



The European Broadband Scorecard

Research Document

Publication date: 11 December 2014

About this document

This is Ofcom's third European Broadband Scorecard with previous publications in March 2013 and 2014. The Scorecard is intended to document aspects of fixed and mobile broadband performance across EU countries for the purpose of measuring and comparing the UK's performance relative to other EU countries. The Scorecard was proposed by BDUK (Broadband Delivery UK), part of DCMS (the Department of Culture, Media and Sport), before being taken up by Ofcom.

The scorecard attempts to report on coverage, takeup and usage, price, speed and choice where sufficiently, comparable, reliable and consistent data is available.

The main body focuses on EU 5 countries (Germany, France, Italy, Spain and the UK) while EU 28 data is included in an Annex.

This Scorecard will be updated in Q1 2015 to incorporate data currently unavailable related to takeup and usage.

This year, we publish the Scorecard alongside Ofcom's 'International Communications Market Report' (ICMR).

Contents

Section		Page
1	Introduction	2
2	The Scorecard	8

Annex		Page
1	Annex A: EU28 data	27
2	Annex B: Analysis of broadband speed data	36

Section 1

Introduction

1.1 Background to the European Broadband Scorecard

In December 2010, the Department for Culture, Media and Sport (DCMS), in partnership with the Department for Business, Innovation and Skills, published a strategy document entitled *Britain's Superfast Broadband Future*. The document set out the Government's ambition that the UK 'should have the best high speed broadband network in Europe by 2015'.¹ As well as committing to benchmark the UK against other EU countries, the Government intends to ensure that all UK premises can experience download speeds of at least 2Mbit/s by 2015 and that ninety per cent of premises can access broadband with headline speeds of 'more than or equal to' 24Mbit/s. To this end, it allocated £530m to stimulate commercial investment in the rollout of high speed broadband in rural communities.²

The Broadband Delivery UK (BDUK) Rural Broadband Programme³ is designed to provide faster speed broadband coverage beyond commercial operators' existing network footprints. The procurement phase is now complete and approximately half of the programme projects have begun rolling out 24+Mbit/s⁴ connections since the beginning of 2013. In February 2014, DCMS announced an additional £250m allocation to extend 24+Mbit/s broadband coverage to 95% of UK premises by 2017 and provided £10m in funding pilot projects seeking to provide an alternative broadband solution for the final 5% of UK premises.

There are also a number of measures in place to increase mobile broadband coverage. The licences for some of the 4G mobile spectrum that was auctioned by Ofcom in 2013 included coverage obligations. One of the licences requires the holder, Telefonica UK Ltd (O2), to provide indoor reception to at least 98% of the UK population. In addition, DCMS has begun a £150m Mobile Infrastructure Project (MIP) to improve mobile coverage across the UK, particularly focusing on rural areas.

Within DCMS, BDUK proposed a Scorecard for measuring the development of the UK's broadband network relative to those in other EU countries, based on four headline indicators: coverage and take-up, speed, price and choice (Figure 1).

¹ DCMS / BIS, *Britain's Superfast Broadband Future*, 2010, p. 2, at

<http://www.culture.gov.uk/images/publications/10-1320-britains-superfast-broadband-future.pdf>.

² See http://www.culture.gov.uk/what_we_do/telecommunications_and_online/7763.aspx.

³ BDUK is part of the government's investment and policy approach to bringing forward network infrastructure upgrades and to improve the accessibility of services in locations where there is a weak commercial investment case. It is a team within DCMS created to deliver policies relating to stimulating private sector investment. See <https://www.gov.uk/broadband-delivery-uk>

⁴ Ofcom now defines the term 'superfast broadband' as a broadband connection with an actual modem sync speeds of 30Mbit/s or more. The EC defines superfast as a broadband connection with a headline speeds of 'more than or equal to' 30Mbit/s. Throughout this document we use the term '30+Mbit/s' to represent the EC definition of superfast.

Figure 1 BDUK’s proposed metrics for inclusion in the Scorecard

Coverage and take-up	Speed	Price	Choice
Standard broadband coverage and take-up	Fixed download speed	Price of standard broadband	Market concentration in fixed broadband market
Broadband coverage and take-up of superfast connections	Fixed upload speed	Price of superfast broadband.	Market concentration in mobile broadband market
Mobile broadband coverage and take-up	Mobile download speed	Price of mobile broadband	

Source: BDUK

In December 2011, Ofcom agreed to identify, collate and publish the best available data relating to each of these metrics.⁵ We revised BDUK’s framework, splitting ‘coverage and take-up’ into two and including information on the proportion of the population that use the internet and perform tasks online (Figure 2).

Figure 2 Ofcom’s proposed metrics for inclusion in the Scorecard

Coverage	Take-up and usage	Speed	Price	Choice
Standard broadband coverage	Standard broadband take-up	Fixed download speed	Price of standard broadband	Market concentration in fixed broadband market
Broadband coverage of superfast connections	Broadband take-up of superfast connections	Fixed upload speed	Price of superfast broadband	Market concentration in mobile broadband market
Mobile broadband coverage	Mobile broadband take-up	Mobile download speed	Price of mobile broadband	
	Use of online services			

In August 2012, the Secretary of State for Culture, Media and Sport set a further target that the UK should have the fastest broadband of any major European country by 2015.⁶

We published the first European broadband Scorecard in March 2013.⁷

⁵ Ofcom, *International Communications Market Report 2011*, 2011, p. 43, at <http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/icmr/ICMR2011.pdf>.

⁶ See http://www.culture.gov.uk/news/ministers_speeches/9299.aspx.

We published the second Scorecard in March 2014.⁸

Both scorecards have set out the principles we would follow when choosing our data sources. We have repeated these principles below, in Sections 1.2 and 1.3.

Definitions of broadband continue to develop. In particular the term ‘superfast’ broadband is subject to a number of different definitions. To minimise potential confusion we have decided to drop the term superfast completely from this edition of the scorecard and instead use definitions that we consider will reduce the potential for confusion.

For this scorecard we have made clarifications to Figure 2 removing the term superfast and replacing it with more appropriate text. We discuss the definitions used further in each subsection of the scorecard. The updated metrics table including these clarifications is provided in Figure 3.

Figure 3 Ofcom’s proposed metrics for this Scorecard

Coverage	Take-up and usage	Speed	Price	Choice
Standard broadband coverage	Standard broadband take-up	Fixed download speed	Price of standard broadband	Market concentration in fixed broadband market
Broadband coverage of NGA broadband connections	Broadband take-up of connections with a headline speed of 30Mbit/s or more	Fixed upload speed	Price of broadband connections with a headline speed of 30Mbit/s or more	Market concentration in mobile broadband market
Mobile broadband coverage	Mobile broadband take-up	Mobile download speed	Price of mobile broadband	
	Use of online services			

The charts in this Scorecard focus on the UK’s position relative to the other EU5 countries (France, Germany, Italy and Spain). The factors that affect the development of broadband networks, such as geography, population size and density, and legacy infrastructure, differ significantly between the 28 EU Member States. For this reason we consider it more appropriate to compare the UK’s broadband network with those in other major European economies than with those in all EU28 countries. For completeness, however, Annex A provides EU28 data for the metrics in the Scorecard, where such data are available.

Croatia became the 28th EU member state in July 2013. The majority of the data sources include figures for Croatia but some do not. Since the second scorecard was published data

⁷ See *The European Broadband Scorecard*, 2013 at <http://stakeholders.ofcom.org.uk/market-data-research/other/telecoms-research/bbresearch/scorecard>

⁸ See *The European Broadband Scorecard*, March 2014 at <http://stakeholders.ofcom.org.uk/market-data-research/other/telecoms-research/bbresearch/scorecard-14>

is now available for Croatia across more metrics and therefore we now include it in Annex A as a comparator country, where such data is available.

Figure 4 EU28 country codes (highlighting EU5)

Code	Country	Code	Country	Code	Country	Code	Country
BE	Belgium	EL	Greece	LT	Lithuania	PT	Portugal
BG	Bulgaria	ES	Spain	LU	Luxembourg	RO	Romania
CZ	Czech Republic	FR	France	HU	Hungary	SI	Slovenia
DK	Denmark	HR	Croatia	MT	Malta	SK	Slovakia
DE	Germany	IT	Italy	NL	Netherlands	FI	Finland
EE	Estonia	CY	Cyprus	AT	Austria	SE	Sweden
IE	Ireland	LV	Latvia	PL	Poland	UK	United Kingdom

Source: Eurostat

1.2 Challenges of providing data

Due to the complexity of gathering data across comparator countries we have faced a number of practical considerations in compiling the Scorecard. These relate to ensuring that the data we publish are comparable, reliable and the most recent available at the time of preparing the Scorecard. We have applied the same considerations for this edition of the Scorecard as we did for last year's.

Comparable. The notes to the charts in the Scorecard contain the definitions of 'standard' fixed-line broadband, 30+Mbit/s fixed-line broadband and mobile broadband that Ofcom or other organisations used in collecting the relevant data. In some cases these are different in different charts and countries. However, in general, 'standard' fixed-line broadband comprises technologies capable of providing speeds over 144Kbit/s and less than 30Mbit/s and fixed-line broadband with headline speeds of 'more than or equal to' 30Mbit/s comprises technologies capable of providing speeds equal to or greater than 30Mbit/s such as FTTx (e.g. fibre to the cabinet (FTTC) or fibre to the home FTTH) and cable.

We take these definitions of broadband from those that the European Commission (EC) uses in collecting data to measure progress against its Digital Agenda Targets.⁹ We consider that the EC is one of the primary sources of robust data comparing broadband networks across the EU28 and as such it is appropriate to adopt its definitions in the Scorecard. However we also acknowledge that increasing consumer expectations and expanded use of higher bandwidth services for fixed broadband mean that using a definition for standard broadband that starts at speeds of 144kbit/s is becoming more challenging to

⁹ See <https://ec.europa.eu/digital-agenda/en/scoreboard>.

justify. A definition that starts at 2Mbit/s or even 10Mbit/s could be considered to be more appropriate for the typical fixed broadband consumer.

In the interests of transparency the Scorecard shows publicly available data (with the exception of pricing data, explained below). We publish the source of the data in the notes to the charts.

As one of the aims of the methodology we used to compile this data was to ensure consistency across the EU28 to enable comparison between countries, the figures we publish here may differ from those that Ofcom or other organisations publish elsewhere, which may have been collected and analysed for a different purpose or using a different methodology.

One example of this difference is the Scorecard comparisons of ‘take-up and usage’ across the EU5. In general we consider household penetration a more useful measure of take-up among the population than population penetration. Thus we have used one measure based on survey data that excludes business connections to illustrate fixed broadband penetration per 100 households (Figure 10). However we also present fixed broadband connections per 100 people (Figure 9), a measure of fixed broadband penetration based on industry data rather than survey data, for reasons of consistency and to enable cross-comparisons with measures of broadband with a headline speed of 30+Mbit/s and mobile broadband which use the same survey methodology.

The metrics in Figure 2 are useful indicators of how broadband networks compare across the EU at a given point in time. However, they are just that: given the diverse topography, population density and legacy infrastructure of EU states (to name just a few factors), the direct comparison of individual metrics does not take account of the dynamics and relative challenges of developing broadband networks in different countries.

Reliable. Where we have any comments about the basis on which we or our sources collected or analysed the data in the Scorecard we have noted these in the charts’ accompanying commentary.

At the time of publication of the first and second Scorecards we did not consider that there were suitable data available to illustrate three of the metrics in Figure 2. These were fixed-line download speed, fixed-line upload speed and mobile download speed. We have once again not been able to identify suitable datasets for inclusion in this Scorecard.

Since the first Scorecard was published the Commission has published two research documents on the quality of broadband services in the EU.^{10 11} The Commission has sought views and data from the Body of European Regulators for Electronic Communications (BEREC) in order to refine its methodology regarding data collection and normalisation to improve the accuracy of the report. Other fixed-line download speed datasets are publicly available, however in our opinion there are limitations to the methodology used to obtain these datasets which mean that they may not offer comparable, robust estimates of national average fixed-line download speed. For this reason we have not included the data in this Scorecard. We discuss the availability of broadband speed data further in Annex B.

Most recent available. Collecting data across different countries can often take a long time. This means that some of our datasets may have been collected many months before the Scorecard’s publication. Given the speed at which broadband markets are moving,

¹⁰ See *Quality of Broadband Services in the EU March 2012, 2013* at <https://ec.europa.eu/digital-agenda/en/news/quality-broadband-services-eu-march-2012>

¹¹ http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=2319

comparable and robust data covering the EU5 may not reflect the state of individual markets at the time of this Scorecard's publication and more up-to-date information for each country may be available elsewhere. The notes to each chart set out the date to when its data refer.

The EC data is drawn from two main datasets¹², the 'comprehensive database' from Eurostat¹³, that refers to households within the EU and the Digital Agenda data tool available on the Digital Agenda website. The Digital Agenda data was updated December 2013, while the Eurostat database has not been updated since the period January 2013 to March 2013. We last accessed the Eurostat data for our previous Scorecard in early 2014 after then, meaning that any charts using the Eurostat data in the Scorecard have not changed. We decided to continue with publication of the Scorecard and then to publish an update in Q1 2015 as soon as new Eurostat data becomes available. On balance, we believe that the advantages of publishing an interim version of the Scorecard with a reduced number of charts alongside the International Communications Market Report (ICMR) outweigh the disadvantages of updating the Scorecard in Q1 2015. The Q1 2015 update will provide the remainder of the data and will complete the Scorecard.

Any charts or tables that use the Eurostat data have a note stating that the data needs to be updated and charts will be greyed out to ensure that it is clear which charts will be updated in Q1 2015.

