

● ● 4. Internet Access Service (IAS)

This chapter presents the situation with respect to the IAS as at the end of 2009.

Below is a summary of the main aspects of this service's evolution during 2009.

4.1. Main aspects of evolution in 2009

- In 2009, exponential growth was reported in mobile broadband. By the end of the year there were about 3.8 million users of active accesses to mobile broadband Internet, of which 2.7 million were actually used during December. Portugal is in 2nd place among EU countries in terms of mobile broadband penetration.

The penetration rate in Portugal rose, in 2009, more than the average of EU countries that belong to the OECD. Despite the performance reported in 2009, Portugal fell in the EU27 rankings to 22nd place.

However, when the types of mobile broadband Internet access which are closer to fixed broadband are added (cards / modem) - the form of access for which Portugal ranks 2nd at EU level, - broadband penetration (fixed + mobile) reaches 34.7 per 100 inhabitants, which places Portugal 7th in the EU ranking (compared to 13th place in 2008), surpassing countries such as Germany, France, Luxembourg or Belgium.

- Following the spin-off of PT Multimédia from Grupo PT (in 2007), the share of Portugal's incumbent operator fell to below European average (45 % in 2009). However, a recovery has been reported in the share of this operator, growing 4.2 % points in two years, and remaining the main operator of this service with a customer share of 44.5 %.

The customer share of the ZON/TV Cabo group grew by 0.9 % points in 2009, to stand at 33.2 % while Sonaecom has seen significant declines in its share of the market: around 4 % points in 2008 and 3.3 in 2009.

- Certain operators have undertaken an update to their networks, installing the EuroDOCSIS 3.0 standard

on cable networks and launching new retail Internet access offers based on optical fibre. This type of offer reported significant growth, representing 18 % of all available broadband offers at the end of the year.

Likewise, the number of broadband offers included in multiple play bundles also increased. Bundled broadband offers now represent 63 % of the total. Around two in every five broadband offers are included in triple-play products.

In terms of download speeds, it is seen that there have been significant alterations in terms of the main speeds available. In 2009, the main speeds available were 2 Mbps, 20 Mbps, 30 Mbps and 100 Mbps. Offers have since appeared on the market with speeds of 200 Mbps, and one offer, unique in Europe for the residential segment, of 1 Gbps. The higher transmission speeds are supported over optical fibre or coaxial cable using DOCSIS 3.0.

- Consumer perceptions of the quality of broadband service remain generally positive.

4.2. The Internet Access Service offer

The IAS may be provided over different platforms and technologies, and it is provided at different bit rates, reflecting the provision of narrowband or broadband services.

In the case of fixed Internet access, the service is provided by entities with a general authorization. In the case of mobile broadband Internet, operators have a license for the provision of 3rd generation mobile services, or a general authorization in the case of mobile virtual operators using a third party network⁸³.

The services provided and their evolution in 2009 are described in detail below. The entities providing these services in Portugal are also presented.

83 See Regulatory framework of the activity of mobile virtual network operators (MVNO), available at <http://www.anacom.pt/template31.jsp?categoryId=234406>.

4.2.1. Internet access platforms and technologies

The main Internet access platforms and technologies currently available are as follows:

- Access using digital subscriber line (DSL) technologies or technologies of the DSL family (xDSL) - This technology uses sophisticated modulation systems to increase data bit rate over copper wires, using frequencies that are not used by the voice signal and enabling the provision of broadband services. The fact that voice and data are carried on different frequencies gives these technologies the ability to perform both types of communication simultaneously, with the Internet connection being "always on". This technology is provided in pre-defined areas, where access to a connection with the minimum physical requirements is possible⁸⁴.

There are different xDSL variations, of which the most common one is ADSL (Asymmetric DSL⁸⁵). Regarding data bit rates, ADSL offers available in Portugal vary between 512 kbps and 24 Mbps. Besides ADSL, there are also other modes, such as Very high-bit-rate Digital Subscriber Line (VDSL).⁸⁶

- Coaxial cable access - coaxial cable is the primary cable type used by the cable television distribution industry. Its composition enables the provision of broadband services and provides smaller exposure to electrical and radio interference. Internet access over cable television distribution networks, with the use of a cable modem, enables higher access bit rates. Maximum connections speeds are similar to those of ADSL access, both downstream and upstream. In order for the Internet service to be provided over this type of network, the network must support bi-directionality; i.e., it has to be able to both send and receive data (the overwhelming majority of cabled households have this capability).

With the installation of the EuroDOCSIS 3.0 standard on the cable television distribution systems where bi-directionality already existed, it is possible for service providers to offer high speed data transmission services⁸⁷, and offers have been launched in 2009 with a theoretical download speed of 200 Mbps.

- Access using third generation mobile - 3rd generation of mobile services have made it possible to materialize convergence between fixed communications and mobile communications, and between electronic communications and multimedia, bringing mobile networks closer to the capacity of fixed networks and giving mobile users access to broadband multimedia services. Key among the third generation mobile systems is UMTS, identified with the European standard of the global family of standards for international mobile communications systems (IMT2000). UMTS technology uses the WCDMA⁸⁸, transmission mode, which is based on multiple accesses by code division.

The evolution of these standards lead to the development of HSDPA and HSUPA standards which, through updates to the software used on UMTS networks, enable maximum theoretical speeds of 14 Mbps download speed and 5.8 Mbps upload speed.

In 2009, products appeared which were based on HSPA+ Quadruple Amplitude Modulation (64QAM) technology, allowing the maximum download speed of the mobile broadband service to be tripled from 7.2 Mbps to 21.6 Mbps. HSPA+ is the latest step in the development of 3G/HSPA technology (High Speed Packet Access) and uses the most advanced modulation technique 64 QAM (Quadruple Amplitude Modulation).

The evolution of the next mobile generation involves the development of LTE technology. One of the characteristics which distinguishes LTE is the high data

⁸⁴ All the national territory covered by the switched fixed telephone network has the potential for this type of service, except in the case of technical restrictions.

