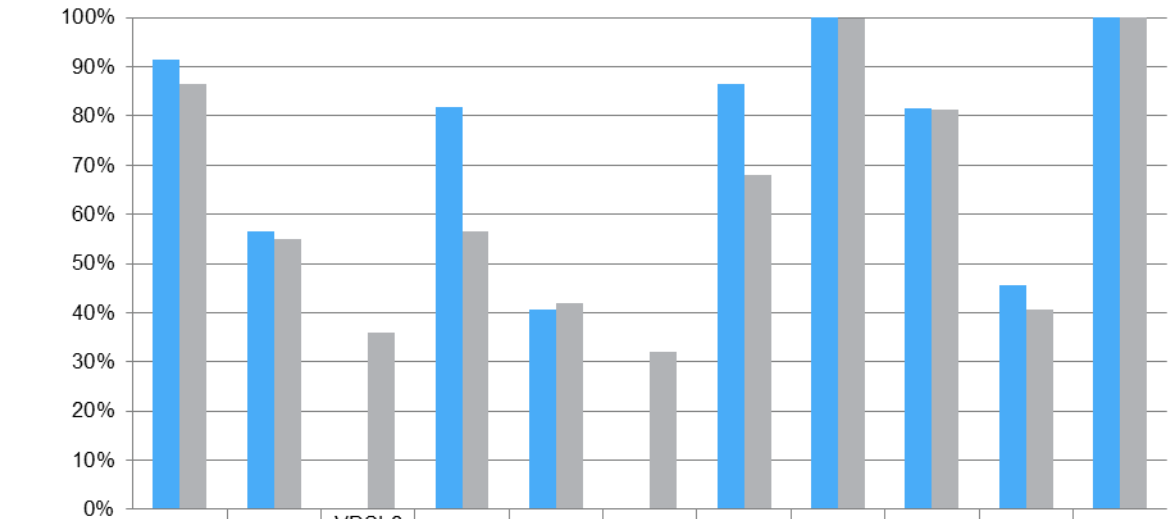
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of individual fixed broadband technologies, FTTP deployment accelerated over the year, with 81.9% of homes passed as of June 2022, a 6.5 p.p increase. FTTP coverage in Norway maintained a gap of more than 25 percentage points ahead of the EU. But DSL is still the most prevalent broadband technology, despite a drop of 1.0 p.p., with 91.6% of households covered. VDSL coverage has also gone down (by 1.7 percentage points) to 56.6% coverage. VDSL2 Vectoring had not been deployed in Norway as of mid-2022.

Following a 0.4 percentage point decrease cable modem DOCSIS 3.0 networks passed 40.7% of Norwegian homes after peaking at 52.5% coverage in 2016. There were no deployments of DOCSIS 3.1 recorded in Norway as of June 2022. Meanwhile FWA coverage stood at 86.5% for Norwegian households by June 2022.

In terms of mobile broadband coverage, 5G coverage is now available across Norway, and reached 81.5% coverage by mid-2022, in line with the EU (81.2%). But 5G coverage using the 3.4–3.8 GHz band was slightly ahead of the EU at June 2022 (45.7% vs 40.7%).

Norway: Coverage by technology, total, 2022



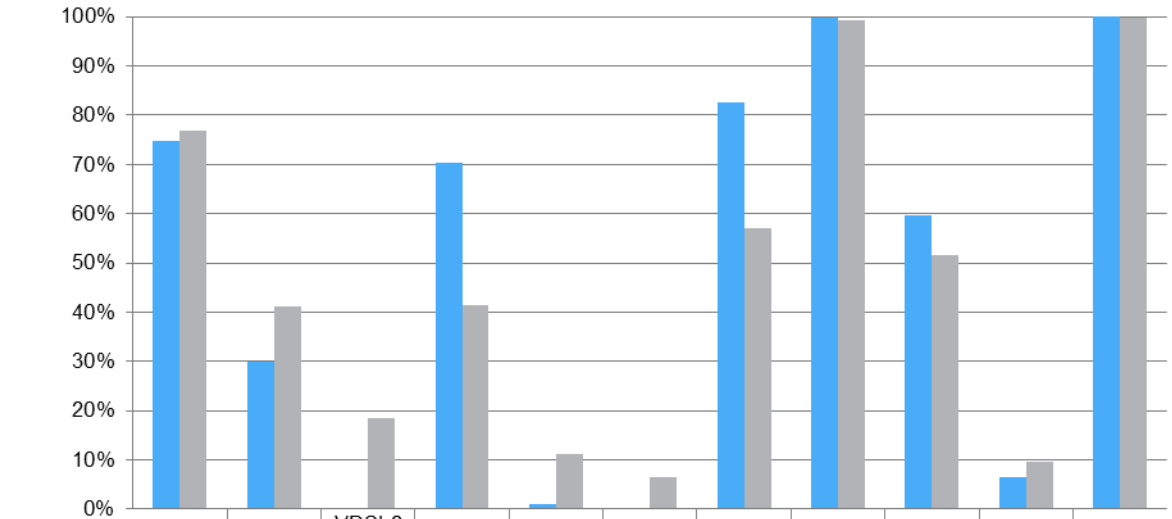
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Norway	91.6%	56.6%	0%	81.9%	40.7%	0%	86.5%	100.0%	81.5%	45.7%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at rural regions of Norway, rural FTTP coverage once again saw a significant coverage increase, going from 64.0% to reach 70.4% of rural homes. Rural FTTP availability was well ahead of the EU average, which stood at 41.4%. DSL remained the most prevalent fixed broadband technology reaching 74.8% of rural households, while VDSL coverage increased by 0.6 percentage points to 30.0%. Both these technologies fell below the EU27 average. Cable modem DOCSIS 3.0 coverage remained limited in rural areas, with only 1.1% of rural Norwegian homes passed.

Early 5G deployments were focussed on urban areas, but rural coverage grew markedly over the year, to reach 59.8% of rural households in June 2022, up from just 4.5% the previous year. But 5G coverage using the 3.4–3.8 GHz band remains low, at 6.5% of rural households.

Norway: Coverage by technology, rural areas, 2022

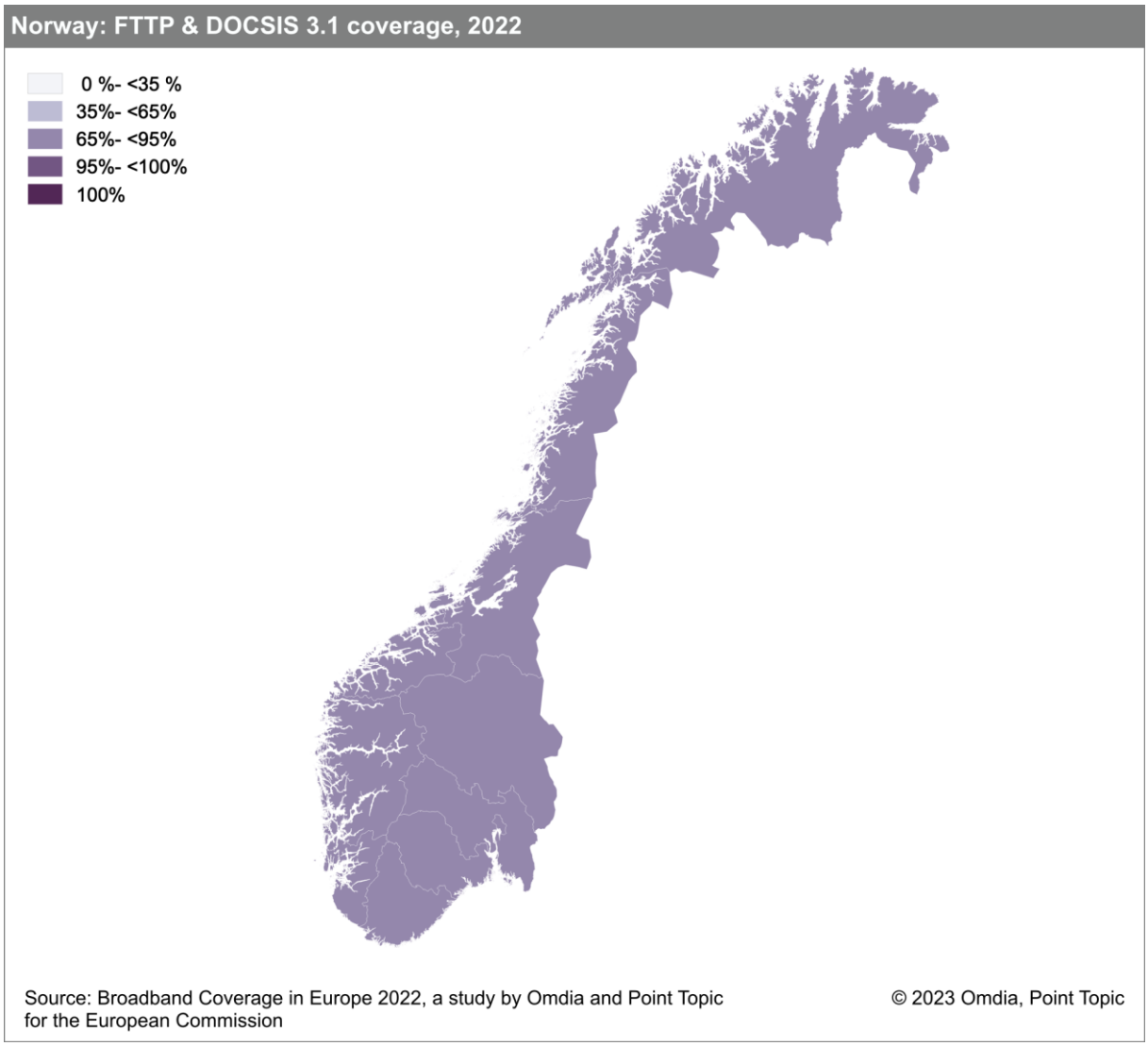


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Norway	74.8%	30.0%	0%	70.4%	1.1%	0%	82.6%	99.9%	59.8%	6.5%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

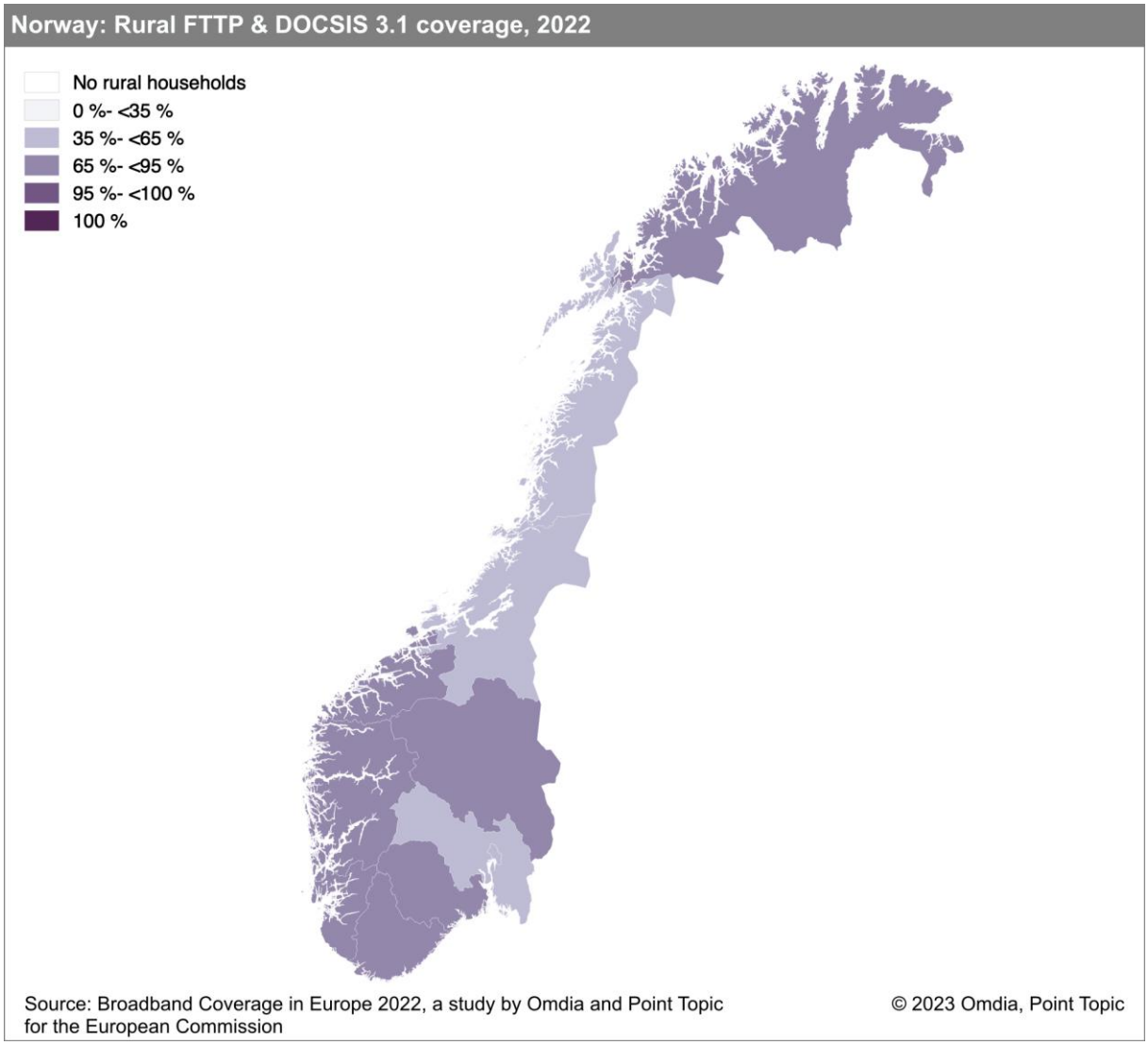
5.22.2 Regional coverage by broadband technology

Overall coverage of FTTP & DOCSIS 3.1 lay between 65% and 95% for all regions of Norway in June 2022. The capital, Oslo, recorded the lowest coverage, at 74.7%, while Møre og Romsdal recorded the highest, at 91.8%.



Since there are no DOCSIS 3.1 services in Norway, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

In rural areas, four out of eleven regions failed to reach 65% coverage of FTTP & DOCSIS 3.1 services (Trøndelag, Nordland, Viken, and the capital, Oslo). Vestland recorded the highest coverage, at 84.5%.



5.22.3 Data tables for Norway

Statistic	National
Population	5,393,669
Persons per household	2.1
Rural proportion	17.3%

	Norway 2022		Norway 2021		Norway 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	91.6%	74.8%	92.5%	75.4%	94.7%	78.3%	86.6%	77.0%
VDSL	56.6%	30.0%	58.4%	29.4%	59.1%	27.3%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	81.9%	70.4%	75.3%	64.0%	73.7%	56.3%	56.5%	41.4%
Cable modem DOCSIS 3.0	40.7%	1.1%	40.3%	1.7%	44.5%	1.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	1.0%	0.0%	0%	0%	31.9%	6.4%
FWA	86.5%	82.6%	94.1%	84.9%	97.9%	93.5%	67.9%	57.0%
LTE	100.0%	99.9%	100.0%	99.9%	99.9%	99.9%	99.8%	99.2%
5G	81.5%	59.8%	23.8%	4.5%	2.4%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	45.7%	6.5%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	97.2%	92.7%	99.9%	99.9%
Overall fixed broadband	99.8%	99.1%	98.1%	91.0%	98.9%	96.8%	97.3%	91.4%
Overall NGA broadband	94.1%	73.6%	91.8%	68.7%	92.8%	70.5%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	81.9%	70.4%	75.8%	64.0%	73.7%	56.3%	73.4%	45.1%
At least 30Mbps	98.5%	-	91.7%	-	91.0%	-	91.7%	-
At least 100Mbps	93.6%	-	89.2%	-	88.5%	-	86.6%	-
At least 1Gbps	92.5%	-	86.5%	-	52.9%	-	70.2%	-
At least 1Gbps upload and download	81.9%	-	73.6%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

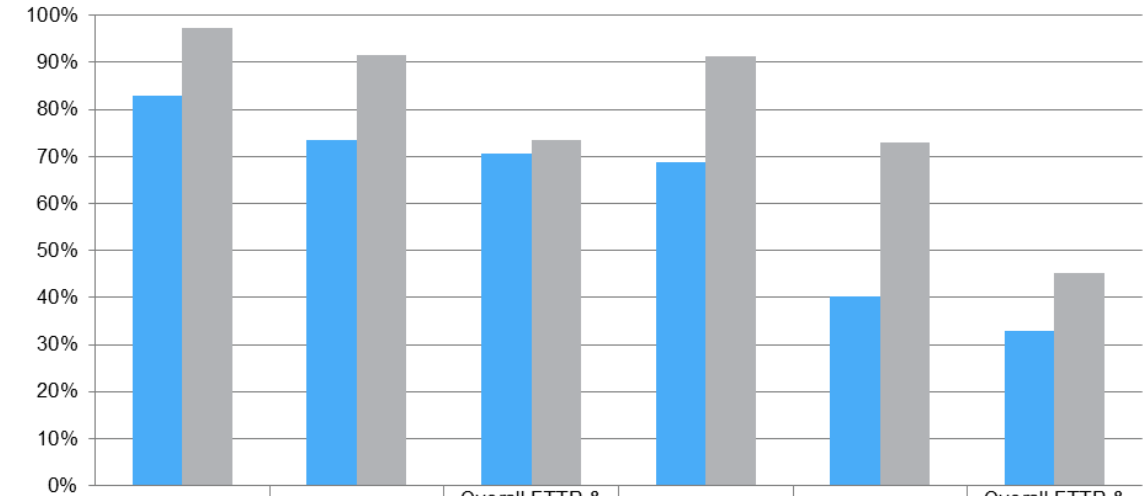
5.23 Poland

5.23.1 National coverage by broadband technology

82.9% of Polish households were covered by at least one broadband technology by the end of June 2022, while 68.7% of households were covered in rural regions. In terms of NGA coverage, Poland passed 73.4% and 40.3% of homes on national and rural level, respectively. Poland continued to perform below the EU average and ranked among the bottom two study countries across both categories on national and rural level in this year's study.

Seven in ten Polish households (70.7%) were covered by 1Gbps-capable networks (FTTP & DOCSIS 3.1), up by 0.8 percentage points compared to the prior year. The improvement was particularly supported by a continuous fast-faced FTTP rollout. In rural regions, one third (32.8%) of households were covered.

Poland: Coverage by technology combination, 2022



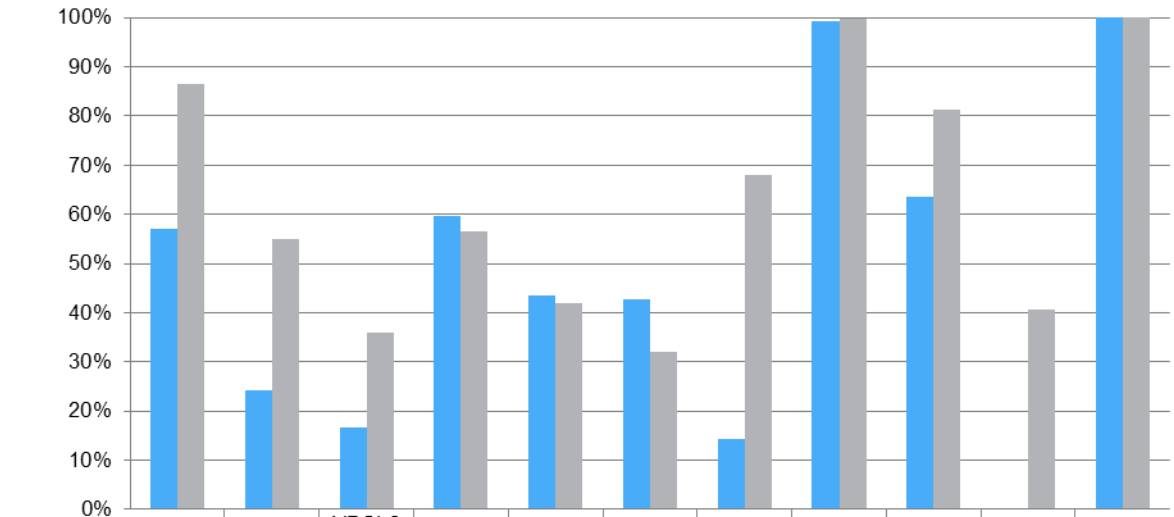
	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Poland	82.9%	73.4%	70.7%	68.7%	40.3%	32.8%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP was the fastest growing broadband technology in Poland, up by 7.6 percentage points, and exceeded the EU average by 3.0 percentage points. FTTP has also become the most prevalent technology, overtaking DSL (57.1%), as Polish operators are prioritizing FTTP deployment. Poland scored above the EU average in the DOCSIS 3.0 and DOCSIS 3.1 categories, with 43.4% and 42.8% of homes passed, respectively. Polish operators were early movers to upgrade to DOCSIS 3.1 standard and had upgraded 98.4% of the cable footprint by mid-2022.

The pace of 5G rollouts accelerated over the study period, making the technology available to 63.4% of Polish households by the end of June 2022, up by 29.2 percentage points compared to the prior year. As frequencies in the 3.4–3.8 GHz band had not yet been allocated as of mid-2022, Poland had no 5G coverage in that band yet. Polish operators launched 5G services with existing frequencies, such as 2100 MHz. LTE coverage stood at 99.2%.

Poland: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Poland	57.1%	24.2%	16.6%	59.5%	43.4%	42.8%	14.4%	99.2%	63.4%	0%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

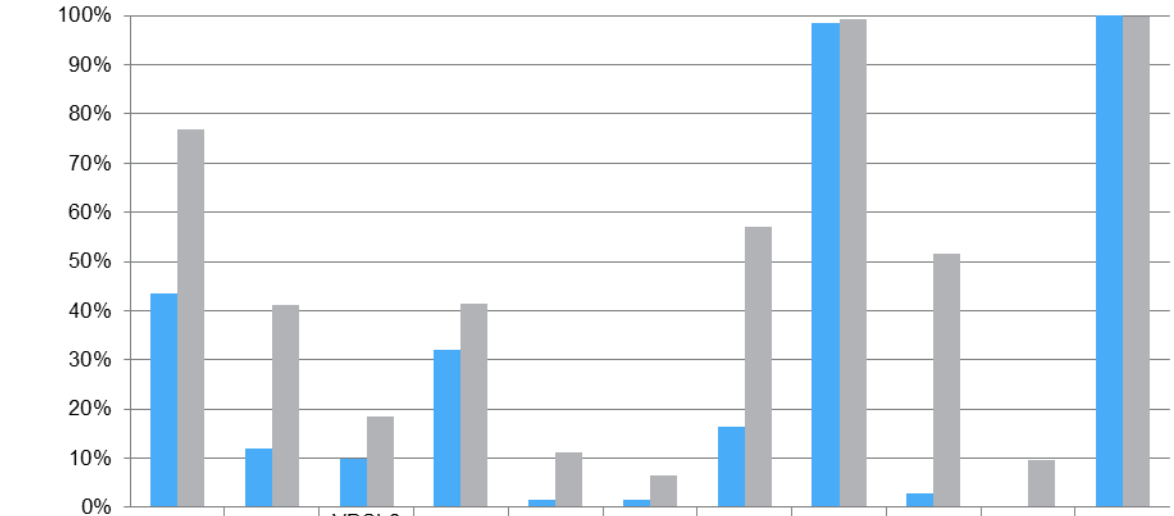
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural regions of Poland, DSL remained the most prevalent broadband technology, with 43.6% of households covered by mid-2022. VDSL coverage improved by 1.7 p.p. over the study period, while VDSL2 Vectoring remained unchanged at 9.8%. All three technologies fell below the EU average.

FTTP remained the leading NGA technology in rural Poland, covering almost one third (32.1%) of Polish households but recorded slower progress than in previous years. DOCSIS 3.0 and DOCSIS 3.1 coverage remained unchanged from last year, being almost absent in rural regions with only 1.6% and 1.5% of homes passed, respectively. FWA was available to 16.4% of households but as all other broadband technologies in rural Poland, it remained below the EU average.

5G rollouts remained strongly focused on urban areas, with only 2.8% of rural households covered by the end of June 2022. Poland recorded the third lowest rural 5G coverage among study countries which improved by only 1.7 percentage points compared to the prior year. LTE coverage stood at 98.4%.