We have published data in the Scorecard that we consider best meet these challenges.

1.3 Next steps

As we did in publishing the previous two Scorecards, we will apply the following principles to determine if and when it is appropriate to publish an updated Scorecard in future:

- We will only publish data in the Scorecard that we consider sufficiently robust and that refer to as recent a period as possible;
- The Scorecard will contain comparable data covering all EU5 countries as far as possible;¹⁴
- Dependent on the availability of sufficiently robust data, future Scorecards should contain the metrics that this Scorecard contains as a minimum; and
- In the interests of transparency, we will publish publicly available data in the Scorecard if they are sufficiently robust, timely and allow helpful comparison between countries.

We currently intend to publish any future Scorecards(as we have done with this scorecard) alongside our annual *International Communications Market Report* ("the ICMR"), which contains communications sector data covering a number of comparator countries, including the EU5.¹⁵

¹² <http://ec.europa.eu/digital-agenda/download-data>

¹³

http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive_database

¹⁴

We reiterate that the metrics in Figure 2 are *indicators* of how broadband networks compare across the EU at a given point in time.

¹⁵ See <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr13/international/>

Section 2

The Scorecard

2.1 Overview

Figure 4 provides an overview of the UK's position relative to that of EU5 countries across the Scorecard's metrics (except price).

Figure 5 Overview of the UK's position on the Scorecard relative to the EU5 (excluding pricing)

Coverage	EU5	Take-up and usage	EU5	Speed	EU5	Choice	EU5
Standard broadband coverage	=1/5	Fixed broadband take-up	1/5*	Fixed download speed	N/A	Market concentration in fixed broadband market	1/5
Broadband coverage of NGA broadband connections	1/5	Broadband take-up of connections with a headline speed of 30Mbit/s or more	1/5**	Fixed upload speed	N/A	Market concentration in mobile broadband market	2/5
Mobile broadband coverage	=1/5	Mobile broadband take-up	1/5	Mobile download speed	N/A		
		% accessing internet regularly	1/5				
		% never used internet	1/5				
		% buying goods or services	1/5				
		% interacted with public authorities	4/5				

* 1/5 for broadband take-up per 100 households (old data). The UK ranks 3/5 for broadband take-up per 100 people (year-end 2013). We consider the per household figure to be a more useful figure because broadband is usually shared amongst a household rather taken by individuals. In this case the per individual measure is distorted by differences in the average number of people per household across the comparator countries. The per household measure therefore gives a closer indication of the share of people that do or do not have a broadband connection.

** 1/5 for take-up of broadband with headline speeds of 'more than or equal to' 30Mbit/s per 100 people. No per household take-up figures are available.

Figure 6 Overview of the UK's position on the Scorecard relative to the EU5: pricing

	Weighted average single-service pricing	Weighted average bundle pricing	Best offer pricing
8Mbit/s, 25GB data, 250 mins	2/5	2/5	2/5
16Mbit/s, 50GB data, 250 mins	1/5	2/5	2/5
30Mbit/s, 75GB data, 250 mins	1/5	2/5	4/5
1GB data (mobile broadband only)			2/5
3GB data (mobile broadband only)			3/5
5GB data (mobile broadband only)			3/5

Note: (1) Weighted average single-service pricing is the sum of the weighted average prices of the three cheapest standalone fixed broadband and three cheapest standalone fixed voice services that fulfil each basket's requirements. We weight the averages for each service by the relevant providers' market shares. (2) Weighted average bundle pricing is the weighted average of the three lowest prices for bundled fixed broadband and fixed voice services that fulfil each basket's requirements. (3) Best offer pricing is the lowest price that a consumer could pay for each basket of services including, where appropriate, bundled services. We weight the averages for each service by the relevant providers' market shares. (4) We have used three baskets including fixed broadband and fixed voice telephony in our analysis: a fixed broadband connection with a minimum headline speed of 'up to' 8Mbit/s and 25GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month; a fixed broadband connection with a minimum headline speed of 'up to' 16Mbit/s and 50GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month; and a fixed broadband connection with a minimum headline speed of 'up to' 30Mbit/s and 75GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month.

Figure 7 Overview of the UK's position on the Scorecard relative to the EU5, including data: pricing

		UK Rank	UK (£PPP)	FR (£PPP)	DE (£PPP)	ES (£PPP)	IT (£PPP)
Weighted average single-service pricing	8Mbit/s, 25GB data, 250 mins	2/5	35	47	32	52	65
	16Mbit/s, 50GB data, 250 mins	1/5	35	43	51	52	65
	30Mbit/s, 75GB data, 250 mins	1/5	47	62	51	52	66
Weighted average bundle pricing	8Mbit/s, 25GB data, 250 mins	2/5	27	29	22	38	34
	16Mbit/s, 50GB data, 250 mins	2/5	27	30	27	38	34
	30Mbit/s, 75GB data, 250 mins	2/5	35	40	27	44	43
Best offer pricing	8Mbit/s, 25GB data, 250 mins	2/5	23	28	22	37	29
	16Mbit/s, 50GB data, 250 mins	2/5	23	29	22	37	29
	30Mbit/s, 75GB data, 250 mins	4/5	33	32	22	43	29
Best offer pricing	1GB data (mobile broadband only)	2/5	7	9	12	11	5
	3GB data (mobile broadband only)	3/5	15	13	20	24	5
	5GB data (mobile broadband only)	3/5	16	15	20	30	13

Note: (1) Data and rankings for the UK listed in bold. (2) Weighted average single-service pricing is the sum of the weighted average prices of the three cheapest standalone fixed broadband and three cheapest standalone fixed voice services that fulfil each basket's requirements. We weight the averages for each service by the relevant providers' market shares. (3) Weighted average bundle pricing is the weighted average of the three lowest prices for bundled fixed broadband and fixed voice services that fulfil each basket's requirements. (4) 'Best offer' pricing is the lowest price that a consumer could pay for each basket of services including, where appropriate, bundled services. (5) We have used three baskets including fixed broadband and fixed voice telephony in our analysis: a fixed broadband connection with a minimum headline speed of 'up to' 8Mbit/s and 25GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month; a fixed broadband connection with a minimum headline speed of 'up to' 16Mbit/s and 50GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month; and a fixed broadband connection with a minimum headline speed of 'up to' 30Mbit/s and 75GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month.

Figure 8 Overview of the UK's position on the Scorecard relative to the EU5, for both the previous and current Scorecard, including data (excluding pricing)

	Data	EU5 ranking
Standard broadband coverage	95-100% <i>(95-100%)</i>	=1 <i>(=1)</i>
NGA broadband coverage	80-85% <i>(70-75%)</i>	1 <i>(1)</i>
Mobile broadband coverage	95-100% <i>(95-100%)</i>	=1 <i>(=1)</i>
Fixed broadband connections per 100 households	83 <i>(83)</i>	1 <i>(1)</i>
Fixed broadband connections per 100 people	34 <i>(34)</i>	3 <i>(3)</i>
Broadband connections with a headline speed of 'more than or equal to' 30Mbit/s per 100 people	9 <i>(9)</i>	1 <i>(1)</i>
Mobile broadband connections per 100 people	89 <i>(84)</i>	1 <i>(1)</i>
Percentage of individuals accessing the internet at least once a week	87% <i>(87%)</i>	1 <i>(1)</i>
Percentage of individuals that have never used the internet	8% <i>(8%)</i>	1 <i>(1)</i>
Percentage of individuals who bought or ordered goods or services online within the last 12 months	77% <i>(77%)</i>	1 <i>(1)</i>
Percentage of individuals who interacted online with public authorities within the last 12 months	41% <i>(41%)</i>	4 <i>(4)</i>
Percentage of fixed broadband lines operated by incumbent	33% <i>(31%)</i>	1 <i>(1)</i>
Percentage market share of leading MNOs	29% <i>(31%)</i>	2 <i>(1)</i>

Note: Data and rankings for December 2014 Scorecard listed in bold. Data and rankings for March 2014 Scorecard listed in italics and parentheses.

2.2 Coverage

Standard broadband, broadband with headline speeds of 30+Mbit/s and mobile broadband coverage

The EC published the most recent coverage estimates of standard fixed-line broadband, broadband with headline speeds of 'more than or equal to' 30Mbit/s and mobile broadband at a national level for EU5 countries.

The EC estimates coverage of standard broadband and broadband with headline speeds of 'more than or equal to' 30Mbit/s as the proportion of households in a region that can access a fixed-line technology theoretically capable of providing headline download speeds of at least 144kbit/s and less than 30Mbit/s for standard broadband and greater than or equal to 30Mbit/s for non-standard broadband.¹⁶ It calculates mobile broadband coverage as the percentage of households within a region that can access an HSPA-upgraded 3G network¹⁷.

In acknowledgement of the difficulties of accurately measuring coverage to a single percentage point (and comparing countries where coverage levels are very similar), we report coverage figures within bands of five percentage points. For example, 97% coverage or 95% coverage will be placed in the 95%-100% coverage band.

In all five comparator countries, at least 95% of households are in areas served by standard broadband. At least 95% of households are in areas served by mobile broadband in every EU5 country except Germany, where between 90% and 95% of households are in areas with coverage. However, it is important to note that Germany generally applies a more rigorous definition of mobile coverage than other countries, based on actual download speeds rather than simple reception of a signal.

Coverage of broadband from Next Generation Access (NGA) networks which can provide headline speeds of 'more than or equal to' 30Mbit/s has increased significantly in the UK since our last Scorecard, from 70-75% of households covered up to 80-85%.

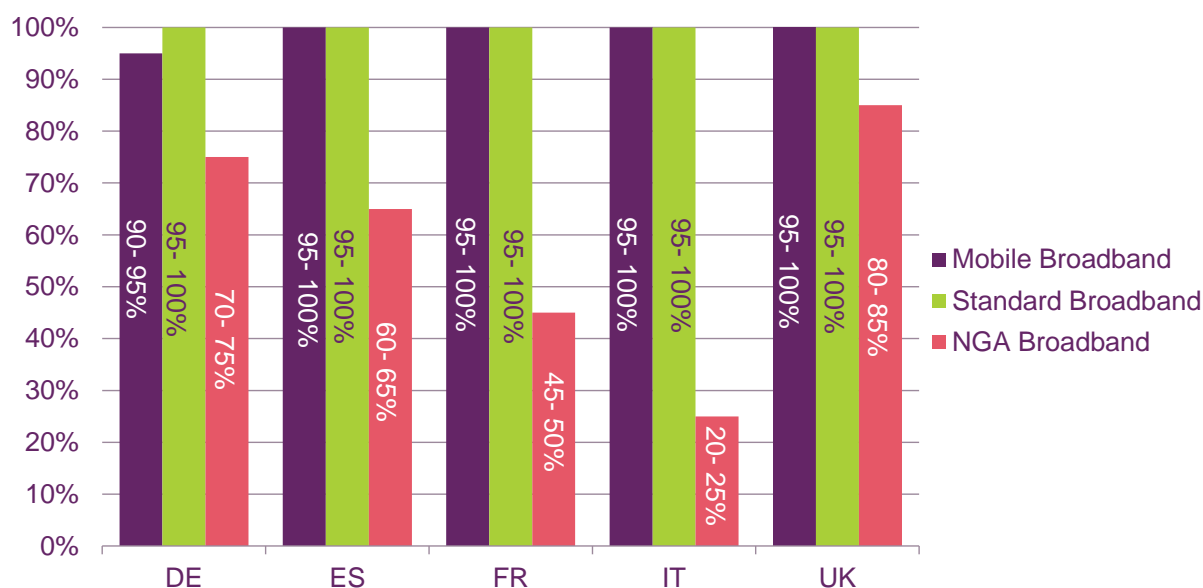
In Ofcom's latest Infrastructure Report, published on 8 December 2014, we report that the 78% of residential and small commercial premises in the UK are covered by NGA networks (with 75% of premises having a connection that can deliver more than 30Mbit/s). We calculated this based upon inputs from UK communications providers, who provided detailed postcode level data. This methodology results in a lower number to that used by the Commission for the UK, (82% versus our 78%). We consider that our data is more likely to reflect the current state of NGA coverage in the UK than the Commissions data.

The UK continues to have the highest level of coverage amongst the EU5 for NGA broadband (using either the Commission's data or Ofcom's infrastructure report data), with coverage growing by higher levels than the remainder of the EU5. Italy has the lowest level of coverage of the EU5 (20-25%).

¹⁶ Next Generation Access (NGA) technologies (VDSL, FTTC, FTTP and DOCSIS3.0 cable) are capable of providing 30Mbit/s (or higher) download speeds. However not all lines served by an NGA technology will receive speeds of 30Mbit/s or higher. This is because some NGA technologies such as VDSL cannot deliver speeds above 30Mbit/s to all households that are covered by the technology.

¹⁷ We note that mobile coverage levels can vary significantly depending on the definitions used. For example indoor coverage levels are typically lower than outdoor coverage levels. Additionally mobile broadband use is much wider than just in buildings. For example many consumers wish to use their mobile broadband service while travelling. To address these types of requirement, coverage measures that capture wider geographic areas beyond households are necessary such as % of a rail network covered.

Figure 9 Percentage of households in areas served by standard, NGA and mobile broadband



Source: EC, Digital Agenda Data Tool, year-end 2013.

Note: (1) Data refers to September 2014. (2) Ofcom has banded figures within a range between the nearest integers divisible by 5. (3) 'Standard broadband' refers to DSL, FTTP, WiMAX and Standard Cable, the main fixed-line technologies capable of providing headline speed of at least 144kbit/s and less than 30Mbit/s download speed for end-users. (4) NGA Broadband refers to NGA technologies, including VDSL, FTTx and DOCSIS3.0 cable, those needed to provide 'more than or equal to' 30Mbit/s download speeds for end users. (5) 'Mobile broadband' refers to coverage by at least one HSPA-upgraded 3G mobile network. LTE coverage is not included.