⁸⁵ Digital technology transforming analogue or ISDN telephone lines into greater capacity lines, making Internet Access possible at much higher speeds. Data transmission is made asymmetrically, i.e. the downstream is faster than the upstream, which is currently at around 1 Mbps, and bandwidth is managed in an intelligent way. It makes it possible to simultaneously use the Internet and the traditional telephone line (for voice, fax service). An ADSL line has three data channels: a downstream high bit rate channel. (1.5 to 8 Mbps), a duplex upstream medium throughput channel (16 to 640 kbps) and a channel for the telephone service

⁸⁶ VDSL enables speeds up to 100 Mbps (VDSL2) in distances of less than 300 m.

⁸⁷ EuroDOCSIS 3.0 enables downstream speeds from 200 Mbps up and upstream speeds of 100 Mbps. <https://supportforums.cisco.com/docs/DOC-1239>

⁸⁸ Broadband Access system whose disciplines of access regarding the various users are characterized by the sharing of the same frequency band through different codes assigned to each user.

transmission speed. Currently, LTE can theoretically offer downlink speeds of up to 300 Mbps and uplink speeds of up to 90 Mbps⁸⁹, which contrasts with the 42 Mbps downlink speed allowed by HSPA technology⁹⁰.

- Access using optical fibre (FTTx) - the network architectures that fully or partially replace the traditional network of copper access or coaxial cable access by optical fibre are named Fibre to the x (FTTx). Depending on the network access point reached by the optical fibre, it can be Fibre to the Node (FTTN), Fibre to the Cabinet (FTTC), - Fibre to the Building (FTTB) and FTTH. These solutions are then complemented by traditional means, such as the copper wire or the coaxial cable, and with previously mentioned standards such as, for example, DOCSIS or VDSL2, which technically make them FTTx networks and not FTTH. In the most common case, where optical fibre is shared by several users, optical fibre networks use two types of optical distribution networks: Active Optical Networks (AON), which make it possible to send each signal directly to a specific user, or Passive Optical Networks (PON), which broadcast the signal and use encryption to guarantee that a given signal is only received by the user to which it is directed.

This mode of access will remain the main support to next generation networks (NGN), enabling the provision of high speed data transmission services (typically 100 Mbps, and capable of exceeding 1 Gbps⁹¹).

In Portugal, there is currently one offer of FTTH of up to 1 Gbps theoretical download speed.

- Access using switched (dial-up) type connections - the first offers of narrowband Internet access services used switched (dial-up) type connections available to any subscriber with a fixed telephone line and a modem, just requiring that they become a customer of one (or several) internet service providers (ISP). Packages within this mode have a maximum bit-transfer rate of 64 kbps (narrow band). ISDN access enables higher

bit rates, and the integration of voice and data into one single access. ISDN accesses can be basic⁹² or primary⁹³. This access mode, which at first represented the main means of access, currently represents a low and decreasing proportion of Internet accesses.

- Other modes of access - it is important to note that there are other technologies available which can be used to provide Internet access, specifically: access through dedicated connection, FWA and CDMA, access using electricity power lines (PLC), access over local wireless networks and using satellite links.

4.2.2. Geographic availability of this service

As of 2009, the Internet Access Service was available in practically the entire Portuguese territory.

Dial-up access, particularly, is available across the entire public switched telephone network.

The availability of broadband offers depends on the exchanges of the public switched network being equipped with Digital Subscriber Line Access Multiplexer (DSLAM), on the availability of broadband-enabled cable television distribution networks, on existing 3G network coverage or on the existence of optical fibre networks.

As far as ADSL is concerned, at the end of the fourth quarter of 2009, there were 1,853 exchanges equipped with DSLAM in Mainland Portugal, corresponding to the entire coverage of possible areas for ADSL provision, as in the 4th quarter of 2006.

This infrastructure is concentrated in the greater Lisbon and greater Porto areas, along the northern coastline and in the Algarve. Inland, exchange density is lower, in line with population density.

89 <http://www.3gpp.org/LTE>, <http://www.3gpp.org/LTE-Advanced>

90 <http://www.3gpp.org/HSPA>

91 <http://www.oecd.org/dataoecd/49/8/40390735.pdf>

92 Basic Access (Basic Rate Access 2B+D) - Customer access to ISDN using a copper pair and providing two 64kbps channels (B1 and B2 channels) for voice and data transfer, and a 16 kbps D channel for signalling, package data transfer and telemetry. The overall bit rate is 192 kbps

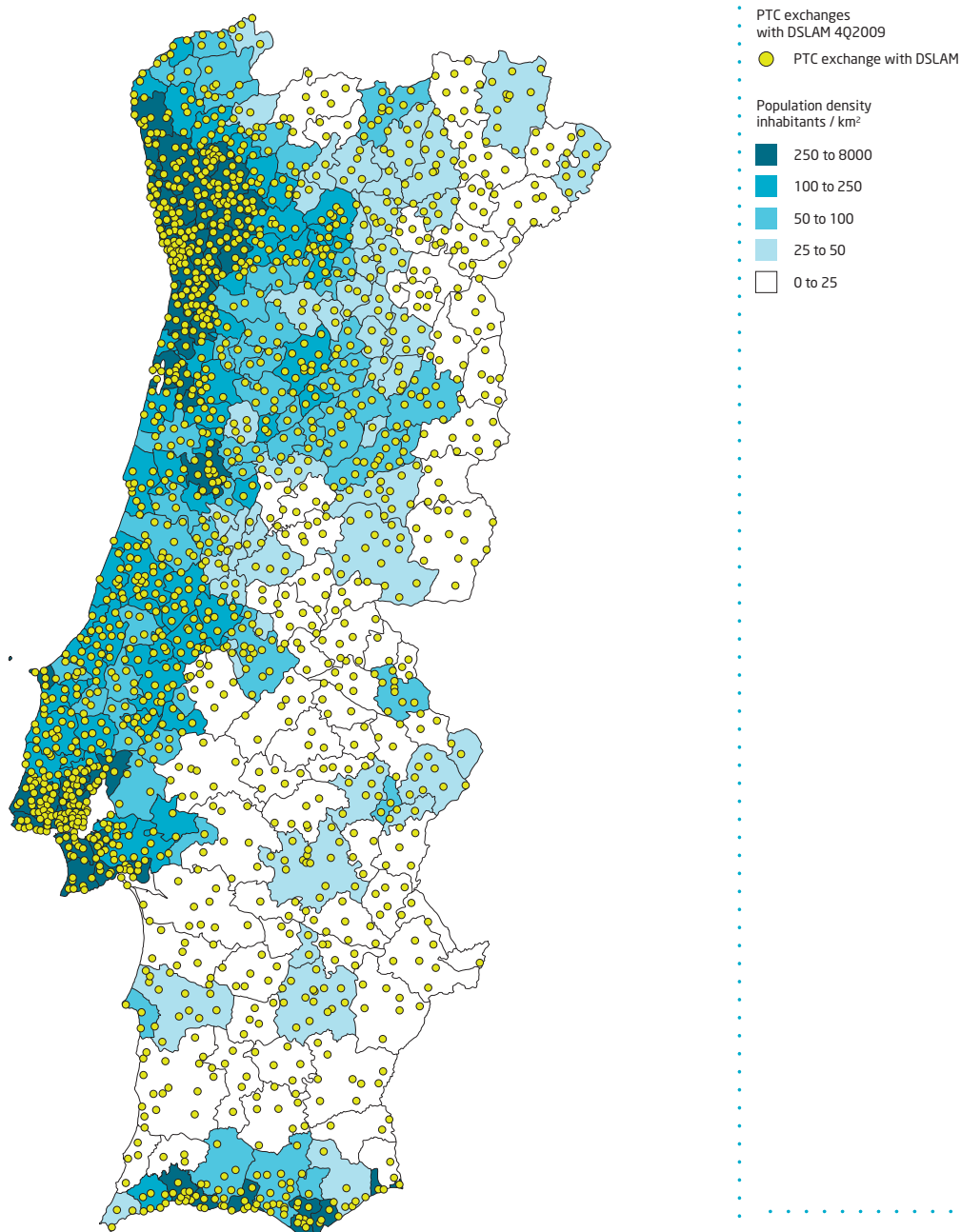
93 Primary Access - 30B+D Access to the ISDN, with a global 2 Mbps throughput. Both the 30 B voice/data channels and the D signalling channel carry 64 kbps.