Poland: Coverage by technology, rural areas, 2022



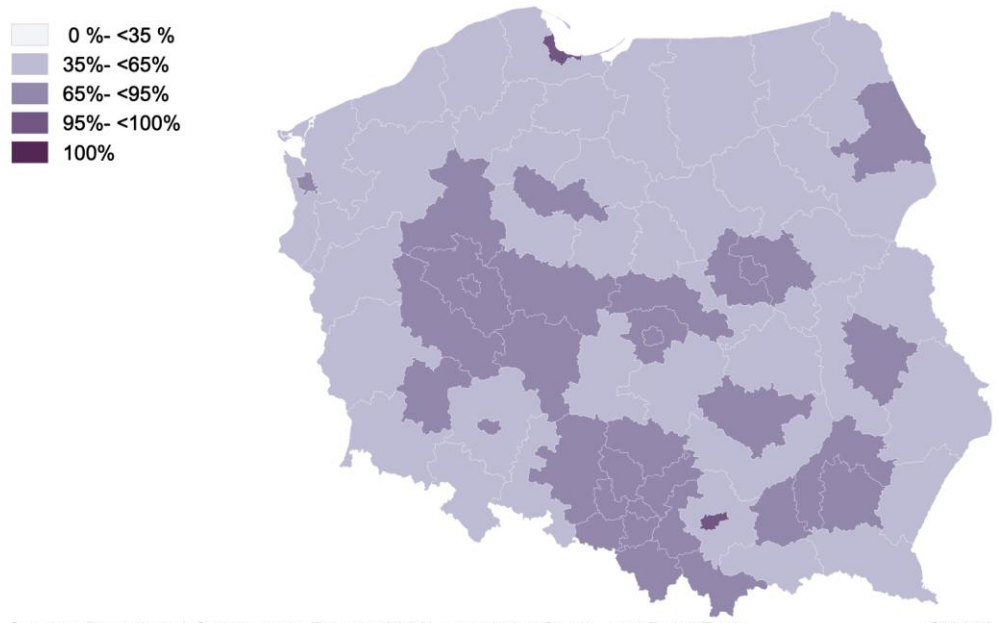
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Poland	43.6%	12.0%	9.8%	32.1%	1.6%	1.5%	16.4%	98.4%	2.8%	0%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.23.2 Regional coverage by broadband technology

FTTP & DOCSIS 3.1 coverage varied across Polish regions, ranging from 38.9% in Ciechanowski to 99.9% in Miasto Kraków. Trójmiejski was the only other Polish region that exceeded 95% coverage, while no region recorded FTTP & DOCSIS 3.1 coverage below 35%.

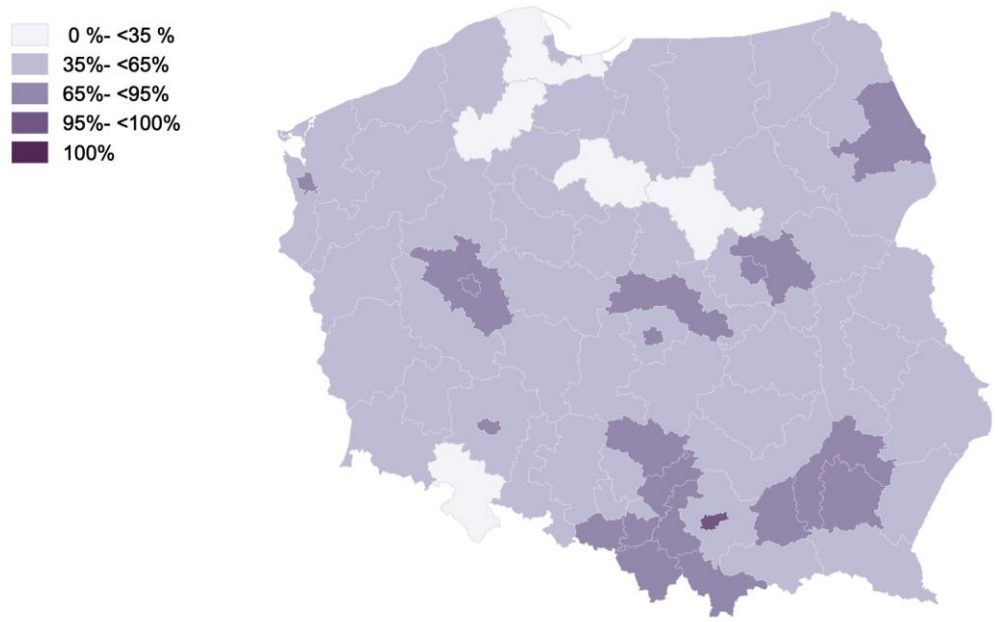
Poland: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Five Polish regions (Wałbrzyski, Grudziądzki, Gdański, Chojnicki, and Ciechanowski) recorded FTTP coverage below 35%, while Miasto Kraków was the only region to exceed the 95% threshold.

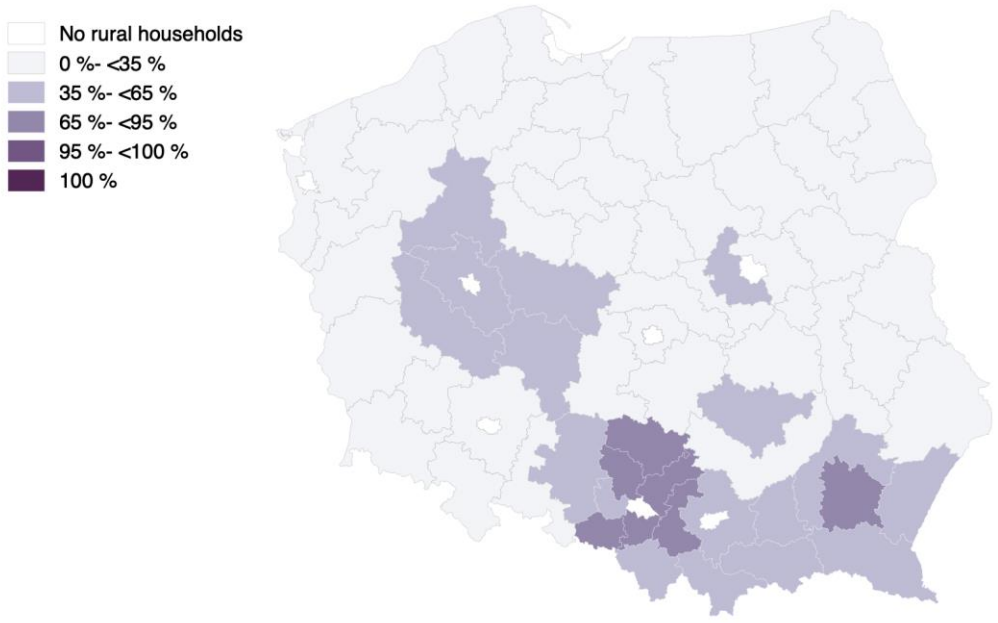
Poland: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Seven regions exceeded the 65% threshold for rural FTTP & DOCSIS 3.1 coverage, while the majority of regions recorded coverage below 35%.

Poland: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.23.3 Data tables for Poland

Statistic	National
Population	37,840,001
Persons per household	2.5
Rural proportion	32.4%

	Poland 2022		Poland 2021		Poland 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	57.1%	43.6%	64.5%	44.5%	63.4%	43.1%	86.6%	77.0%
VDSL	24.2%	12.0%	26.6%	10.3%	35.4%	17.3%	54.9%	41.2%
VDSL2 Vectoring	16.6%	9.8%	18.7%	9.8%	27.4%	16.9%	35.9%	18.4%
FTTP	59.5%	32.1%	51.9%	32.6%	44.6%	24.1%	56.5%	41.4%
Cable modem DOCSIS 3.0	43.4%	1.6%	43.9%	1.6%	43.4%	1.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	42.8%	1.5%	43.0%	1.5%	42.4%	1.5%	31.9%	6.4%
FWA	14.4%	16.4%	15.5%	16.9%	14.7%	15.7%	67.9%	57.0%
LTE	99.2%	98.4%	99.9%	99.9%	99.9%	99.9%	99.8%	99.2%
5G	63.4%	2.8%	34.2%	*1.1%*	10.3%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	0%	0%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	82.9%	68.7%	89.7%	69.8%	88.6%	63.8%	97.3%	91.4%
Overall NGA broadband	73.4%	40.3%	78.2%	40.0%	76.2%	37.1%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	70.7%	32.8%	70.0%	33.4%	64.6%	24.9%	73.4%	45.1%
At least 30Mbps	76.0%	-	77.0%	-	74.9%	-	91.7%	-
At least 100Mbps	73.8%	-	69.2%	-	63.4%	-	86.6%	-
At least 1Gbps	62.2%	-	55.2%	-	46.6%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

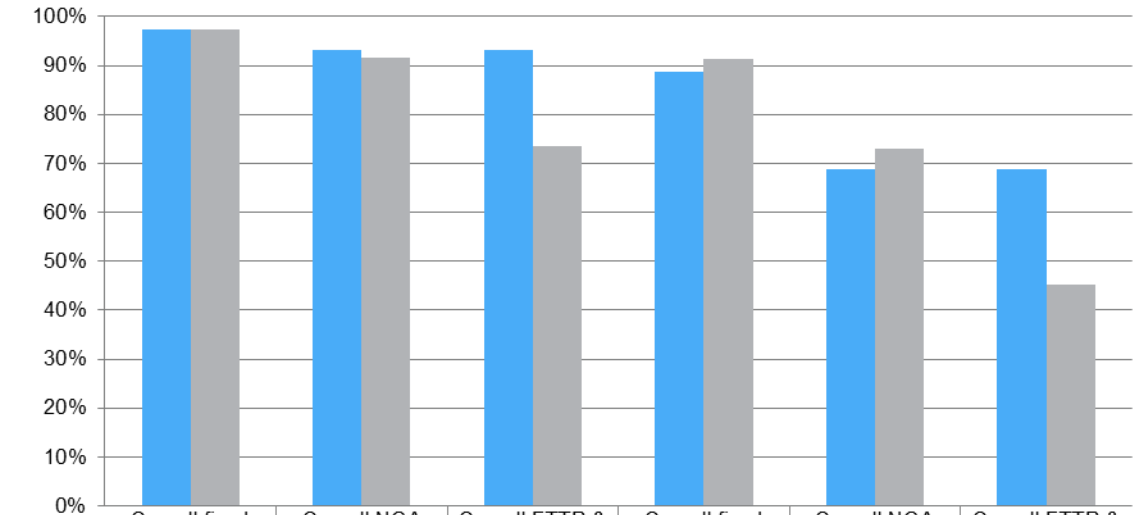
All restatements are highlighted in italics.

5.24 Portugal

5.24.1 National coverage by broadband technology

Availability of FTTP & DOCSIS 3.1 in Portugal increased by 2.5 p.p. to reach 90.5% of homes at June 2022, almost 20 p.p. ahead of the EU average. Rural coverage was also well ahead of the EU average, at 68.8% of households. There have been no deployments of VDSL in Portugal, and cable networks have all been upgraded to support the DOCSIS 3.1 standard – thus the NGA coverage is equal to the coverage of FTTP & DOCSIS 3.1 networks. Overall NGA coverage is slightly ahead of the EU average at national level, but the absence of rural VDSL puts Portugal 4.1 p.p behind the average for rural NGA coverage. By the end of June 2022, overall fixed broadband coverage reached 97.3% of all Portuguese households and 88.6% of rural households.

Portugal: Coverage by technology combination, 2022



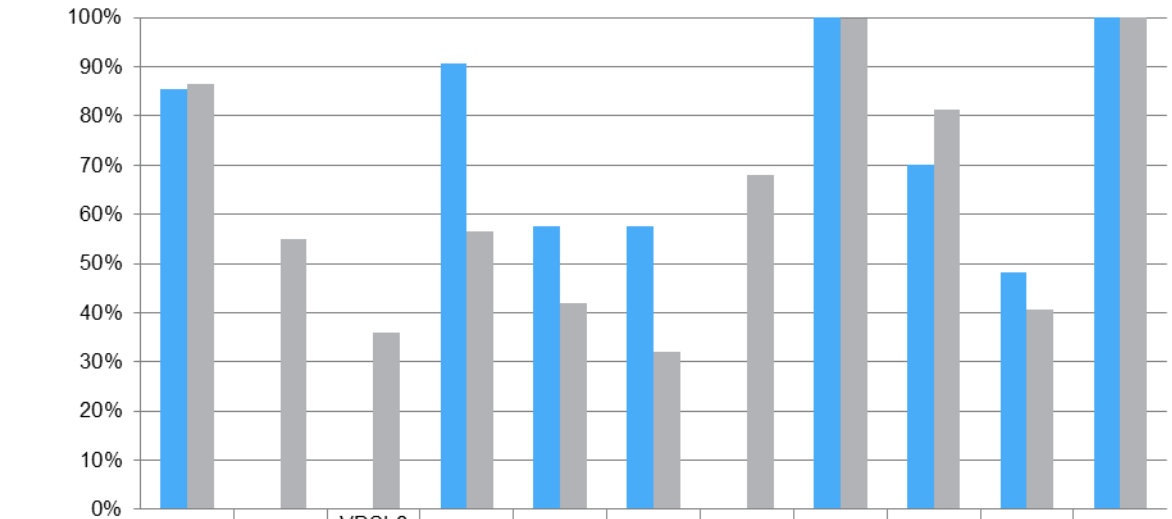
	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Portugal	97.3%	93.0%	93.0%	88.6%	68.8%	68.8%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of individual technologies, FTTP coverage continues to increase and is now the most prevalent technology, with 90.8% of homes passed as of June 2022, up from 87.6% one year previously. DSL coverage remained unchanged for the fourth year running, at 85.4%. As discussed previously, Portuguese operators have opted for FTTP deployment, rather than upgrading DSL to VDSL. Cable modem DOCSIS 3.1 coverage fell slightly to reach 57.5% of households, the entirety of the network having been upgraded from DOCSIS 3.0 to DOCSIS 3.1.

Following a protracted spectrum auction, Portugal belatedly launched 5G in late 2021, among the last countries in Europe to do so. By June 2022 5G coverage had reached seven in ten households (70.1%), below the EU average of 81.2%. But coverage of 5G services using the 3.4–3.8 GHz band was ahead of the average, at 48.2% of households.

Portugal: Coverage by technology, total, 2022



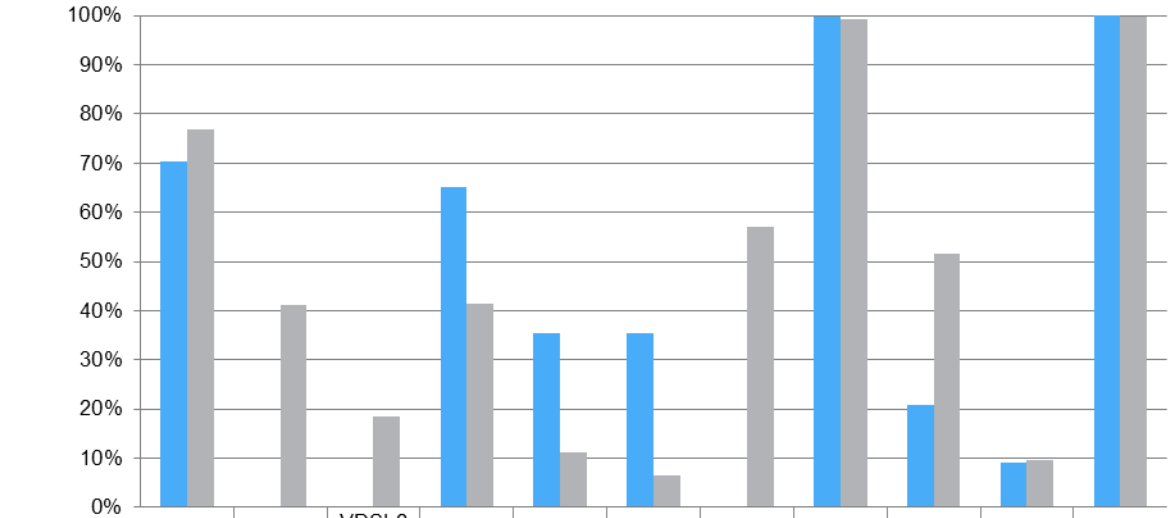
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Portugal	85.4%	0%	0%	90.8%	57.5%	57.5%	0%	100.0%	70.1%	48.2%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of rural areas, FTTP coverage improved by 4.4 p.p. over the study period, to reach 65.1% of rural Portuguese households, up from 60.7% in mid-2021. DSL is still the most prevalent rural technology, reaching 70.3% of households, while cable modem DOCSIS 3.1 reached over a third of rural homes (35.3%), well ahead of the EU average.

Initial 5G deployments were focussed on urban areas, and rural 5G coverage reached only one in five households as of June 2022, compared with half of rural households at EU level. But rural 5G coverage in the 3.4–3.8 GHz band was in line with the average, at 9.2%.

Portugal: Coverage by technology, rural areas, 2022



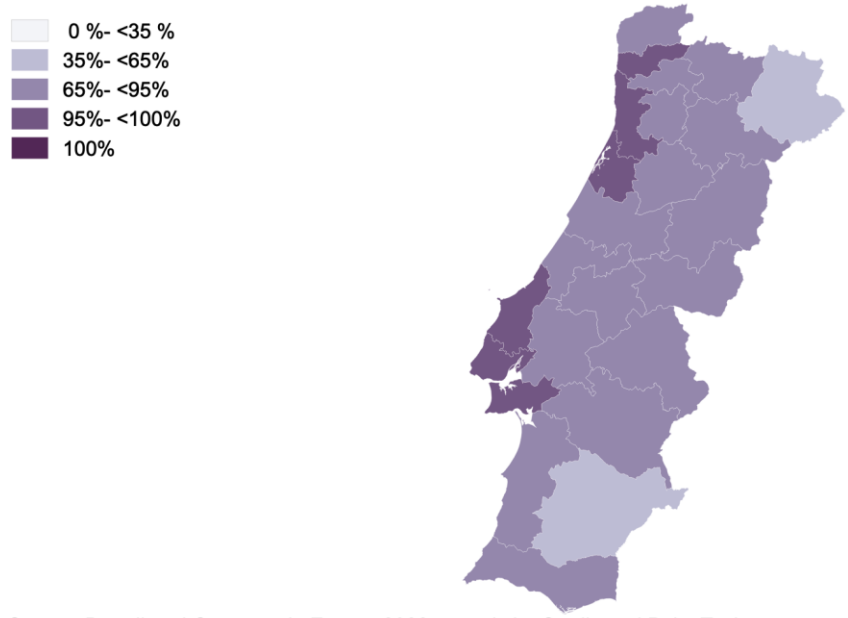
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Portugal	70.3%	0%	0%	65.1%	35.3%	35.3%	0%	99.9%	20.8%	9.2%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.24.2 Regional coverage by broadband technology

In this iteration of the study, seven of Portugal's 25 regions achieved combined coverage of FTTP & DOCSIS 3.1 greater than 95%: the two largest cities (Lisbon and Porto), Cávado, Oeste, Região de Aveiro, and the two autonomous regions of Madeira and the Azores. Only two regions failed to reach 65% coverage – Terras de Trás-os-Montes, and Baixo Alentejo.

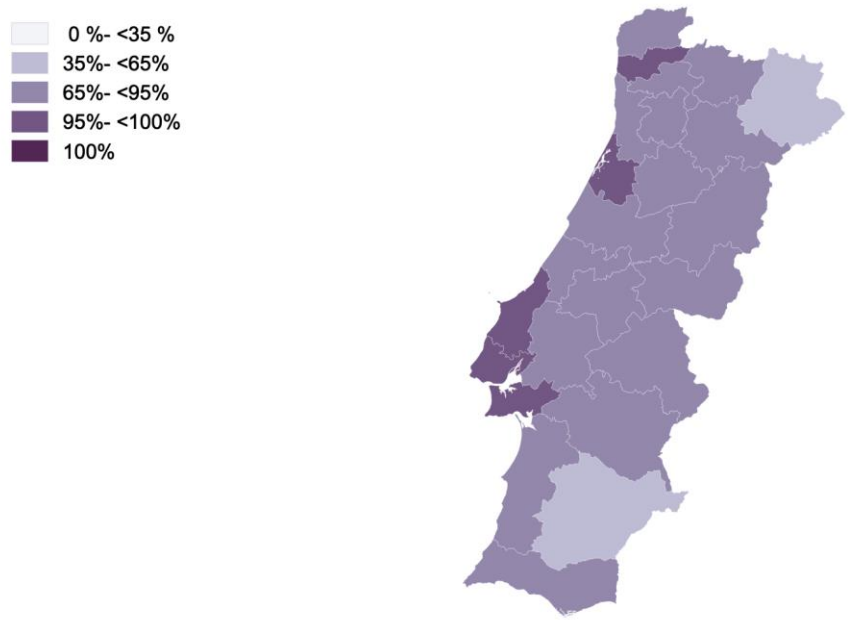
Portugal: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

For FTTP alone the picture was very similar, with only Porto dropping below the 95% threshold.

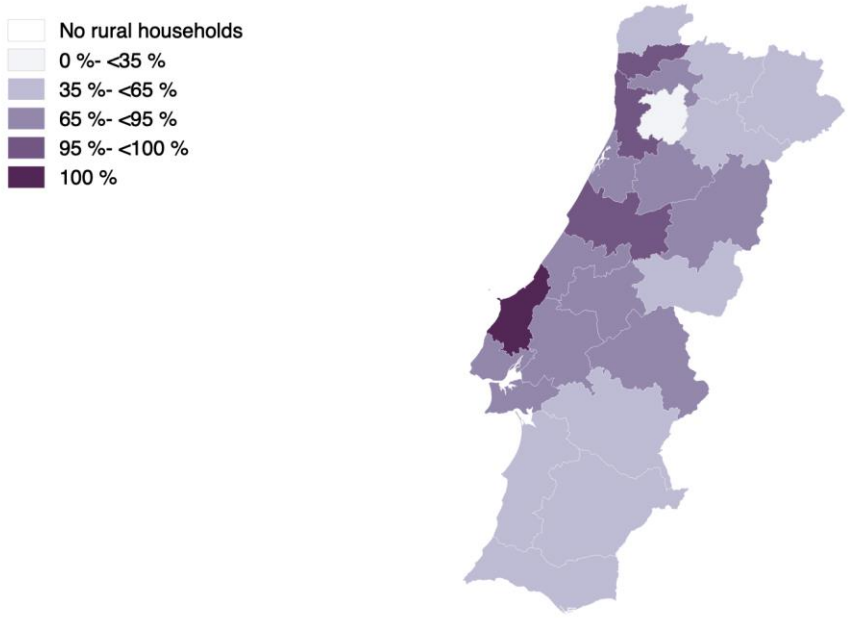
Portugal: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural areas, two regions achieved 100% coverage of FTTP & DOCSIS 3.1 – Oeste, and the autonomous region of Madeira. Only Tâmega e Sousa, in the north of the country, failed to achieve 35% rural coverage.

Portugal: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The following broadband coverage levels were recorded in Portuguese regions outside mainland Europe:

Coverage data for Portuguese NUTS 3 areas outside mainland Europe

NUTS 3	Description	Total FTTP & DOCSIS 3.1	Total FTTP	Rural FTTP & DOCSIS 3.1
PT200	Região Autónoma dos Açores	95% – <100%	95% – <100%	65% – <95%
PT300	Região Autónoma da Madeira	95% – <100%	95% – <100%	100%

5.24.3 Data tables for Portugal

Statistic	National
Population	10,298,252
Persons per household	2.5
Rural proportion	14.4%

	Portugal 2022		Portugal 2021		Portugal 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	85.4%	70.3%	85.4%	70.3%	85.4%	71.0%	86.6%	77.0%
VDSL	0%	0%	0%	0%	0%	0%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	90.8%	65.1%	87.6%	60.7%	82.3%	51.2%	56.5%	41.4%
Cable modem DOCSIS 3.0	57.5%	35.3%	57.6%	43.3%	59.4%	43.5%	41.8%	11.1%
Cable modem DOCSIS 3.1	57.5%	35.3%	57.6%	43.3%	59.4%	43.5%	31.9%	6.4%
FWA	0%	0%	0%	0%	0%	0%	67.9%	57.0%
LTE	100.0%	99.9%	99.8%	98.9%	99.9%	99.0%	99.8%	99.2%
5G	70.1%	20.8%	0%	0%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	48.2%	9.2%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	97.3%	88.6%	96.3%	90.5%	95.2%	90.0%	97.3%	91.4%
Overall NGA broadband	93.0%	68.8%	90.5%	75.9%	86.6%	70.3%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	93.0%	68.8%	90.5%	75.9%	86.6%	70.3%	73.4%	45.1%
At least 30Mbps	94.9%	-	92.8%	-	89.7%	-	91.7%	-
At least 100Mbps	94.9%	-	92.8%	-	89.5%	-	86.6%	-
At least 1Gbps	88.4%	-	86.0%	-	83.4%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

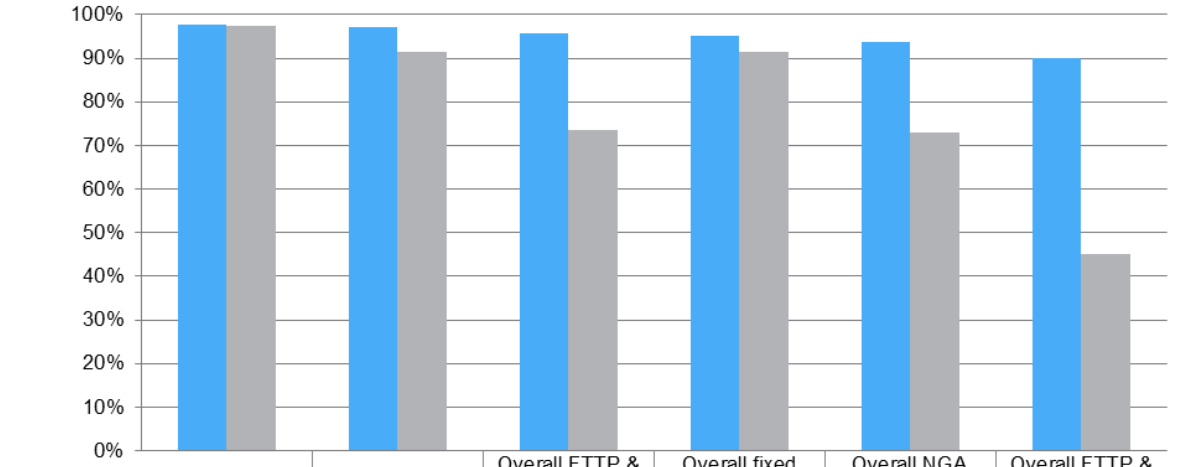
5.25 Romania

5.25.1 National coverage by broadband technology

Overall fixed broadband coverage in Romania increased by 3.7 p.p. over the course of the study period, to reach 97.8% of households – rising above the EU average for the first time. Rural fixed broadband coverage also continued to improve, going from 89.0% to 95.1% of rural households. NGA coverage grew by 3.9 percentage points, to reach 97.2% of Romanian households. At a rural level, NGA coverage continued to grow significantly, reaching 93.7% of rural households by the end of June 2022, an increase of 9.0 percentage points on the previous year.

