IHS TECHNOLOGY

# Broadband Coverage in Europe 2013:
## Coverage in Switzerland

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**FINAL REPORT**

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# 1.0 Introduction

In order to foster the development of a network-based knowledge economy and stimulate growth, the Digital Agenda for Europe (DAE), adopted in 2010 as a flagship initiative of Europe 2020, includes a set of specific broadband coverage targets:

- Universal broadband coverage by 2013; and
- Universal broadband coverage of speeds at least 30 Mbps by 2020.

In order to monitor the progress of the broadband coverage objectives of the Digital Agenda, DG Connect (the European Commission Directorate general for Communications Networks, Content and Technology) has commissioned the Broadband Coverage in Europe project to measure the household coverage of all the main fixed and wireless broadband technologies with a specific focus on Next Generation Access (NGA) technologies. In previous years (2010-2012), DG Connect appointed a London-based research agency, Point Topic, to conduct the research.

In 2013, DG Connect selected the consortium of IHS & VVA to run the project. As in previous years, DG Connect requested the study to be based on a survey of broadband network operators and National Regulatory Agencies (NRAs) to obtain a Europe-wide picture of the coverage of the nine main broadband technologies. The study was to cover thirty countries including the EU-28, Norway, and Iceland. A separate study was commissioned by Glasfasernetz Schweitz to conduct identical research of broadband coverage in Switzerland. This report presents results of this additional research as well as Europe-wide overview of the broadband coverage trends at the end of 2013.

The nine broadband technologies analysed in this study are:

- DSL (including VDSL)
- VDSL
- Cable modem (including DOCSIS 3.0)
- DOCSIS 3.0
- FTTP (Fibre-to-the-property)
- WiMAX
- HSPA
- LTE
- Satellite

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

The study also aimed to estimate the overall coverage of “combination” 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, and similar to previous years, are:

- Overall broadband coverage
    - Includes all the main broadband technologies, both fixed and mobile, but excludes satellite
    - Combination of DSL (including VDSL), cable modem (including DOCSIS 3.0), FTTP, WiMAX, HSPA and LTE

- Overall fixed broadband coverage
  - Includes all the main fixed-line broadband access technologies, but excludes satellite
  - Combination of DSL (including VDSL), cable modem (including DOCSIS 3.0), FTTP, and WiMAX

- 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, DOCSIS 3.0, and FTTP

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 the technology combinations.

The research team, in agreement with DG Connect, decided to apply similar methodology to the one used by Point Topic in the previous years of the project and use regional approach to measuring overlapping and complementary coverage. Coverage data was collected on a regional level using NUTS 3 statistical units 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 and Switzerland). More specifically, NUTS 3 level areas are smaller regional units of 150,000 to 800,000 inhabitants. There are 1,362 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 as well as allowing for a year-on-year comparison with the BCE 2012 data.

In addition to individual technology coverage and combination technology coverage, DG Connect required coverage by download speed to be included in the study in 2013. The following speed categories were thus added among the research metrics:

- Coverage by broadband network/s capable of at least 2 Mbps download speed

- Coverage by broadband network/s capable of at least 30 Mbps download speed

- Coverage by broadband network/s capable of at least 100 Mbps download speed

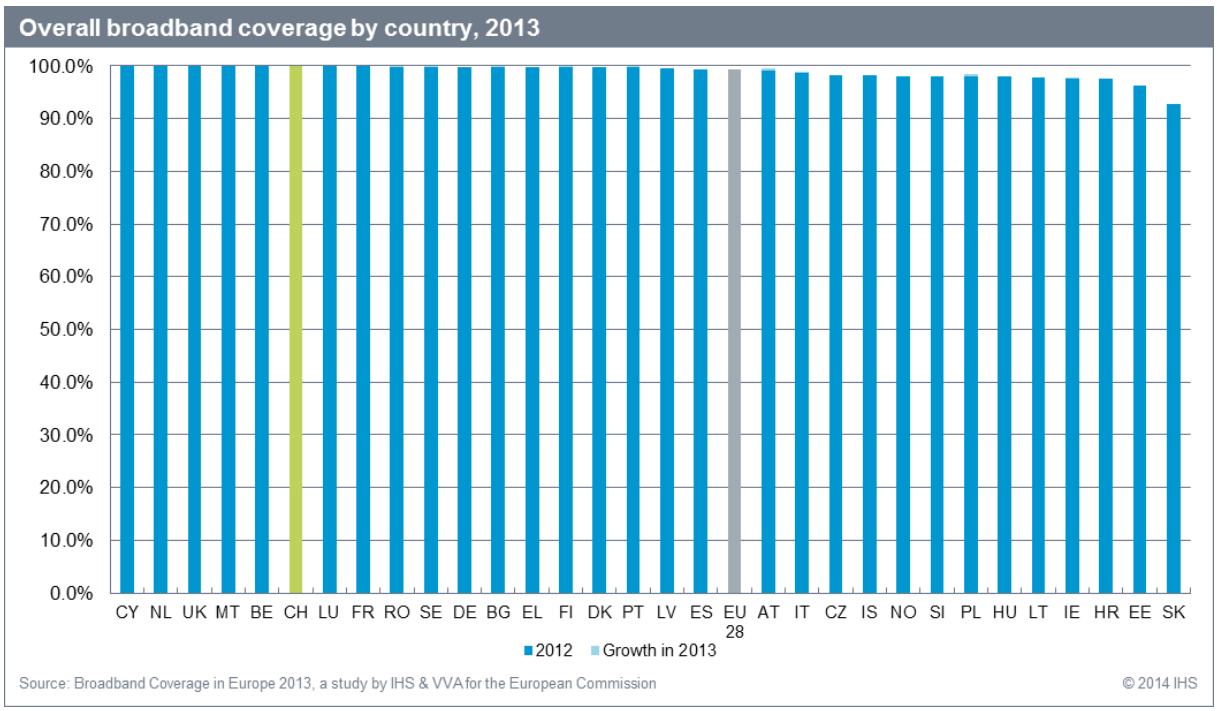
By including the additional metric, it is possible to obtain an additional analytical layer to evaluate the study countries' progress towards the Digital Agenda goals. However, since this was a new metric, the level of quality of received data varied quite substantially. For this reason the research team decided to include information on speed categories in the form on an Appendix of this report.

# 2.0 European Overview

## 2.1 Country comparison of overall broadband coverage

The overall broadband coverage combination category combines broadband coverage of all fixed broadband access technologies (DSL, cable, FTTP, WiMAX) as well as mobile broadband technologies (HSPA and LTE).

This category provides an indication of the number of households covered by basic broadband provided by at least one of the abovementioned technologies.