UK NGA¹⁸ broadband coverage has risen quickly as a result of infrastructure programmes by commercial network operators as well as Government's broadband investment programmes. Openreach and Virgin Media's respective networks account for over 99% of all homes passed by NGA broadband.¹⁹ Openreach's programme to expand its NGA broadband footprint is ongoing and is due to end in 2015, while Virgin Media has focused on increasing speeds offered to the homes it already covers.

A number of other smaller providers are also building and operating NGA broadband networks, including KCOM in the Hull area, WightFibre on the Isle of Wight, Small World Cable in North West England and Western Scotland and a number of commercial schemes in new housing developments and community projects in rural areas.

The UK Government has committed to funding the further expansion of 24+Mbit/s broadband coverage beyond the major commercial programmes.²⁰ It has made funding of £530m available, to be supplemented with additional funding from local authorities and devolved administrations, with the aim of achieving coverage of at least 90% which it expects to reach in 2016. The programme is being coordinated by Broadband Delivery UK. Additional funding of £250m has been allocated by Government, to be matched by local authorities, to extend coverage from 90% to 95% by 2017. Pilot projects are underway as a

¹⁸ NGA stands for Next Generation Access. NGA networks are designed to provide speeds of more than 24Mbit/s, but some households may not be able to receive these speeds

¹⁹ See Ofcom *Infrastructure Report 2014* at <http://stakeholders.ofcom.org.uk/market-data-research/market-data/infrastructure/infrastructure-2014/>

²⁰ See <https://www.gov.uk/broadband-delivery-uk>

result of a further £10m of funding to identify possible solutions for the remaining 5% of premises yet to be covered.

2.3 Take-up and usage

At the time of the Scorecard's preparation, the EC's Communications Committee (Cocom) and Eurostat offered the most recent assessments of broadband take-up in the forms of fixed broadband, 30+Mbit/s broadband and mobile broadband penetration per 100 people or per 100 households across the EU5.²¹

Cocom measures broadband penetration per 100 people based on NRA and operator data. Its figures refer to year-end 2013 and it publishes the following relevant metrics:

- Fixed broadband penetration per 100 people (Figure 9);
- Broadband connections with headline speeds 'more than or equal to' 30Mbit/s per 100 people (Figure 11); and
- Mobile broadband connections per 100 people (Figure 12).

Eurostat publishes survey data on the proportion of households that had access to fixed broadband in 2013 (Figure 10), however this data has not been updated in time for the publication of this version of the Scorecard.

Fixed broadband take-up

Cocom reports that there were 34 fixed broadband connections of any speed per 100 people in the UK in January 2013. This was slightly fewer than in France (38) and Germany (35). However penetration in the UK was considerably higher than in Italy (23 connections per 100 people) and Spain (26).

Our own data on the number of broadband penetration connections per person, based on IHS, operator and Ofcom data and analysis, gave very similar results.

²¹ Cocom, EC, *Digital Agenda Scoreboard 2013*, at http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=2375; Eurostat, *Community survey on ICT usage by Households and Individuals*, 2013, at http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive_database or http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/database

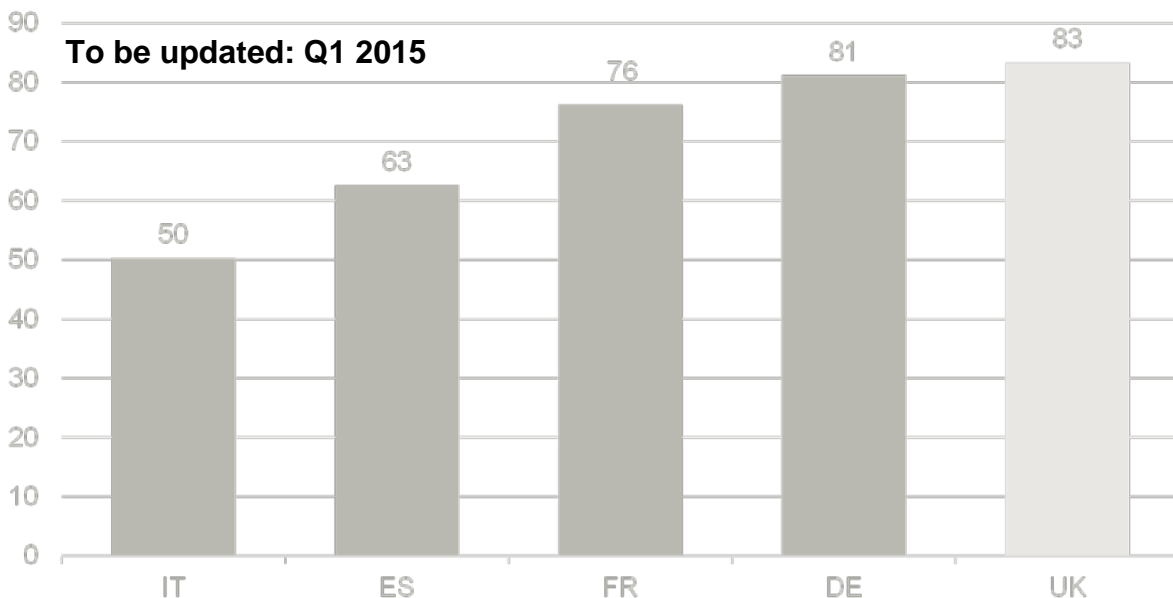
Figure 10 Fixed broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2013.

Note: (1) Data refer to year-end 2013. (2) These data refer to all forms of fixed-line broadband, including standard and 30+Mbit/s connections.

Figure 11 Fixed broadband connections per 100 households



Source: Eurostat, Comprehensive Database, 2013.

Note: (1) Data refer to Q1 2013. (2) These data refer to all forms of fixed-line broadband (3) Data relates to households with at least one member aged 16-74 years.

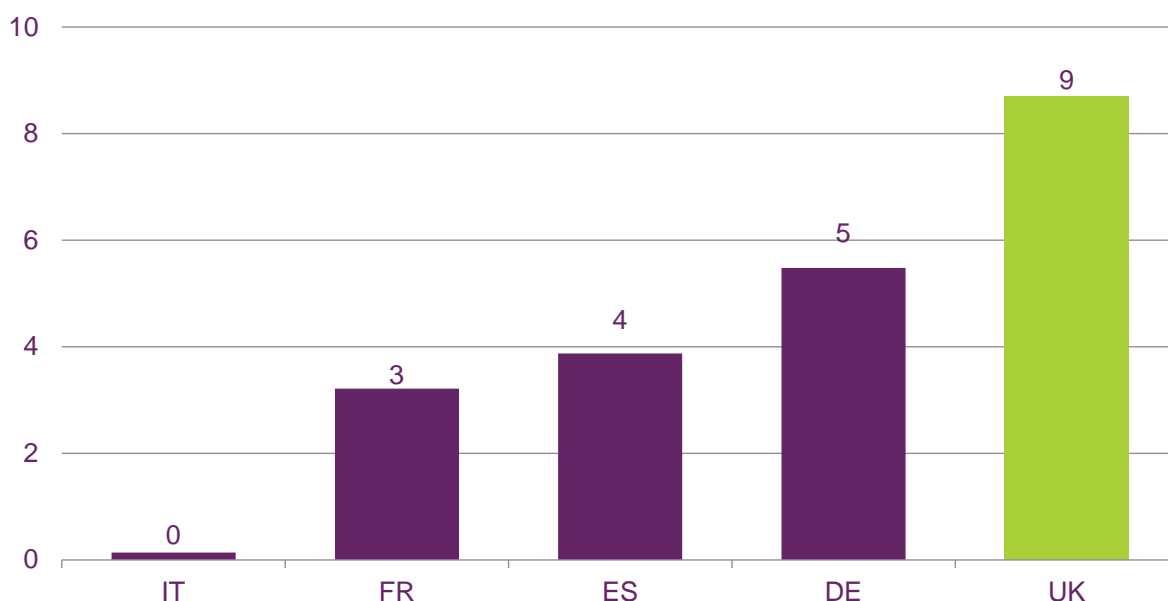
Take-up of broadband with headline speeds of 'more than or equal to' 30Mbit/s

Cocom reports on high speed broadband penetration, defining this as the number of broadband connections per 100 people that access the internet via NGA technologies theoretically capable of offering headline speeds of 30+Mbit/s, including VDSL, FTTP and DOCSIS3.0.

In December 2013 Cocom reports that there were 9 connections with a headline speed of 30+Mbit/s per 100 people in the UK, the highest 30+Mbit/s penetration rate among the EU5.

The high take-up of broadband with headline speeds of 'more than or equal to' 30Mbit/s in the UK can be explained in part by the higher availability of NGA connections compared to other EU5 countries (See Figure 8 and accompanying commentary, above). It is also due in part to cable operator Virgin Media continuing to undertake a programme of doubling the speed of its broadband customers²². The 2012 Scorecard identified a number of commercial and public initiatives to roll out NGA broadband which were then in progress.²³ The effects of these programmes continue to be reflected in the penetration figures.

Figure 12 Broadband connections with a headline speed of 'more than or equal to' 30Mbit/s per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard year-end 2013.

Mobile broadband take-up

Cocom calculates mobile broadband penetration as the combined number of the following subscriptions per 100 people:

- Subscriptions that have connected to the internet in the preceding ninety days through a smartphone or web-enabled handset;
- Subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as a standalone service (modems/dongles); and
- Subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as an add-on data package requiring an additional subscription.

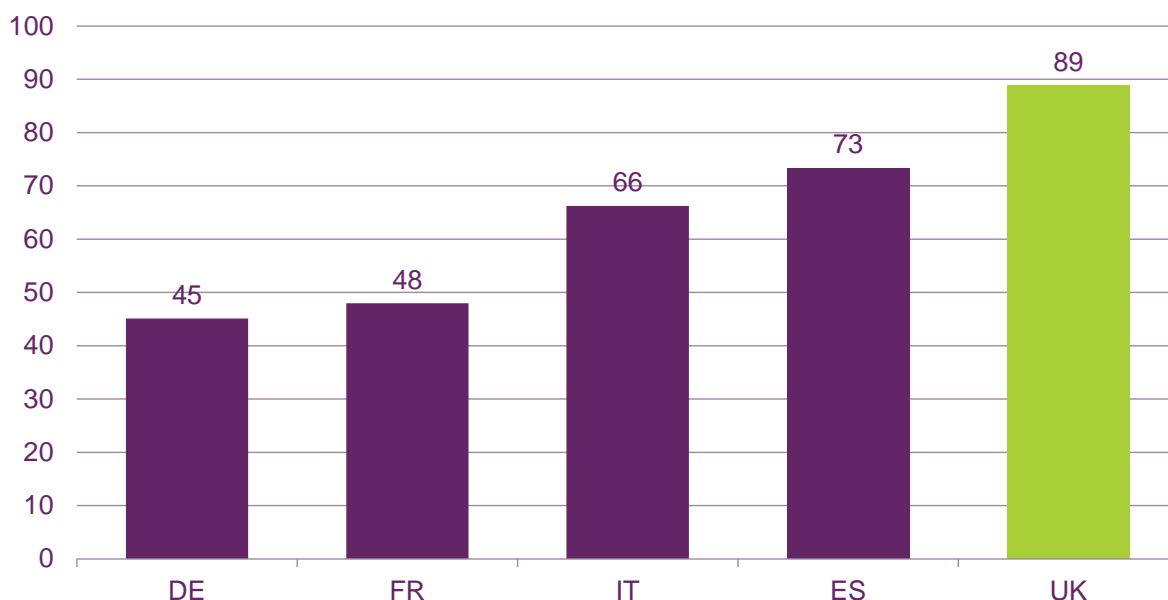
²² See <http://keepup.virginmedia.com/speedupgrade>

²³ See *The European Broadband Scorecard*, 2013, p. 14 at

<http://stakeholders.ofcom.org.uk/binaries/research/broadband-research/scorecard.pdf>

In the UK there were 89 such connections per 100 people in December 2013, up from 84 in January 2013. The UK continues to hold the highest rate of penetration in the EU5, staying ahead of previous leader Spain where there were 73 mobile broadband connections per 100 people in December 2013. In Italy (66 connections per 100 people), France (48) and Germany (45) the mobile broadband penetration was lower, although each saw increases on the penetration levels in January 2013.

Figure 13 Mobile broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2013.

Notes: (1) Data refer to year-end 2013. (2) Data combine the number of subscriptions that have connected to the internet in the preceding ninety days through a standard mobile subscription, the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as a standalone service (modem/dongle) and the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as an add-on data package requiring an additional subscription. (3) Mobile broadband connections may use technologies including 3G, HSPA and LTE.