The reason for these improvements is the continued expansion of FTTP networks throughout the country. Coverage of networks capable of achieving gigabit speeds, i.e. FTTP & DOCSIS 3.1, was again much higher than the EU average at both national and rural level. By mid-2022, 95.6% of all homes and 90.1% of rural homes were passed by networks potentially capable of delivering gigabit speeds.

Romania: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Romania	97.8%	97.2%	95.6%	95.1%	93.7%	90.1%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

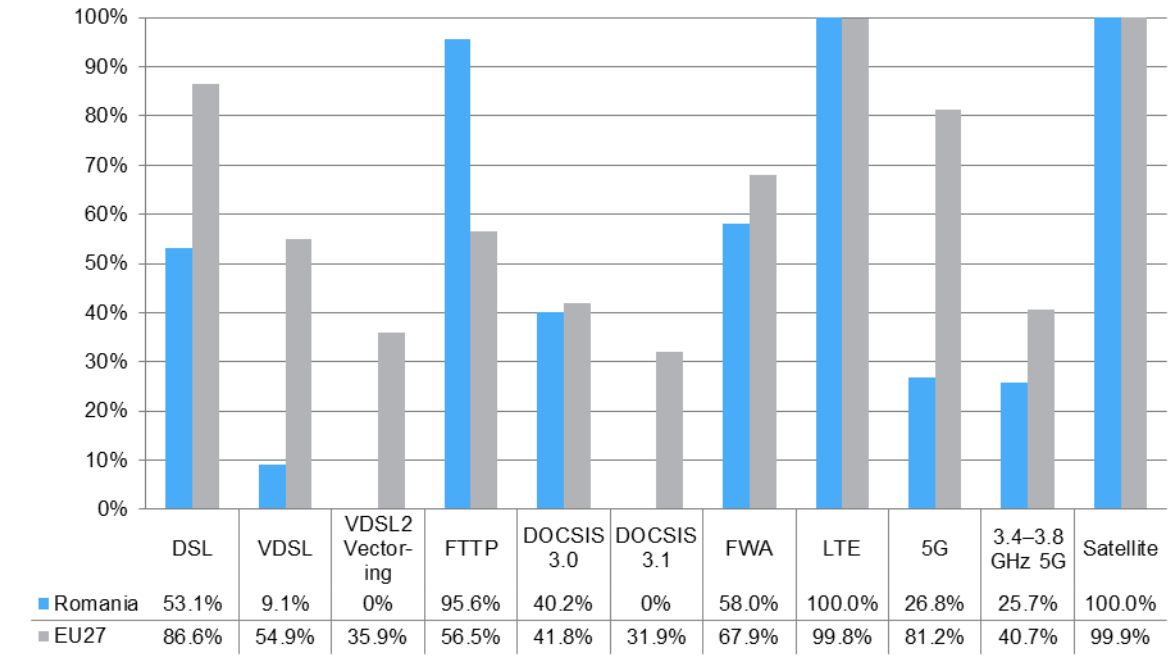
In terms of individual technologies, DSL continued to slowly decrease, with 53.1% of households covered. As is the case in several study countries, this decrease in DSL coverage is due to the incumbent Telekom Romania's focus on investing in fibre deployment and gradual decommissioning of legacy copper networks. FWA in Romania covered 58.0% of houses at the end of June 2022.

Looking at NGA technologies, FTTP coverage continued to increase in this iteration of the study, with 95.6% of households covered, up from 87.1% in mid-2021. At the end of June 2022, Romania was the leading study country in terms of FTTP coverage.

Cable modem DOCSIS 3.0 remained the second most prevalent NGA broadband technology in Romania, reaching 40.2% of homes. As of mid-2022, cable operators in Romania have still not launched any DOCSIS 3.1 upgrades to their networks. Lastly, VDSL remained the least common NGA technology in Romania with 9.1% of households covered. VDSL2 Vectoring has not been deployed.

In terms of mobile broadband coverage, LTE coverage was universal reaching all Romanian households. Over the study period, there has been only small progress in 5G coverage, which grew by 1.9 p.p. and reached 26.8% by mid-2022. 5G services in the 3.4–3.8 GHz spectrum were available to a quarter (25.7%) of Romanian households.

Romania: Coverage by technology, total, 2022



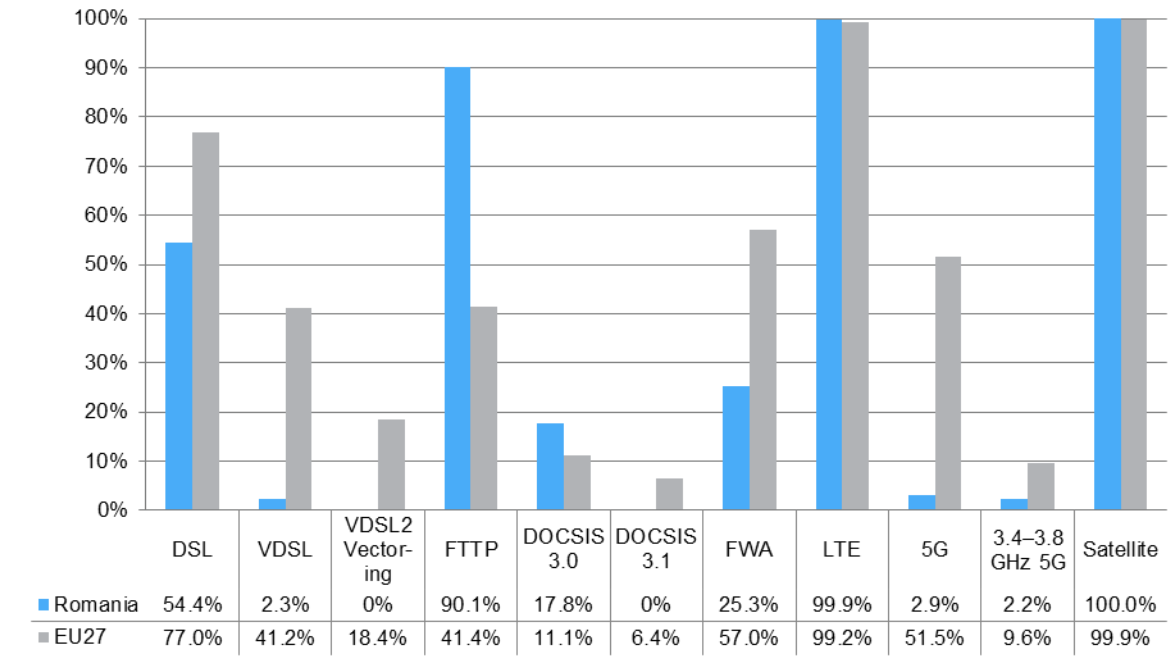
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Romania	53.1%	9.1%	0%	95.6%	40.2%	0%	58.0%	100.0%	26.8%	25.7%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at rural regions of Romania, FTTP was the most prevalent technology in rural Romania with FTTP services available to nine in ten (90.1%) rural households, a 14.3 p.p. increase compared to mid-2021 and more than double the EU average. DSL declined to 54.4% coverage. Rural DOCSIS 3.0 coverage decreased from 24.5% to 17.8% pointing to a growing preference for the FTTP technology. This puts it behind FWA at 25.3% by June 2022.

Rural LTE coverage remained near-universal, while 5G coverage was limited (2.9% of households) as deployments continue to be focused on more densely-populated areas.

Romania: Coverage by technology, rural areas, 2022



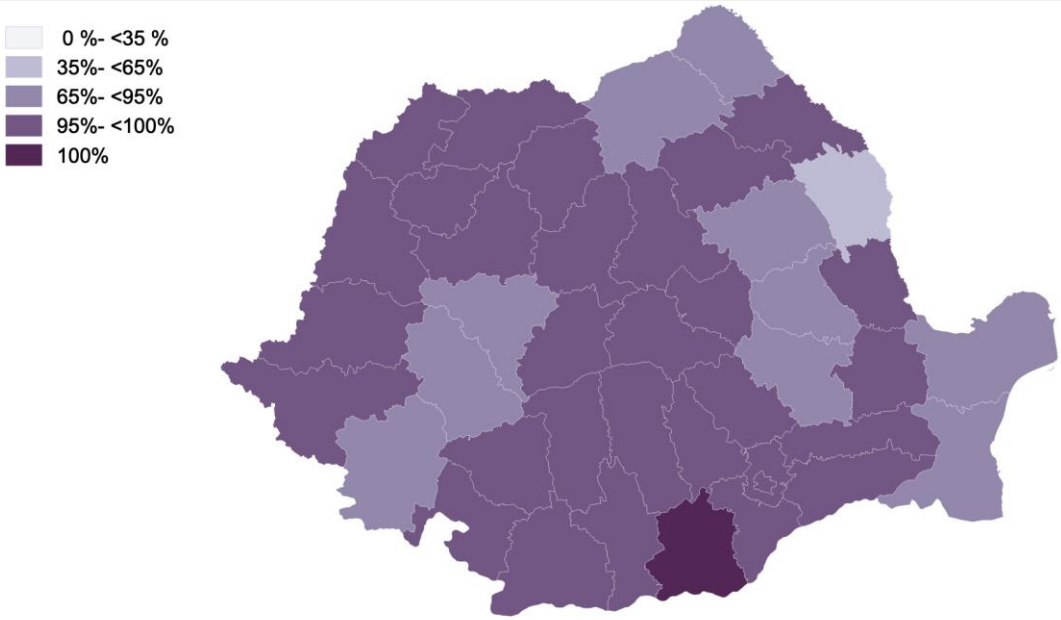
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Romania	54.4%	2.3%	0%	90.1%	17.8%	0%	25.3%	99.9%	2.9%	2.2%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.25.2 Regional coverage by broadband technology

Combined FTTP & DOCSIS 3.1 coverage across Romanian regions varies considerably, ranging from universal coverage in the Teleorman region, to 48.9% in the region of Vaslui, which is the only region to record fixed broadband levels under 65%. The capital region of Bucharest, and the Ilfov and Olt regions recorded near 100% FTTP & DOCSIS 3.1 coverage.

Romania: FTTP & DOCSIS 3.1 coverage, 2022

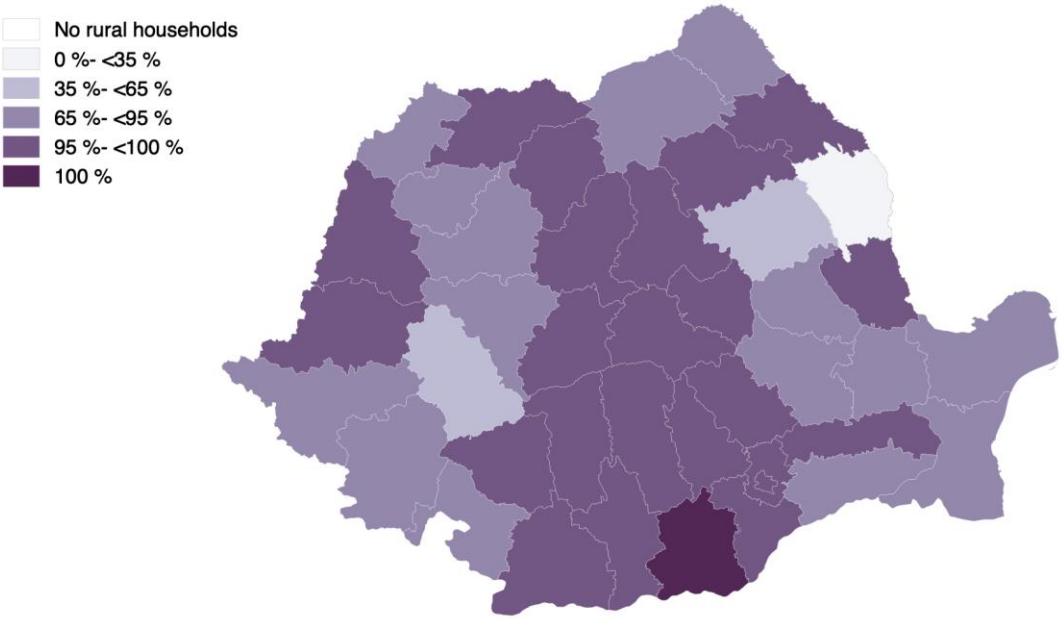


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since there are no DOCSIS 3.1 services in Romania, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

In terms of rural FTTP & DOCSIS 3.1 coverage, two regions (Bacău and Hunedoara) recorded coverage below 65%. Similar to the total coverage, four regions recorded universal or very near-universal rural FTTP & DOCSIS 3.1 coverage – the Teleorman region, the capital region of Bucharest, and the Ilfov and Olt regions.

Romania: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.25.3 Data tables for Romania

Statistic	National
Population	19,328,838
Persons per household	2.6
Rural proportion	21.0%

	Romania 2022		Romania 2021		Romania 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	53.1%	54.4%	55.1%	56.7%	55.9%	57.9%	86.6%	77.0%
VDSL	9.1%	2.3%	9.1%	2.3%	9.1%	2.2%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	95.6%	90.1%	87.1%	75.7%	75.9%	55.6%	56.5%	41.4%
Cable modem DOCSIS 3.0	40.2%	17.8%	43.7%	24.5%	42.3%	23.4%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	58.0%	25.3%	58.0%	25.3%	56.1%	24.5%	67.9%	57.0%
LTE	100.0%	99.9%	99.9%	99.7%	99.7%	99.0%	99.8%	99.2%
5G	26.8%	2.9%	24.9%	2.0%	11.7%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	25.7%	2.2%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	97.8%	95.1%	94.1%	89.0%	89.5%	82.9%	97.3%	91.4%
Overall NGA broadband	97.2%	93.7%	93.3%	84.7%	87.0%	66.5%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	95.6%	90.1%	87.1%	75.7%	75.9%	55.6%	73.4%	45.1%
At least 30Mbps	96.1%	-	93.7%	-	87.0%	-	91.7%	-
At least 100Mbps	94.5%	-	88.6%	-	82.8%	-	86.6%	-
At least 1Gbps	91.8%	-	85.2%	-	72.8%	-	70.2%	-
At least 1Gbps upload and download	0%	-	0%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic. Given the large number of broadband providers in Romania, data reflecting Romania's progress in terms of coverage and availability of different broadband technologies and speeds have been collected from operators accounting for 99% of the market volume (the most important ones).

In Romania, speeds are strictly specified based on transport layer protocol payload, in line with paragraph 140 of the BoR (20) 112 BEREC Guidelines on the Implementation of the Open Internet Regulation (page 40). Practically, an internet offer with maximum/advertised "best-effort" speed of 1Gbps is considered as a 940Mbps offer and, thus, below the Gigabit threshold. Therefore, since the measurements are made at a higher layer in the network, the maximum/advertised speeds are lower than the standard theoretically marketed "best-effort" speeds.

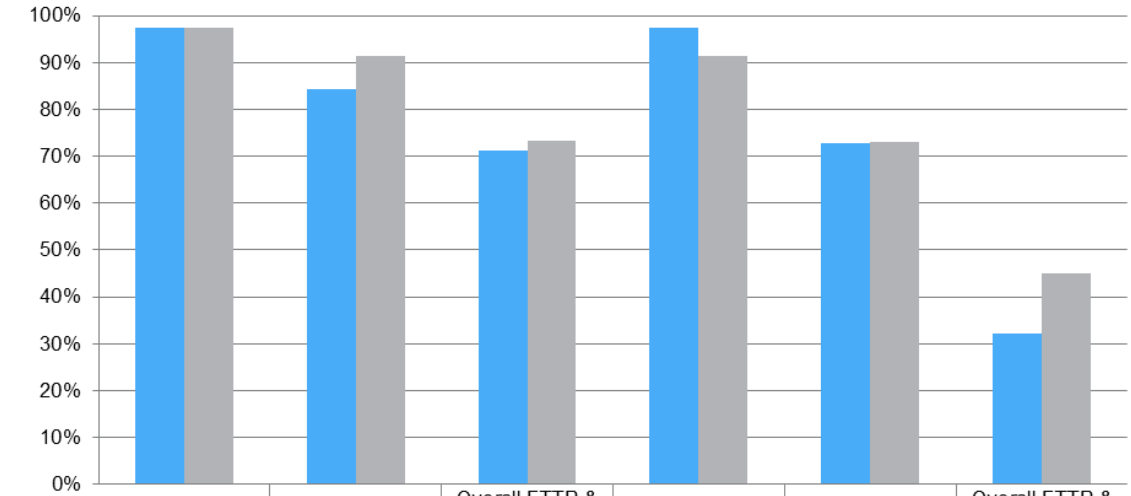
5.26 Slovakia

5.26.1 National coverage by broadband technology

97.4% of Slovak households were covered by at least one broadband technology by the end of June 2022, unchanged from the previous year. In rural regions, fixed broadband coverage improved by 0.2 percentage points and was available to 97.3% of rural households. While Slovakia exceeded the EU average in fixed broadband coverage, it remained below the EU average across the NGA and FTTP & DOCSIS 3.1 metrics. NGA coverage stood at 84.4% and 72.9% on national and rural level, respectively.

1Gbps-capable networks (FTTP & DOCSIS 3.1) were available to 71.3% of Slovak households by mid-2022, an improvement of 4.6 percentage points. In rural regions, FTTP and DOCSIS 3.1 rollouts progressed at fast pace, and covered one third (32.3%) of rural households, up by 10.7 percentage points compared to mid-2021.

Slovakia: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Slovakia	97.4%	84.4%	71.3%	97.3%	72.9%	32.3%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

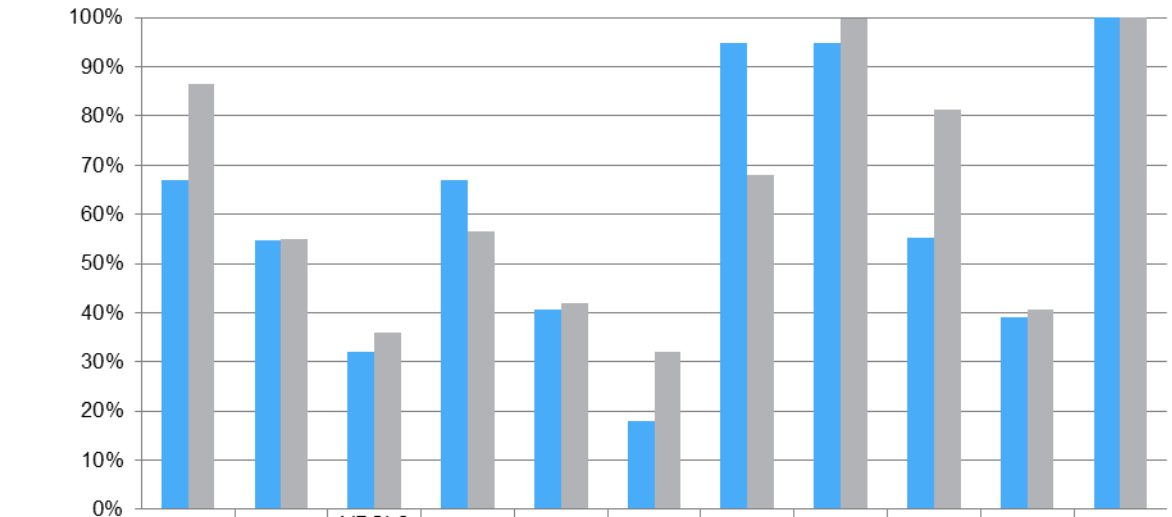
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Slovakia is one of the study countries with comparatively low DSL coverage (66.9%) and has seen a steady decline in coverage since 2020. Similarly to Czechia, FWA technologies provide connectivity to a large number of households (94.9%), which are typically offered by small and regional operators. DSL coverage declined by 4.6 percentage points over the twelve-month period as operators are focusing on FTTP upgrades. VDSL and VDSL2 Vectoring also saw a decline of 3.0 percentage points and 1.3 percentage points, respectively.

FTTP was available to two thirds (66.9%) of Slovak households and was the strongest growing technology in the country (+4.6 percentage points). Slovakia exceeded the EU average of 56.5% in FTTP coverage. In contrast, it remained below the EU average across both cable metrics, despite an improvement of 1.3 percentage points in DOCSIS 3.0 coverage. Around 44% of the entire cable network had been upgraded to DOCSIS 3.1 by the end of June 2022, covering 17.9% of households.

The pace of 5G rollouts accelerated over the study period, and coverage grew by 41.6 percentage points since mid-2021. More than half (55.3%) of Slovaks were covered by 5G networks by the end of June 2022, but despite the substantial improvement, Slovakia remained below the EU average of 81.2%. Looking at 5G provided via frequencies in the 3.4–3.8 GHz band, Slovakia also remained just below the EU average with 39.2% of households covered, compared to 40.7% on EU level.

Slovakia: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vectoring	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Slovakia	66.9%	54.7%	32.0%	66.9%	40.7%	17.9%	94.9%	94.8%	55.3%	39.2%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

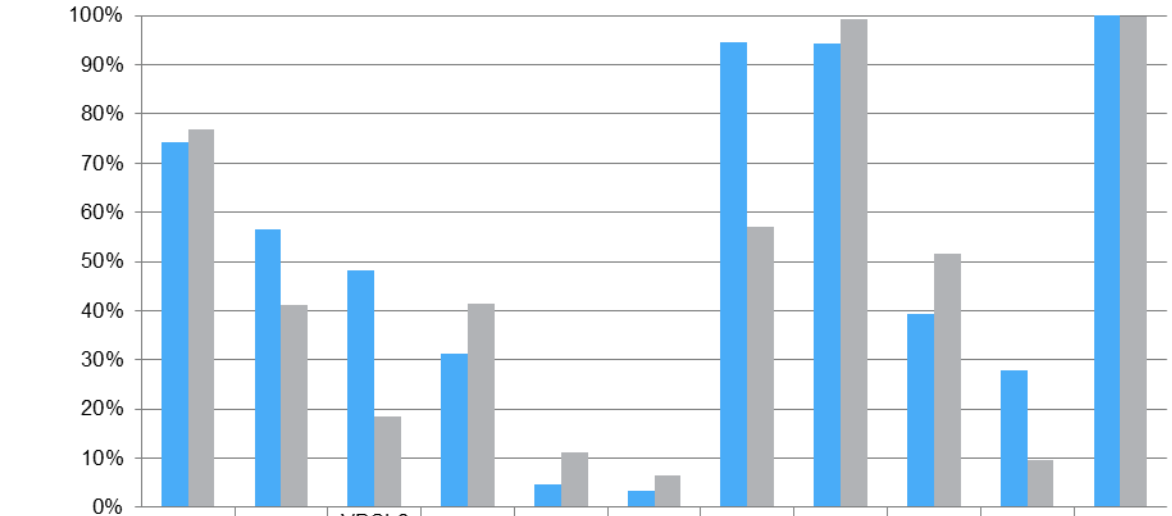
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural areas, FWA has traditionally been the most prevalent broadband technology, covering 94.6% of rural households at mid-2022, up by 0.3 p.p. year-on-year. DSL remained the second largest technology, with 74.2% of rural homes passed, but as seen on national level, followed a declining trend (–5.8 p.p.). VDSL and VDSL2 Vectoring was available to 56.6% and 48.1% of rural households, respectively.

FTTP coverage rose by 9.6 percentage points, making it the fastest growing technology in rural areas, covering almost one third (31.2%) of rural households. DOCSIS 3.0 networks were available to 4.6% of rural households, up by 2.0 percentage points compared to the prior year. DOCSIS 3.1 upgrades progressed at fast pace, with 71% of the entire cable footprint upgraded.