It should be stressed that there are exceptional cases when it is not possible to provide ADSL services over a given loop,

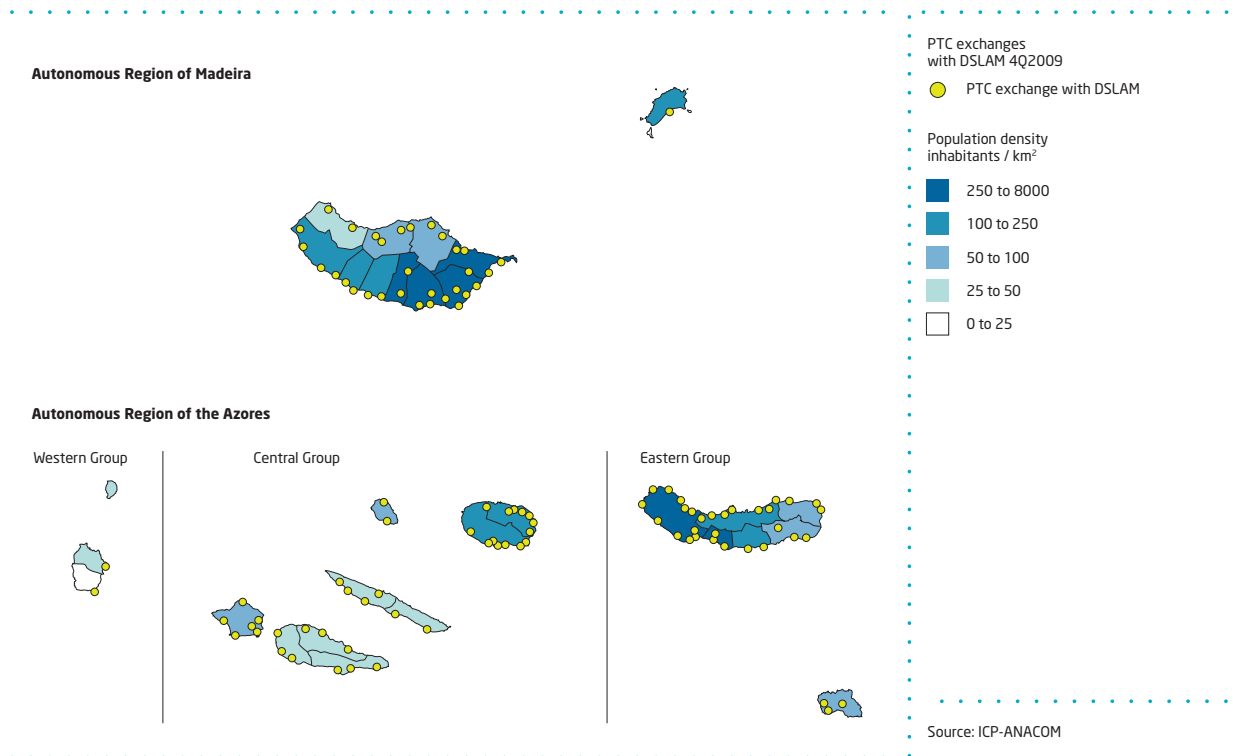
due to its physical characteristics (namely its length, section and its state of conservation).

Distribution of exchanges with DSLAM and population density per municipality (Mainland Portugal)

Figure 5



Distribution of exchanges and population density per municipality (Autonomous Regions) | Figure 6