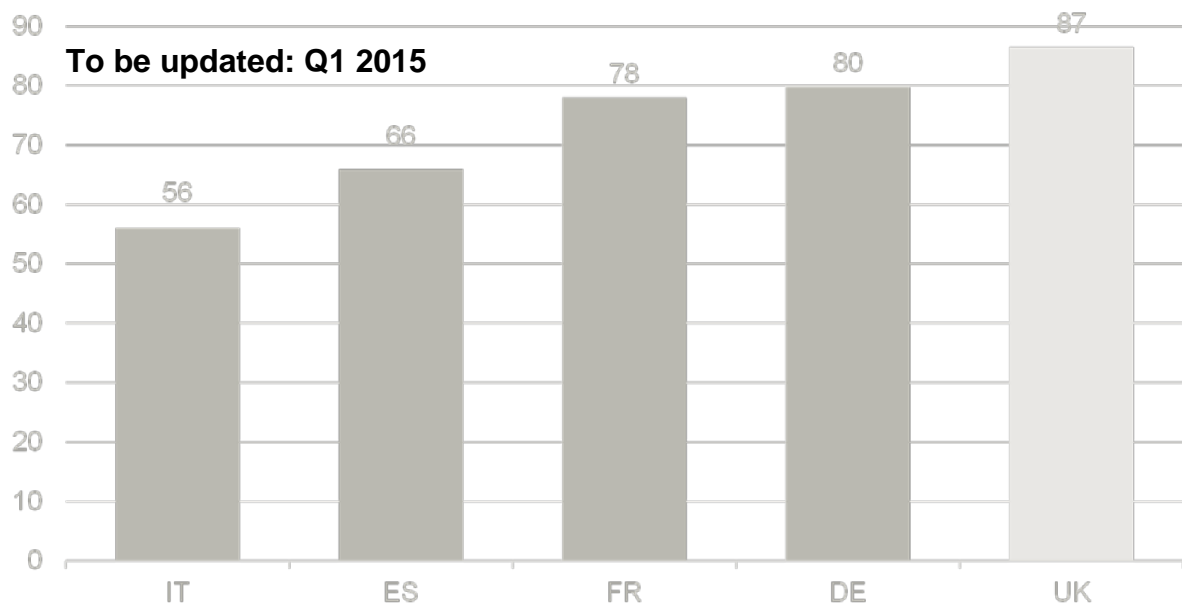
Use of online services

Eurostat survey data covering the EU5 includes the following metrics relating to internet usage:²⁴

- The percentage of individuals accessing the internet at least once a week (Figure 13);
- The percentage of individuals who have never used the internet (Figure 14);
- The percentage of individuals who bought or ordered goods or services online within the last 12 months (Figure 15); and
- The percentage of individuals who have interacted online with public authorities within the last 12 months (Figure 16).

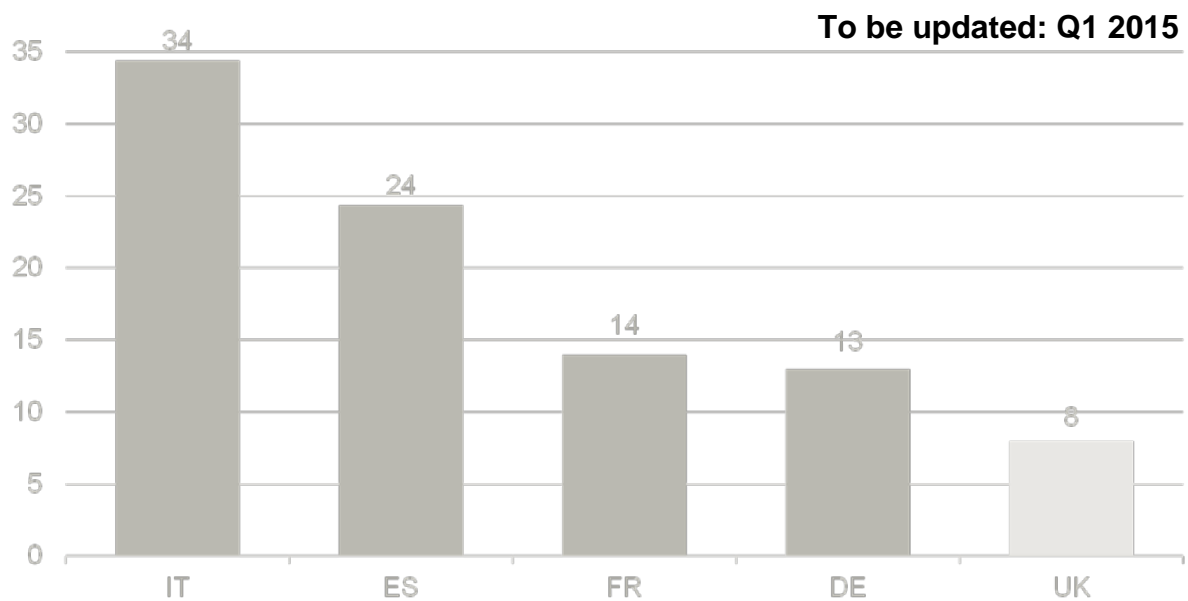
²⁴ See Eurostat, *Community survey on ICT usage by Households and Individuals*, 2013, at http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/database

Figure 14 Percentage of individuals accessing the internet at least once a week



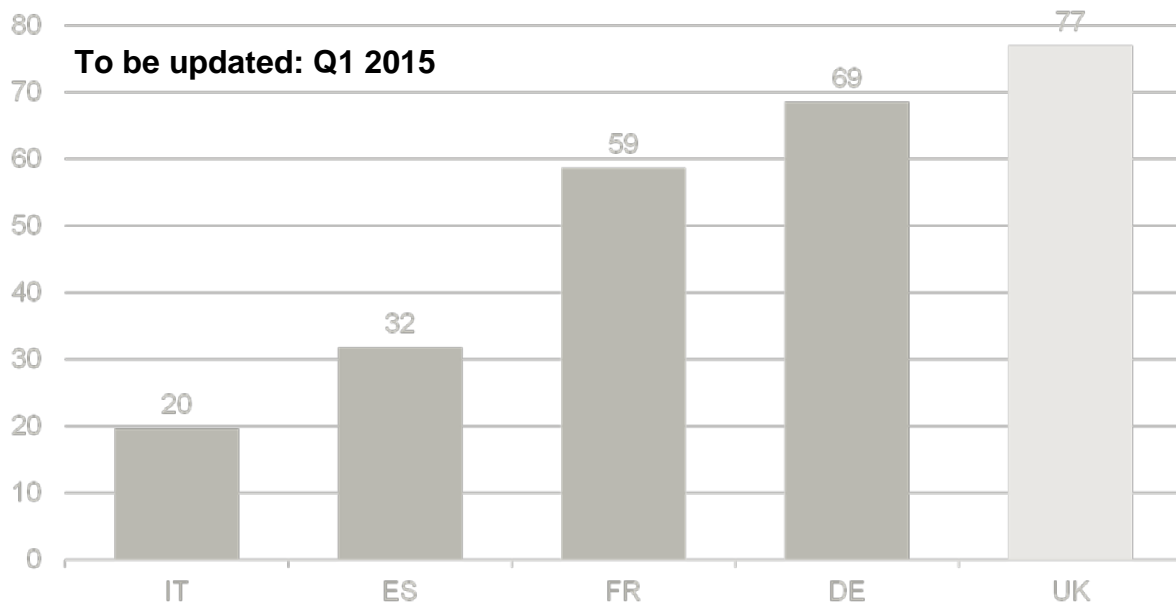
Source: Eurostat, Community survey on ICT usage in Households and by Individuals.
Note: (1) Data refer to 2013. (2) These data cover individuals aged 16 to 74.

Figure 15 Percentage of individuals that have never used the internet



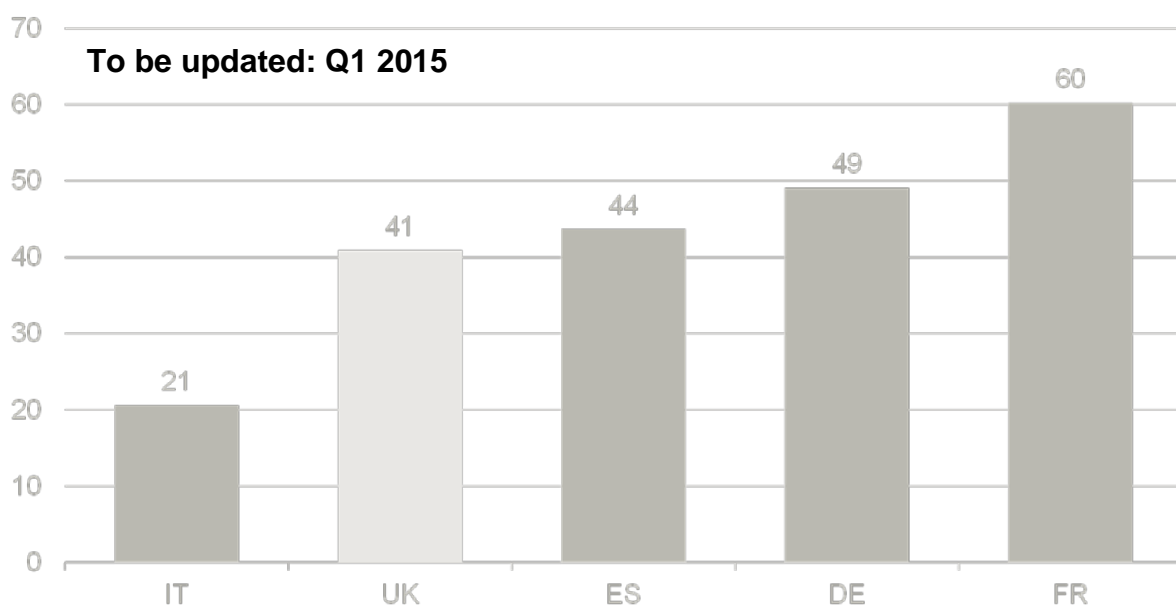
Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.
Note: (1) Data refer to 2013. (2) These data cover individuals aged 16 to 74.

Figure 16 Percentage of individuals who bought or ordered goods or services online within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.
Note: (1) Data refer to 2013. (2) These data cover individuals aged 16 to 74.

Figure 17 Percentage of population who interacted online with public authorities within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.
Note: (1) Data refer to 2013. (2) These data cover individuals aged 16 to 74.

2.4 Pricing

Ofcom compares the price of communications services in the UK, France, Germany, Italy, Spain and the US in its *International Communications Market Report*.²⁵

We do this using a model, which is provided by pricing consultancy Teligen, that incorporates the residential tariffs offered by the largest providers of consumer fixed broadband, fixed voice, mobile phone, mobile broadband and pay-TV services in these six countries, including bundled tariffs. Using this data, the model calculates the lowest possible monthly price at which a consumer could meet the usage requirements of pre-defined baskets of services.²⁶

Using this model we have undertaken additional analysis to determine the monthly cost of three baskets of fixed broadband and fixed voice services among EU5 countries. We present these prices in three different ways:

- **Weighted average stand-alone pricing.** This is the sum of the average of the three cheapest standalone fixed broadband and average of the three cheapest standalone fixed voice services that fulfil each basket's requirements. We weight the averages for each service by the relevant providers' market shares (Figure 17);
- **Weighted average bundle pricing.** This is the weighted average of the three lowest prices for bundled fixed broadband and fixed voice services that fulfil each basket's requirements. In our analysis the average has been weighted by the providers' fixed broadband market shares (Figure 18); and
- **'Lowest available' pricing.** This is the lowest price that a consumer could pay for each basket of services including, where appropriate, bundled services (Figure 19).

In general, weighted average pricing measures offer a more accurate reflection of the prices consumers are paying in a given market, as opposed to the 'lowest available' price which may reflect service offerings with relatively limited availability or low take-up. However, none of the individual pricing metrics is perfect in isolation, for the reasons outlined below, so we use them in conjunction to build up an overall impression.

We have used the following baskets in this analysis:

- A fixed broadband connection with a minimum headline speed of 'up to' 8Mbit/s and 25GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month;
- A fixed broadband connection with a minimum headline speed of 'up to' 16Mbit/s and 50GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month; and

²⁵ Ofcom, *International Communications Market Report 2014*, at <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr14/international/>

²⁶ This model, provided by Teligen, incorporates the tariffs offered by those communications providers that make up 80% of the market by connection share for each service in each country, or a maximum of five providers for each service.

- A fixed broadband connection with a minimum headline speed of ‘up to’ 30Mbit/s and 75GB of data use per month, alongside a fixed line with 250 minutes of outgoing calls per month.

Each basket includes the relevant line rental fee for the fixed-line connection.

We have also analysed the price of mobile broadband services. Below, we display the stand-alone ‘lowest available’ prices of connections requiring 1GB, 3GB and 5GB of data per month using a datacard or dongle (not taking into account connection speed) (Figure 20).

We adjust all of our figures for purchasing power parity (PPP) so that they have equivalent purchasing power across countries. This adjustment makes cross-country comparisons fairer. Exchange rate fluctuations and changes in PPP and Basket compositions between countries since last year mean that the figures included in other Scorecards are not directly comparable to those in this one.

There are limitations to how accurately our analysis can reflect the prices that consumers actually pay:

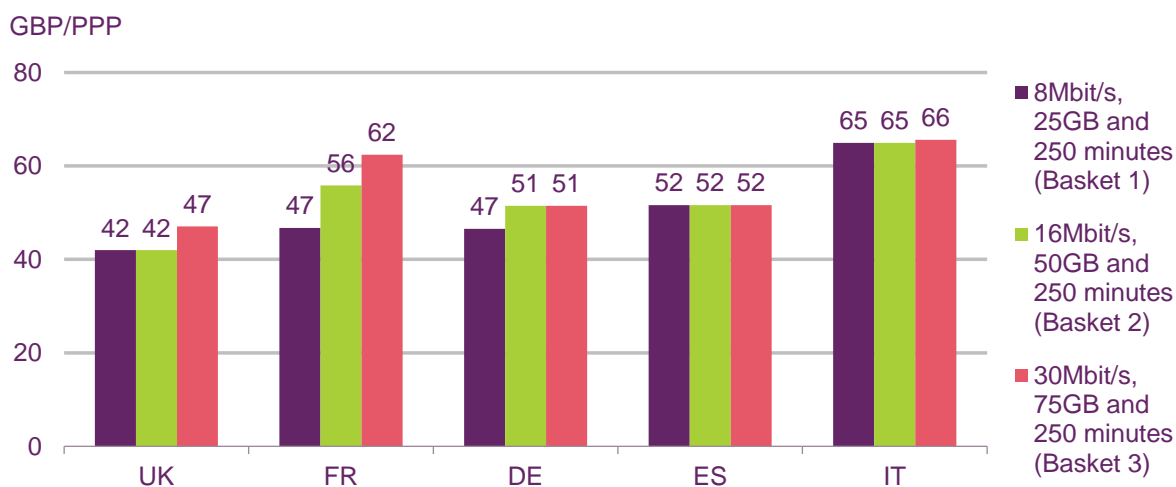
- Weighted averages give a better reflection of the prices a country’s consumers pay because they take account of providers’ market shares. That reduces the risk of averages being skewed by cheap services which relatively few consumers take up. However weighted averages discount those services that are not available to everyone, a metric that is measured using ‘lowest available’ pricing.
- ‘Lowest available’ pricing data reflects tariffs that may not be available to some consumers, (for example if they do not have access to the requisite infrastructure); and
- Any average pricing data does not give an indication of the range of prices among the tariffs from which we take the average.