While 5G rollout had only just started in 2020/2021, operators accelerated the rollout pace in 2022 and covered 39.3% of rural households by mid-2022. 5G services in the 3.4–3.8 GHz band were available to 27.9% of rural households, which exceeded the EU average of 9.6%.

Slovakia: Coverage by technology, rural areas, 2022



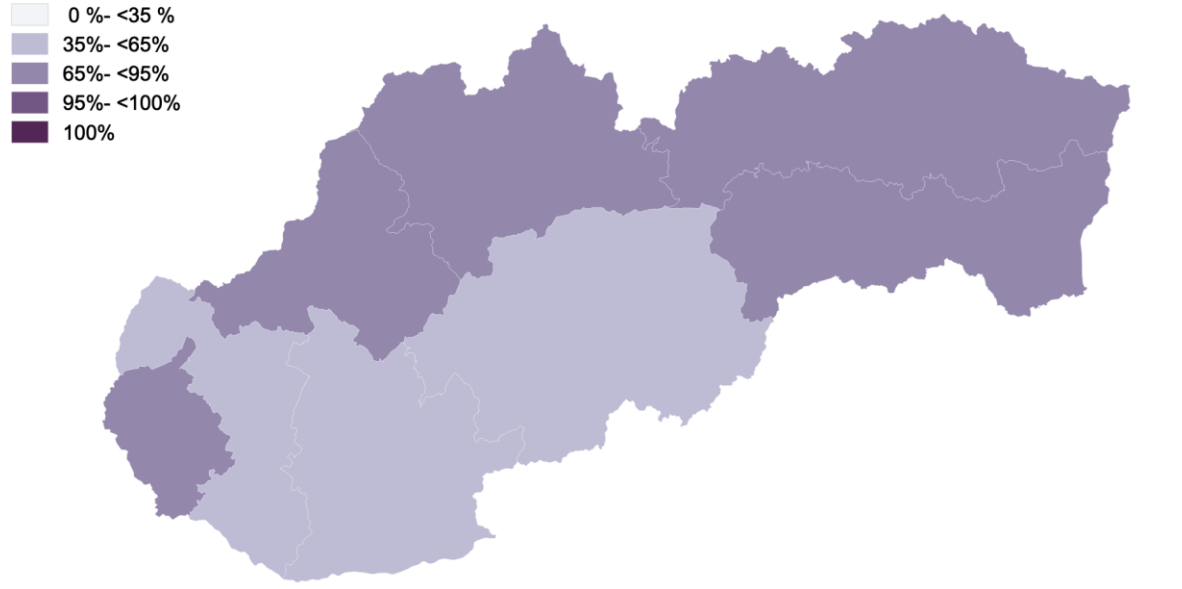
	DSL	VDSL	VDSL2 Vectoring	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Slovakia	74.2%	56.6%	48.1%	31.2%	4.6%	3.3%	94.6%	94.2%	39.3%	27.9%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.26.2 Regional coverage by broadband technology

FTTP & DOCSIS 3.1 coverage in Slovakia ranged from 62.1% in Nitriansky kraj to 90.6% in Bratislavský kraj. None of the regions exceeded the 95% threshold.

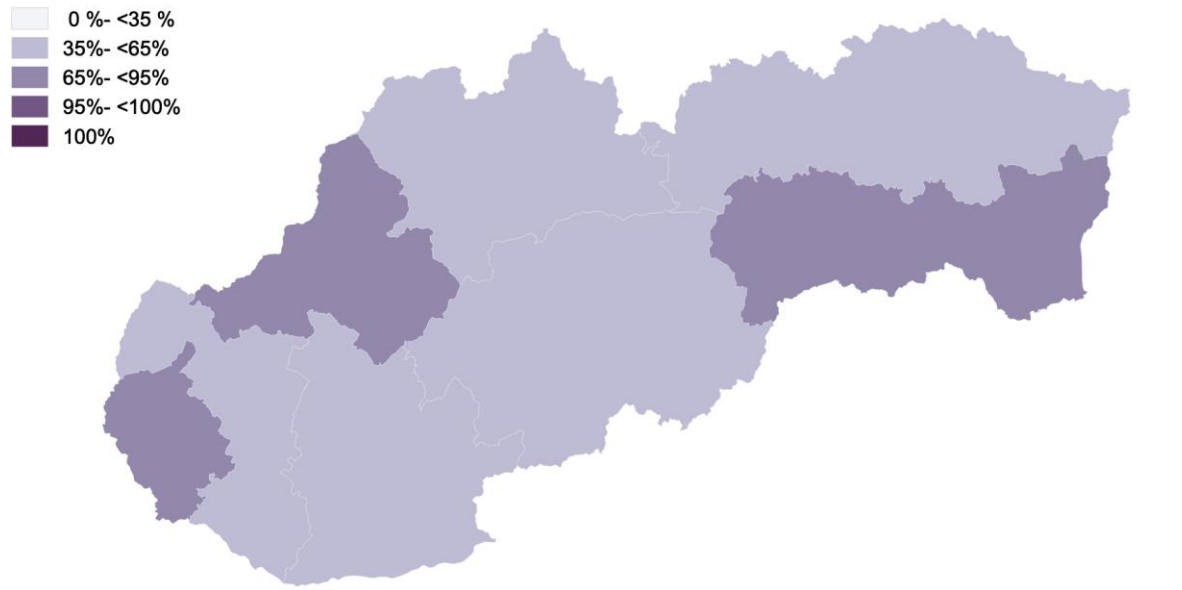
Slovakia: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Košický kraj (82.2%) and Bratislavský kraj (81.1%) recorded the highest levels of FTTP coverage, while Trnavský kraj (57.6%) was the region with the lowest availability of FTTP.

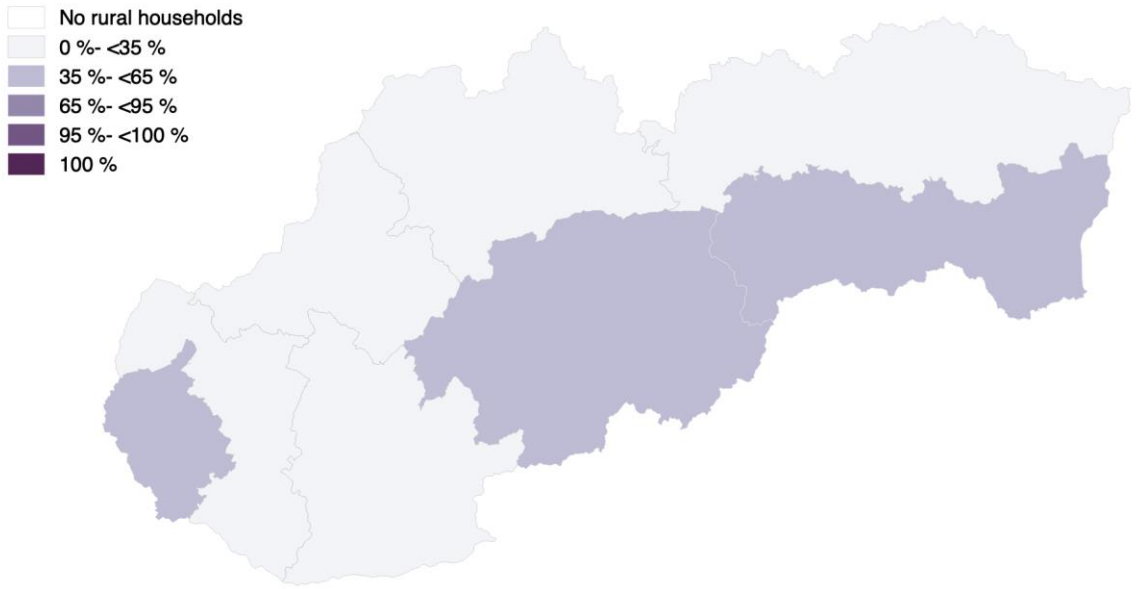
Slovakia: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Five out of eight Slovak regions recorded rural FTTP & DOCSIS 3.1 coverage below 35%, while Košický kraj, Banskobystrický kraj, and Bratislavský kraj were the three regions with the highest availability of rural FTTP & DOCSIS 3.1. None of the regions exceeded the 65% threshold.

Slovakia: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.26.3 Data tables for Slovakia

Statistic	National
Population	5,459,781
Persons per household	3.2
Rural proportion	33.5%

	Slovakia 2022		Slovakia 2021		Slovakia 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	66.9%	74.2%	71.5%	80.0%	77.0%	74.0%	86.6%	77.0%
VDSL	54.7%	56.6%	57.7%	60.2%	39.3%	46.4%	54.9%	41.2%
VDSL2 Vectoring	32.0%	48.1%	33.4%	51.0%	21.0%	34.0%	35.9%	18.4%
FTTP	66.9%	31.2%	62.3%	21.6%	49.2%	18.0%	56.5%	41.4%
Cable modem DOCSIS 3.0	40.7%	4.6%	39.4%	2.6%	32.9%	1.7%	41.8%	11.1%
Cable modem DOCSIS 3.1	17.9%	3.3%	17.4%	0.8%	9.7%	0%	31.9%	6.4%
FWA	94.9%	94.6%	94.8%	94.3%	94.8%	94.3%	67.9%	57.0%
LTE	94.8%	94.2%	98.4%	95.2%	98.4%	94.4%	99.8%	99.2%
5G	55.3%	39.3%	13.8%	2.4%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	39.2%	27.9%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	97.4%	97.3%	97.4%	97.1%	97.4%	97.2%	97.3%	91.4%
Overall NGA broadband	84.4%	72.9%	84.3%	79.5%	75.2%	56.1%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	71.3%	32.3%	66.7%	21.6%	50.2%	18.0%	73.4%	45.1%
At least 30Mbps	82.8%	-	82.3%	-	74.1%	-	91.7%	-
At least 100Mbps	80.2%	-	75.4%	-	61.9%	-	86.6%	-
At least 1Gbps	40.4%	-	28.0%	-	21.4%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

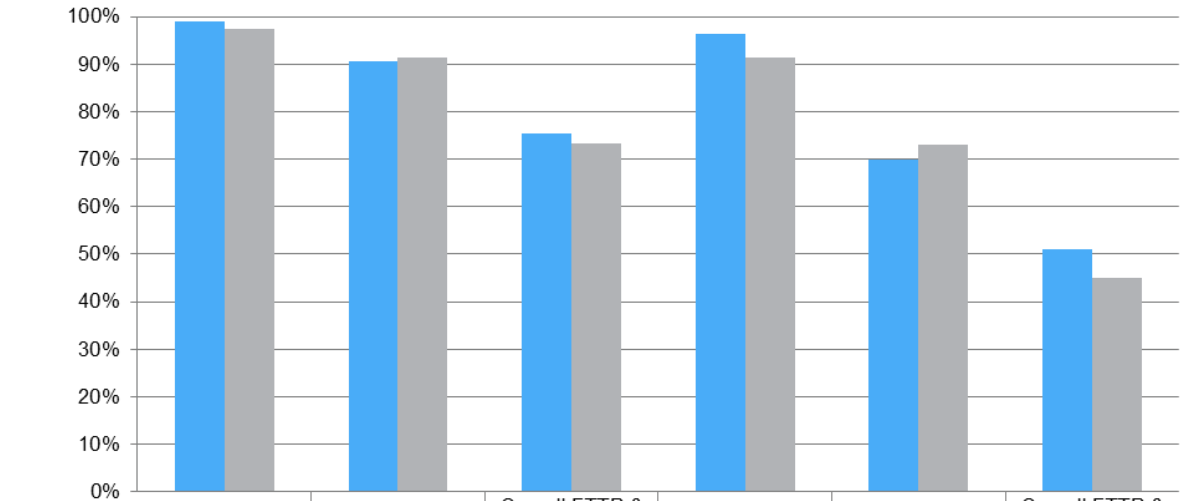
5.27 Slovenia

5.27.1 National coverage by broadband technology

99.0% of all Slovenian households and 96.3% of rural households had access to at least one fixed broadband technology by the end of June 2022. Compared to the previous year, fixed broadband coverage grew by 0.1 percentage points at national level, and by 0.3 percentage points at rural level. NGA coverage increased by 1.0 percentage points and 2.9 percentage points on national and rural level, respectively, but remained slightly below EU average.

1Gbps-capable networks were accessible to three quarters (75.5%) of Slovenian households by mid-2022, up by 3.1 percentage points compared to the prior year. In rural Slovenia, more than half (51.0%) of rural homes were passed by gigabit networks, up by 4.6 percentage points compared to June 2021. The combined FTTP & DOCSIS 3.1 category remained limited to FTTP only, as there was no record of DOCSIS 3.1 deployments by the end of June 2022. The widespread availability of FTTP networks enabled Slovenia to outperform the EU average in this metric.

Slovenia: Coverage by technology combination, 2022



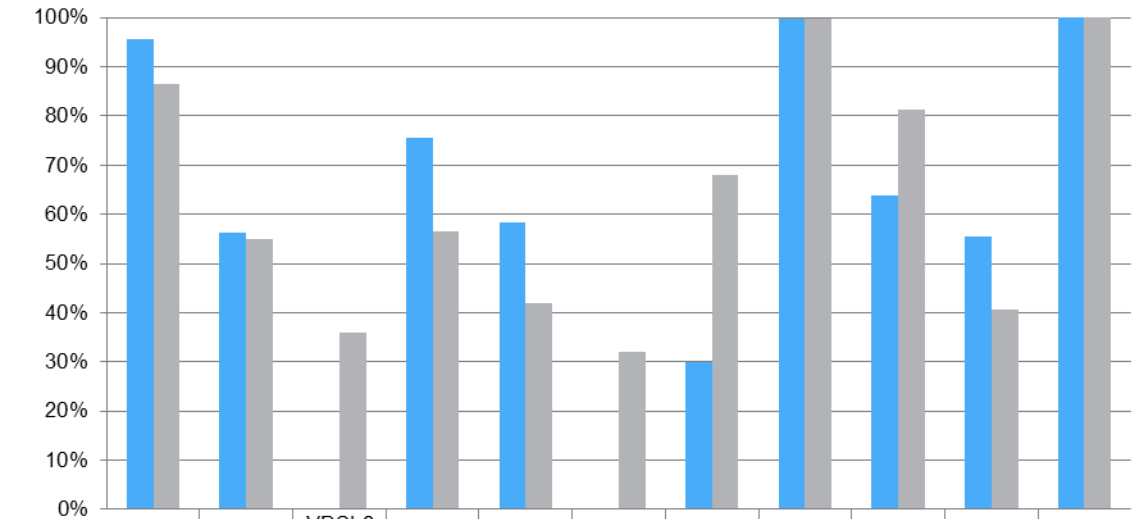
	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Slovenia	99.0%	90.5%	75.5%	96.3%	70.0%	51.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the most prevalent individual technology in Slovenia, covering 95.6% of households. VDSL was available to 56.2% of households, while no upgrades to VDSL2 Vectoring had taken place by mid-2022. FTTP recorded the strongest growth among broadband technologies (3.1 percentage points), while the availability of DOCSIS 3.0 remained mostly unchanged at 58.4%. None of the operators had upgraded their cable networks to DOCSIS 3.1 standard by mid-2022.

The pace of 5G network deployments accelerated over the twelve-month period and coverage stood at 63.9% by mid-2022, up by 27.3 percentage points. While Slovenia remained below the EU average in the overall 5G metric, the country exceeded the EU average by 14.7 percentage points in 3.4–3.8 GHz 5G coverage. This reflects an extensive use of frequencies in this band which covered 86.7% of the overall 5G footprint. LTE coverage remained almost universal at 99.8%.

Slovenia: Coverage by technology, total, 2022



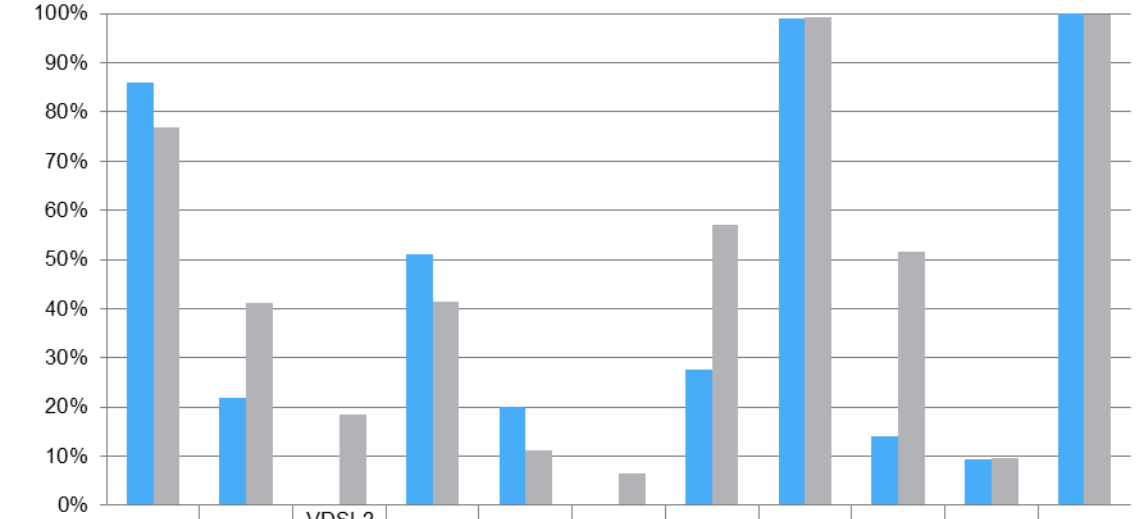
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Slovenia	95.6%	56.2%	0%	75.5%	58.4%	0%	29.9%	99.8%	63.9%	55.4%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural Slovenia, DSL was available to 86.1% of households, while 21.8% of households were covered by VDSL networks by mid-2022. In terms of NGA broadband technologies, FTTP remained the leading technology, covering just over half (51.0%) of rural households, and performed 9.6 percentage points above the EU average. DOCSIS 3.0 networks were available to one fifth (20.1%) of rural homes, up by 0.8 percentage points compared to the prior year.

5G coverage grew by 11.3 percentage points over the twelve-month period, but despite good progress, Slovenia remained below the EU average, with a gap of 37.3 percentage points. As seen on national level, large parts of rural 5G networks (65.5%) rely on frequencies in the 3.4–3.8 GHz band, enabling coverage for 9.3% of rural households using this band. LTE coverage stood at 99.0% by the end of June 2022.

Slovenia: Coverage by technology, rural areas, 2022



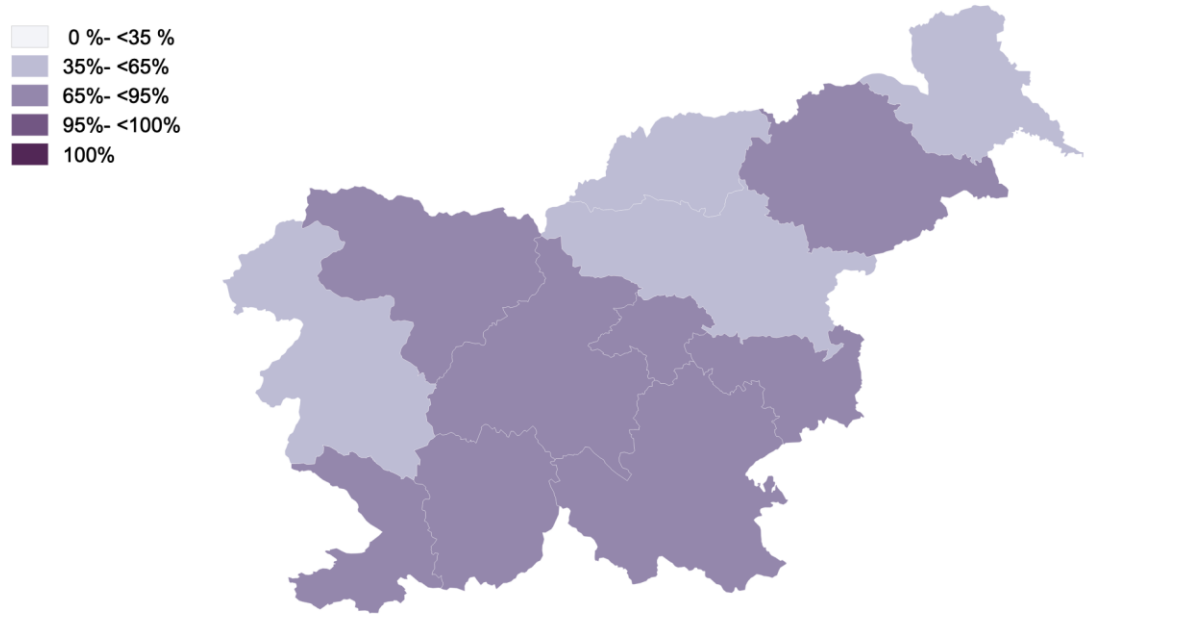
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Slovenia	86.1%	21.8%	0%	51.0%	20.1%	0%	27.5%	99.0%	14.1%	9.3%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.27.2 Regional coverage by broadband technology

FTTP & DOCSIS 3.1 coverage ranged from 49.5% in Savinjska to 90.1% in Osrednjeslovenska. None of the Slovenian regions exceeded the 95% threshold but eight out of twelve regions exceeded the 65% threshold.

Slovenia: FTTP & DOCSIS 3.1 coverage, 2022

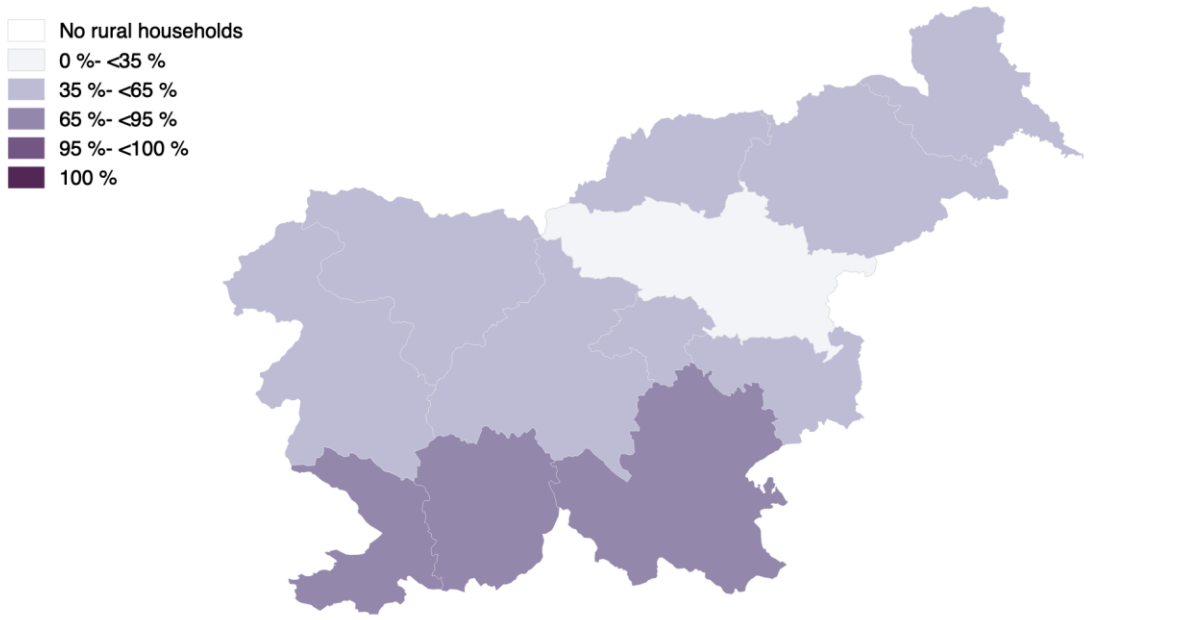


Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since there are no DOCSIS 3.1 services in Slovenia, the FTTP coverage is identical to coverage for the FTTP & DOCSIS 3.1 combined category.

Primorsko-notranjska (89.8%), Obalno-kraška (84.5%), and Jugovzhodna Slovenija (79.6%), recorded the highest level of rural FTTP & DOCSIS 3.1 coverage, while Savinjska was the only region that failed to surpass the 35% threshold.