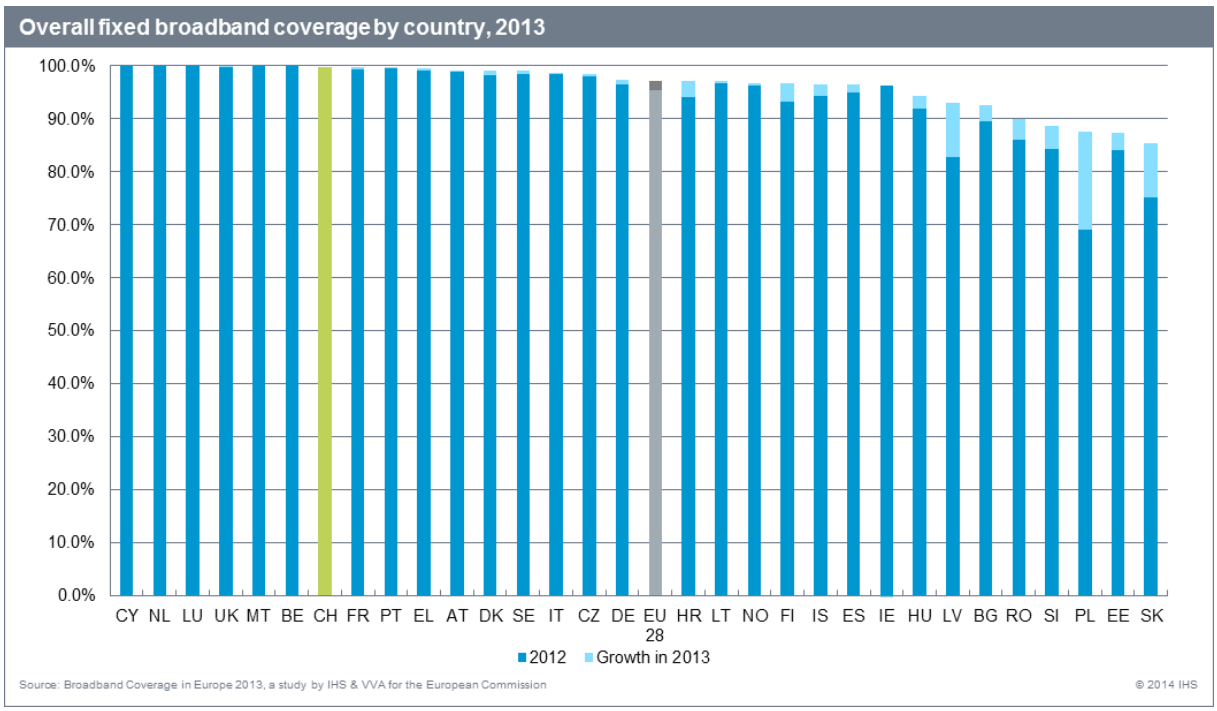

At the end of 2013, 99.9% of Swiss households had access to at least one fixed or mobile broadband service. In terms of overall broadband coverage, Switzerland ranks well above the EU average of 99.4% and sixths among all study countries behind Cyprus, Netherlands, UK, Malta and Belgium. All study countries but Slovakia recorded overall broadband coverage reaching more than 96% of households.

Compared to 2012, there were only small increases in overall broadband coverage and no country registered an increase higher than 0.5 percentage points. Highest increase, 0.4 percentage points was recorded in Austria. This is mostly due to the fact HSPA rollout, which is generally the biggest driver of this category, was largely completed in 2012 and DSL (the second most important driver) networks' deployment is saturated across European countries.

As was pointed out by Point Topic in the 2012 report on broadband coverage in Switzerland, while all households in Switzerland are guaranteed by law to be able to get connected to at least 1Mbps, our research estimates show that there continues to be a small number of homes that cannot be serviced by either fixed or mobile broadband connections. However, given the fact that a 100% satellite coverage was reported for Switzerland, it is possible to assume that satellite broadband services are available to all Swiss households.

## 2.2 Country comparison of fixed broadband coverage

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 figures: DSL (including VDSL), cable (including DOCSIS 3.0), FTTP, and WiMAX.

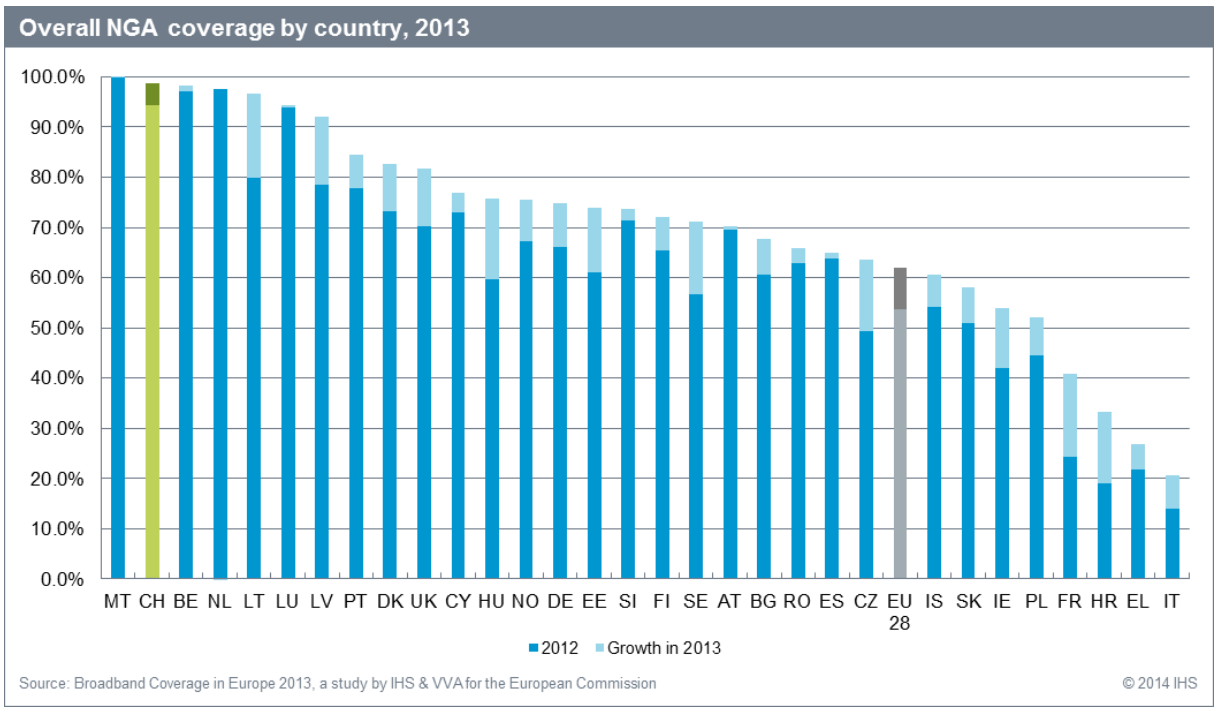



Compared to the previous year, fewer countries are above the European average for overall fixed broadband coverage. Out of the 31 study countries, 15 countries have fixed broadband coverage levels of at least 97.2%, 27 countries have fixed broadband covering at least 90% of their households. Fixed broadband coverage is lowest in Slovenia, Poland, Estonia and Slovakia, in which it reaches between 89.9% and 85.0%, respectively. All of these countries have in common (apart from being located in Eastern Europe) sparsely populated and underserviced rural areas, which present coverage challenges.

In Switzerland, 99.8% of homes have access to fixed broadband service at the end of 2013, unchanged from the previous year. In terms of coverage by the individual fixed technologies, Switzerland registered second highest coverage of cable broadband networks with 97.2% of homes passed by cable networks. Only Malta, among the study countries, with universal cable coverage ranked higher. DSL coverage in Switzerland is also high, reaching 99.4% households.

## 2.3 Country comparison of NGA coverage

The NGA combination category comprises VDSL, FTTP and DOCSIS 3.0 technologies, all typically capable of delivering a service speed of at least 30Mbps (although VDSL local loop lengths mean that actual speeds do vary). The analysis of this combination category is an evaluation of the state of play of the roll-out of the relevant technologies and progress towards the DAE goal of reaching full coverage of European households by 30Mbps download speed capable networks by 2020.