However, by defining the price of our baskets in different ways as set out above we have mitigated the risk that the analysis in the Scorecard distorts the actual prices consumers can expect to attain. We also believe that our data is the most reliable data available that compares fixed and mobile broadband prices across the EU5. We therefore consider that it is the most appropriate dataset for inclusion in the Scorecard.

‘Weighted average’ stand-alone pricing

The average of the three lowest available prices for standalone fixed broadband and fixed voice services, weighted by the relevant provider’s market share, was cheaper in the UK than in any other EU5 country for all baskets in 2014. The weighted average monthly price of single-service tariffs for Basket 1, offering 8Mbit/s headline download speed, 25GB of data use and 250 voice minutes, was £42 in the UK in 2014. For Basket 2 (16Mbit/s, 50GB and 250 minutes) the weighted average stand-alone price was also £42 in 2014, while that of Basket 3 (30Mbit/s, 75GB and 250 minutes) was £47. The highest weighted average stand-alone prices for all Baskets were found in Italy in 2014.

Figure 18 Weighted average single-service pricing for fixed broadband and fixed voice services



Source: Ofcom, using data supplied by Teligen.

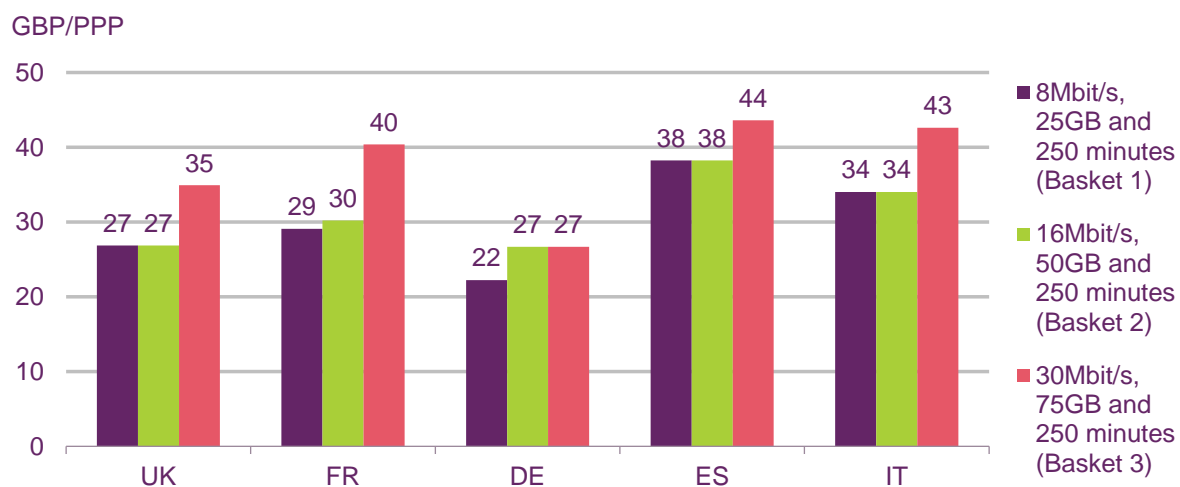
Note: (1) Average of three lowest single-service tariffs available in each country, weighted by market share. (2) Data refer to July 2014. (3) In some cases the weighted average price for a broadband connection is lower than it is for slower connection speeds. This is a result of the market share weighting for each speed, i.e. cheaper providers have greater market share at the faster connection speeds than they do at the lower speed. (4) PPP adjusted.

'Weighted average' bundle pricing

The UK offered the joint lowest available weighted average bundled price for one basket (Basket 2) and the second lowest average prices for two baskets (Basket 1 and 3) after Germany in 2014.

The joint lowest weighted average price for Basket 2 (which includes a broadband connection of at least 16Mbit/s, 50GB of data and 250 minutes of fixed voice calls) was found in the UK and Germany in 2014 at £27 per month (when rounded to an integer). The lowest average prices for Baskets 1 and 3 (Basket 1 with the same fixed voice use and 25GB of data use over a connection of at least 8Mbit/s, and Basket 3 with similar outgoing calls and 75GB of use over a connection of at least 30Mbit/s) were both found in Germany in 2014, at £22 and £27 per month respectively. In the UK, the average prices of these baskets were £27 per month and £35 per month respectively.

Figure 19 Weighted average bundle pricing for fixed broadband and fixed voice services



Source: Ofcom, using data supplied by Teligen.

Note: (1) Average of the three lowest bundled tariffs available in each country. (2) Data refer to July 2014. (3) PPP adjusted.

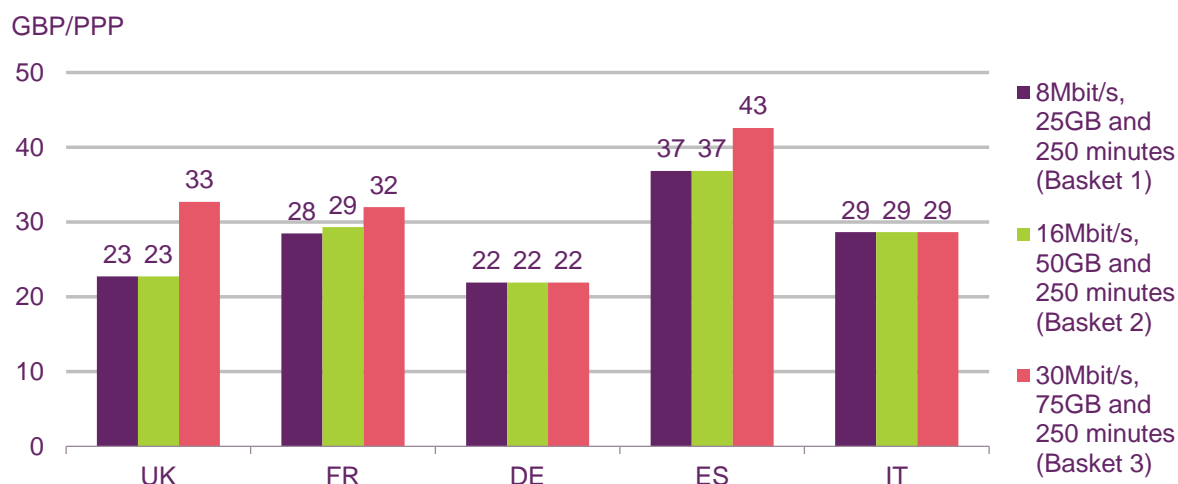
‘Lowest available’ fixed-line pricing

The ‘lowest available’ prices (including for bundled tariffs) of our three baskets of fixed broadband and fixed voice services give an indication of the lowest prices available in each country. As a result they reflect special promotional offers which some communications providers put in place to attract new customers. On this measure the UK offered the second cheapest price in the EU5 for Basket 1 and 2 and the fourth cheapest²⁷ for Basket 3.

Germany offered the lowest priced offer for Basket 1 (an 8Mbit/s headline download speed, 25GB of data use and 250 minutes package) at £22 per month, with the UK being second cheapest at £23 per month. Germany also offered the ‘lowest available’ price for Basket 2, (a 16Mbit/s connection, 50GB data and 250 minutes) and Basket 3 (30Mbit/s, 75GB and 250 minutes combination), both also at £22 per month. Basket 2 was available in the UK at £23 per month. The second lowest price for Basket 3 was in Italy, £29 per month, followed by France and Italy at £32 and £29 per month respectively. Spain was the most expensive for Basket 3 at £43 compared to the UK in fourth at £33.

²⁷ Includes the true stand-alone Virgin Media fixed-line broadband service. There is no way to confirm whether other services are ‘true’ stand-alones or not.

Figure 20 'Lowest available' pricing for fixed broadband and fixed voice services, including bundled tariffs



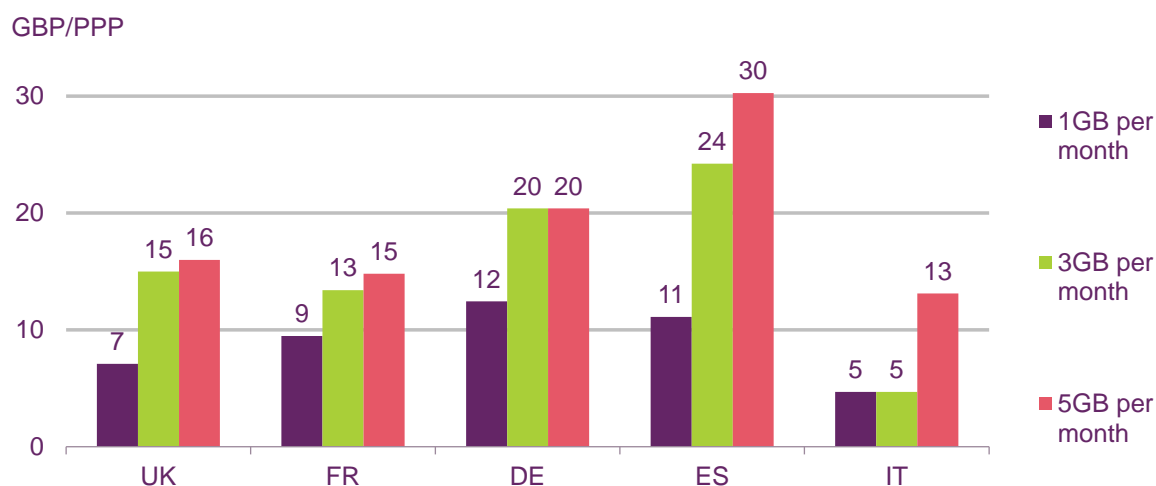
Source: Ofcom, using data supplied by Teligen.

Note: (1) Lowest tariff available in each country. (2) Data refer to July 2014. (3) PPP adjusted.

'Lowest available' mobile broadband pricing

The cheapest 'lowest available' prices for mobile broadband offering 1GB and 3GB of data per month were in Italy, both at £5 per month. The best 'lowest available' prices for mobile broadband offering 5GB per month were also found in Italy (£13). UK operators offered the third-lowest prices for both the 3GB per month data allowance and for 5GB (£15 and £16 respectively) while the UK's 'lowest available' pricing was second lowest for the 1GB plan.

Figure 21 'Lowest available' mobile broadband pricing



Source: Ofcom data supplied by Teligen.

Note: (1) Lowest tariff available from any of the largest providers by market share in each country. (2) Data refer to July 2014. (3) PPP adjusted.

2.5 Choice

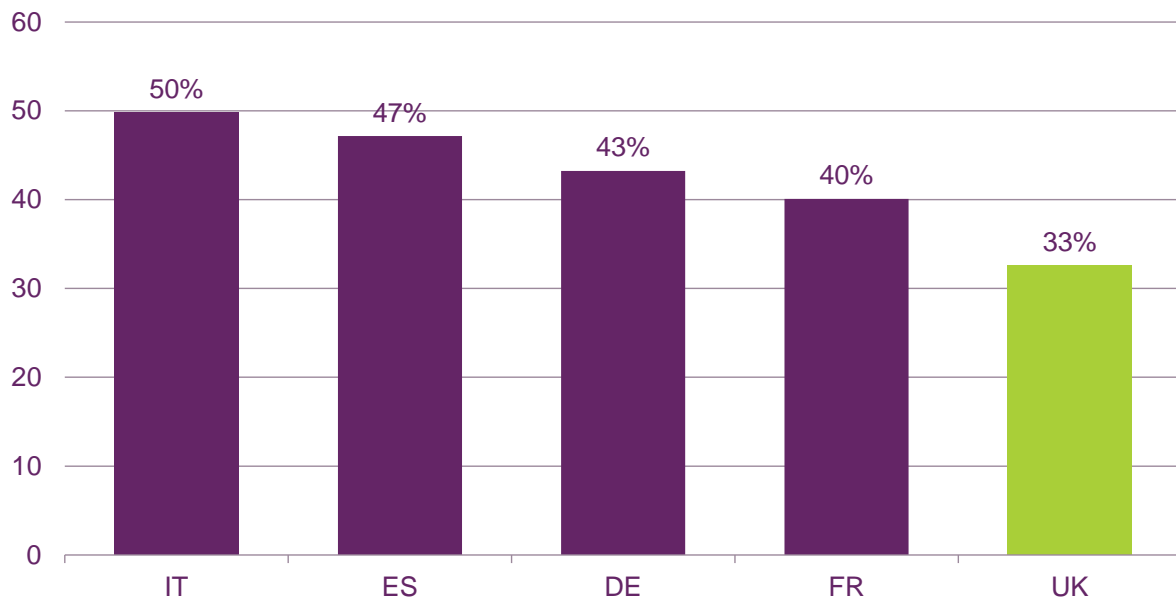
Market concentration in fixed broadband market

Figure 21 and Figure 22 illustrate two proxy measures of consumer choice in the broadband market: the percentage of all fixed broadband subscriptions that incumbent providers in EU5

countries operate and the market share of the largest mobile network operator (MNO) in each EU5 market.