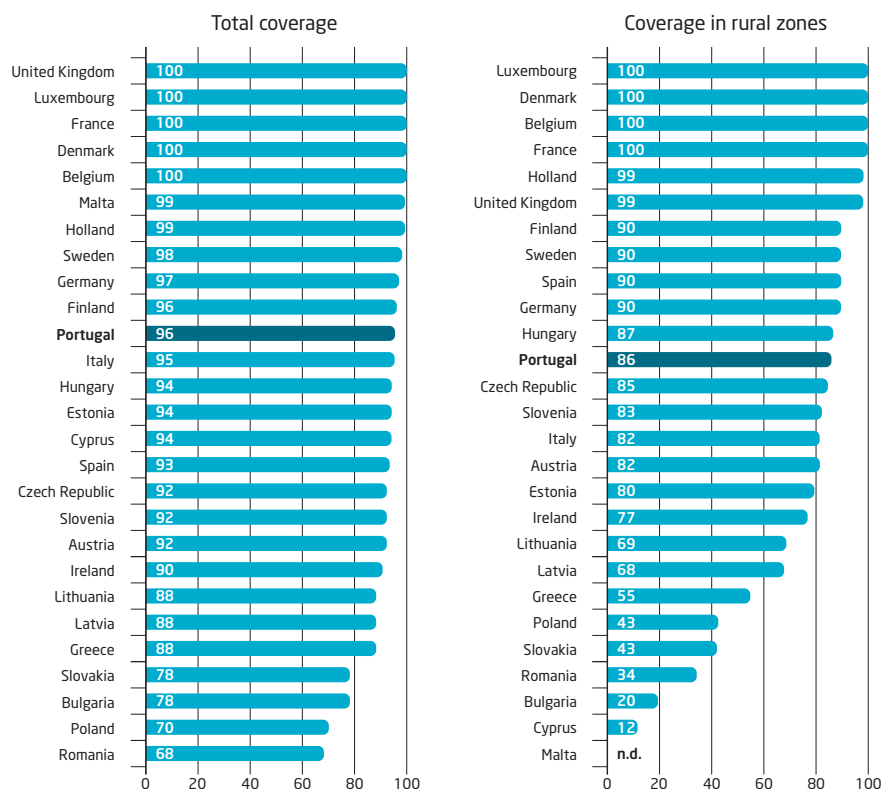


According to the EC, DSL coverage - service availability - in Portugal was the 16th highest among the 27 EU countries in 2009. In rural areas, DSL coverage in Portugal ranks 15th, 9.4 % above the EU27 average.

It should also be mentioned that coverage in Portugal (95 %) is above the EU27 average, which is 92.7 %. The EU27 average in rural areas is 76.6 %, while in Portugal it is 86 %⁹⁴.

⁹⁴ According to the methodology of the study promoted by the Commission, all the inhabitants of the parish ("Nú5") where the exchange is located are considered to be covered. Thus, although all exchanges have DSLAM, the percentage of the population covered is below 100 %. See http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/broadband_coverage_in_europe.pdf

DSL coverage in EU27 | Graph 111



Unit: %
Source: IDATE, Broadband Coverage in Europe,
DGINFSO, 2009 Survey.
Data from 31 December 2008.

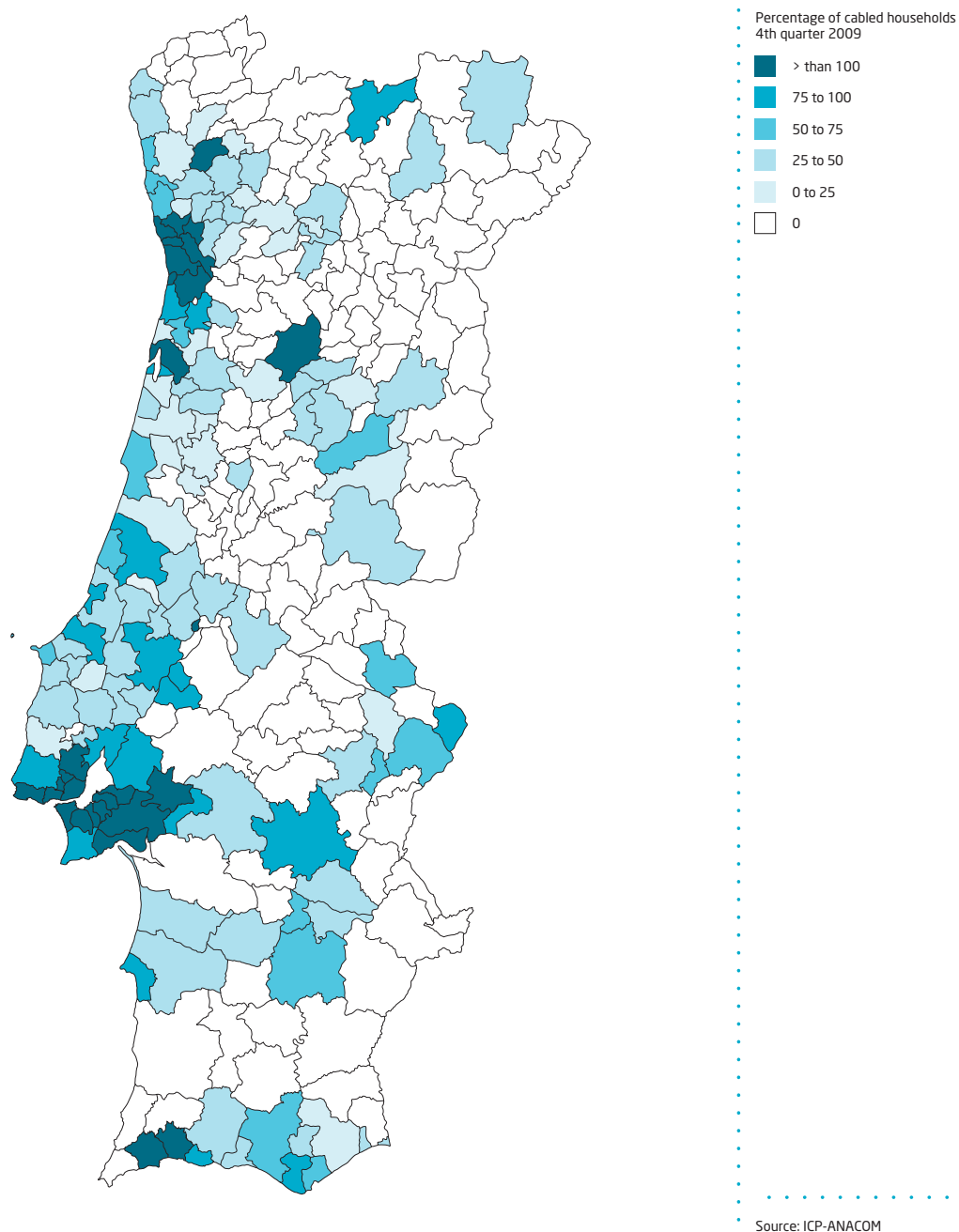
In terms of broadband Internet access using cable modem, cable distribution networks in Mainland Portugal are focused in the greater Lisbon and greater Porto regions.