The chart presented above that generally the most urbanised countries recorded the highest NGA coverage. Malta is the only country reporting complete coverage for NGA technologies due to its cable network upgrade to DOCSIS 3.0 now complete, followed closely by Belgium, the Netherlands, Lithuania, Luxembourg and Latvia, all reaching above 90%. However, the pattern of NGA coverage is very mixed, reflecting the various strategies and approaches to high-speed broadband deployment adopted across Europe.

Switzerland ranked second in terms of NGA coverage with 98.7% homes passed by networks capable to reach at least 30Mbps download speeds. Compared to 2012, NGA coverage in Switzerland recorded a 4.2 percentage point increase.

Out of the 31 study countries, 22 countries perform above the European average (62%), and only four countries reported NGA coverage below 50% (France, Hungary, Greece and Italy). Italy has the lowest coverage of NGA technologies, with a total NGA coverage of 20.8%.

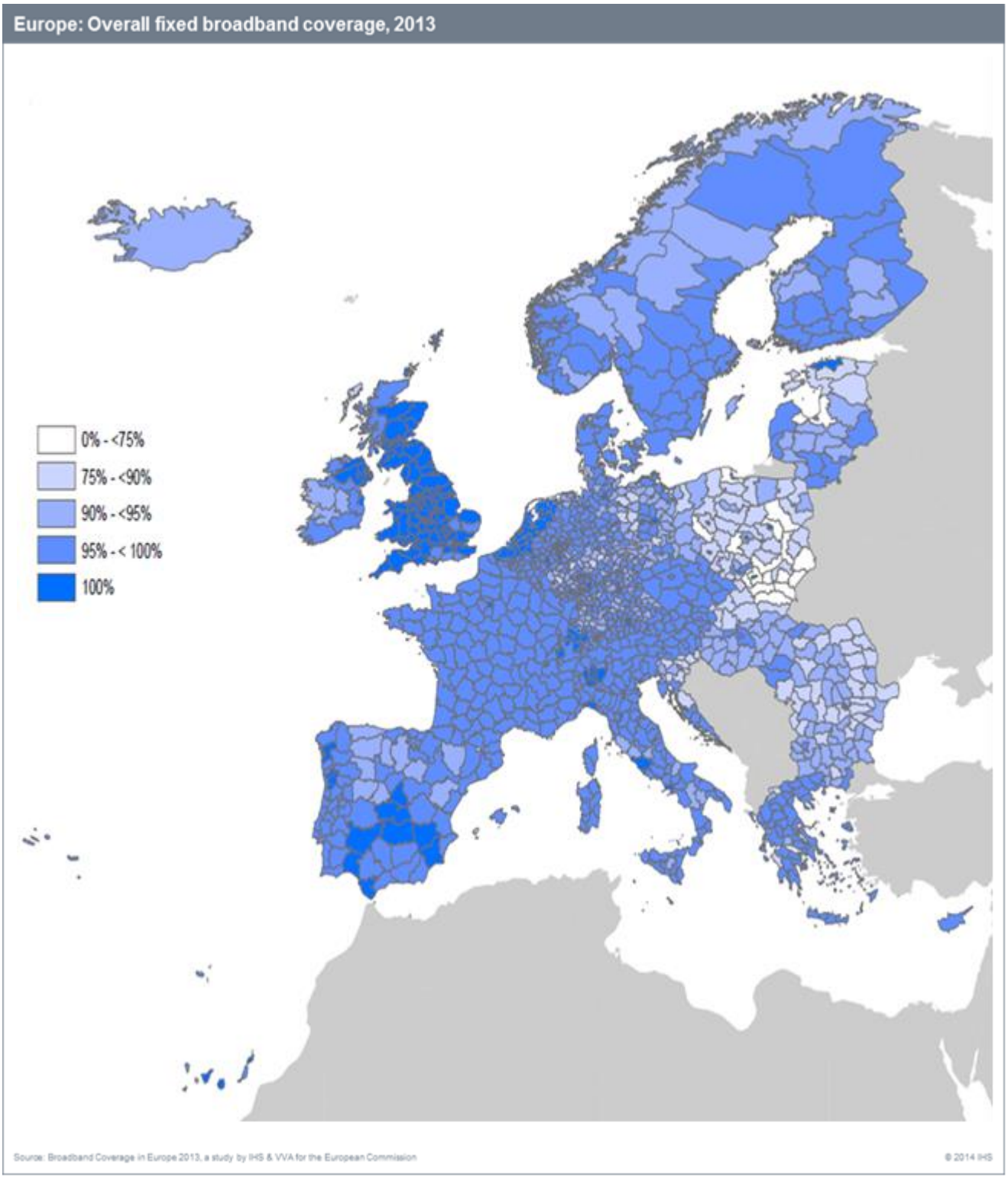
In 2013, VDSL continued to be the fastest growing NGA technology, increasing to over 31% of homes from nearly 25% in 2012. With upgrades of cable networks to DOCSIS 3.0 nearly complete and FTTP coverage increasing by two percentage points only, this development demonstrates a shift in broadband strategy in many of the study countries, in which companies are focusing on upgrading of existing copper networks rather than on the typically more costly (but perhaps longer-lived) deployment of fibre optic all the way to consumers' homes.

With regards to VDSL roll-out, only three countries reached coverage above 80%. Luxembourg and Belgium were the best performers on this measure, with VDSL infrastructure covering nearly 89% of their respective households, followed by the Netherlands (84%) and Malta (75%). Overall, 14 study countries achieved VDSL coverage above the EU average.