The incumbent fixed broadband provider in the UK, BT, operated a lower proportion of lines (33%) than the incumbent provider in any other EU5 market. The second least-concentrated fixed broadband market was France (40%). The incumbent operated the highest proportion of lines in Italy (50%).

Figure 22 Percentage of fixed broadband lines operated by incumbent



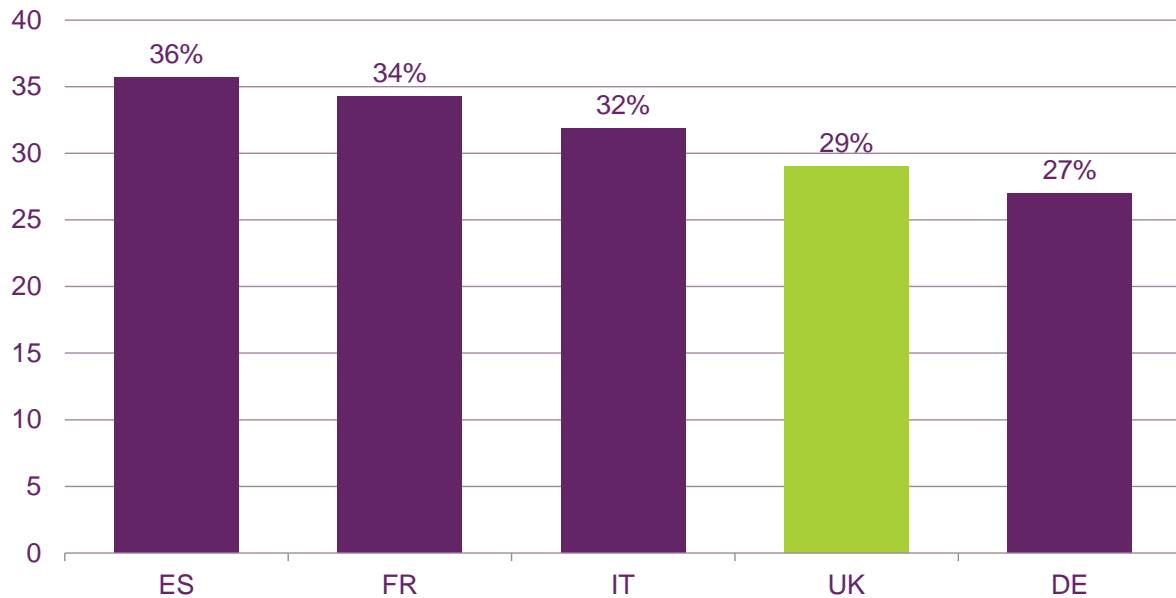
Source: Cocom, EC, Digital Agenda Scoreboard 2013.

Note: (1) Data refer to December 2013. (2) These data refer to all forms of fixed-line broadband, including standard and 30+Mbit/s connections.

Market concentration in mobile connection market

The leading MNO in the UK held 29% of UK mobile connections in 2014. In Italy the leading MNOs operated a slightly higher proportion of connections (32%). Germany held the least concentrated MNO market in 2014, with the leading MNO holding 27% of the market. The markets in Spain (where the leading MNO operated 36% of connections) and France (34%) were more concentrated. The leading MNO in each of the EU5 countries lost share.

Figure 23 Percentage market share of leading MNOs



Source: IHS

Note: Data refers to 2014. Figures provided by IHS.

Annex A: EU28 data

1.1 Overview

The charts in this Annex illustrate the Scorecard's metrics using data on all EU28 countries, where these data are available. We include these charts for completeness. However, as we explained above, we consider that it is more appropriate to compare the UK's broadband network against those of other major European economies, as we have done in the Scorecard, than against all EU countries.

The data below are from the same sources as those in the Scorecard except in the case of pricing, as Ofcom's pricing model only incorporates tariffs from EU5 countries. For last year's Scorecard we used data comparing the EU28 countries produced by Van Dijk Management Consultants for the EC. However we are not aware of a similar study being published since then, so we have chosen to omit EU28 price comparisons from the Scorecard this year.

Figure 24 Overview of the UK's position on the Scorecard relative to the EU28

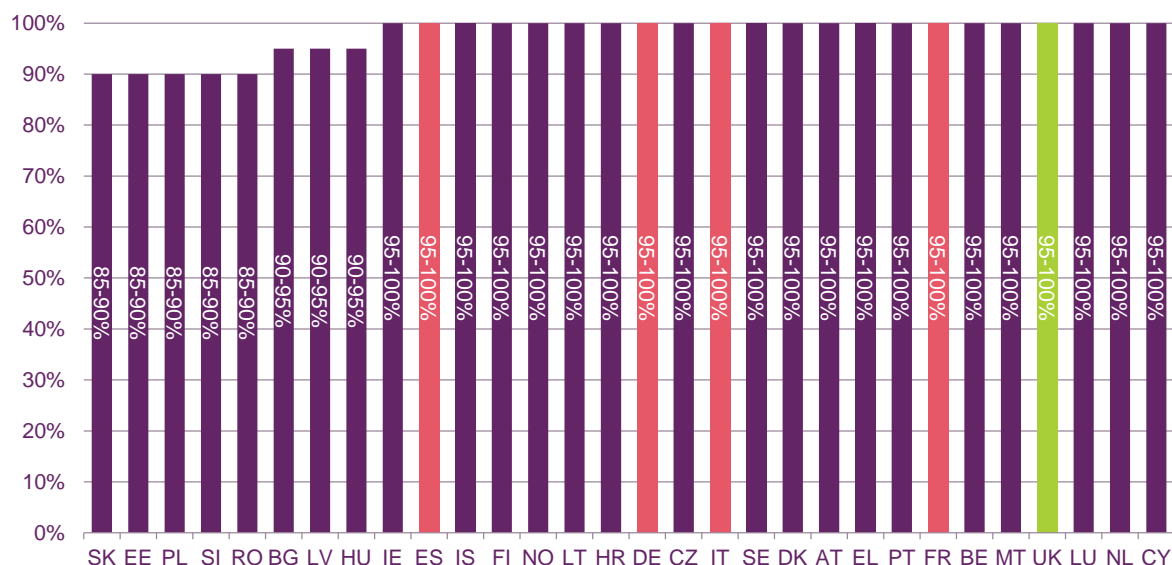
Coverage	EU27	Take-up and usage	EU27	Speed	EU27	Price	EU27	Choice	EU27
Standard broadband coverage	=1/28	Standard broadband take-up	1/27*	Fixed download speed	N/A	Price of standard broadband	N/A**	Market concentration in fixed broadband market	5/27
Broadband coverage of NGA broadband connections	9/28	Broadband take-up of connections with a headline speed of 30Mbit/s or more	11/27	Fixed upload speed	N/A	Price of broadband connections with a headline speed of 30Mbit/s or more	N/A**	Market concentration in mobile broadband market	2/26
Mobile broadband coverage	=2/28	Mobile broadband take-up	=4/28	Mobile download speed	N/A	Price of mobile broadband	N/A**		
		% accessing internet regularly	6/28						
		% never used internet	6/28						
		% buying goods or services	2/28						
		% interacted with public authorities	14/28						

Source: Ofcom

Notes: Where the figure is not 'out of' 28, we are lacking data for one or more of the EU28 countries and have excluded it from the table. ** We derive the EU28 pricing data below from a different source to the EU5 pricing figures in the Scorecard, above. No update was available for this year.

1.2 Coverage

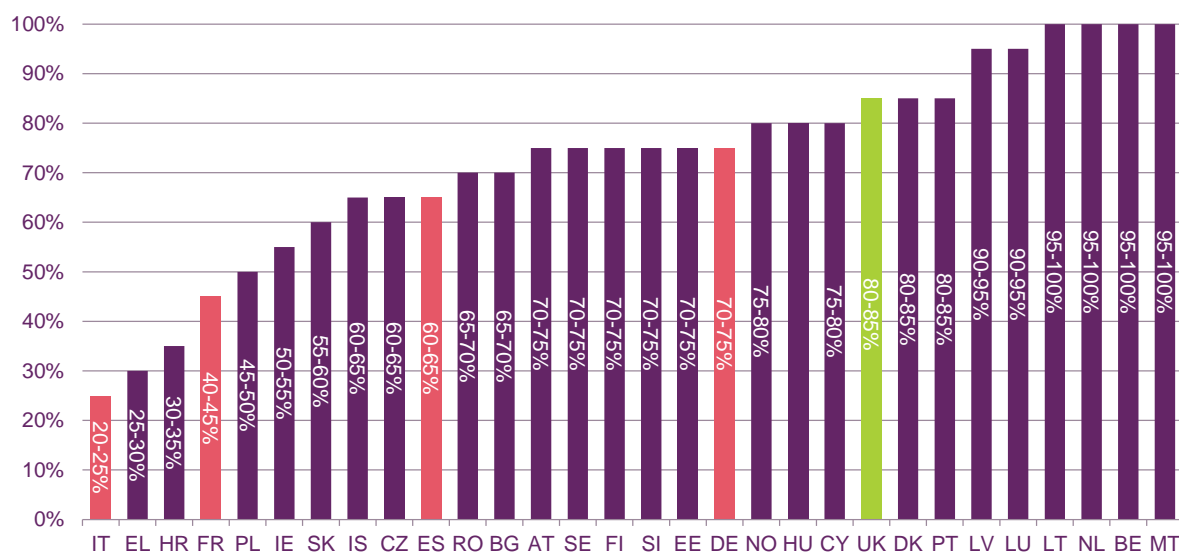
Figure 25 Percentage of households in areas served by standard broadband



Source: EC, Digital Agenda Data Tool, 2013

Note: (1) Data refer to year-end 2013. (2) 'Standard broadband' refers to DSL, FTTP, WiMAX and Standard Cable, the main fixed-line technologies capable of providing headline speed of at least 144kbit/s and less than 30Mbit/s download speed for end-users.

Figure 26 Percentage of households in areas served by NGA broadband



Source: EC, Digital Agenda Data Tool, 2013

Note: (1) Data refer to year-end 2012. (2) '30+Mbit/s broadband' refers to NGA technologies, including VDSL, FTTP and DOCSIS3.0 cable, those needed to provide 30Mbit/s download speeds for end users.

Figure 27 Percentage of households in areas served by mobile broadband

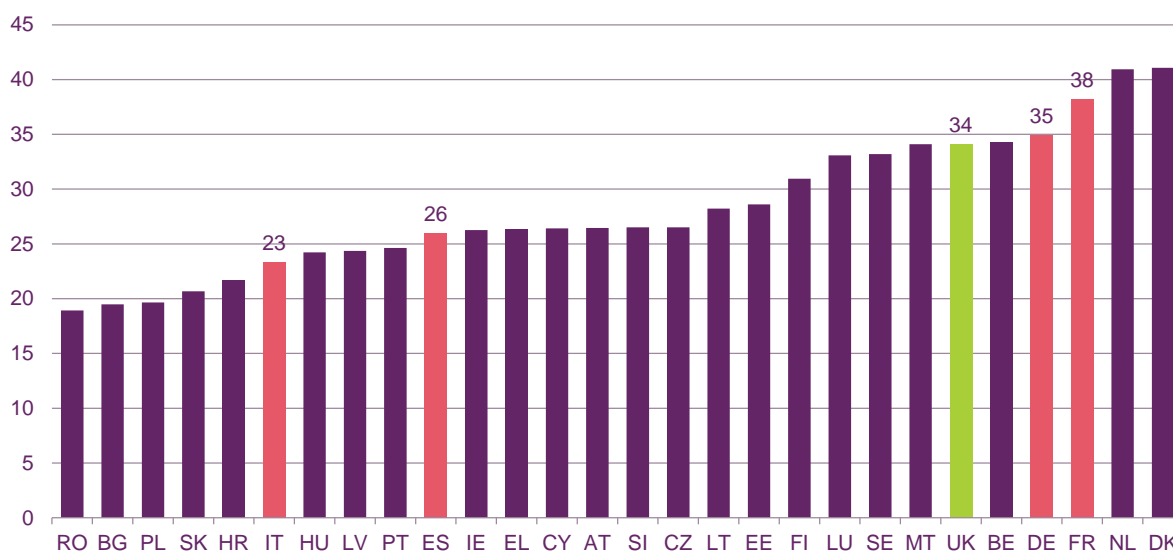


Source: EC, Digital Agenda Data Tool, 2013

Note: (1) Data refer to year-end 2013. (2) 'Mobile broadband' refers to coverage by at least one HSPA-upgraded 3G mobile network.