Slovenia: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.27.3 Data tables for Slovenia

Statistic	National
Population	2,108,977
Persons per household	3.0
Rural proportion	22.5%

	Slovenia 2022		Slovenia 2021		Slovenia 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	95.6%	86.1%	95.8%	86.5%	95.9%	86.8%	86.6%	77.0%
VDSL	56.2%	21.8%	56.6%	22.0%	56.2%	21.9%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	75.5%	51.0%	72.5%	46.4%	65.6%	39.0%	56.5%	41.4%
Cable modem DOCSIS 3.0	58.4%	20.1%	58.5%	19.3%	58.7%	19.8%	41.8%	11.1%
Cable modem DOCSIS 3.1	0%	0%	0%	0%	0%	0%	31.9%	6.4%
FWA	29.9%	27.5%	29.7%	27.4%	36.2%	33.3%	67.9%	57.0%
LTE	99.8%	99.0%	99.9%	99.8%	99.9%	99.7%	99.8%	99.2%
5G	63.9%	14.1%	36.6%	2.8%	0%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	55.4%	9.3%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.0%	96.3%	98.9%	96.0%	98.9%	96.0%	97.3%	91.4%
Overall NGA broadband	90.5%	70.0%	89.5%	67.0%	87.6%	62.7%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	75.5%	51.0%	72.4%	46.4%	65.6%	39.0%	73.4%	45.1%
At least 30Mbps	90.5%	-	89.5%	-	87.6%	-	91.7%	-
At least 100Mbps	87.2%	-	85.5%	-	82.1%	-	86.6%	-
At least 1Gbps	0.9%	-	0.9%	-	0.8%	-	70.2%	-
At least 1Gbps upload and download	0.9%	-	0.9%	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

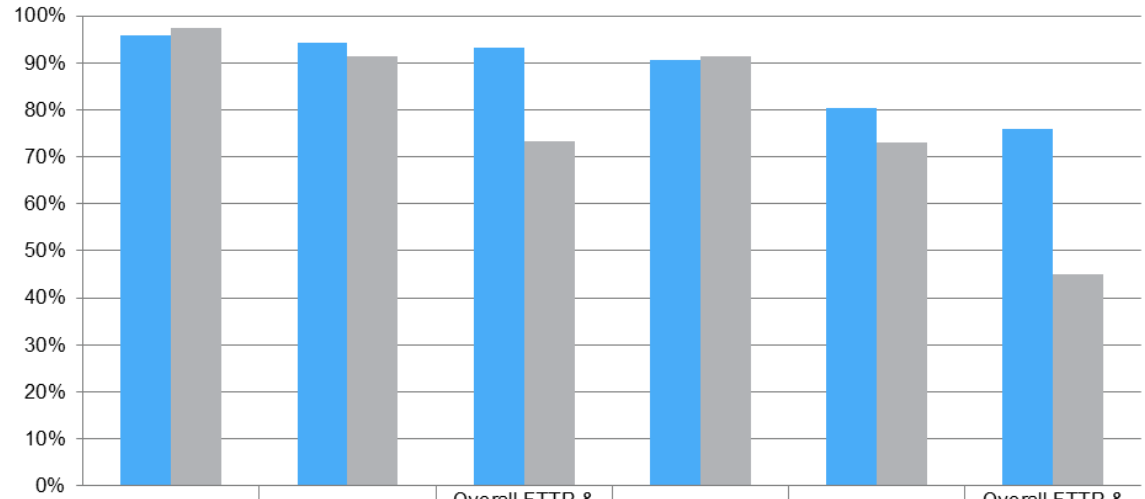
5.28 Spain

5.28.1 National coverage by broadband technology

96.0% of Spanish households were covered by at least one broadband technology by mid-2022, while 90.6% of households were covered in rural regions. Spain performed slightly below the EU average in terms of fixed broadband access both on national and rural level but exceeded the EU average in terms of NGA and FTTP & DOCSIS 3.1 coverage. NGA coverage stood at 94.1% and 80.4% on national and rural level, respectively.

Spain continued to grow the availability of 1Gbps-capable networks in rural regions (+4.5 percentage points) which was primarily driven by an accelerated pace of FTTP rollouts. With 76.0% of rural homes passed, Spain exceeded the FTTP & DOCSIS 3.1 EU average by 30.9 percentage points. On national level, coverage stood at 93.3%.

Spain: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Spain	96.0%	94.1%	93.3%	90.6%	80.4%	76.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

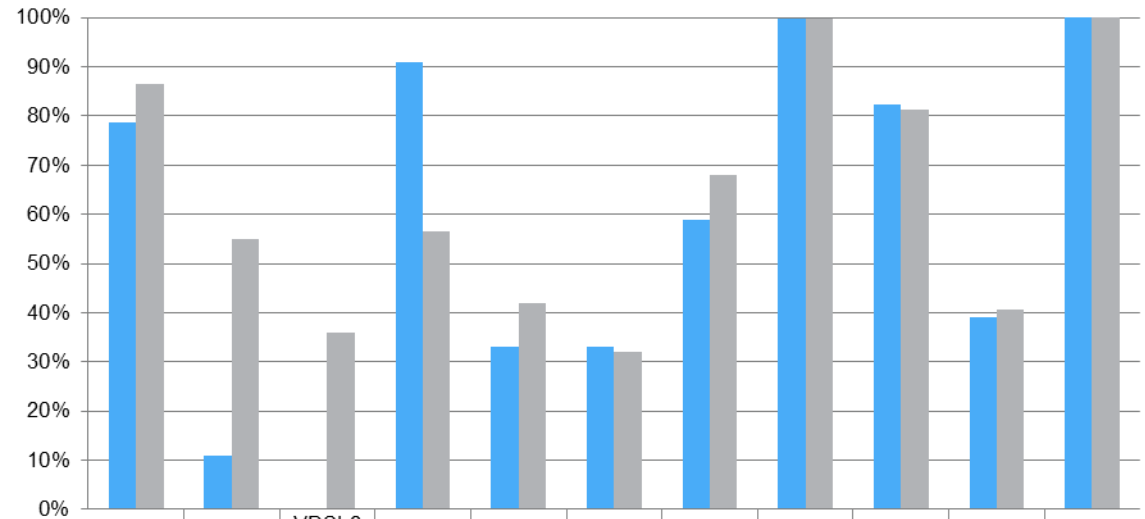
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP was the most prevalent broadband technology in Spain and coverage grew by 2.1 percentage points compared to mid-2021. With 91.0% of homes passed, Spain recorded the second highest FTTP coverage among study countries, just after Romania. Given the widespread availability of FTTP networks, Spanish cable operators have started to migrate customers to FTTP where available and some cable operators also switched to deploy FTTP themselves. This trend was reflected in a 5.4 percentage point decline in DOCSIS 3.0 and DOCSIS 3.1 coverage, both of which were available to one third (33.0%) of Spanish households by mid-2022.

DSL coverage declined by 10.1 percentage points over the twelve-month period, with 78.7% of homes passed by the end of June 2022. As Spanish operators focused on FTTP deployment rather than copper upgrades, the proportion of VDSL networks remained low (14.0%), while VDSL2 Vectoring had not been deployed by mid-2022. FWA was available to 58.8% of households, up by 23.5 percentage points on a year-on-year comparison.

Spanish operators accelerated the pace of 5G deployment and covered 82.3% of households by mid-2022. The year-on-year increase of 23.4 percentage points enabled Spain to surpass the EU 5G average for the first time in this year's study, but it remained slightly below the EU average in 3.4–3.8 GHz 5G. Coverage via this band stood at 39.1% in Spain, compared to 40.7% in the EU as a whole.

Spain: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Spain	78.7%	11.0%	0%	91.0%	33.0%	33.0%	58.8%	99.9%	82.3%	39.1%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

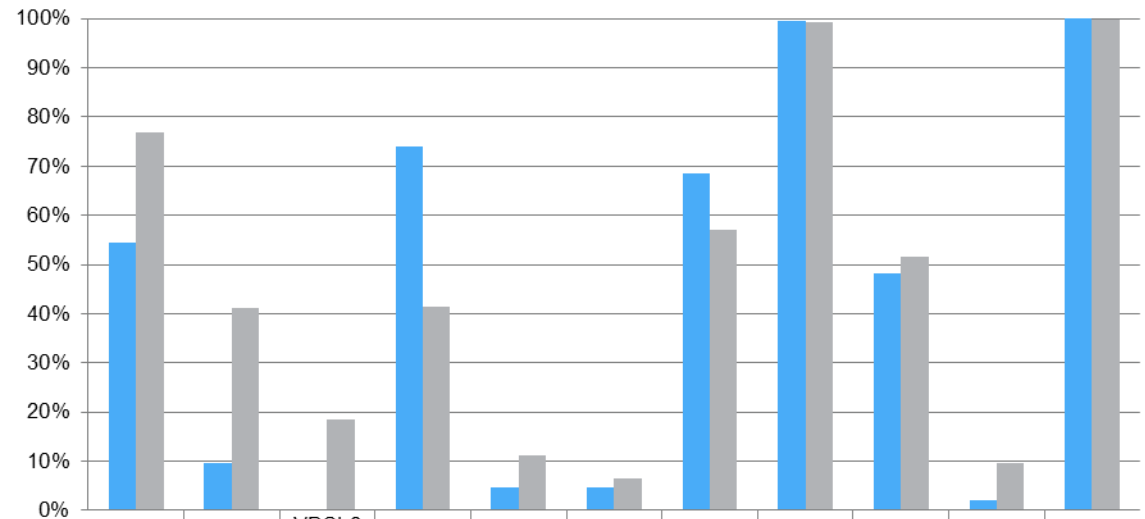
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

FTTP was also the most prevalent broadband technology in rural Spain, covering 73.9% of rural households by the end of June 2022. With a 32.5 percentage point gap to the EU average, Spain recorded the sixth highest FTTP coverage among participating countries in this year's study. FWA became available to more than two thirds (68.5%) of Spanish households, up by 6.3 percentage points compared to mid-2021.

As seen on national level, coverage of legacy cable and copper networks also declined in rural areas. By mid-2022, DSL and DOCSIS 3.0/3.1 coverage stood at 54.5% and 4.6%, respectively.

5G coverage stood at 48.3% which represents an increase of 23.5 percentage points on a year-on-year basis. Rural 5G coverage on the 3.4–3.8 GHz spectrum band remained marginal at 1.9%. Spain remained below the EU average across both 5G metrics.

Spain: Coverage by technology, rural areas, 2022

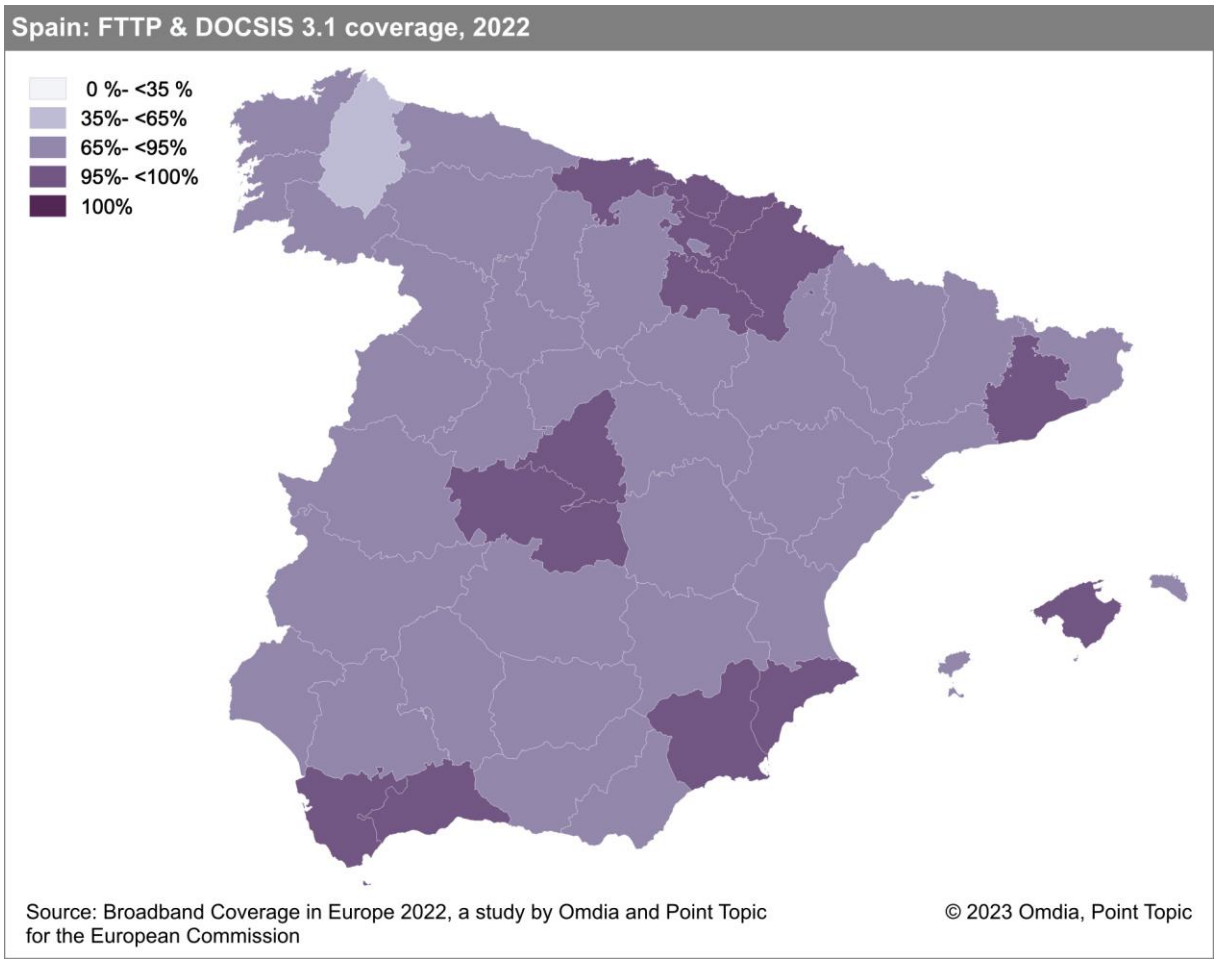


	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Spain	54.5%	9.6%	0%	73.9%	4.6%	4.6%	68.5%	99.5%	48.3%	1.9%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

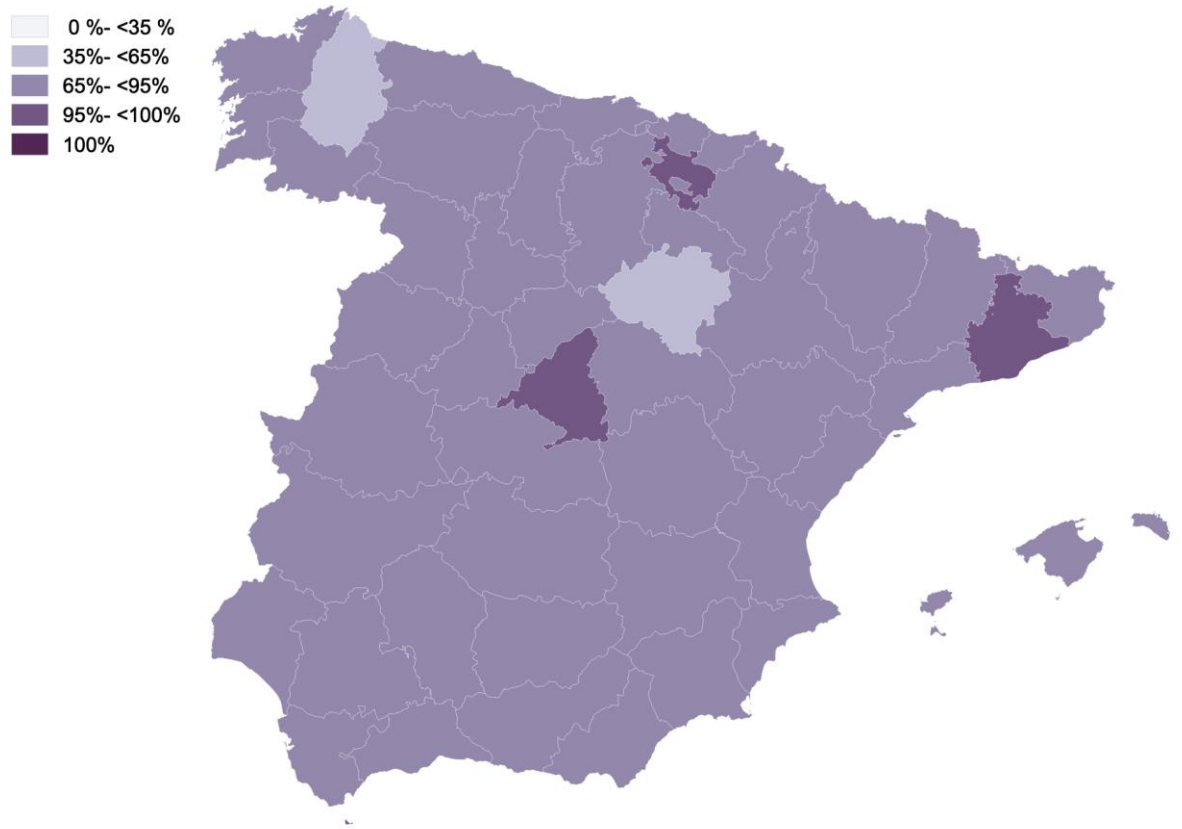
5.28.2 Regional coverage by broadband technology

19 out of 59 regions surpassed the 95% threshold in terms of FTTP & DOCSIS 3.1 coverage, with the highest availability in Melilla (99.8%), Ceuta (99.3%), and Madrid (99.2%). Lugo was the only region that recorded coverage below 65%.



Five regions – Araba/Álava, Madrid, Barcelona, Ceuta, and Melilla – recorded FTTP coverage above 95%, while Lugo and Soria were the only two regions that fell below the 65% threshold.

Spain: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The majority of Spanish regions (42 out of 59) recorded rural FTTP & DOCSIS 3.1 coverage between 65%–95%. Eivissa y Formentera was the only region to exceed the 95% threshold, while Ceuta and Melilla were the only two regions that remained below 35%.

Spain: Rural FTTP & DOCSIS 3.1 coverage, 2022

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

The following broadband coverage levels were recorded in Spanish regions outside mainland Europe:

Coverage data for Spanish NUTS 3 areas outside mainland Europe

NUTS 3	Description	Total FTTP & DOCSIS 3.1	Total FTTP	Rural FTTP & DOCSIS 3.1
ES630	Ceuta	95% – <100%	95% – <100%	0% – <35%
ES640	Melilla	95% – <100%	95% – <100%	0% – <35%
ES703	El Hierro	65% – <95%	65% – <95%	65% – <95%
ES704	Fuerteventura	65% – <95%	65% – <95%	65% – <95%
ES705	Gran Canaria	95% – <100%	65% – <95%	65% – <95%
ES706	La Gomera	65% – <95%	65% – <95%	65% – <95%
ES707	La Palma	65% – <95%	65% – <95%	65% – <95%
ES708	Lanzarote	95% – <100%	65% – <95%	65% – <95%
ES709	Tenerife	95% – <100%	65% – <95%	65% – <95%

5.28.3 Data tables for Spain

Statistic	National
Population	47,398,695
Persons per household	2.6
Rural proportion	16.7%

	Spain 2022		Spain 2021		Spain 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	78.7%	54.5%	88.8%	85.4%	89.1%	83.1%	86.6%	77.0%
VDSL	11.0%	9.6%	11.9%	16.0%	11.6%	15.1%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	91.0%	73.9%	88.9%	68.9%	84.9%	59.5%	56.5%	41.4%
Cable modem DOCSIS 3.0	33.0%	4.6%	38.4%	6.3%	45.8%	10.8%	41.8%	11.1%
Cable modem DOCSIS 3.1	33.0%	4.6%	38.4%	6.3%	45.8%	10.8%	31.9%	6.4%
FWA	58.8%	68.5%	35.3%	62.3%	35.5%	64.0%	67.9%	57.0%
LTE	99.9%	99.5%	99.9%	100.0%	99.9%	99.3%	99.8%	99.2%
5G	82.3%	48.3%	58.9%	24.8%	12.5%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	39.1%	1.9%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	96.0%	90.6%	96.4%	93.8%	95.5%	92.9%	97.3%	91.4%
Overall NGA broadband	94.1%	80.4%	94.4%	78.6%	92.3%	70.1%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	93.3%	76.0%	93.8%	71.5%	91.7%	64.2%	73.4%	45.1%
At least 30Mbps	96.7%	-	96.2%	-	92.3%	-	91.7%	-
At least 100Mbps	91.2%	-	93.8%	-	91.7%	-	86.6%	-
At least 1Gbps	86.7%	-	92.5%	-	91.7%	-	70.2%	-
At least 1Gbps upload and download	83.3%	-	-	-	-	-	-	-

Note: The coverage declines in the speed categories (100Mbps and 1Gbps) was caused by a change in methodology in 2022. The decline in DOCSIS 3.0/3.1 was driven by migration to FTTP and decommissioning of DSL networks. The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

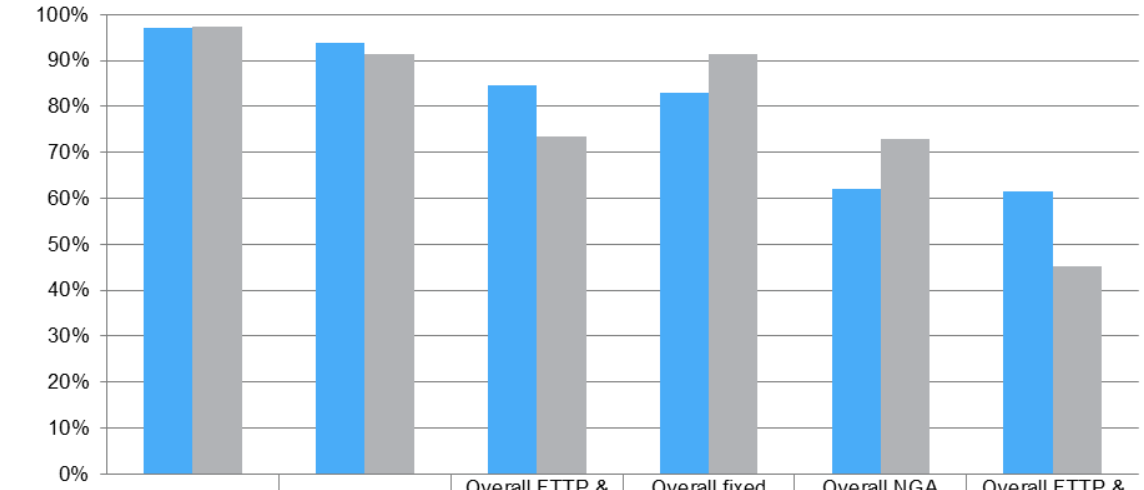
5.29 Sweden

5.29.1 National coverage by broadband technology

Fixed broadband coverage at the national level in Sweden remained in line with the EU average, with 97.2% of homes passed by at least one fixed broadband network at the end of June 2022. However, with just 82.9% of rural households having access to fixed broadband services, Sweden remained below the EU average of 91.4%. NGA broadband services were available to 94.0% of all households and 62.1% of rural households.

Overall coverage of FTTP & DOCSIS 3.1 remained significantly above the EU average at both rural and national level, owing to Sweden's high coverage of FTTP. By mid-2022, 84.6% of Swedish homes were passed by networks capable of delivering gigabit speeds, while such services were available to 61.4% or rural households.

Sweden: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Sweden	97.2%	94.0%	84.6%	82.9%	62.1%	61.4%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

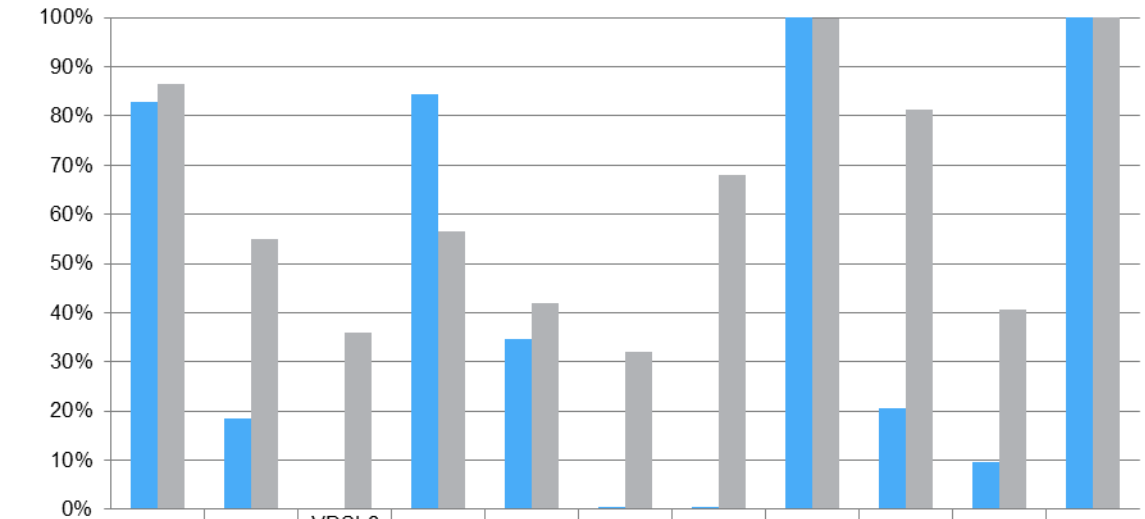
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

By mid-2022, FTTP overtook DSL as the leading broadband technology in Sweden, increasing by 2 p.p. and reaching 84.5% of households, compared to 82.8% of households covered by DSL networks. As the incumbent Telia continued with its deployment of fibre and gradual closing of copper networks, DSL decreased by 4.5 percentage points year-on-year, as did VDSL (by 1.6 percentage points). By the end of June 2022, 18.5% of Swedish households had access to VDSL broadband services. As in previous years, there were no VDSL2 Vectoring deployments reported in Sweden.