In the case of the autonomous regions, Madeira had a ratio of cabled households above 77 %, whereas in the Azores this indicator is reported at 70 %. These figures can be explained by the protocols agreed between the Government of the Republic, the Regional Governments, ICP-ANACOM and the only cable television distribution network operator in both the autonomous regions. These protocols aim at ensuring the necessary conditions for the citizens of the autonomous

regions to have access, without paying a monthly fee⁹⁵, to the broadcasts of the general free-to-air channels available in Mainland Portugal, namely RTP1, RTP2, SIC and TVI, as well as RTP Açores and RTP Madeira, respectively in each of the autonomous regions. The protocol in force in the Autonomous Region of Madeira was signed on 6 August 2004 and the protocol regarding the Autonomous Region of the Azores was signed on 5 November 2005, and remained in force for a year.

⁹⁵ Those joining the service could have to pay a given value for the box.

Distribution of all cabled households by all operators in proportion to total households per municipality (Mainland Portugal) | Figure 7

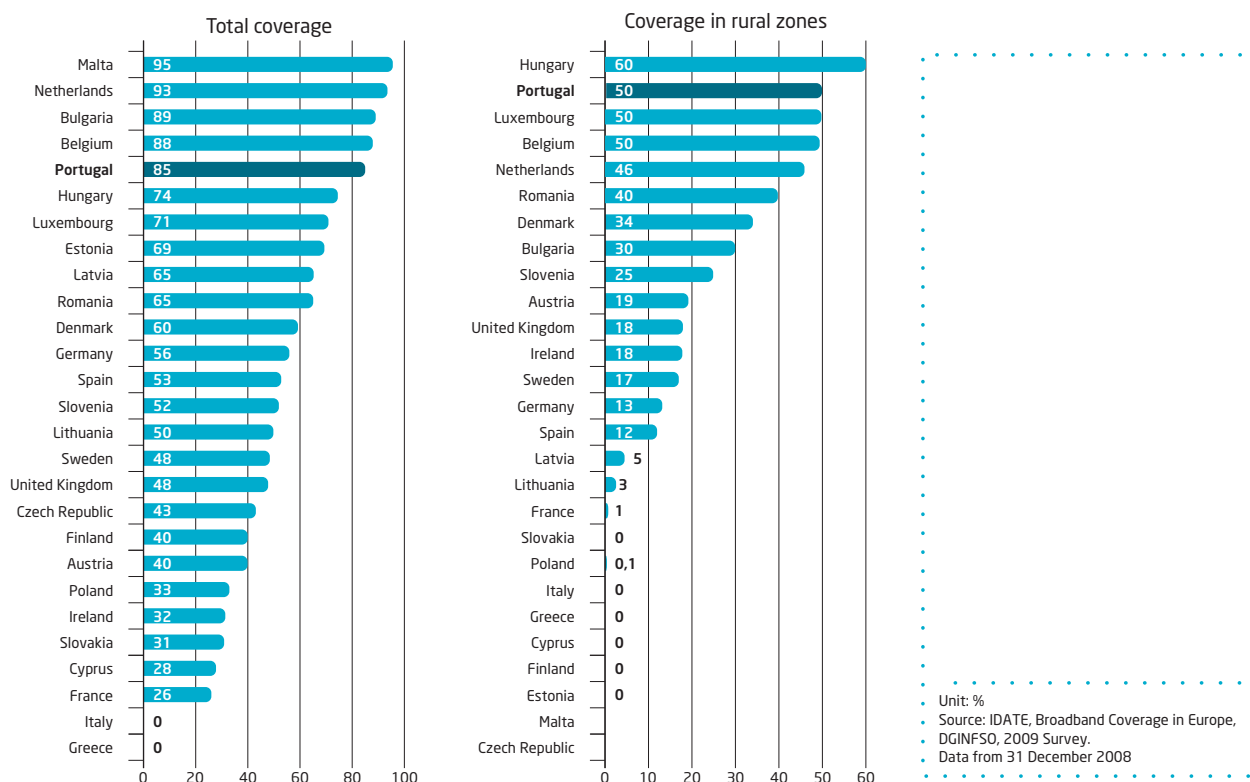


Note: The offer of the service by more than one operator in the same region implies that one household may have multiple cabling. This means that adding all cabled households reported by all operators may result in duplicate counting. This factor is been gaining relevance with the increase in competition between operators. It is estimated that such duplicate counting effects a maximum of 12 % of cabled households.

According to the EC, cable TV network coverage in Portugal (85 % of the population) is clearly above the EU average (43.6 %). In rural areas, Portugal has one of highest levels

of coverage among all the EU27 (50 % versus an average of 13.8 %).

Cable modem coverage in EU27 | Graph 112



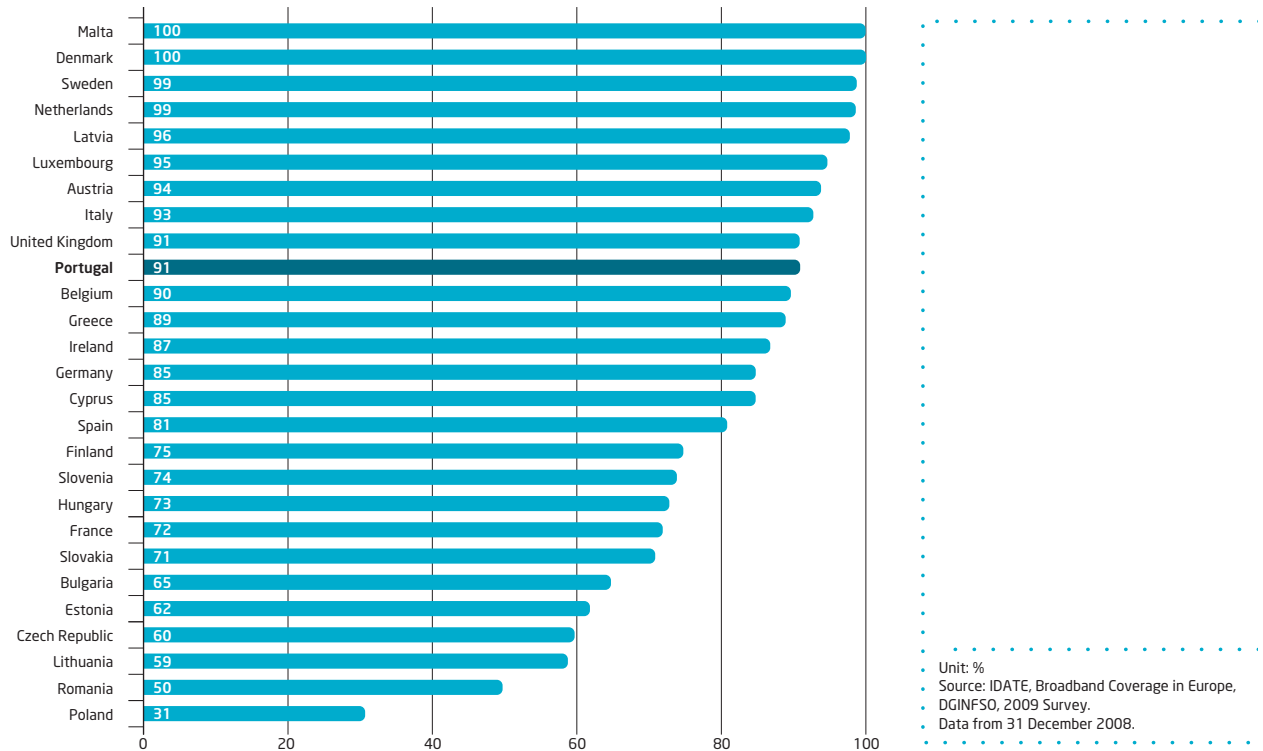
Considering the data presented previously, it is reported that fixed broadband coverage density is in line with the territory's population density.