1.3 Take-up and usage

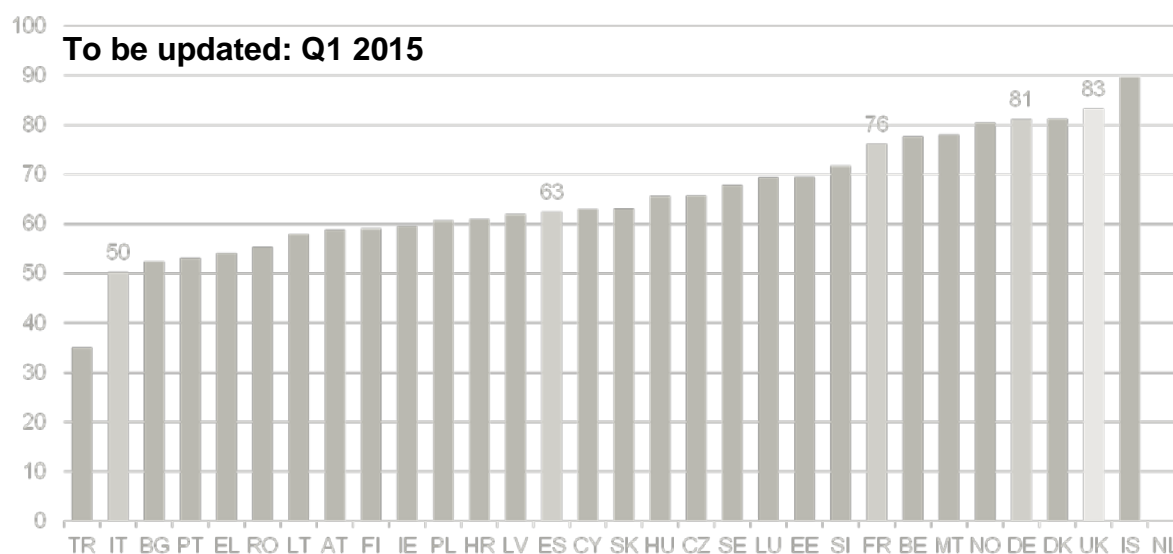
Figure 28 Fixed broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2013.

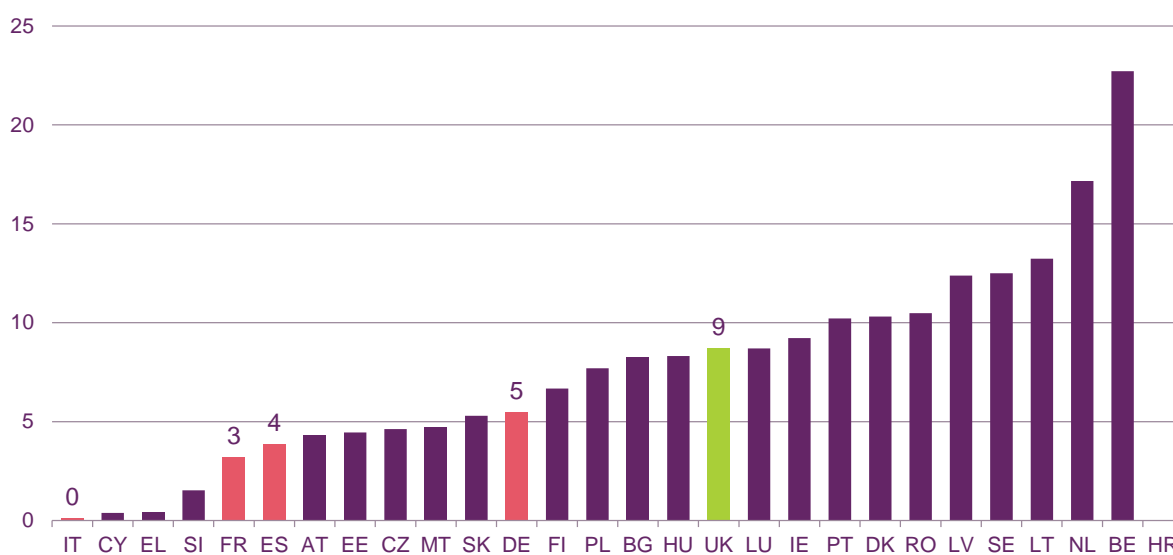
Note: (1) Data refer to December 2013. (2) These data refer to all forms of fixed-line broadband, including standard and 30+Mbit/s connections.

Figure 29 Fixed broadband connections per 100 households



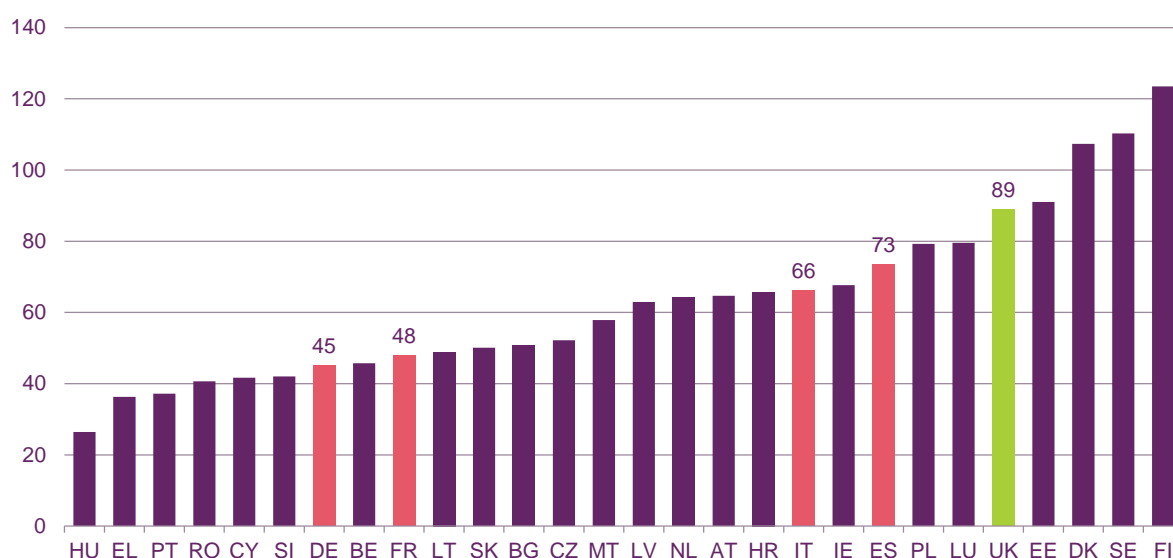
Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.
 Note: (1) Data refer to Q1 2013. (2) These data refer to all forms of fixed-line broadband, including standard and 30+Mbit/s connections. (3) Data relates to households with at least one member aged 16-74 years. (4) No 2012 data available for Netherlands; Netherlands had higher number of connections per household than the UK in 2011

Figure 30 Broadband connections with a headline speed of 'more than or equal to' 30Mbit/s per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2013.
 Note: (1) Data refer to December 2013. (2) '30+Mbit/s broadband' refers to NGA technologies, including VDSL, FTTP and DOCSIS3.0 cable, those needed to provide 30Mbit/s download speeds for end users.

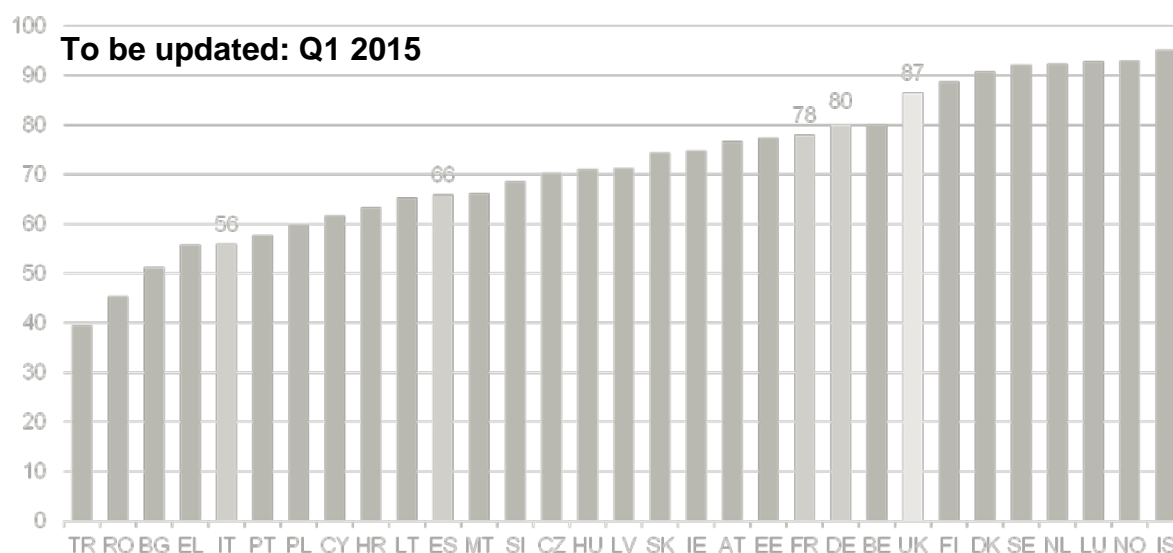
Figure 31 Mobile broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2013.

Notes: (1) Data refer to December 2013. (2) Data combine the number of subscriptions that have connected to the internet in the preceding ninety days through a standard mobile subscription, the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as a standalone service (modem/dongle) and the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as an add-on data package requiring an additional subscription. (3) Mobile broadband connections may use technologies including 3G, HSPA and LTE.

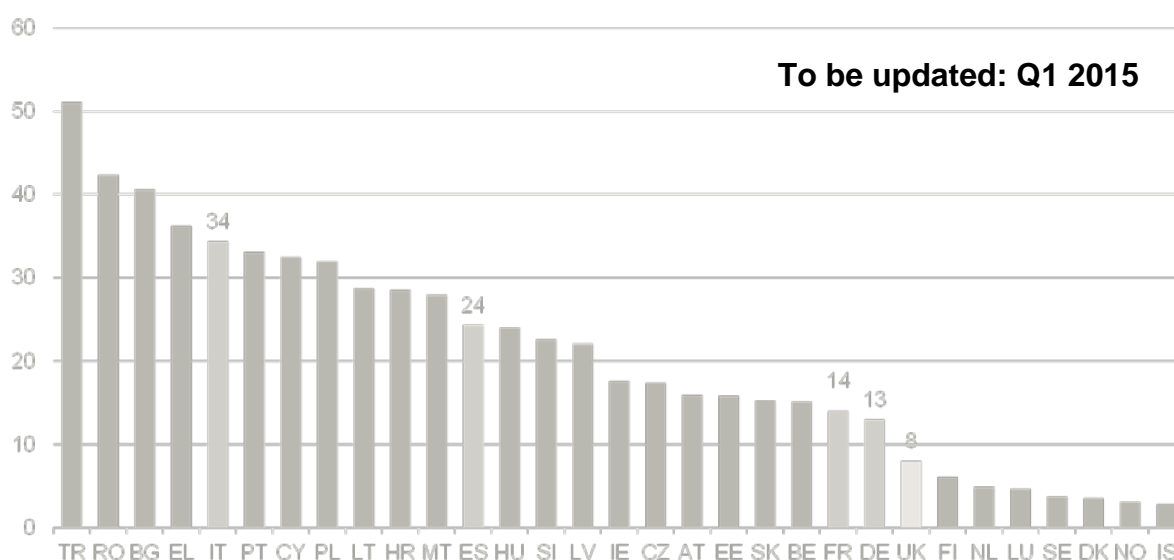
Figure 32 Percentage of individuals accessing the internet at least once a week



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.

Note: (1) Data refer to Q1 2013. (2) These data cover individuals aged 16 to 74.

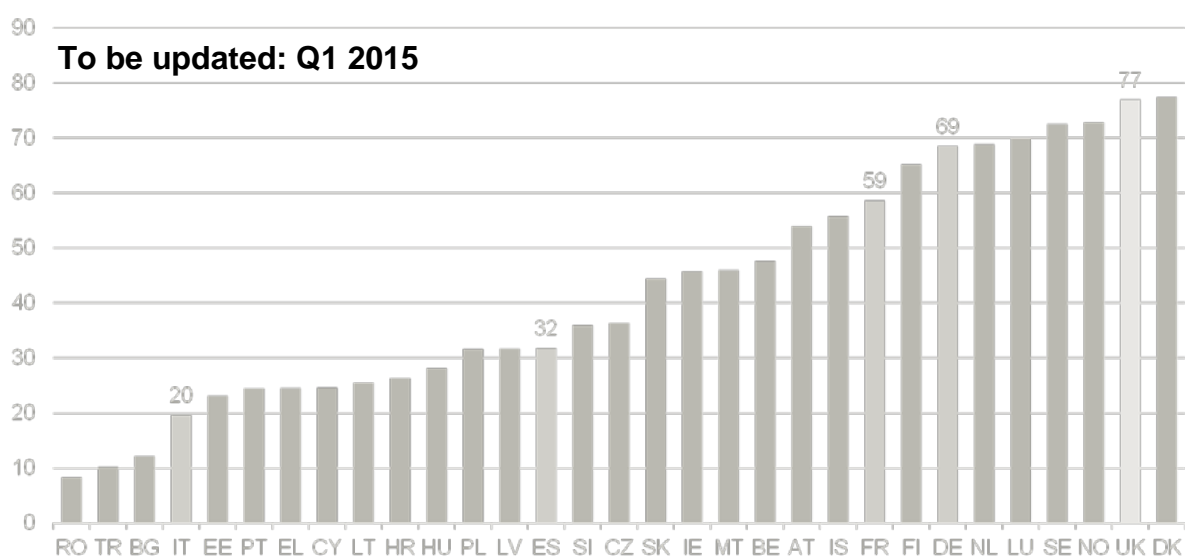
Figure 33 Percentage of individuals that have never used the internet



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.

Note: (1) Data refer to Q1 2013. (2) These data cover individuals aged 16 to 74.