Cable modem DOCSIS 3.0 stood at 34.7% of homes passed at the end of June 2022. Meanwhile, although DOCSIS 3.1 upgrades have launched in Sweden, the technology's reach remains extremely limited, with only 0.3% of homes having access to the new standard.

With Sweden having achieved universal LTE coverage in mid-2017, mobile broadband coverage of Sweden did not change over the study period. The landscape is evolving due to the introduction of 5G, which had reached 20.5% of homes nationally at the end of June 2022, a moderate, 2.7 p.p. increase on the previous year. 5G services in the 3.4–3.8 GHz band were available to 9.7% of households.

Sweden: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Sweden	82.8%	18.5%	0%	84.5%	34.7%	0.3%	0.5%	100.0%	20.5%	9.7%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

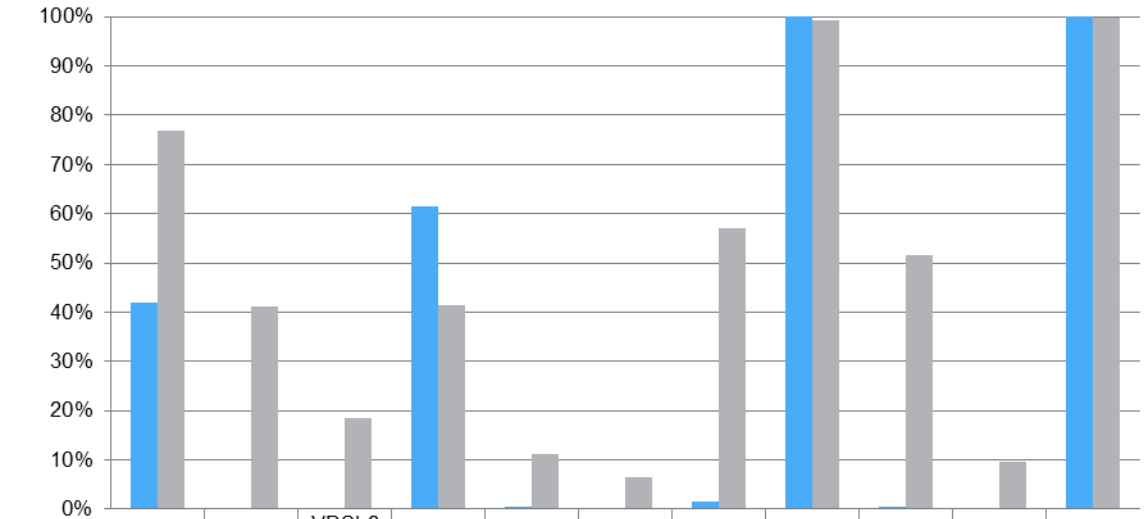
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Looking at broadband availability in rural Sweden, DSL coverage continued to fall, recording a 14.4 p.p. decrease compared to mid-2022. With just 41.8% of rural households covered by DSL networks, FTTP became the most prevalent access technology reaching 61.4% of rural Swedish households, following a 7.1 p.p. increase during the study period.

Rural VDSL and cable modem DOCSIS 3.0 coverage remained negligible, with both remaining below 1.0% of coverage, at 0.5% and 0.3% respectively.

As was the case on a national level, LTE coverage remained universal across rural Sweden, but rural 5G coverage continued to be minimal at 0.5% and just 0.1% were reached by 5G networks using the 3.4–3.8 GHz band.

Sweden: Coverage by technology, rural areas, 2022



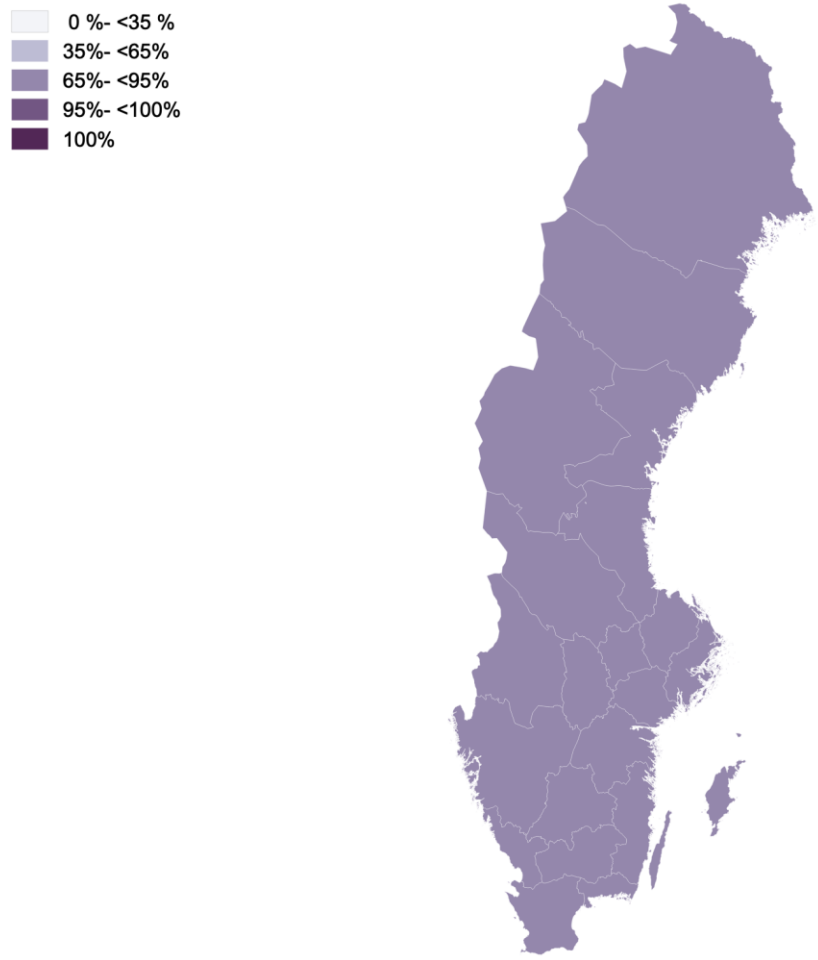
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Sweden	41.8%	0.3%	0%	61.4%	0.3%	0.0%	1.4%	100.0%	0.5%	0.1%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.29.2 Regional coverage by broadband technology

At the end of June 2022, combined FTTP & DOCSIS 3.1 coverage (which in the absence of DOCSIS 3.1 equals FTTP coverage) in all Swedish regions fell between 76% and 91%, with the capital region of Stockholm recording the highest coverage level.

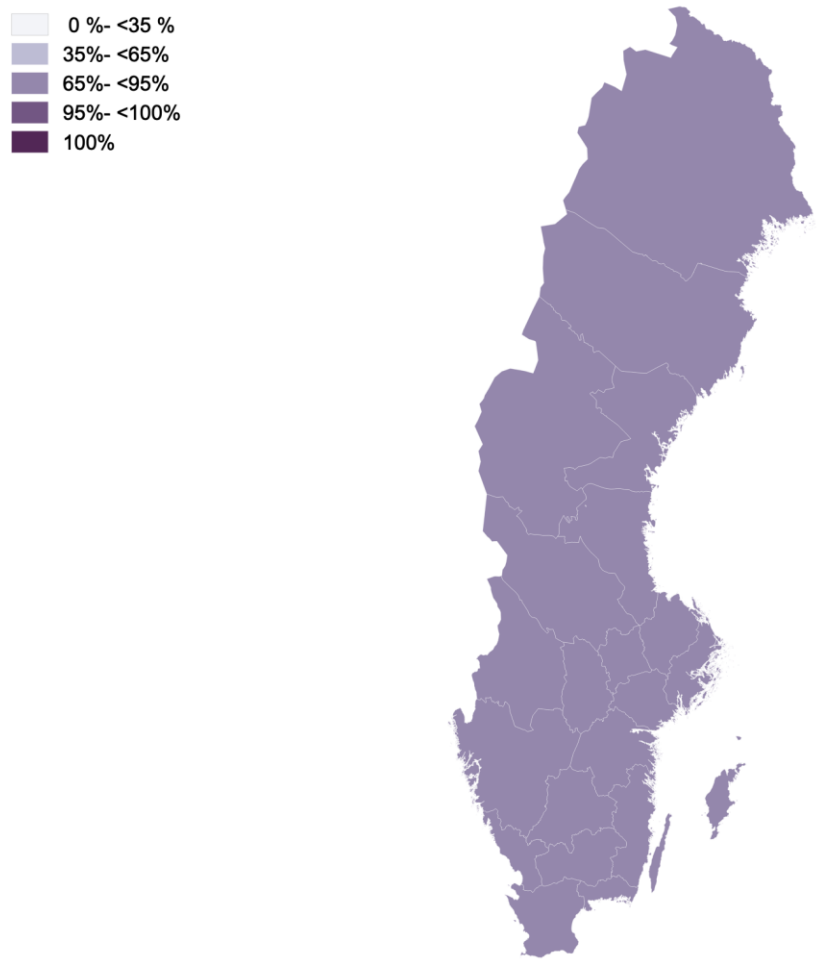
Sweden: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Since coverage of DOCSIS 3.1 remains very limited in Sweden, regional FTTP coverage shows a similar pattern to the combined FTTP and DOCSIS 3.1 coverage.

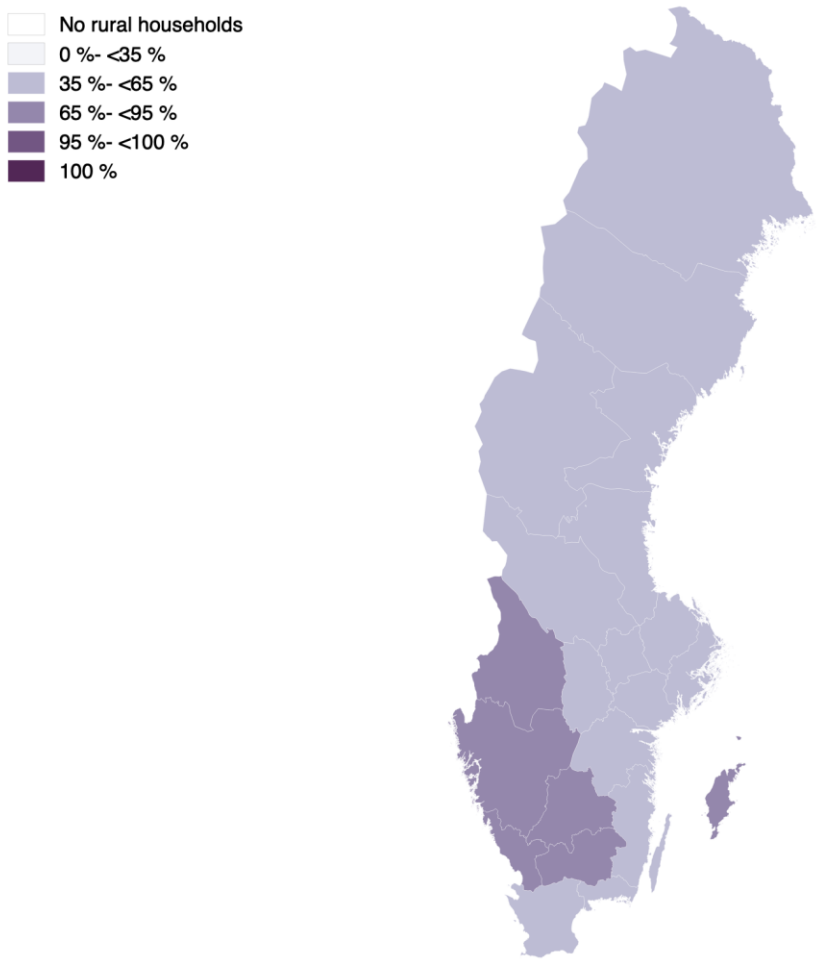
Sweden: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In terms of rural FTTP & DOCSIS 3.1 coverage, the southern regions of Jönköpings län, Kronobergs län, Hallands län, Västra Götalands län, and Värmlands län all recorded coverage levels higher than 65% of rural households.

Sweden: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.29.3 Data tables for Sweden

Statistic	National
Population	10,379,295
Persons per household	2.4
Rural proportion	15.6%

	Sweden 2022		Sweden 2021		Sweden 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	82.8%	41.8%	87.4%	56.2%	88.9%	62.4%	86.6%	77.0%
VDSL	18.5%	0.3%	20.1%	0.5%	21.0%	0.7%	54.9%	41.2%
VDSL2 Vectoring	0%	0%	0%	0%	0%	0%	35.9%	18.4%
FTTP	84.5%	61.4%	82.5%	54.3%	80.5%	48.1%	56.5%	41.4%
Cable modem DOCSIS 3.0	34.7%	0.3%	35.8%	0.3%	37.3%	0.3%	41.8%	11.1%
Cable modem DOCSIS 3.1	0.3%	0.0%	0.4%	0.0%	0.3%	0.0%	31.9%	6.4%
FWA	0.5%	1.4%	0.4%	0.6%	0.2%	0.4%	67.9%	57.0%
LTE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.8%	99.2%
5G	20.5%	0.5%	17.7%	0.5%	13.6%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	9.7%	0.1%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	97.2%	82.9%	97.6%	80.6%	97.7%	81.3%	97.3%	91.4%
Overall NGA broadband	94.0%	62.1%	85.6%	54.6%	87.5%	48.4%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	84.6%	61.4%	82.5%	54.3%	80.5%	48.1%	73.4%	45.1%
At least 30Mbps	95.5%	-	88.9%	-	87.5%	-	91.7%	-
At least 100Mbps	88.2%	-	86.7%	-	85.1%	-	86.6%	-
At least 1Gbps	84.5%	-	82.5%	-	80.5%	-	70.2%	-
At least 1Gbps upload and download	84.5%	-	0%	-	-	-	-	-

Note: Because of the NRA's data collection cycles, data for Sweden each year represents the most recent available data, which is for 1st October of the previous year, e.g. the 2022 figures represent the state of broadband coverage at 1st October 2021. The 2021 and 2020 figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

5.30 Switzerland

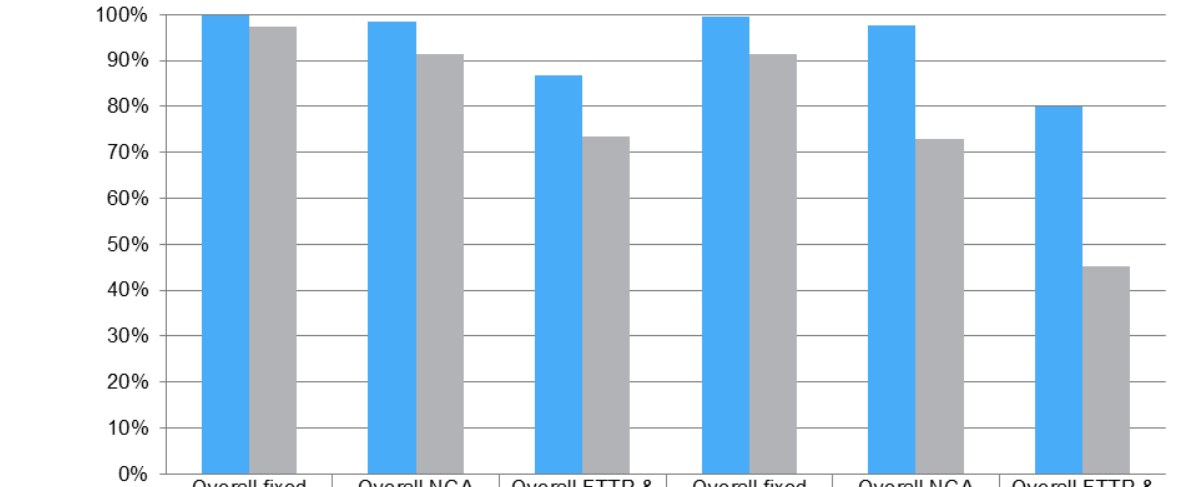
5.30.1 National coverage by broadband technology

As in previous years, research on broadband coverage in Switzerland was included in the BCE study thanks to additional funding provided by Glasfasernetz Schweiz, a Swiss fibre optic industry association.

Almost all Swiss households (99.9%) were able to access at least one broadband technology by mid-2022, which was unchanged from last year. In rural regions, broadband services passed 99.6% of rural homes. NGA networks were available to 98.4% and 97.7% of households on national and rural level, respectively. The combined FTTP & DOCSIS 3.1 networks covered 86.8% of all Swiss households and 80.0% of rural households.

Switzerland exceeded the EU average across all combination categories, both on national and rural levels.

Switzerland: Coverage by technology combination, 2022



	Overall fixed broadband (total)	Overall NGA broadband (total)	Overall FTTP & DOCSIS 3.1 (total)	Overall fixed broadband (rural)	Overall NGA broadband (rural)	Overall FTTP & DOCSIS 3.1 (rural)
Switzerland	99.9%	98.4%	86.8%	99.6%	97.7%	80.0%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

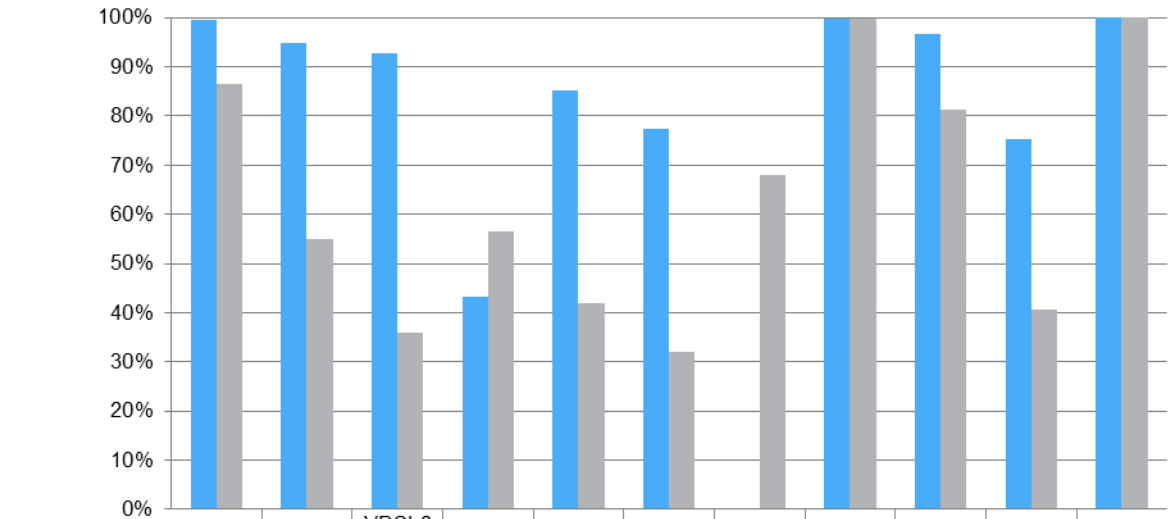
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

DSL remained the leading broadband technology in Switzerland, providing almost universal coverage (99.5%), as seen in previous years. Availability of high-speed copper-based technologies continued to be much higher than in other study countries: VDSL coverage expanded by 1.6 percentage points and reached 94.8% of households, while VDSL2 Vectoring networks passed 92.7% of homes. Switzerland recorded the highest VDSL2 Vectoring coverage in this year's study and came fourth in terms of VDSL coverage.

DOCSIS 3.0 services were available to 85.2% of households by mid-2022. The majority of cable networks have been upgraded to DOCSIS 3.1 standard, which was available to 77.4% of Swiss households. FTTP was the only broadband technology that performed below EU average, with 43.1% of Swiss homes passed, compared to the EU average of 56.5%, this is despite a 3 percentage point growth in FTTP coverage compared to mid-2021.

Switzerland provided universal LTE coverage (100.0%) and passed 96.8% of Swiss households with 5G technology. Switzerland was the first European country to launch 5G services in April 2019. 5G services utilizing the 3.4–3.8 GHz frequency band were available to three-quarters (75.3%) of Swiss households, leading Switzerland to rank third highest in this category.

Switzerland: Coverage by technology, total, 2022



	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Switzerland	99.5%	94.8%	92.7%	43.1%	85.2%	77.4%	0%	99.9%	96.8%	75.3%	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

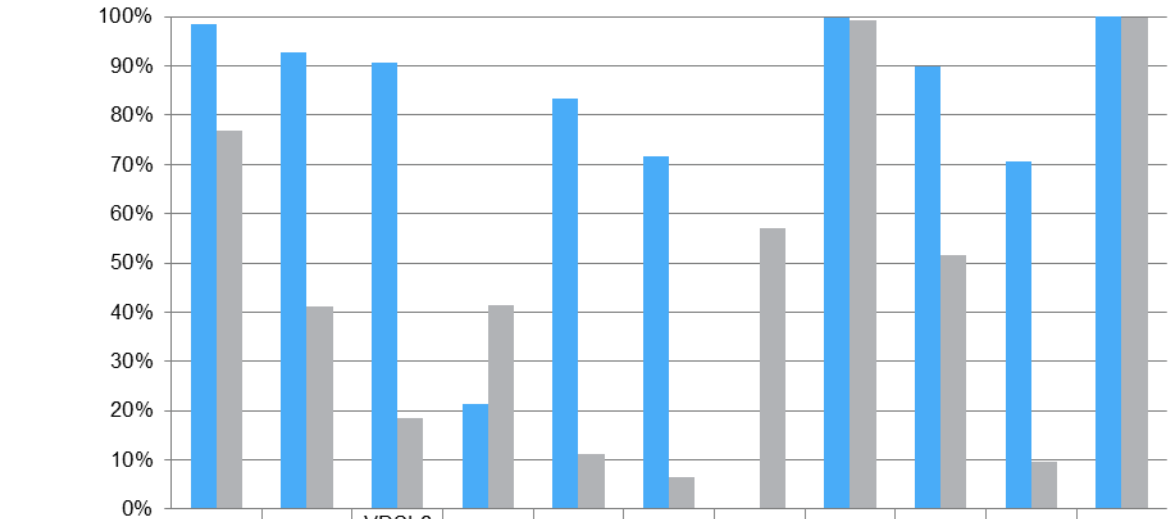
Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural regions, DSL remained the most widespread technology with 98.4% of rural households covered, unchanged from last year. VDSL coverage (92.7%) was more than double the average EU level (41.2%), while VDSL2 Vectoring (90.6%) was almost five times higher than the EU average (18.4%).

Cable modem DOCSIS 3.0 passed 83.3% of rural homes, an improvement of 1.0 percentage point compared to mid-2021. Availability of DOCSIS 3.1 increased by 3.3 percentage points and covered 71.5% of rural households. FTTP coverage remained low compared to other NGA technologies as only 21.3% of rural homes were passed by FTTP networks.

At the end of June 2022, 5G services were available to nine in ten rural Swiss households, while seven in ten were covered by 5G networks using the 3.4–3.8 GHz band.

Switzerland: Coverage by technology, rural areas, 2022



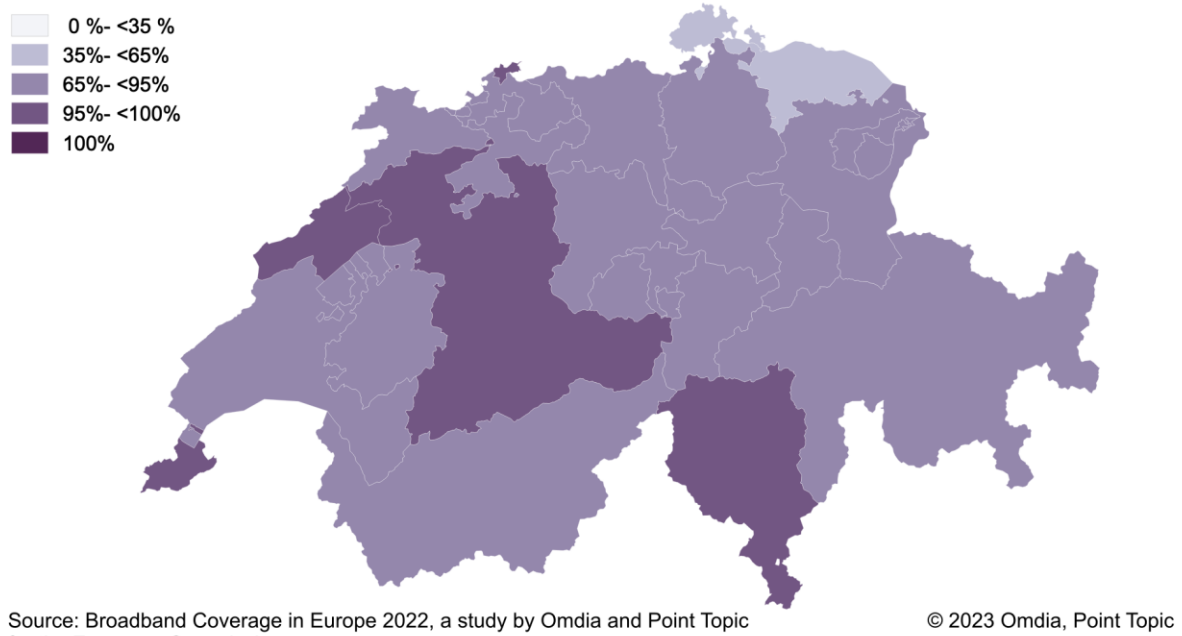
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
Switzerland	98.4%	92.7%	90.6%	21.3%	83.3%	71.5%	0%	99.8%	90.0%	70.6%	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.30.2 Regional coverage by broadband technology

The combined FTTP & DOCSIS 3.1 coverage levels varied greatly across the Swiss cantons, with the Genève, Bern, Neuchâtel, and Basel-Stadt cantons all recoding coverage higher than 95%, while the Schaffhausen and Thurgau cantons seeing coverage below 60%.