Mobile broadband is available in areas where 3rd generation mobile networks are available. According to the EC, in

December 2008, coverage in Portugal was 91 % - above the EU27 average (79 %) and the EU15 average (86 %)⁹⁶.

In terms of the geographical distribution of optical fibre, refer to the section on high-speed networks.

⁹⁶ See 3G coverage data on Chapter 4.

3G (UMTS) coverage in EU27 | Graph 113**4.2.3. The Internet Access Service providers (ISP)**

At the end of 2009 there were 50 registered and qualified entities in Portugal authorised to provide the fixed Internet Access Service and five entities licensed for the provision of mobile Internet access, including two MVNOs. These entities are also known as ISP.

Of all ISPs legally authorised to provide the Internet Access Service, 34 were active.

The following table shows the changes reported in the number of entities authorised to provide this service; the table also shows entries into and exits from the market occurring during the year.

Internet Access Service providers in 2009 - fixed | Table 105

Name	Start	Entries	Exits	End
4 Great Wireless Broadband Solutions, S. A. (4G WING)	NA			NA
ADIANIS - Telecomunicações & Multimédia, S. A.	NA			NA
AR Telecom - Acessos e Redes de Telecomunicações, S. A.	A			A
AT & T - Serviços de Telecomunicações, Soc. Unip., Lda. ⁽¹⁾	NA			NA
BRAGATEL - Companhia de Televisão por Cabo de Braga, S. A. ⁽²⁾	A		X	-
BROADMEDIA - Comunicações Globais, S. A.	A			A
BT Portugal - Telecomunicações, Unipessoal, Lda. ⁽¹⁾	NA			NA
CABOVISÃO - Televisão por Cabo, S. A.	A			A
CGEST, S. A.	NA			A
CGPT, Lda.	NA			NA
CLARA.NET Portugal - Telecomunicações, S. A.	A			A
COLT Telecom - Serviços de Telecomunicações, Unipessoal, Lda.	A			A
COGENT Communications Portugal, Lda.	-	X		A
CORED - Comunicações e Serviços em Rede, S. A.	NA			A
CYCLOP NET - Informática e Telecomunicações, Lda.	A			A
EQUANT Portugal, S.A. (ORANGE)	A			A
FLEXIMEDIA - Serviços e Meios Inf. e Comunicação, Lda.	A			A
GLOBAL CROSSING PEC España, S. A.	A			A
HSIA Hospitality Services Portugal - Serviços de Internet, S. A.	A			A
IPTV TELECOM - Telecomunicações, Lda.	NA			NA
Lazer Visão Antenas, Lda.	-	X		A
MINHOCOM, Gestão de Infra-estruturas de Telecomunicações, EIM	NA			NA
NETACESSO - Serviços Internet e Multimédia, Lda.	NA			NA
NFSI Telecom, Lda.	A			A
NORTENET - Sistemas de Comunicação, S. A.	A			A
ONITELECOM - Infocomunicações, S. A.	A			A
ORBIRECURSO Electricidade e Comunicações, Lda.	NA			NA
PLURICANAL LEIRIA - Televisão por Cabo, S. A. ⁽²⁾	A		X	-
PLURICANAL SANTARÉM - Televisão por Cabo, S. A. ⁽²⁾	A		X	-
PT Comunicações, S. A.	A			A

[continuation] Name	Start	Entries	Exits	End
PT PRIME - Soluções Empresariais de Telecomunicações e Sistemas, S. A.	A			A
RADIOMÓVEL - Telecomunicações, S. A.	NA			NA
REFER Telecom - Serviços de Telecomunicações, S. A.	A			A
ROBOT - Telecomunicações, Projectos e Serviços, Lda.	A		X	-
SEMCABO - Soluções em Redes Informáticas, Lda.	A			A
SONAECON - Serviços de Comunicações, S. A.	A			A
STV - Sociedade de Telecomunicações Vale do Sousa, S. A.	NA			A
TAKE SIGNAL, Lda.	-	X		NA
T - SYSTEM ITC Iberia, S. A. (Soc. Unipersonal) - (Sucursal em Portugal)	NA			NA
TELE LARM Portugal - Transmissão de Sinais, Lda.	A			A
TELEMILÉNIO, Telecomunicações, Sociedade Unip., Lda. (TELE2) ⁽³⁾	A		X	-
TELVENT Portugal, S. A.	NA			NA
TMN - Telecomunicações Móveis Nacionais, S. A.	A			A
TRANSIT Telecom, Sociedade Unipessoal, Lda.	NA			NA
TVTEL Comunicações, S. A. ⁽²⁾	A		X	-
UNITELDATA - Telecomunicações, S. A.	A			A
VALICOM, Gestão de Infra-estruturas de Telecomunicações, EIM	NA			NA
VERIZON Portugal - Sociedade Unipessoal, Lda.	A			A
VIPVOZ - Serviços de Telecomunicações Digitais, Lda.	A		X	-
VODAFONE Portugal - Comunicações Pessoais, S. A.	A			A
WING Global Communications, S.A. (WGC)	NA			NA
WORLDBROKER Telecomunicações - Sociedade de Telecomunicações e Multimédia, Lda.	A			A
ZON TV Cabo Açoreana, S. A.	A			A
ZON TV Cabo Madeirense, S. A.	A			A
ZON TV Cabo Portugal, S. A.	A			A
Total active	34			32
Total non-active	18			16
Overall total	52	3	7	48

Source: ICP-ANACOM

Key: A – Active NA – Not Active

(1) Authorised for provision of Internet access service, but reported activity only with respect to "Other Data Transmission service (ODTS).