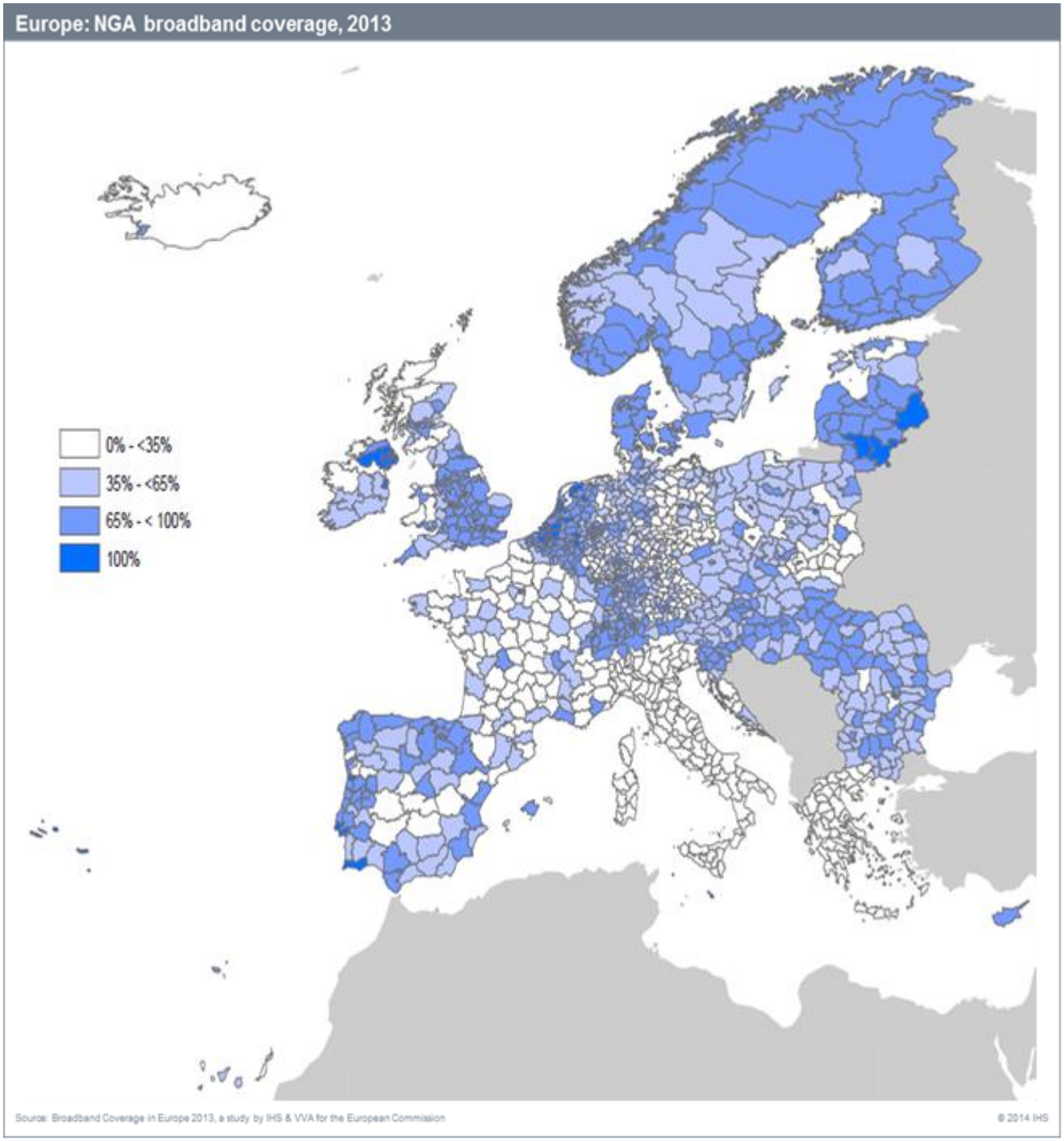
Eastern European countries continued to lead the FTTP coverage category in 2013. With large complexes of blocks of flats found in almost every major city and with markets exhibiting generally less-developed telephone copper networks, Eastern European countries present strong incentives for FTTP deployment. Apart from the three Baltic countries, 15 other countries reported FTTP coverage levels above the EU28 average of 14.5%. The remaining twelve countries reported coverage data below the European average, Greece and Belgium reported the lowest levels of FTTP coverage, at 0.4% each.

By the end of 2013, European cable network operators had nearly finalised upgrading their cable networks to DOCSIS 3.0. As a whole, almost 97% of EU's cable networks have been upgraded to DOCSIS 3.0 (compared to 93% in 2012). In nine countries, the full upgrade was completed at the end of 2013, two more compared to 2012, and an additional seven countries reported at least 95% of cable networks being DOCSIS 3.0 capable, with the remaining countries recording ranges between 67% and 95%.

## 2.4 NUTS 3 coverage of overall fixed broadband



## 2.5 NUTS 3 coverage of NGA broadband



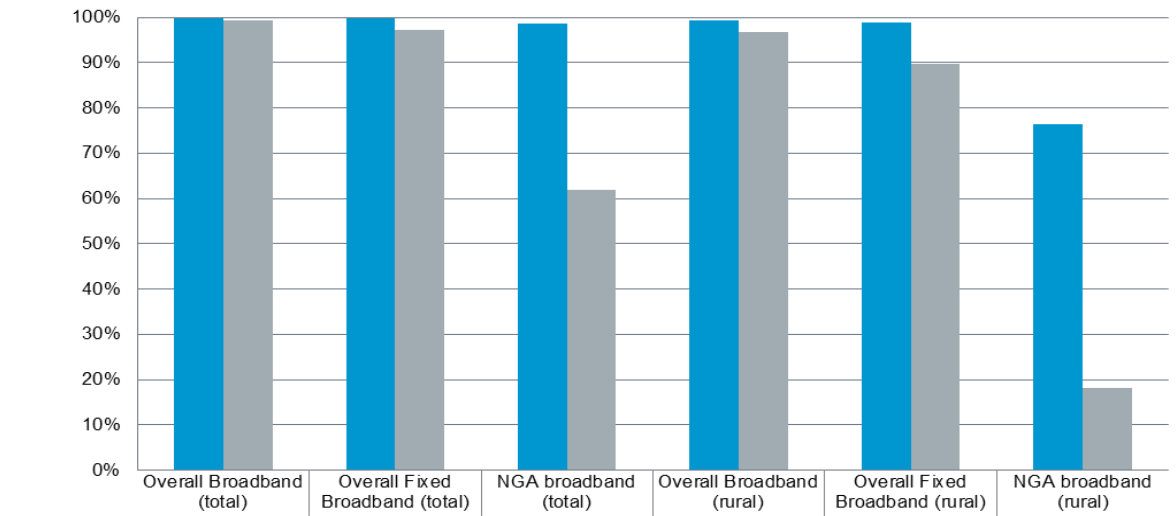
# 3.0 Switzerland

## 3.1 National coverage by broadband technology

Switzerland has one of the most advanced broadband network infrastructures among all study countries. It was ahead of the EU average in all broadband coverage combination categories, most notably in total and rural NGA coverage and rural fixed broadband coverage.

In 2013, Switzerland recorded an increase in NGA coverage at both national and rural levels. Total NGA coverage increased by 4.3 percentage points with NGA technologies reaching over 98% of Swiss households. An even more significant increase was reported for rural NGA coverage, which grew from nearly 65% of rural households in 2012 to more than 76% at the end of 2013.

**Switzerland: Coverage by technology combination, 2013**




| | Overall Broadband (total) | Overall Fixed Broadband (total) | NGA broadband (total) | Overall Broadband (rural) | Overall Fixed Broadband (rural) | NGA broadband (rural) |
|---|---|---|---|---|---|---|
| Switzerland | 99.9% | 99.8% | 98.7% | 99.3% | 98.9% | 76.4% |
| EU 28 | 99.4% | 97.2% | 62.0% | 96.7% | 89.8% | 18.1% |

Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission



A closer look at coverage levels of the individual broadband technologies reveals that Switzerland is ahead of the EU average in each category with the exception of WiMAX, which is not present in Switzerland.