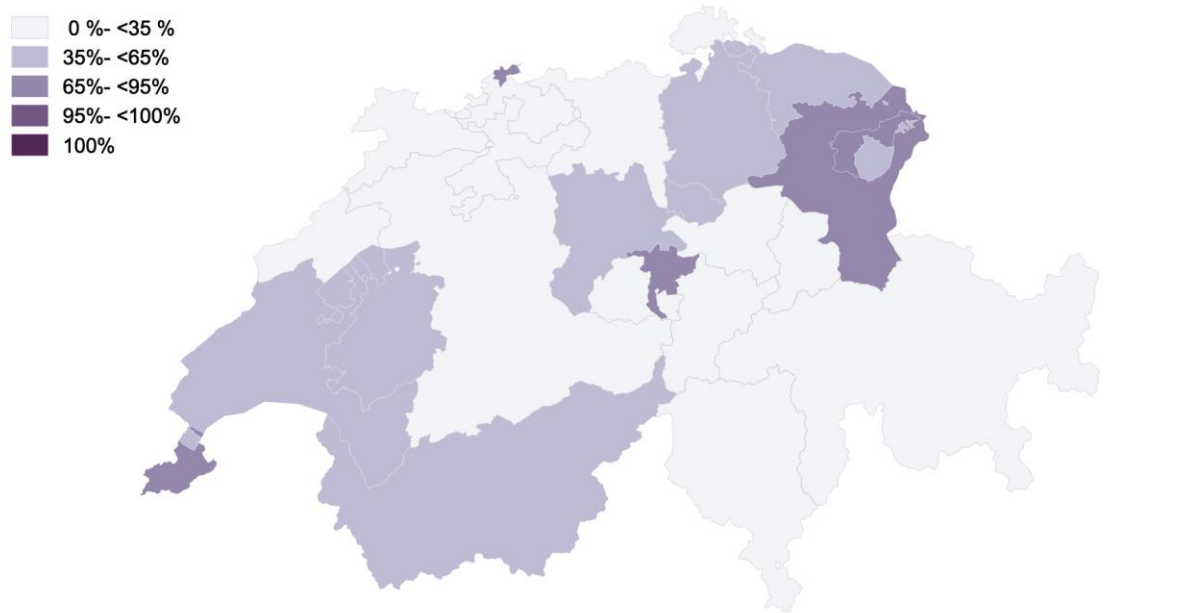
Switzerland: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

With FTTP deployments being limited in Switzerland, 13 cantons recorded FTTP coverage lower than 35%. On the other hand, Basel-Stadt and Genève cantons reached 92.0% and 89.7% FTTP coverage, respectively.

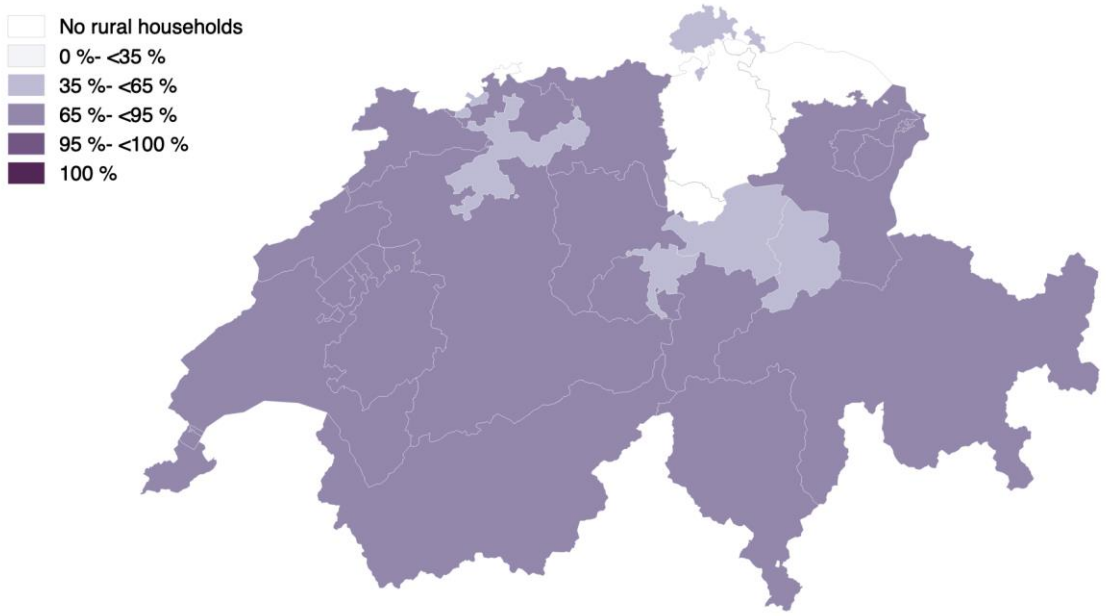
Switzerland: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Rural FTTP & DOCSIS 3.1 coverage also varied significantly among Swiss cantons, ranging from 48.2% in Schwyz to 92.5% in Genève and Bern.

Switzerland: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.30.3 Data tables for Switzerland

Statistic	National
Population	8,670,300
Persons per household	2.2
Rural proportion	13.0%

	Switzerland 2022		Switzerland 2021		Switzerland 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.5%	98.4%	99.5%	98.4%	99.5%	98.4%	86.6%	77.0%
VDSL	94.8%	92.7%	93.2%	89.3%	90.9%	85.8%	54.9%	41.2%
VDSL2 Vectoring	92.7%	90.6%	90.7%	86.3%	87.3%	81.4%	35.9%	18.4%
FTTP	43.1%	21.3%	40.2%	21.1%	39.7%	20.4%	56.5%	41.4%
Cable modem DOCSIS 3.0	85.2%	83.3%	85.2%	82.2%	84.3%	79.6%	41.8%	11.1%
Cable modem DOCSIS 3.1	77.4%	71.5%	77.3%	68.2%	76.5%	64.2%	31.9%	6.4%
FWA	0%	0%	0%	0%	0%	0%	67.9%	57.0%
LTE	99.9%	99.8%	100.0%	99.9%	99.9%	99.9%	99.8%	99.2%
5G	96.8%	90.0%	94.6%	88.8%	89.2%	40.0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	75.3%	70.6%	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.9%	99.6%	99.9%	99.6%	99.9%	99.5%	97.3%	91.4%
Overall NGA broadband	98.4%	97.7%	98.9%	96.4%	99.0%	95.5%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	86.8%	80.0%	86.6%	77.0%	85.9%	73.5%	73.4%	45.1%
At least 30Mbps	99.8%	-	99.8%	-	99.8%	-	91.7%	-
At least 100Mbps	98.6%	-	98.6%	-	98.6%	-	86.6%	-
At least 1Gbps	65.6%	-	63.7%	-	62.9%	-	70.2%	-
At least 1Gbps upload and download	33.2%	-	32.7%	-	-	-	-	-

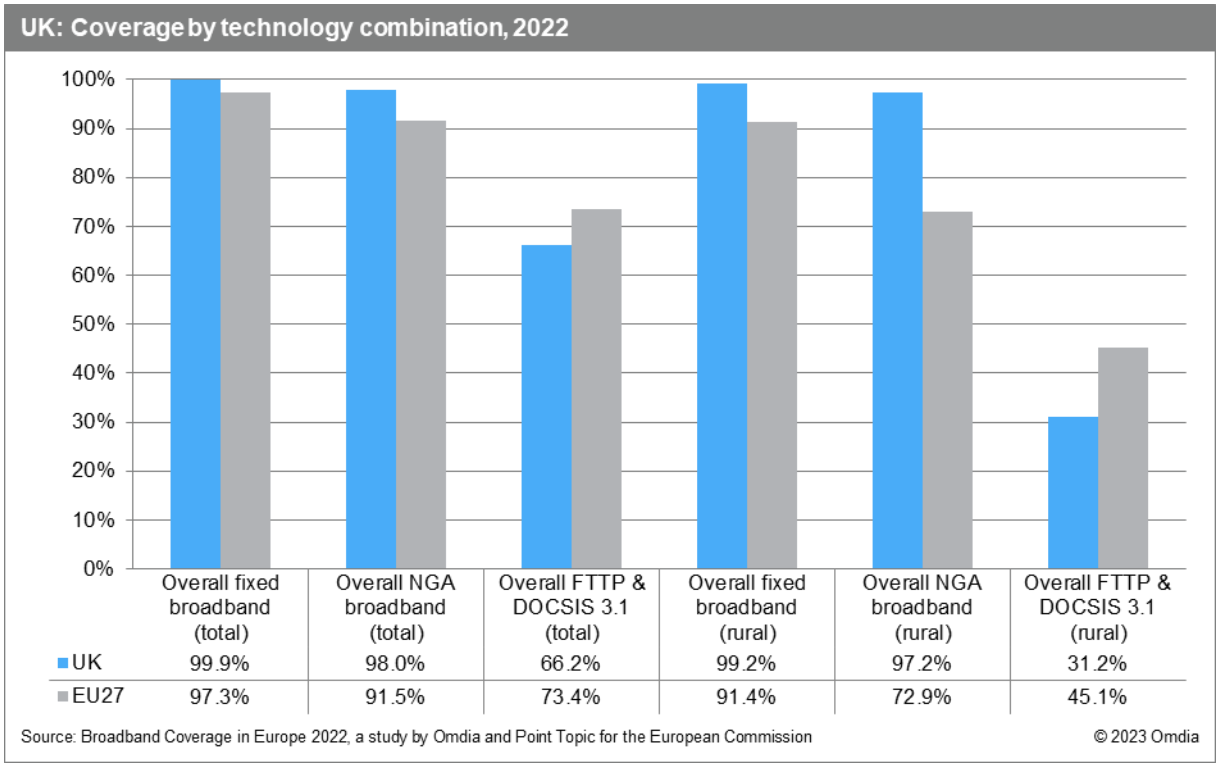
Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

5.31 United Kingdom

5.31.1 National coverage by broadband technology

Of the countries in this year's study, the UK recorded the greatest increase in coverage of FTTP & DOCSIS 3.1, yet it still remained below the EU average. Coverage increased by 26.3 p.p. up to 66.2% of households, versus 73.4% in the EU. Growth in rural areas was less dramatic (+10.6 p.p.) due to the operators' focus on urban areas, especially where DOCSIS 3.1 is concerned, and coverage reached 31.2%, well below the EU's 45.1%.

Over the study period, availability of NGA broadband increased by 0.5 percentage points at both national and rural level, to reach 98.0% of homes, including 97.2% of rural homes. In both categories, the UK surpassed the EU average, by a significant margin in the case of rural coverage. This reflects the historical focus on investment in FTTC at the expense of FTTP. Meanwhile overall fixed broadband coverage remained near-universal, at both national and rural levels.



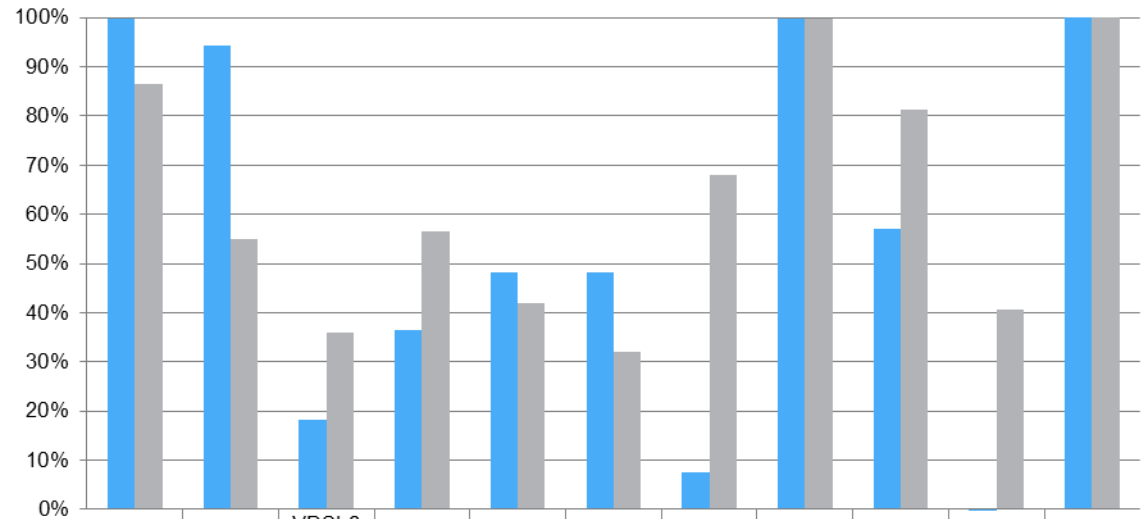
Looking at individual technologies, FTTP rollout continued to be a key priority for UK operators, with numerous smaller providers competing with the established players to roll out the technology. By mid-2022, 36.3% of households had access to FTTP broadband services, 13.1 p.p. higher than in 2021. Yet the UK remained well below the EU average of 56.5% and the UK's FTTP coverage level remained the fourth lowest recorded in this study, with only Belgium, Germany and Greece recording lower FTTP coverage levels.

Cable modem DOCSIS 3.0 coverage declined slightly over the study period, reaching around half (48.2%) of households. During the study period the UK cable operator, Virgin Media O2, completed the upgrade of its network to the DOCSIS 3.1 standard so by mid-2022, DOCSIS 3.1 coverage was equal to DOCSIS 3.0 at 48.2%.

DSL continued to be the most widespread broadband technology, providing near-universal coverage to UK households. FWA coverage increased slightly to 7.4% of premises. VDSL remained the leading NGA technology, with 94.2% of UK households having access to VDSL services. Moreover, 18.2% of UK households had access to VDSL2 Vectoring services providing download speeds higher than 100Mbps, a 0.4 p.p. increase year-on-year.

UK mobile network operators launched 5G networks in 2019 but by the end of June 2022, only an estimated 57.2% of UK households were covered by 5G networks, up from 37.9% the previous year, but below the EU average (81.2%). Data on coverage of 5G in the 3.4–3.8 GHz band was not available for the UK.

UK: Coverage by technology, total, 2022



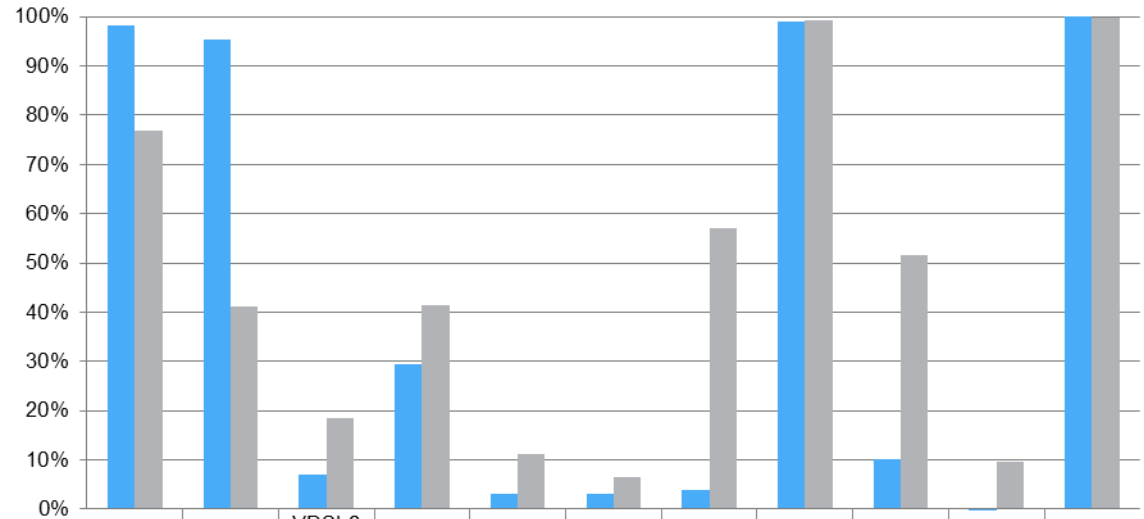
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
UK	99.8%	94.2%	18.2%	36.3%	48.2%	48.2%	7.4%	99.9%	57.2%	-	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

In rural regions of the UK, FTTP coverage also increased significantly, rising by 9.2 percentage points to reach 29.5% of rural households in June 2022. DOCSIS coverage in rural areas remains minimal (3.2%), and VDSL thus maintains its position as the most prevalent rural NGA technology, with coverage of 95.5% of rural households (the second highest after Cyprus). Meanwhile DSL remained the most prevalent broadband technology overall, covering 98.3% of rural households, while VDSL2 Vectoring-enabled services were available to 7.1% of rural households. Rural coverage of Fixed Wireless Access services stood at 3.8% as of June 2022.

Rural 5G coverage remained well below the EU average, with only one in ten rural households having access, compared with more than half (51.5%) in the EU.

UK: Coverage by technology, rural areas, 2022



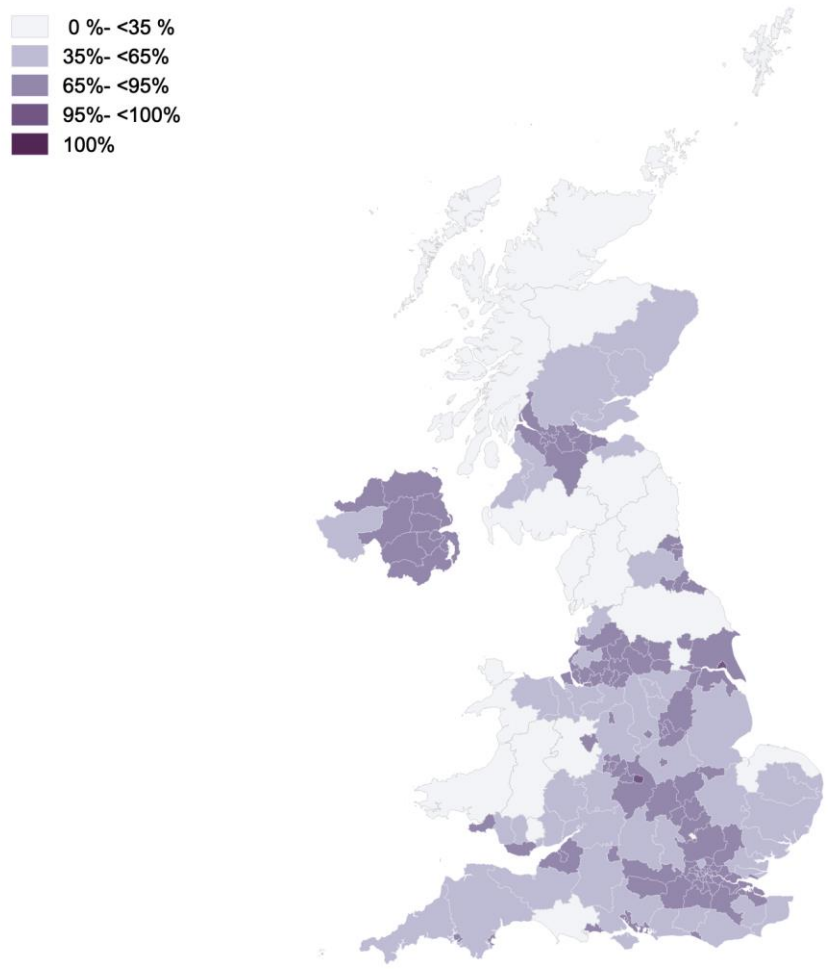
	DSL	VDSL	VDSL2 Vector-ing	FTTP	DOCSIS 3.0	DOCSIS 3.1	FWA	LTE	5G	3.4–3.8 GHz 5G	Satellite
UK	98.3%	95.5%	7.1%	29.5%	3.2%	3.2%	3.8%	99.0%	10.0%	-	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.31.2 Regional coverage by broadband technology

Looking at coverage of FTTP & DOCSIS 3.1 in UK regions, there is a wide range of coverage levels ranging from <2.5% in the Orkney Islands and Shetland Islands, to 97.5% in Kingston upon Hull, where the local incumbent operator KCOM has rolled out an extensive FTTP network. Generally the coverage is greatest in more urban parts of the UK, especially for DOCSIS 3.1 where rural coverage is minimal.

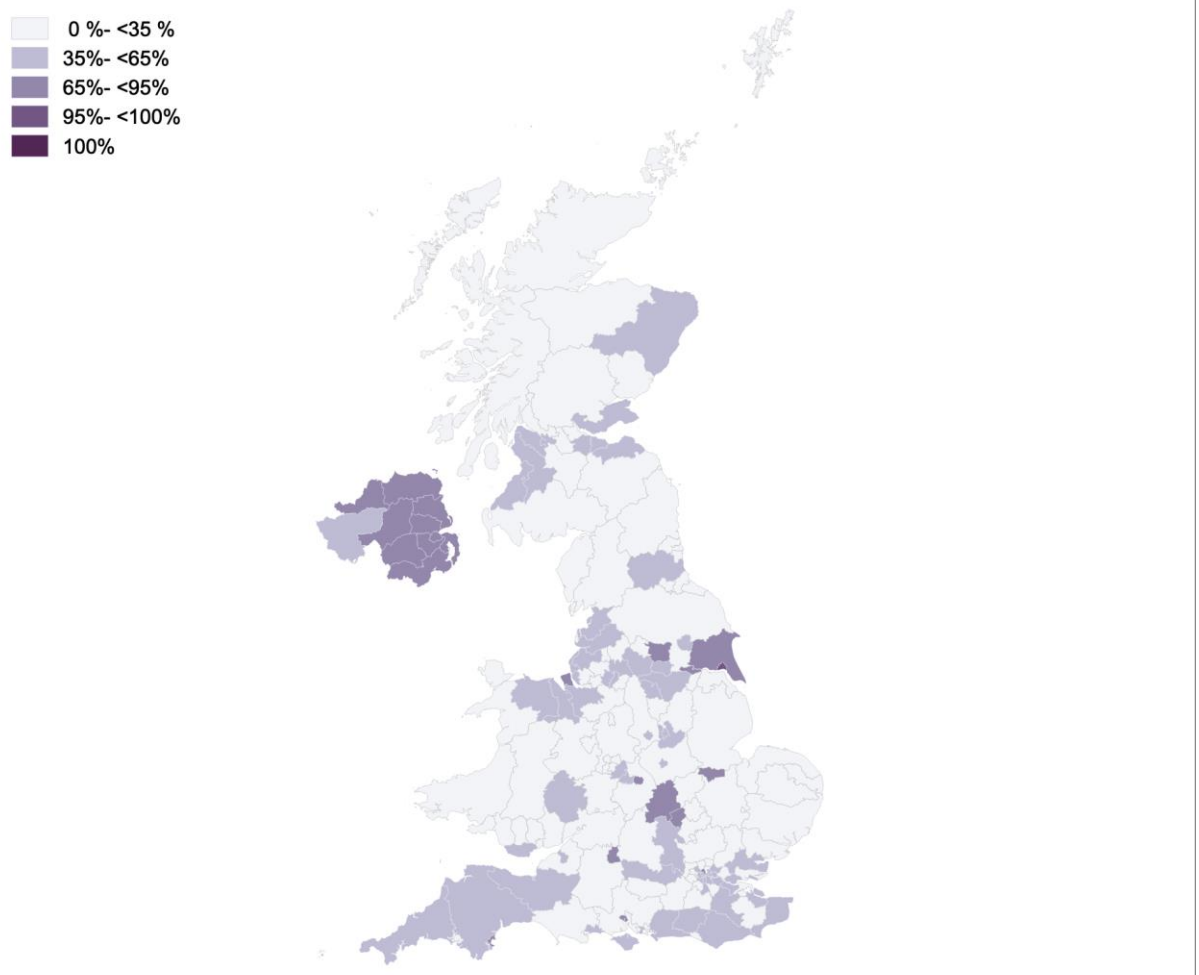
United Kingdom: FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Kingston upon Hull is the only region to exceed 95% coverage of FTTP, and only 22 of the UK's 179 regions exceed 65% coverage, including most of Northern Ireland where the rollout programme is ahead of the other nations of the UK.