(2) On 31 July 2009, the companies TVTEL, Bragatel, Pluricanal Santarém and Pluricanal Leiria were merged into ZON TV CABO.

(3) On 2 January 2009 the company Telemilénio - Telecomunicações, Sociedade Unipessoal, Lda (Tele2) was merged into Sonaecom - Serviços de Comunicações, S.A.

Among the listed above, the following provide the Internet service using dial-up connections:

Internet Access Service providers with dial-up offers | Table 106

AR Telecom - Acessos e Redes de Telecomunicações, S. A.

CLARA.NET Portugal - Telecomunicações, S. A.
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FLEXIMEDIA - Serviços e Meios Inf. e Comunicação, Lda.
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NORTENET - Sistemas de Comunicação, S. A.

ONITELECOM - Infocomunicações, S. A.

PT Comunicações, S. A.

PT PRIME - Soluções Empresariais de Telecomunicações e Sistemas, S. A.
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SONAECOM - Serviços de Comunicações, S. A.
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VODAFONE PORTUGAL - Comunicações Pessoais, S. A.
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Source: ICP-ANACOM

The following table lists the cable television distribution operators providing broadband Internet services using cable modems as at the end of 2009.

Cable distribution network operators providing Internet Access Service | Table 107

CABOVISÃO - Sociedade de Televisão por Cabo, S. A.
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Lazer Visão Antenas, Lda.

STV - Sociedade de Telecomunicações Vale do Sousa

UNITELDATA - Telecomunicações, S. A.

ZON - TV Cabo Açoreana, S. A.

ZON - TV Cabo Madeirense, S. A.

ZON - TV Cabo Portugal, S. A.

Source: ICP-ANACOM

It should be noted that in 2009 ZON Multimédia - Serviços de Telecomunicações e Multimédia, SGPS, S. A. (ZON Multimédia) acquired the companies of Grupo ParfiteL (Bragatel, Pluricanal Leiria and Pluricanal Santarém), as well as TVTEL. On 31 July 2009, these companies were merged into ZON TV Cabo.

Providers offering broadband Internet services over ADSL accesses are listed in the table below.

Internet Access Service providers with ADSL access offers | Table 108

AR Telecom - Acessos e Redes de Telecomunicações, S. A.
CLARA.NET Portugal - Telecomunicações, S. A.
COLT Telecom - Serviços de Telecomunicações, Unipessoal, Lda.
HSIA Hospitality Services Portugal, S. A.
NFSI - Soluções Internet, Lda.
NORTENET - Sistemas de Comunicação, S. A.
ONITELECOM - Infocomunicações, S. A.
PT PRIME - Soluções Empresariais de Telecom. e Sistemas, S. A.
PT Comunicações, S. A.
SONAECOM - Serviços de Comunicações, S. A.
TELE LARM Portugal - Transmissão de Sinais, Lda.
TMN - Telecomunicações Móveis Nacionais, S. A.
VODAFONE PORTUGAL - Comunicações Pessoais, S. A.
WORLDBROKER Telecomunicações - Sociedade de Telecomunicações e Multimédia, Lda.
ZON - TV Cabo Portugal, S. A.

Source: ICP-ANACOM

The next table lists the providers authorised for the provision of Internet Access Services using FWA technology.

Internet Access Service providers with FWA offers | Table 109

AR Telecom - Acessos e Redes de Telecomunicações, S. A.
ONITELECOM - Infocomunicações, S. A.

Source: ICP-ANACOM

The following tables lists the providers of broadband Internet access using other fixed technologies, such as optical fibre and leased lines.

Internet Access Service providers with optical fibre | Table 110

CORED – Comunicações e Serviços em Rede, S. A.

COLT Telecom – Serviços de Telecomunicações, Unipessoal, Lda.

HSIA Hospitality Services Portugal, S. A.

COGENT

Lazer Visão Antenas, Lda.

NFSI – Soluções Internet, Lda.

ONITELECOM – Infocomunicações, S. A.

PT Comunicações, S. A.

PT PRIME – Soluções Empresariais de Telecom. e Sistemas, S. A

REFER TELECOM – Serviços de Telecomunicações, S. A.

SONAECOM – Serviços de Comunicações, S. A

ZON – TV Cabo Portugal, S. A.

Source: ICP-ANACOM

Internet Access Service providers – other technologies (fixed) | Table 111

AR Telecom – Acessos e Redes de Telecomunicações, S. A.

BROADNET Portugal, S. A.

CGEST, S. A.

CLARA.NET Portugal – Telecomunicações, S. A.

COLT Telecom – Serviços de Telecomunicações, Unipessoal, Lda.

FLEXIMEDIA – Serviços e Meios Inf. e Comunicação, Lda.

EQUANT Portugal, S. A. (Orange)

GLOBAL CROSSING PEC. España, S. A.

HSIA Hospitality Services Portugal, S. A.

NFSI – Soluções Internet, Lda.

NORTENET – Sistemas de Comunicação, S. A.

ONITELECOM – Infocomunicações, S. A.

PT PRIME – Soluções Empresariais de Telecom. e Sistemas, S. A.

REFER Telecom – Serviços de Telecomunicações, S. A.

SEMCABO – Soluções em Redes Informáticas. Lda.

VERIZON Portugal, Sociedade Unipessoal, Lda.

VODAFONE Portugal – Comunicações Pessoais, S. A.

Source: ICP-ANACOM

It is noted that, in addition to the providers listed, there are also providers active with national licensing for International

Mobile Telecommunications Systems (IMT2000/UMTS), as well as the provider supported over such networks (MVNO).