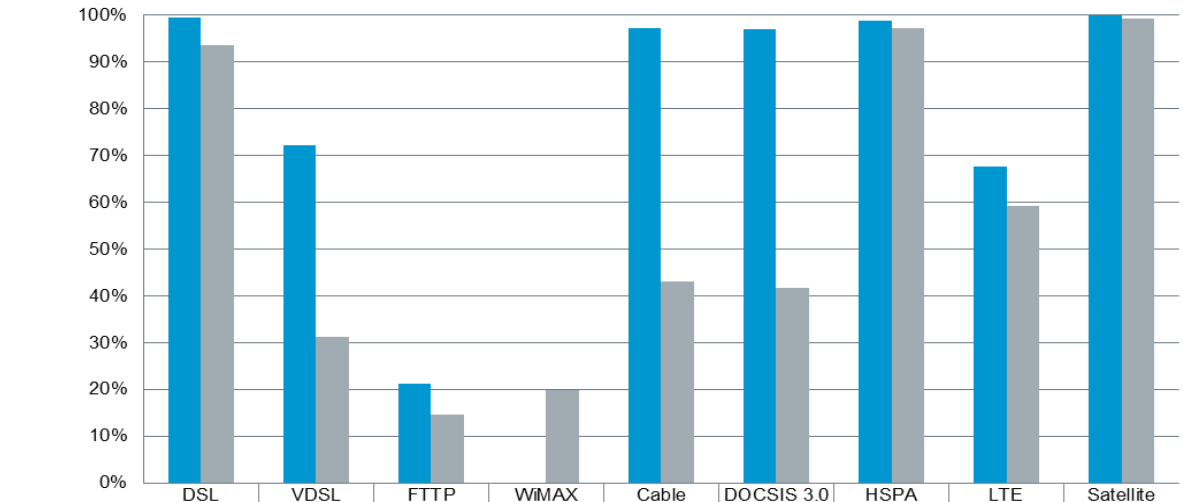
Switzerland's extensive NGA coverage can be explained by the nearly widespread DOCSIS 3.0 coverage reaching nearly 99% of Swiss households. Rapidly increasing VDSL coverage, a result of a large-scale roll out by the incumbent, Swisscom, in recent years, also contributes to the high NGA coverage level. VDSL coverage increased by 19 percentage points year-on-year and passed nearly two-thirds (72%) of Swiss homes by the end of 2013.

In response to competition from cable operators, the incumbent is also investing heavily in FTTP network deployments across the country. At the end of 2013, high-speed FTTP services were available to more than 21% of Swiss households, a 4.4 percentage point increase compared to the previous year.

In terms of mobile broadband coverage, a 1.4 percentage point increase in HSPA coverage was reported in 2013, reaching nearly 99% of households. LTE services were commercially launched at

the end of 2012 and registered significant progress in coverage throughout 2013, rising from 20% to nearly 68% of Swiss households.

**Switzerland: Coverage by technology, total, 2013**




| | DSL | VDSL | FTTP | WiMAX | Cable | DOCSIS 3.0 | HSPA | LTE | Satellite |
|---|---|---|---|---|---|---|---|---|---|
| Switzerland | 99.4% | 72.3% | 21.1% | 0.0% | 97.2% | 97.1% | 98.8% | 67.7% | 100.0% |
| EU 28 | 93.5% | 31.2% | 14.5% | 19.7% | 43.0% | 41.6% | 97.1% | 59.1% | 99.3% |

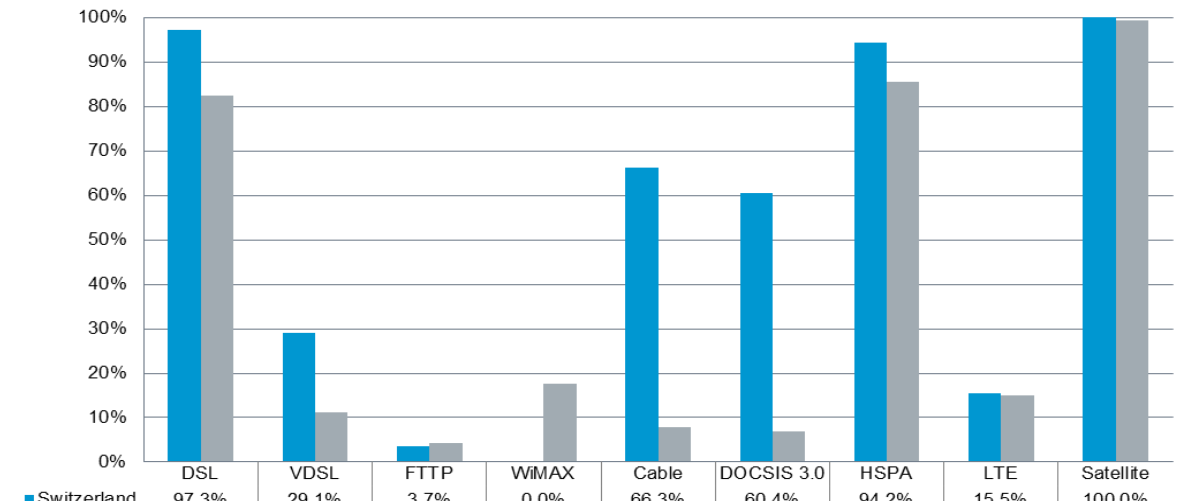
Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission



Rural coverage in Switzerland is generally much higher than the EU average, and especially in the case of cable coverage and DOCSIS 3.0 coverage, which both reach coverage levels that are approx. 50 percentage points higher than the EU average. Such high rural DOCSIS 3.0 coverage is the main reason behind the high rural NGA coverage, although VDSL is also becoming an important contributor to rural NGA coverage.

In 2013, rural VDSL coverage increased more than two-fold from nearly 13% of rural households to over 29% of rural households covered by the technology.

**Switzerland: Coverage by technology, rural areas, 2013**

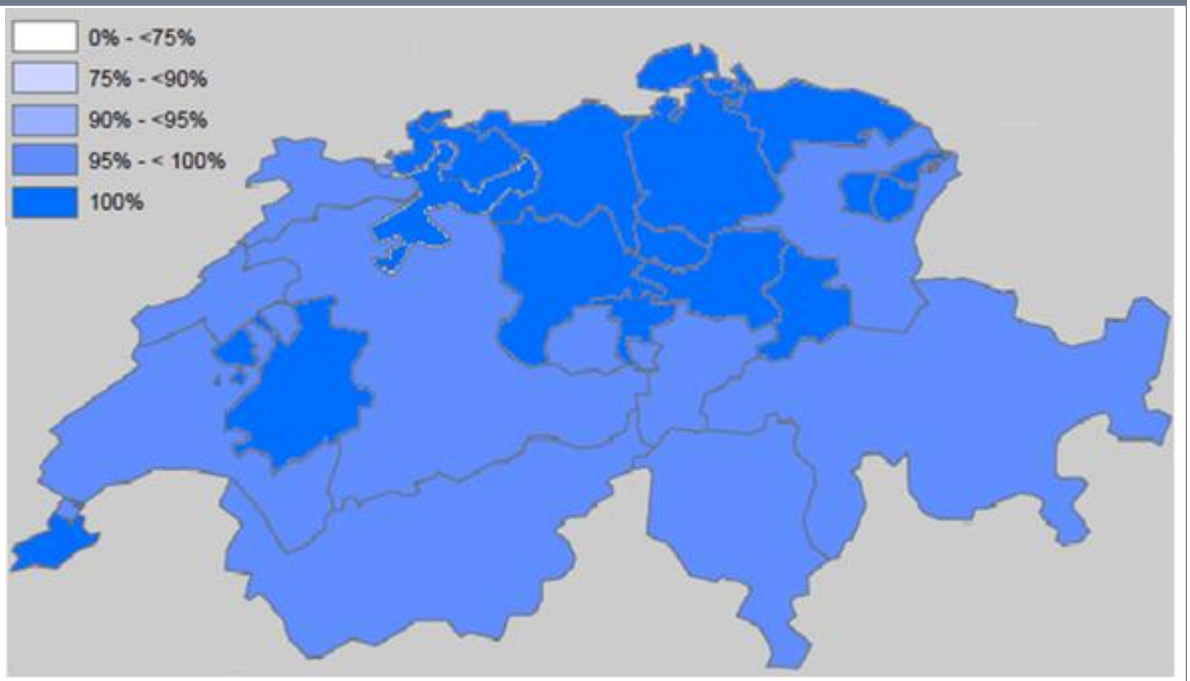



| | DSL | VDSL | FTTP | WiMAX | Cable | DOCSIS 3.0 | HSPA | LTE | Satellite |
|---|---|---|---|---|---|---|---|---|---|
| Switzerland | 97.3% | 29.1% | 3.7% | 0.0% | 66.3% | 60.4% | 94.2% | 15.5% | 100.0% |
| EU 28 | 82.3% | 11.1% | 4.2% | 17.6% | 7.8% | 7.0% | 85.5% | 14.9% | 99.3% |

Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

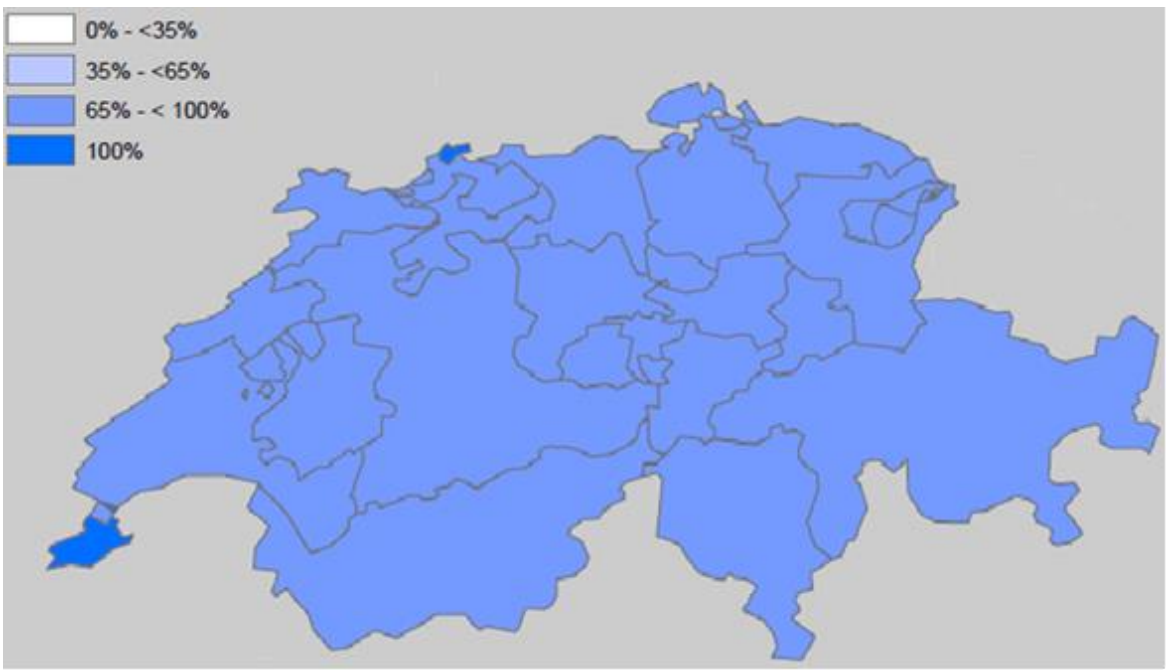
## 3.2 Regional coverage by broadband technology

**Switzerland: Overall fixed broadband coverage, 2013**




Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission © 2014 IHS

**Switzerland: NGA broadband coverage, 2013**




Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission © 2014 IHS

## 3.3 Regulatory and market overview

The Swiss broadband market is characterised by heavy infrastructure-based competition between cable operators and the incumbent, Swisscom with a number of smaller FTTP providers active on a regional and local level.

Swiss cable operators, led by Liberty-Global backed Cablecom, have been investing heavily in network upgrades since 2006 and by 2013 nearly all cable networks were upgraded to the DOCSIS 3.0 standard and offering up to 250 Mbps downstream broadband connections.[1]

Swisscom has adopted a varied approach to its network upgrade, starting with VDSL trials in 2006 and announcing a FTTP network deployment plan in 2009.[2] By the end of 2013, Swisscom's FTTP network passed approx. 750 thousand homes across Switzerland capable of up to 1Gbps downstream speeds.[3] The company aims to roll out ultra-fast broadband technologies to over 2.3 million homes and businesses by the end of 2015 and to more than 85% by 2020

Swisscom also rolled out the first LTE network at the end of 2012 and in 2013, both Orange and Sunrise, the other two mobile operators active in Switzerland, followed by the launch of their respective LTE services[4]

1 http://www.upc-cablecom.ch/en/internet/products/
2 http://www.swisscom.ch/en/about/medien/press-releases/2008/12/20081209_01_Mit_fibre_suisse_in_die_Glasfaserzukunft.html
3 http://www.swisscom.ch/content/dam/swisscom/de/about/investoren/documents/2014/2013-annual-results.pdf.res/2013-annual-results.pdf, p. 9
4 http://www.zdnet.com/sunrise-joins-switzerlands-4g-crowd-with-lte-launch-in-26-towns-7000017004/

## 3.4 Data tables for Switzerland

| Statistic | National |
|---|---|
| Population | 7,954,662 |
| Persons per household | 2.2 |
| Rural proportion | 14.8% |

| | Switzerland 2013 | | Switzerland 2012 | | Switzerland 2011 | | EU28 2013 | |
|---|---|---|---|---|---|---|---|---|
| Technology | Total | Rural | Total | Rural | Total | Rural | Total | Rural |
| DSL | 99.4% | 97.3% | 99.4% | 97.0% | 99.4% | 96.6% | 93.5% | 82.3% |
| VDSL | 72.3% | 29.1% | 53.4% | 12.7% | 43.6% | 6.9% | 31.2% | 11.1% |
| FTTP | 21.1% | 3.7% | 16.7% | 2.9% | 12.2% | 0.0% | 14.5% | 4.2% |
| WiMAX | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 19.7% | 17.6% |
| Cable | 97.2% | 66.3% | 95.0% | 65.7% | 91.7% | 64.4% | 43.0% | 7.8% |
| DOCSIS 3.0 | 97.1% | 60.4% | 93.1% | 58.8% | 88.6% | 55.6% | 41.6% | 7.0% |
| HSPA | 98.8% | 94.2% | 97.4% | 88.9% | 97.4% | 88.9% | 97.1% | 85.5% |
| LTE | 67.7% | 15.5% | 20.2% | 0.5% | 0.0% | 0.0% | 59.1% | 14.9% |
| Satellite | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 99.3% | 99.3% |
| Overall broadband | 99.9% | 99.3% | 99.9% | 99.0% | 99.7% | 98.5% | 99.4% | 96.7% |
| Overall fixed broadband | 99.8% | 98.9% | 99.8% | 98.8% | 99.7% | 98.3% | 97.2% | 89.8% |
| NGA broadband | 98.7% | 76.4% | 94.4% | 64.8% | 92.7% | 41.2% | 62.0% | 18.1% |

# 4.0 Methodology

Following an extensive discussion with DG Connect at the project's inception meeting, the IHS & VVA team decided to adopt similar methodology to the one applied by Point Topic in previous years, in order to ensure consistency and year-on-year comparability of the data.

As in previous years of the project, a survey of 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 coverages by individual technologies as well as the combination coverage categories and speed coverage categories.

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

## 4.1 Survey design and data collection

For the sake of consistency, IHS & VVA used similar wording and formatting of survey questionnaire as was used for the 2012 study. Using near-identical question wording in this year's survey enabled IHS & VVA to deliver findings which can be compared with research undertaken in previous years.