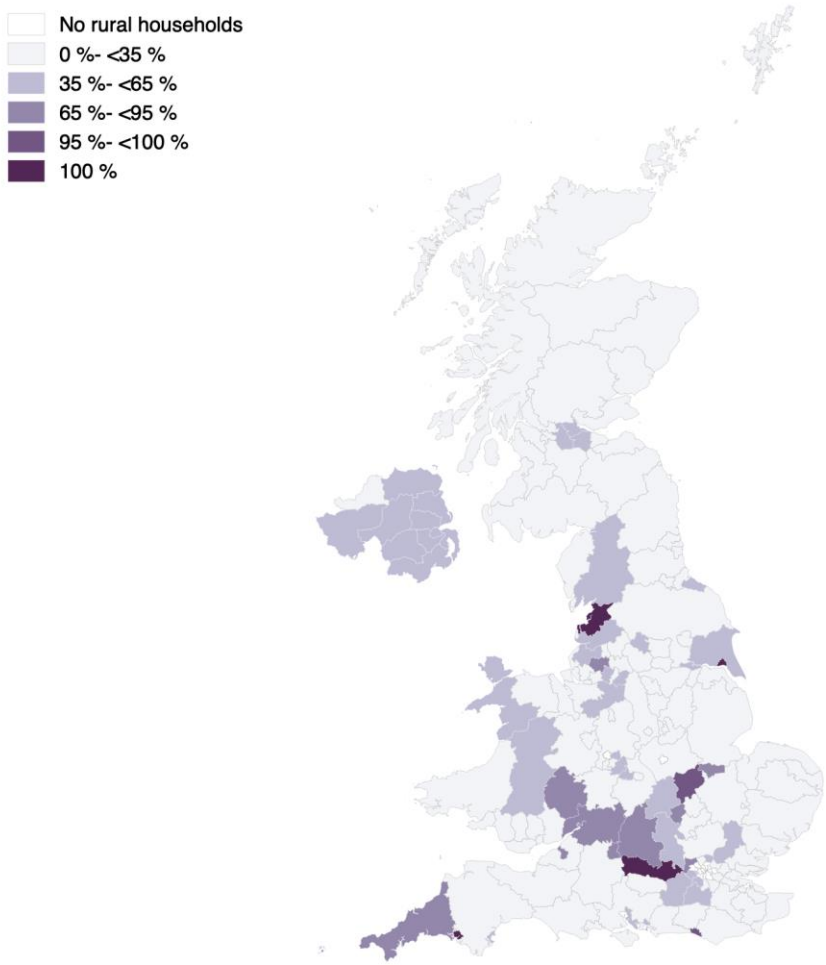
United Kingdom: FTTP coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

Rural coverage of FTTP & DOCSIS 3.1 also varies considerably, reaching 100% in four regions, but remaining very low in the predominantly rural parts of the country, notably the Scottish Highlands and Islands.

United Kingdom: Rural FTTP & DOCSIS 3.1 coverage, 2022



Source: Broadband Coverage in Europe 2022, a study by Omdia and Point Topic for the European Commission

5.31.3 Data tables for the United Kingdom

Statistic	National
Population	66,978,475
Persons per household	2.3
Rural proportion	8.9%

	UK 2022		UK 2021		UK 2020		EU27 2022	
Technology	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.8%	98.3%	99.7%	98.1%	100.0%	99.5%	86.6%	77.0%
VDSL	94.2%	95.5%	94.3%	*93.8%*	94.2%	92.3%	54.9%	41.2%
VDSL2 Vectoring	18.2%	7.1%	17.8%	6.9%	16.2%	6.3%	35.9%	18.4%
FTTP	36.3%	29.5%	23.3%	*20.2%*	14.5%	11.9%	56.5%	41.4%
Cable modem DOCSIS 3.0	48.2%	3.2%	50.3%	3.2%	50.3%	3.1%	41.8%	11.1%
Cable modem DOCSIS 3.1	48.2%	3.2%	23.0%	0.4%	7.9%	0%	31.9%	6.4%
FWA	7.4%	3.8%	5.8%	3.5%	4.9%	2.8%	67.9%	57.0%
LTE	99.9%	99.0%	99.9%	99.0%	99.9%	99.3%	99.8%	99.2%
5G	57.2%	10.0%	37.9%	4.4%	20.4%	0%	81.2%	51.5%
5G coverage on the 3.4–3.8 GHz spectrum band	-	-	-	-	-	-	40.7%	9.6%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%
Overall fixed broadband	99.9%	99.2%	99.8%	*99.1%*	100.0%	100.0%	97.3%	91.4%
Overall NGA broadband	98.0%	97.2%	97.5%	*96.7%*	97.6%	95.5%	91.5%	72.9%
Overall FTTP & DOCSIS 3.1	66.2%	31.2%	39.9%	*20.5%*	21.0%	11.9%	73.4%	45.1%
At least 30Mbps	95.8%	-	95.0%	-	94.8%	-	91.7%	-
At least 100Mbps	69.8%	-	63.2%	-	59.0%	-	86.6%	-
At least 1Gbps	66.6%	-	38.7%	-	21.0%	-	70.2%	-
At least 1Gbps upload and download	-	-	-	-	-	-	-	-

Note: The 2022 figures represent the state of broadband coverage at the end of June 2022. The 2021 (end of June) and 2020 (end of June) figures are drawn from the previous studies conducted by IHS Markit, Omdia, and Point Topic.

All restatements are highlighted in italics.

6. Appendices

6.1 Broadband coverage definitions

6.1.1 Technology definitions

The table below indicates the definitions of the individual broadband access technologies studied by this project. These definitions were included in the survey questionnaire.

Please note that the definitions are not designed to be rigorous definitions from an engineering point of view, but rather are intended to reflect practical definitions used by NRAs and ISPs.

Technology	Technology definition
DSL	DSL (for Digital Subscriber Line) is the basic technology used to provide broadband over conventional telephone lines. The types of DSL used for standard fixed broadband (mainly ADSL, ADSL2+, VDSL or VDSL2) deliver download speeds of at least 2Mbps. Not all DSL connections are capable of download speeds of 2Mbps and higher (e.g. due to a large distance – typically more than 5km – between customer and exchange), these connections should not be reported in the survey, but we ask you to note this fact in Step 7 – Technology definitions of the survey.
VDSL	VDSL (also called FTTC+VDSL for example) is a "Very-high-speed" version of DSL. VDSL is usually provisioned from a street cabinet which has fibre backhaul or directly from the telephone exchange in areas which are close to the exchange. Actual VDSL download speeds can vary and we ask you to note the typical VDSL connection speeds in Step 7 – Technology definitions of the survey. This definition does not include implementations where fibre is provisioned to a large building, such as a block of flats, and the final connections are provided by VDSL within the building, which are defined as FTTP.
VDSL2 Vectoring	VDSL2 Vectoring is a solution that eliminates crosstalk between all the lines that terminate on a single DSLAM leading to an improved performance VDSL2 lines and having the effect of as much as doubling VDSL2 speeds on very short lines (approx. 500m from the street cabinet or node).
FTTP	FTTP (fibre-to-the-premises) is broadband provided over fibre optic cables going all the way to the home or business premises. This definition also includes "FTTB", where fibre terminates at a large building and broadband distribution within the building, to different flats for example, is by a different non-fibre technology such as VDSL.
Cable modem DOCSIS 3.0	DOCSIS 3.0 broadband is delivered over a fixed cable TV network using coaxial cable according to the DOCSIS 3.0 standard, providing download speeds of 30Mbps and above.
Cable modem DOCSIS 3.1	DOCSIS 3.1 broadband is delivered over a fixed cable TV network using coaxial cable according to the DOCSIS 3.1 standard, providing download speeds of 100Mbps and above.
FWA	Fixed Wireless Access is a means of providing wireless broadband connectivity using radio links between two fixed points, as an alternative method of providing wireless broadband connectivity, while eliminating the need for physical connections (coper, fibre). It can be implemented various standardised technologies (e.g. WiMAX, LTE, 5G).
LTE	LTE (Long Term Evolution) is the next-generation mobile service standardised by the 3rd Generation Partnership Project and which supports peak downstream speeds of up to 100Mbps (LTE) and up to 1Gbps (LTE-Advanced).
5G	5G is the fifth generation technology standard for mobile broadband standardised by the 3rd Generation Partnership Project and capable of supporting downstream speeds of up to 10Gbps. This can include DSS and 700 MHz bands.
5G coverage on the 3.4–3.8 GHz spectrum band	5G using the 3.4–3.8 GHz frequency band only.

6.1.2 Coverage definitions

The definitions included in the table below were used to determine whether households are within the coverage reach of the individual broadband technologies. These definitions were included in the survey questionnaire.

Please note that the definitions are not designed to be rigorous definitions from an engineering point of view, but rather are intended to reflect practical definitions used by NRAs and ISPs.

Technology	Coverage definition
DSL	A household has DSL coverage if it is in a telephone exchange area fully enabled for DSL. Includes all types of xDSL.
VDSL	A household has VDSL coverage if it is close enough to a VDSL-enabled cabinet or exchange to get a high-speed broadband signal. Includes VDSL, VDSL2, VDSL2 Vectoring etc.
VDSL2 Vectoring	A household has VDSL2 Vectoring coverage if it is close enough to a VDSL2-enabled cabinet or exchange and Vectoring solution is applied to receive at least 100Mbps download speed.
FTTP	A household has FTTP coverage if it can be connected now to a fibre service without requiring the construction of new fibre infrastructure and is available to be connected within reasonable time and cost limits.
Cable modem DOCSIS 3.0	A household has DOCSIS 3.0 coverage if it can be connected now to a DOCSIS 3.0 or higher service without requiring the construction of new cable TV network infrastructure and is available to be connected within reasonable time and cost limits. Includes DOCSIS 3.1.
Cable modem DOCSIS 3.1	A household has DOCSIS 3.1 coverage if it can be connected now to a DOCSIS 3.1 or higher service without requiring the construction of new cable TV network infrastructure and is available to be connected within reasonable time and cost limits.
FWA	A household has FWA coverage for broadband if it can receive at least 2Mbps downstream from an existing service without requiring the construction of new FWA infrastructure and is available to be connected within reasonable time and cost limits.
LTE	A household has LTE coverage if it is in the stated coverage area for at least one LTE mobile network. Population coverage (in percentage terms) in a given area is understood to be equal to household coverage.
5G	A household has 5G coverage if it is in the stated coverage area for at least one 5G mobile network. Population coverage (in percentage terms) in a given area is understood to be equal to household coverage.
5G coverage on the 3.4–3.8 GHz spectrum band	A household has 5G coverage on the 3.4–3.8 GHz spectrum band if it is in the stated coverage area for at least one 5G mobile network utilizing that frequency band. Population coverage (in percentage terms) in a given area is understood to be equal to household coverage.

6.2 Broadband coverage data tables

6.2.1 Total and rural coverage by combination categories for each country

	TOTAL			RURAL		
	Overall fixed broadband coverage*	Overall NGA coverage**	Overall FTTP & DOCSIS 3.1***	Overall fixed broadband coverage*	Overall NGA coverage**	Overall FTTP & DOCSIS 3.1***
AT	99.1%	94.7%	54.8%	96.0%	74.2%	27.4%
BE	100.0%	99.4%	78.3%	99.6%	95.3%	62.2%
BG	98.9%	94.4%	85.6%	93.9%	75.9%	66.6%
HR	99.0%	87.9%	61.5%	99.3%	51.9%	19.2%
CY	100.0%	100.0%	60.0%	100.0%	100.0%	35.0%
CZ	99.9%	93.3%	53.2%	99.8%	70.1%	8.2%
DK	99.5%	98.0%	96.3%	99.0%	91.7%	88.0%
EE	94.9%	89.9%	79.2%	76.1%	69.4%	33.9%
FI	82.4%	74.9%	70.8%	80.1%	51.1%	25.4%
FR	99.6%	80.2%	73.3%	99.7%	59.4%	45.7%
DE	99.2%	97.4%	70.1%	97.0%	92.8%	30.1%
EL	99.0%	86.3%	27.8%	98.1%	51.1%	0%
HU	99.7%	98.4%	80.3%	99.2%	96.2%	59.1%
IS	99.2%	98.8%	89.2%	88.1%	82.3%	78.7%
IE	99.0%	97.8%	83.8%	97.3%	94.1%	57.2%
IT	99.8%	97.6%	53.7%	99.4%	91.1%	26.0%
LT	89.2%	86.9%	78.0%	68.4%	62.1%	39.5%
LV	98.9%	95.0%	91.5%	96.1%	87.2%	80.0%
LU	100.0%	97.5%	93.3%	100.0%	95.3%	79.1%
MT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NL	99.3%	99.2%	97.8%	98.5%	96.9%	91.7%
NO	99.8%	94.1%	81.9%	99.1%	73.6%	70.4%
PL	82.9%	73.4%	70.7%	68.7%	40.3%	32.8%
PT	97.3%	93.0%	93.0%	88.6%	68.8%	68.8%
RO	97.8%	97.2%	95.6%	95.1%	93.7%	90.1%
SK	97.4%	84.4%	71.3%	97.3%	72.9%	32.3%
SI	99.0%	90.5%	75.5%	96.3%	70.0%	51.0%
ES	96.0%	94.1%	93.3%	90.6%	80.4%	76.0%
SE	97.2%	94.0%	84.6%	82.9%	62.1%	61.4%
CH	99.9%	98.4%	86.8%	99.6%	97.7%	80.0%
UK	99.9%	98.0%	66.2%	99.2%	97.2%	31.2%
EU27	97.3%	91.5%	73.4%	91.4%	72.9%	45.1%

* Fixed broadband coverage includes DSL, VDSL, VDSL2 Vectoring, FTTP, Cable modem DOCSIS 3.0, DOCSIS 3.1, FWA

** NGA coverage includes VDSL, VDSL2 Vectoring, FTTP, Cable modem DOCSIS 3.0, DOCSIS 3.1

*** Includes FTTP and DOCSIS 3.1

6.2.2 Total coverage by technology for each country

	DSL*	VDSL	VDSL2 Vectoring	FTTP	DOCSIS 3.0**	DOCSIS 3.1	FWA	LTE	5G***	3.4–3.8 GHz 5G	Satellite
AT	97.0%	81.6%	55.3%	36.6%	59.3%	39.5%	20.7%	99.9%	91.7%	73.6%	100.0%
BE	99.9%	96.9%	47.9%	17.2%	95.7%	74.4%	99.8%	100.0%	29.6%	5.6%	100.0%
BG	85.4%	21.9%	0%	85.6%	70.9%	0%	18.8%	99.9%	67.2%	36.7%	100.0%
HR	98.1%	78.1%	12.1%	53.9%	35.1%	33.3%	38.4%	99.0%	82.5%	37.2%	100.0%
CY	100.0%	100.0%	32.6%	60.0%	50.6%	0%	99.7%	99.5%	100.0%	25.0%	100.0%
CZ	97.6%	86.1%	86.0%	37.4%	42.1%	34.9%	85.1%	100.0%	82.6%	42.3%	100.0%
DK	89.2%	58.5%	15.1%	77.9%	66.2%	66.1%	10.4%	100.0%	97.8%	75.0%	100.0%
EE	61.4%	55.3%	41.2%	79.2%	79.0%	0%	8.4%	99.9%	43.3%	14.5%	75.4%
FI	42.0%	34.0%	29.6%	50.3%	37.9%	37.9%	0%	100.0%	94.7%	83.9%	100.0%
FR	97.3%	15.9%	0%	73.3%	20.2%	0%	98.8%	100.0%	88.8%	52.3%	100.0%
DE	97.7%	94.8%	74.2%	19.3%	62.8%	62.3%	89.8%	99.8%	93.2%	36.5%	100.0%
EL	97.9%	76.3%	54.5%	27.8%	0%	0%	0.7%	99.6%	85.7%	36.8%	100.0%
HU	77.3%	48.4%	0%	70.1%	81.2%	38.6%	42.3%	99.9%	57.9%	21.4%	100.0%
IS	89.0%	84.1%	65.4%	88.2%	3.1%	3.1%	2.0%	99.7%	41.6%	-	0%
IE	93.0%	85.7%	67.3%	72.1%	48.6%	48.5%	30.0%	99.0%	83.9%	56.0%	100.0%
IT	99.8%	96.2%	70.1%	53.7%	0%	0%	97.4%	99.9%	99.7%	80.3%	100.0%
LT	85.2%	77.7%	77.7%	78.0%	26.5%	0%	14.7%	100.0%	90.1%	35.9%	100.0%
LV	31.1%	24.3%	24.3%	90.5%	30.0%	18.0%	94.0%	100.0%	42.0%	20.6%	100.0%
LU	59.7%	54.5%	15.2%	76.2%	82.5%	82.5%	0%	99.9%	93.2%	51.3%	100.0%
MT	100.0%	72.0%	0%	56.2%	100.0%	100.0%	100.0%	100.0%	100.0%	20.0%	100.0%
NL	57.6%	55.8%	43.5%	63.4%	94.2%	88.9%	86.7%	100.0%	100.0%	0%	100.0%
NO	91.6%	56.6%	0%	81.9%	40.7%	0%	86.5%	100.0%	81.5%	45.7%	100.0%
PL	57.1%	24.2%	16.6%	59.5%	43.4%	42.8%	14.4%	99.2%	63.4%	0%	100.0%
PT	85.4%	0%	0%	90.8%	57.5%	57.5%	0%	100.0%	70.1%	48.2%	100.0%
RO	53.1%	9.1%	0%	95.6%	40.2%	0%	58.0%	100.0%	26.8%	25.7%	100.0%
SK	66.9%	54.7%	32.0%	66.9%	40.7%	17.9%	94.9%	94.8%	55.3%	39.2%	100.0%
SI	95.6%	56.2%	0%	75.5%	58.4%	0%	29.9%	99.8%	63.9%	55.4%	100.0%
ES	78.7%	11.0%	0%	91.0%	33.0%	33.0%	58.8%	99.9%	82.3%	39.1%	100.0%
SE	82.8%	18.5%	0%	84.5%	34.7%	0.3%	0.5%	100.0%	20.5%	9.7%	100.0%
CH	99.5%	94.8%	92.7%	43.1%	85.2%	77.4%	0%	99.9%	96.8%	75.3%	100.0%
UK	99.8%	94.2%	18.2%	36.3%	48.2%	48.2%	7.4%	99.9%	57.2%	-	100.0%
EU27	86.6%	54.9%	35.9%	56.5%	41.8%	31.9%	67.9%	99.8%	81.2%	40.7%	99.9%

* DSL figures include VDSL and VDSL2 Vectoring coverage

** Cable modem DOCSIS 3.0 figures include DOCSIS 3.1 coverage

*** 5G coverage includes coverage provided using Dynamic Spectrum Sharing (DSS)

6.2.3 Rural coverage by technology for each country

	DSL*	VDSL	VDSL2 Vectoring	FTTP	DOCSIS 3.0**	DOCSIS 3.1	FWA	LTE	5G***	3.4–3.8 GHz 5G	Satellite
AT	93.6%	49.6%	26.1%	22.6%	12.8%	6.3%	27.6%	99.6%	68.9%	31.3%	100.0%
BE	97.8%	84.6%	29.5%	1.3%	70.2%	61.5%	96.1%	100.0%	21.2%	2.0%	100.0%
BG	75.7%	15.6%	0%	66.6%	27.6%	0%	9.8%	99.7%	18.4%	8.6%	100.0%
HR	98.5%	36.0%	3.1%	13.7%	11.9%	9.4%	19.3%	96.7%	73.5%	5.0%	100.0%
CY	100.0%	100.0%	19.9%	35.0%	0%	0%	98.0%	98.1%	100.0%	6.8%	100.0%
CZ	93.1%	64.2%	64.2%	8.1%	3.8%	0.0%	85.4%	100.0%	78.0%	32.0%	100.0%
DK	90.6%	16.7%	4.4%	87.0%	5.3%	5.3%	17.0%	100.0%	99.2%	21.1%	100.0%
EE	50.2%	42.1%	19.6%	33.9%	30.7%	0%	8.4%	99.8%	32.5%	6.7%	75.4%
FI	59.5%	35.6%	16.5%	25.4%	0%	0%	0%	100.0%	77.6%	30.8%	100.0%
FR	97.4%	24.8%	0%	45.7%	0.3%	0%	98.2%	99.9%	73.5%	3.5%	100.0%
DE	94.4%	89.7%	50.3%	16.9%	15.3%	14.8%	87.1%	99.0%	74.8%	2.1%	100.0%
EL	97.8%	51.1%	9.3%	0%	0%	0%	3.5%	98.1%	57.8%	4.2%	100.0%
HU	91.7%	48.2%	0%	52.4%	63.6%	6.6%	35.8%	99.8%	33.8%	2.0%	100.0%
IS	48.0%	7.6%	0.8%	78.7%	0.9%	0.9%	19.1%	94.1%	7.9%	-	0%
IE	92.3%	86.8%	51.8%	54.3%	3.8%	3.7%	19.4%	97.4%	58.3%	8.8%	100.0%
IT	98.8%	86.8%	33.9%	26.0%	0%	0%	96.8%	100.0%	99.8%	53.3%	100.0%
LT	61.3%	52.6%	52.6%	39.5%	0.5%	0%	6.9%	99.9%	75.6%	5.6%	100.0%
LV	39.4%	30.6%	30.6%	80.0%	0%	0%	84.9%	99.8%	0%	0%	100.0%
LU	66.5%	63.2%	28.7%	58.2%	54.5%	54.5%	0%	99.7%	46.7%	14.0%	100.0%
MT	100.0%	0%	0%	0%	100.0%	100.0%	100.0%	100.0%	100.0%	4.9%	100.0%
NL	82.8%	63.4%	40.0%	74.0%	89.5%	87.7%	87.3%	100.0%	100.0%	0%	100.0%
NO	74.8%	30.0%	0%	70.4%	1.1%	0%	82.6%	99.9%	59.8%	6.5%	100.0%
PL	43.6%	12.0%	9.8%	32.1%	1.6%	1.5%	16.4%	98.4%	2.8%	0%	100.0%
PT	70.3%	0%	0%	65.1%	35.3%	35.3%	0%	99.9%	20.8%	9.2%	100.0%
RO	54.4%	2.3%	0%	90.1%	17.8%	0%	25.3%	99.9%	2.9%	2.2%	100.0%
SK	74.2%	56.6%	48.1%	31.2%	4.6%	3.3%	94.6%	94.2%	39.3%	27.9%	100.0%
SI	86.1%	21.8%	0%	51.0%	20.1%	0%	27.5%	99.0%	14.1%	9.3%	100.0%
ES	54.5%	9.6%	0%	73.9%	4.6%	4.6%	68.5%	99.5%	48.3%	1.9%	100.0%
SE	41.8%	0.3%	0%	61.4%	0.3%	0.0%	1.4%	100.0%	0.5%	0.1%	100.0%
CH	98.4%	92.7%	90.6%	21.3%	83.3%	71.5%	0%	99.8%	90.0%	70.6%	100.0%
UK	98.3%	95.5%	7.1%	29.5%	3.2%	3.2%	3.8%	99.0%	10.0%	-	100.0%
EU27	77.0%	41.2%	18.4%	41.4%	11.1%	6.4%	57.0%	99.2%	51.5%	9.6%	99.9%

* DSL figures include VDSL and VDSL2 Vectoring coverage

** Cable modem DOCSIS 3.0 figures include DOCSIS 3.1 coverage

*** 5G coverage includes coverage provided using Dynamic Spectrum Sharing (DSS)

6.2.4 Broadband coverage by speed category for each country

	Broadband coverage (>30Mbps)	Broadband coverage (>100Mbps)	Broadband coverage (>1Gbps)	Broadband coverage (>1Gbps upload and download)*
AT	94.8%	85.8%	54.8%	21.6%
BE	97.8%	96.9%	78.8%	14.6%
BG	93.9%	91.9%	21.4%	-
HR	88.0%	67.4%	57.6%	5.7%
CY	100.0%	93.5%	60.0%	-
CZ	98.3%	90.2%	42.5%	-
DK	98.4%	97.3%	91.6%	78.0%
EE	89.5%	85.6%	39.6%	0.1%
FI	78.0%	71.0%	60.0%	15.0%
FR	86.1%	81.5%	80.4%	80.4%
DE	94.2%	91.0%	68.6%	20.2%
EL	96.0%	63.9%	27.9%	26.1%
HU	97.0%	95.6%	81.9%	-
IS	98.8%	88.3%	85.6%	85.6%
IE	92.1%	90.7%	72.3%	-
IT	92.3%	82.8%	53.5%	53.5%
LT	86.7%	86.7%	77.8%	77.8%
LV	94.6%	91.5%	40.7%	-
LU	97.5%	95.1%	93.3%	-
MT	100.0%	100.0%	100.0%	0%
NL	99.2%	98.7%	97.8%	63.4%
NO	98.5%	93.6%	92.5%	81.9%
PL	76.0%	73.8%	62.2%	-
PT	94.9%	94.9%	88.4%	-
RO	96.1%	94.5%	91.8%	0%
SK	82.8%	80.2%	40.4%	-
SI	90.5%	87.2%	0.9%	0.9%
ES	96.7%	91.2%	86.7%	83.3%
SE	95.5%	88.2%	84.5%	84.5%
CH	99.8%	98.6%	65.6%	33.2%
UK	95.8%	69.8%	66.6%	-
EU27	91.7%	86.6%	70.2%	-

* Only available where reported by the NRA

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