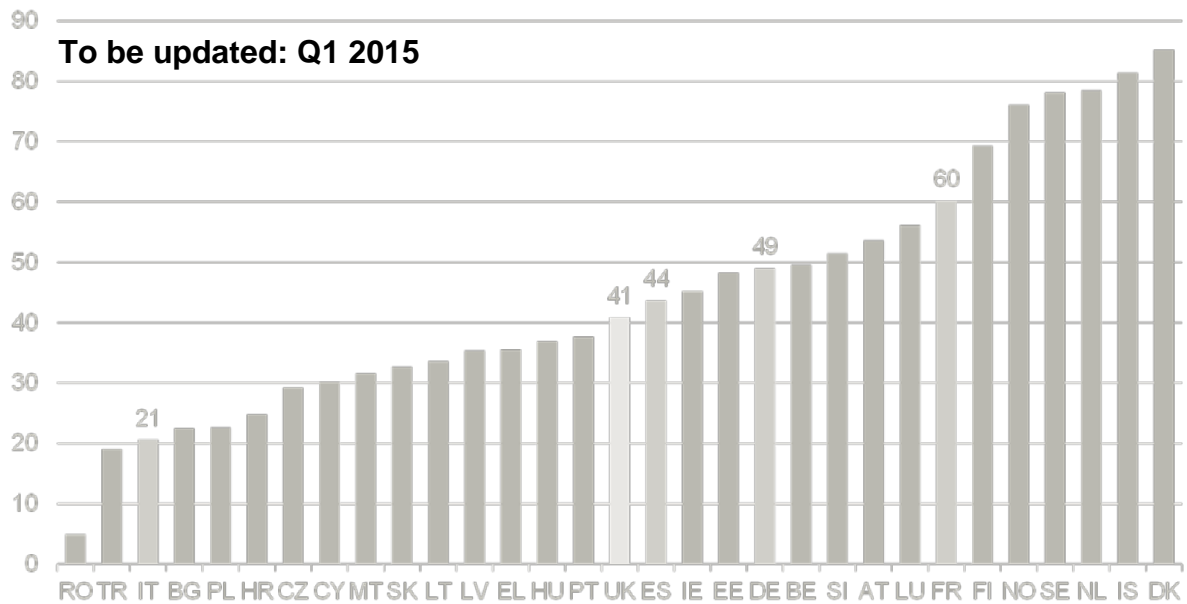
Figure 34 Percentage of individuals who bought or ordered goods or services online within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.

Note: (1) Data refer to Q1 2013. (2) These data cover individuals aged 16 to 74.

Figure 35 Percentage of population who interacted online with public authorities within the last 12 months



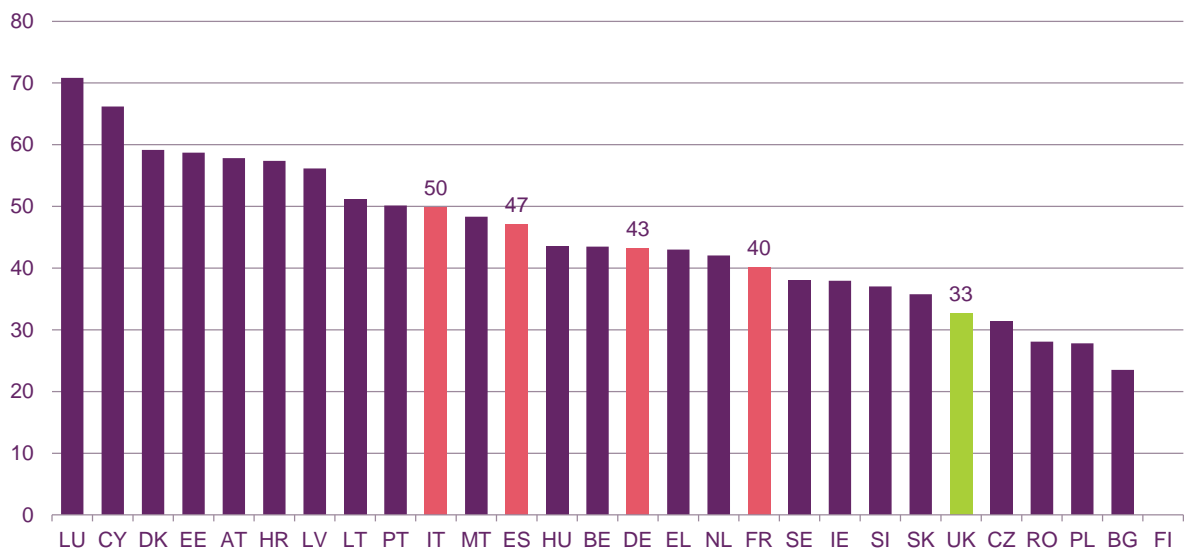
Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2013.
 Note: (1) Data refer to Q1 2013. (2) These data cover individuals aged 16 to 74.

1.4 Price

We have included analysis from our Teligen model in the Scorecard because it uses the most recent pricing data available for the EU5; however, it does not include tariffs from all EU28 countries.

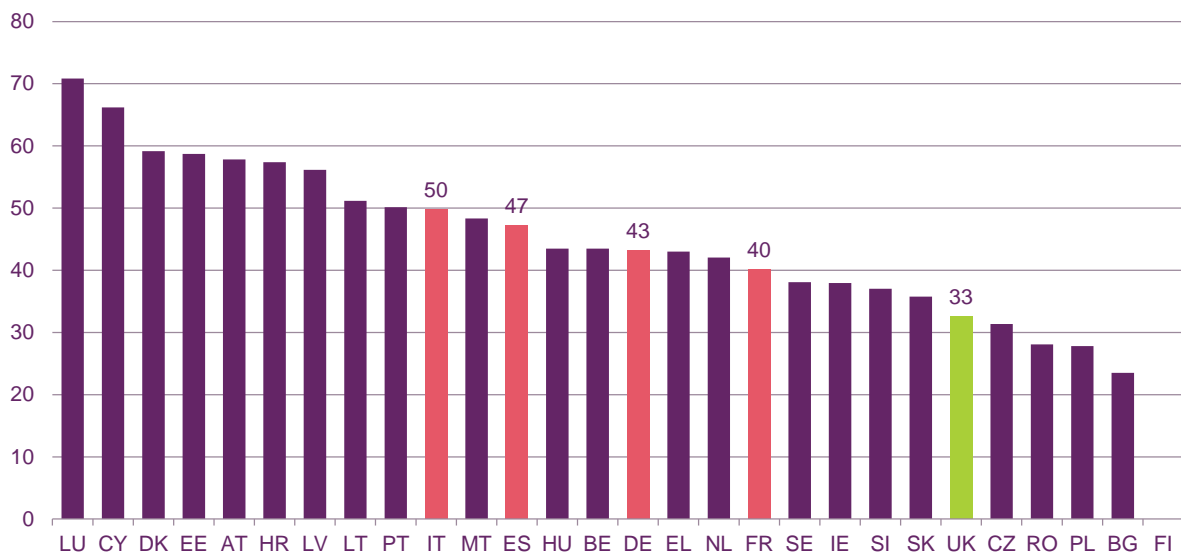
1.5 Choice

Figure 36 Percentage of fixed broadband lines operated by incumbent



Source: Cocom, EC, Digital Agenda Scoreboard 2013.
 Note: (1) Data refer to December 2013. (2) These data refer to all forms of fixed-line broadband, including standard and 30+Mbit/s connections.

Figure 37 Percentage market shares of leading MNOs



Source: Cocom, EC, Digital Agenda Scoreboard 2013

Note: Data refer to 2013. UK, Germany, Netherland and Greece figures provided by IHS

Annex B: Analysis of broadband speed data

To estimate the UK's national average broadband speed with appropriate accuracy, Ofcom tests a carefully-controlled sample of consumers' fixed broadband connections using hardware installed in their homes.

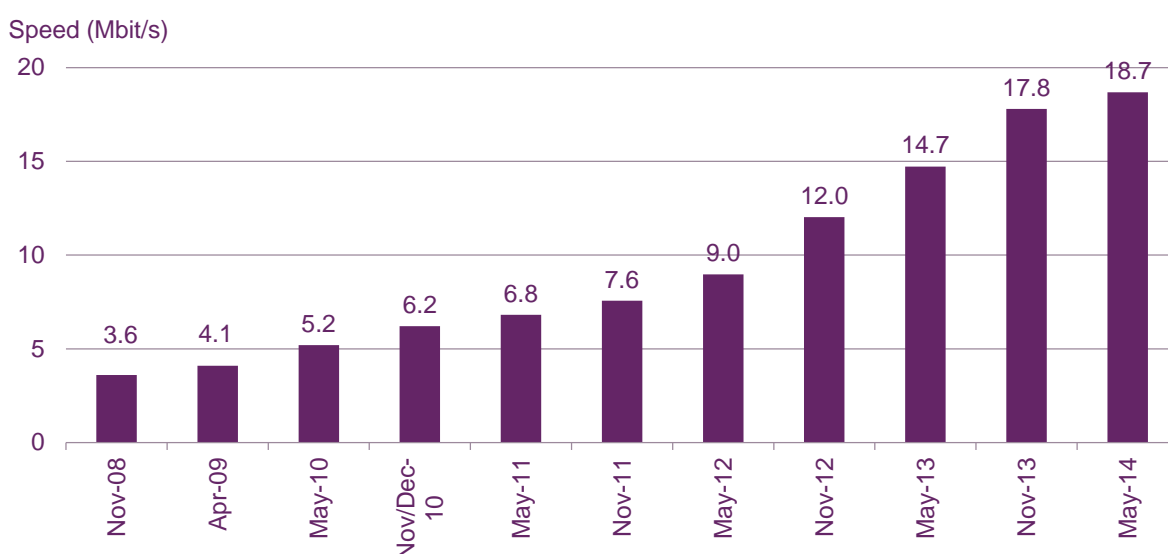
Ofcom has measured the broadband speed that consumers receive in the UK since 2008. We publish our results twice a year, including the average speed of broadband in the UK. Broadband speed analysts SamKnows currently collect this data on our behalf. Our most recent published figure for the average speed of broadband in the UK is 18.7Mbit/s, which was derived from data collected in May 2014.

SamKnows obtain the data using test equipment called 'white boxes' in homes. White boxes are connected to the customer's modem or router and run tests to measure the speed of the broadband line.

As we know how the boxes are distributed, their location, the package to which the home subscribes and how and when the tests take place, we are confident that our data generates a reliable estimate of the average UK broadband speed that consumers experience.

The chart below shows the average UK fixed broadband speed since November 2008.

Figure 38 Average fixed broadband download speed in the UK: 2008-2013



Source: SamKnows measurement data for all panel members

Notes: (1) Data have been weighted by ISP package and LLU/non-LLU connections, rural/urban, geographic market classification and distance from exchange to ensure that they are representative of UK residential broadband consumers as a whole. (2) As sufficient sample sizes were not available for consumers on packages of 'up to' 2Mbit/s or less, data collected for these packages in April 2009 has been factored in, in proportion to share of all connections in November 2013. (3) Data collected from single-thread download speed tests prior to November/December 2010 and multi-thread download speed tests for November/December 2010 onwards.

The EC commissioned research on European broadband speeds and has so far published two reports on the issue. The reports are based on data collected for the Commission by

SamKnows using the same broad approach as Ofcom uses for its broadband speeds work. The results of this work aim to cover all EU countries. BEREC shared with the Commission its concerns over some aspects of the methodology regarding data collection and normalisation in the second report²⁸. NRAs have since provided the Commission with data to help to improve the accuracy of the third report. Until this process has been completed we have decided not to include any results from this piece of research in our Scorecard.

2.6 Other ways to measure speed

There are alternative ways to measure the speed of broadband networks, which have generated a number of fixed-line broadband speed datasets.²⁹ Drawing on our experience of collecting fixed-line speed data, we believe that there are limitations to the methodologies used to obtain these datasets that mean that we cannot be confident that they offer estimates of national average speed based on comparable testing and samples across countries and that are reflective of the speeds that consumers experience in practice. For these reasons we have not included the data in this Scorecard. We examine these alternative methods and their limitations below.

Sync speed measurement. The sync speed is the maximum speed a broadband line can support and is normally higher than the average speed consumers actually receive. As part of the process of collecting data for publication in Ofcom's *Infrastructure Report*, we survey a large majority of the broadband lines in the UK to obtain their sync speed from network providers.³⁰ This requires the largest communications providers in the country to provide data on every broadband line they operate. In our most recent analysis of data derived from this method, collected in June 2014, we calculated that the average UK fixed-line download speed was 23.4Mbit/s.

This approach provides an accurate measure of the consumer access network's performance. However, it does not take account of factors such as contention, traffic management policies or protocol overheads, so its results usually exceed the speed that consumers will experience in practice.

Software testing. These are tests of end users' connections that do not require the installation of hardware on the user's premises. For example, users can test their connection speed using downloaded applications, the providers of which may collate results to estimate national average broadband speeds. Alternatively, some content providers estimate users' connection speed from the time taken to deliver content of a known size. Both methods of testing are inexpensive to perform and can generate data from a large number of consumers quite easily.

However, it is more difficult to control the environment in which software testing generates its results in comparison with equipment-based testing, for example:

- The use of an end user's broadband connection in a separate session during a test can affect its results;
- Deriving data from the time required to deliver small amounts of content may not take account of the effect of the start-up processes of network protocols;

²⁸ http://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/4344-berec-statement-on-the-second-broadband-0.pdf

²⁹ See for example www.speedtest.net and www.akamai.com.

³⁰ Ofcom, *Infrastructure Report 2014 Update*.

- Connection speed may not affect the time required to deliver data if providers stream that data at a constant speed (typically the case with video);
- Variation in the amounts of data that end users consume in different countries and their transit or peering arrangements can skew some software-based testing; and
- The use of Wi-Fi to access broadband service can affect its speed and levels of Wi-Fi adoption may vary between countries.

Software testing can be a useful tool for consumers and generates large amounts of international data. However, given the factors set out above, we do not consider this data suitable for deriving comparable national average fixed-line download speed estimates.

2.7 Publishing broadband speed data in the Scorecard

We will keep the availability of data relating to fixed-line download speed, fixed-line upload speed and mobile download speed under review, so as to publish it in future versions of the Scorecard if possible.