DG Connect kindly provided the research team with a list of survey participants contacted for the 2012 BCE study. While some of the previous year's respondents were not available to participate in the 2013 study, the fact that the BCE project is a long-running project means that most respondents were 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 was focused on one central question, which asked about the absolute number of homes passed by broadband networks, and was 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 - For the 2013 study, a new metric was introduced – that of speed coverage. Thus the survey questionnaire was extended to include questions asking participants about the numbers of homes passed by networks able to achieve speeds of at least 2 Mbps, 30 Mbps and 100 Mbps.

In a number of cases, coverage data was delivered on a more detailed geographical level than the requested NUTS 3 areas. In these cases, IHS & VVA aggregated the provided data to match the NUTS 3 regions.

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 IHS & VVA 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.

In order to protect the confidentiality of the data, study results for individual coverage technologies are published only on a total country level. On the regional NUTS 3 level, reported data is limited to coverage by technology combinations. As these technology combinations include multiple technologies, coverage by individual technologies or companies is concealed within the combined total coverage.

All of the collected data was treated as commercially confidential and was used solely for the purposes of this study.

## 4.2 Defining rural areas

As mentioned above one of the dimensions of the study was in gaining information on broadband coverage in rural areas. In order for the rural data to be comparable to the 2012 dataset, the IHS & VVA research team adopted a similar approach to determine rural areas to the one used by Point Topic.

In 2012, Point Topic developed a new approach to defining rural areas using the Corine land cover database and creating a database of population and land type in every square kilometre across Europe. Households in square kilometres with population less than one hundred were classified as rural. This granular approach based on population density enabled Point Topic to identify truly rural areas likely to be unserved or underserved by broadband operators. Using this methodology, Point Topic estimated that approx. 15% of households in the study countries were rural.

In order to be able to analyse rural coverage in a consistent manner, the IHS & VVA team received from DG Connect data indicating the proportion of rural areas in each NUTS 3 area. Combining this information with updated 2013 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.

## 4.3 Additional research conducted in parallel to the survey

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

The additional research was built on the IHS & VVA 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 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

IHS & VVA also contacted other relevant organisations, such as the FTTH Council Europe and Cable Europe to gain additional insight on individual access technologies deployment and coverage trends. The research team is particularly grateful to the FTTH Council Europe and IDATE, FTTH Council Europe's data provider, for kindly sharing information from their research of FTTx coverage and subscribers across Europe. While in most cases the team relied on data collected though the survey, IDATE's data proved to be an important source for cross-checking the gathered figures and estimating the final coverage results.

IHS has also utilised its close relationship with cable industry association Cable Europe. IHS has been Cable Europe's preferred research partner for the past decade and has access to data from Cable Europe members – used in the publication of the annual 'Cable Yearbook' study. Cable Europe was very helpful in establishing contacts with a number of European cable providers for the purposes of this study.

## 4.4 Validation and integration of data

In this phase of the study, data collected through the survey and via additional research were brought together to obtain the actual coverage figures for all of the 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 for 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 IHS & VVA team was able to provide estimates for each of the nine broadband technologies in all NUTS 3 areas both on total and rural level.

3.5 Estimating coverage for different technology combinations and speed categories

After reaching the broadband coverage figures by individual technologies in each country and NUTS3 regions, the research team calculated estimates for the following three technology combinations, taking into account the overlaps of different technologies:

- Overall broadband coverage (including DSL, VDSL, FTTP, Standard cable modem, DOCSIS 3.0, WiMAX, HSPA and LTE)

- Overall fixed broadband coverage (including DSL, VDSL, FTTP, Standard cable modem, DOCSIS 3.0 and WiMAX)

- Overall NGA coverage (including VDSL, FTTP and DOCSIS 3.0)

For the sake of consistency, IHS and VVA applied similar methodology to the one used by Point Topic in previous 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 to 100%, whichever was the greater.

As in the previous study, a varied formula was used in cases where some 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 at the national level were made by summing the estimates for the NUTS 3 areas rather than applying this formula at 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 publication of the finalised data in the 2013 update of the Digital Agenda Scoreboard.

In a number of cases, new and more accurate data was provided to the research team reflecting the 2012 data and thus justifying restatement of the figures published in the Broadband Coverage in Europe 2012 study. Restatements are indicated in the data tables sections of individual country chapters.

# 5.0 Appendix

## 5.1 Broadband coverage by speed categories

In addition to individual technology coverage and combination technology coverage, DG Connect required coverage by download speed to be included in the study in 2013. The following speed categories were thus added among the research metrics:

- Coverage by broadband network/s capable of at least 2 Mbps download speed
- Coverage by broadband network/s capable of at least 30 Mbps download speed
- Coverage by broadband network/s capable of at least 100 Mbps download speed

By including the additional metric, it is possible to obtain an additional analytical layer to evaluate the study countries' progress towards the Digital Agenda goals. However, since this was a new metric, the quality of received data varied quite substantially across participant responses. For this reason and with approval from DG Connect, the research team decided to include information on speed categories in the form on an Appendix of this report, with the hope that the metric will become a standard component of the report in future iterations.

### 5.1.1 Methodology for determining coverage by speed categories

The research team needed to develop a suitable methodology and clear definition to determine coverage by realistically achievable speeds as required by DG Connect. Thus, 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 speeds of at least 2 Mbps. This category encompassed DSL (including VDSL), FTTP, WiMAX, standard cable (including DOCSIS 3.0 cable), HSPA and LTE broadband access technologies. However, as not all DSL connections are capable of download speeds of 2Mbps and higher, respondents were asked to exclude those connections which did not meet the criteria from their answers.

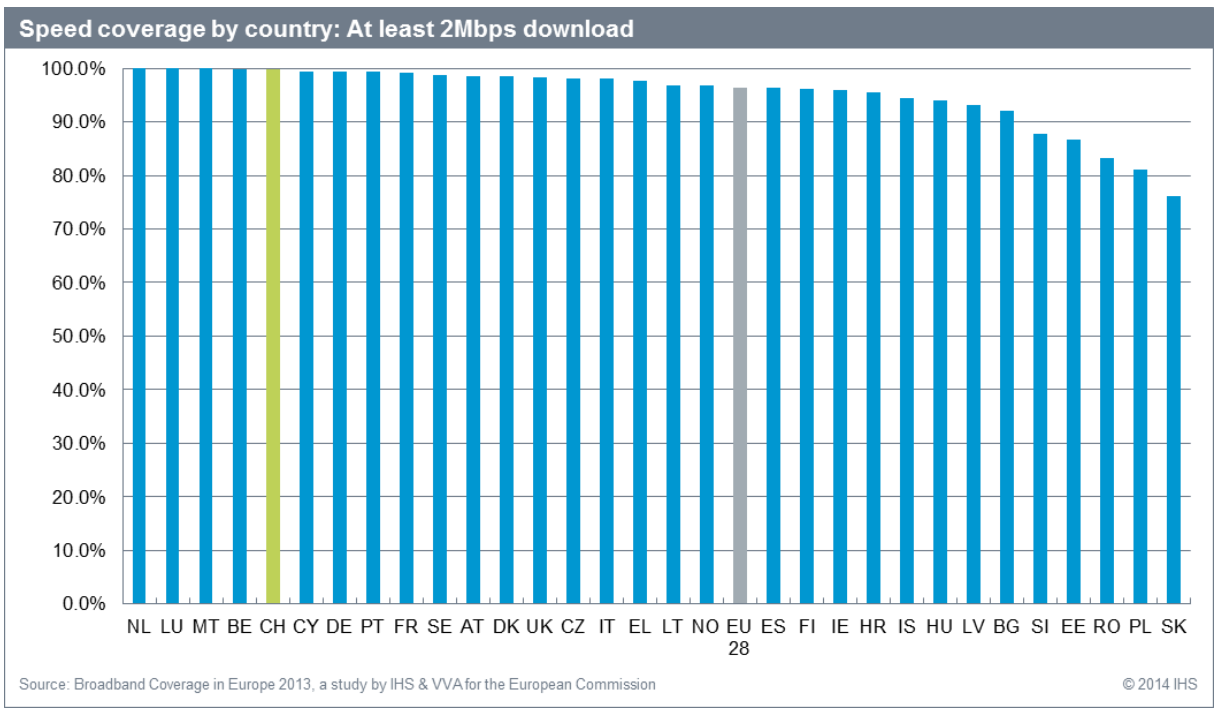
- Coverage by broadband network/s capable of realistically achieving actual download speeds of at least 30 Mbps. This category encompassed VDSL, FTTP, and DOCSIS 3.0 cable broadband access technologies. However, as not all connections utilizing these technologies can achieve 30 Mbps and higher actual download speeds (for example, VDSL connections with distance from the exchange point higher than 500m see radical decrease in actual speeds), respondents were asked to exclude those connections which did not meet the criteria from their answers.

- Coverage by broadband network/s capable of realistically achieving actual download speeds of at least 100 Mbps. This category encompassed FTTP and DOCSIS 3.0 cable broadband access technologies. In cases where vectoring is applied to VDSL2 technology and speeds reach 100 Mbps 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 100 Mbps 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.

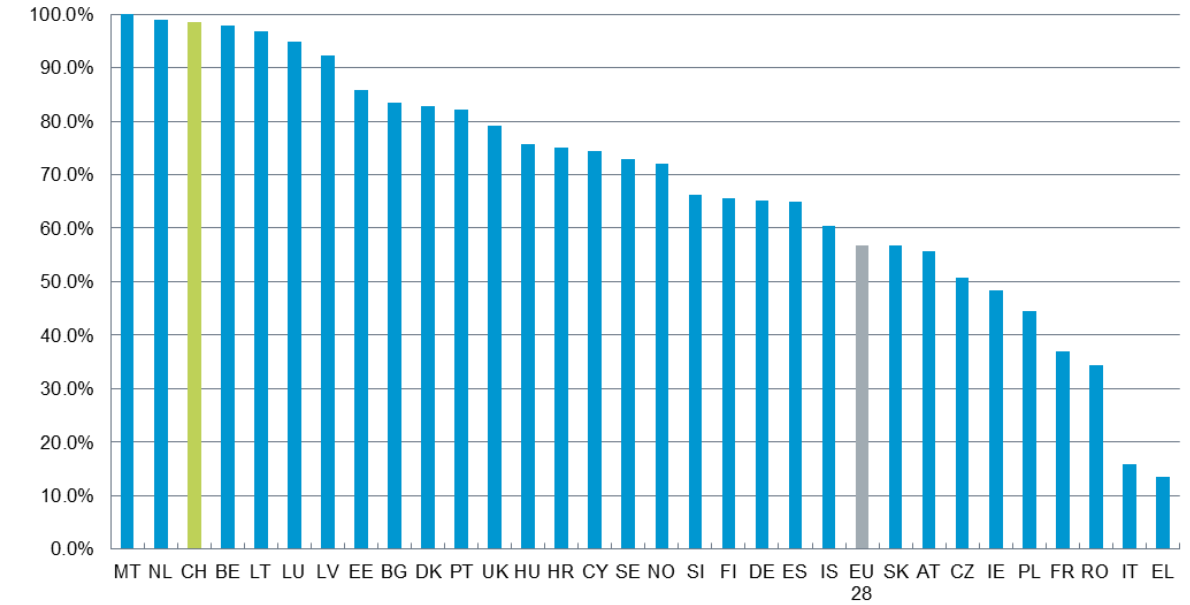
The coverage of these speed categories was then defined as a household having technical access to one or more networks supporting at least 2, 30, or 100 Mbps downstream speed connections if the connection's broadband speed was capable of achieving a minimum of 2, 30, or 100 Mbps downstream speed (respectively) for the majority of the time. 'Majority of time' was understood to mean actual download speeds achieved by a household for at least 75% of the time.

As this was a new metric, and speed information can be generally hard to decode, even for the NRAs and ISPs themselves, the IHS & VVA team also relied in addition to the collected survey data, on sector knowledge regarding deployments to make informed estimates of achievable speeds to gain complete picture of coverage by the speed categories. 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 available such information at future points in time.

### 5.1.2 Broadband coverage by speed categories results



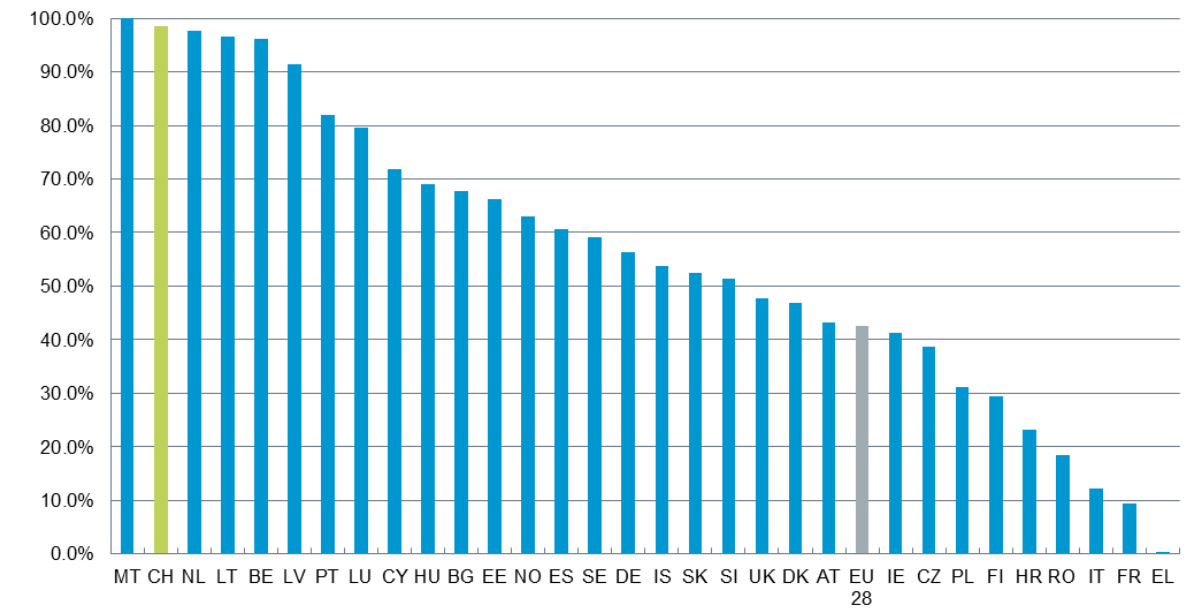
**Speed coverage by country: At least 30Mbps download**




Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission



**Speed coverage by country: At least 100Mbps download**




Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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