MTS providers offering the mobile broadband Internet Access Service | Table 112

Optimus Telecomunicações, S. A.
TMN – Telecomunicações Móveis Nacionais, S. A.
Vodafone Portugal – Comunicações Pessoais, S. A.
ZON – TV Cabo Portugal, S. A.

Source: ICP-ANACOM

In 2009, new mobile broadband offers from Grupo ZON (MVNO) appeared. CTT, which also has an MVNO operation, was marketing a mobile broadband offer from TMN under its own brand.

4.2.4. The structure of the (fixed) Internet Access offer

In recent years, various developments have taken place or been announced which have affected the offer structure of these services.

On the one hand, back in 2007, PT Multimédia was spun off from Grupo PT, following a failed takeover bid of Portugal Telecom, SGPS, S. A. by Sonaecom. Meanwhile, Sonaecom acquired Tele2 and the residential business of Onitelem.

As a result of the spin-off described above, which was concluded in November 2007, Grupo PT's share of broadband customers was reported at 40 %, 30.6 less than in the previous year (if the effect of the spin-off is not considered, Grupo PT's share would have fallen by 4.1 % points in 2007).

Meanwhile, in 2008, ZON Multimédia acquired the companies of Grupo Parfitel (Bragatel, Pluricanal Leiria and Pluricanal Santarém) and TVTEL, as previously described.

Despite these changes, Grupo PT remains the main operator of this service with a 44.5 % customer share, 2.9 % points more than in the previous year.

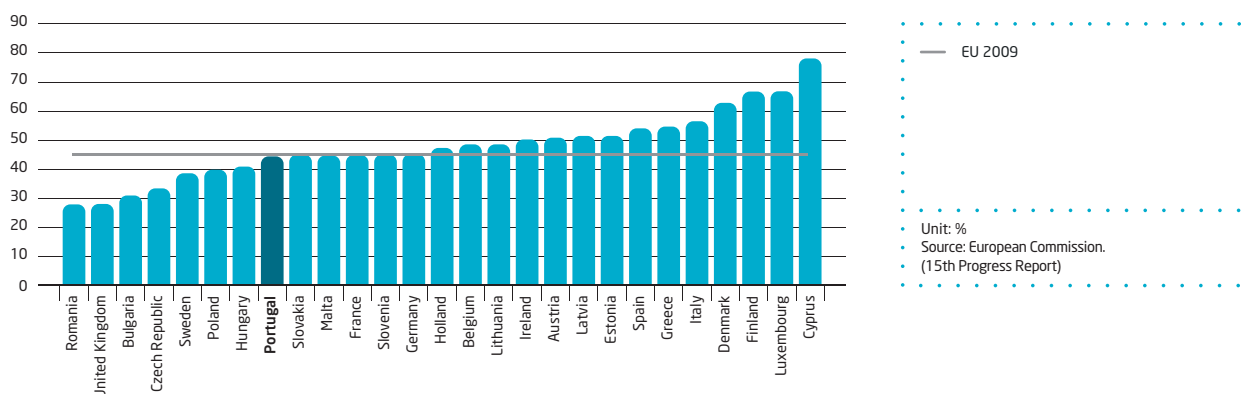
Grupo PT broadband customer shares | Table 113

	2005	2006	2007	2008	2009
Total customers	78.2 %	70.9 %	40.3 %	41.6 %	44.5 %
ADSL access customers	83.8 %	73.7 %	68.3 %	71.7 %	76.5 %
Cable modem access customers	70.8 %	66.7 %	0.0 %	0.0 %	0.0 %
Other access technologies customers	45.3 %	19.7 %	6.9 %	3.6 %	37.1 %

Source: ICP-ANACOM

After the spin-off, the incumbent operator's share in Portugal fell below the European average (46 % in 2007 and 2008 and 45 % in 2009).

Access shares of the incumbent operator in the Internet Access Service using broadband in the EU27 during the 4th quarter of 2009 | Graph 114



The evolution of Grupo PT's share has not been constant over time. Initially, broadband was provided over cable modem, a period when Cabovisão and TV Cabo were the main operators. With the launch of ADSL, Grupo PT achieved even greater predominance: Grupo PT's share of customers increased by about 16 % points between 2001 and 2004, to reach 82 % by the end of the year.

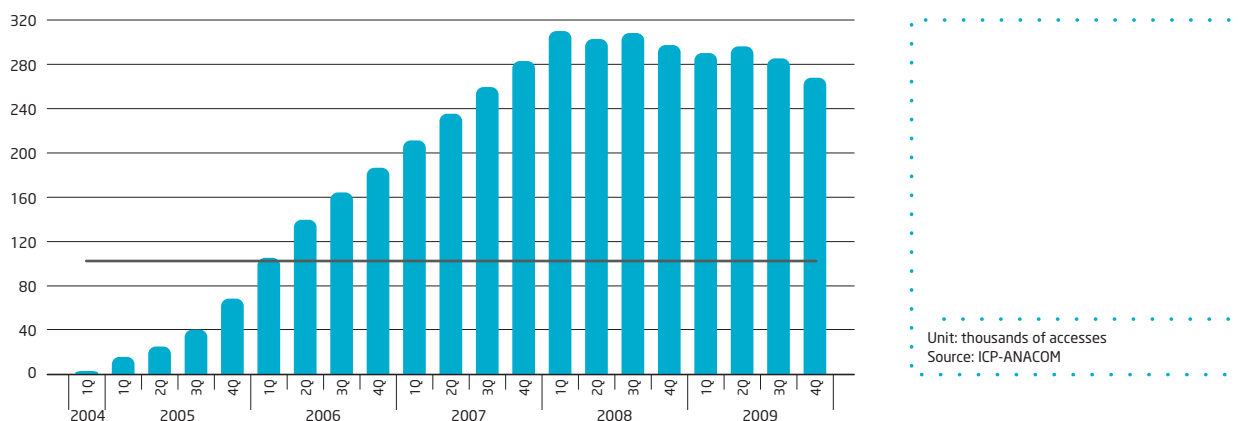
This trend reversed in 2005, as a result of interventions by ICP-ANACOM with respect to the Internet access wholesale offers and the consequent response by alternative operators:

- As far as LLU is concerned, about 69 thousand broadband loops were unbundled in 2005, another 120 thousand in 2006, around 95 thousand in 2007, and another 13 thousand new unbundled broadband loops in 2008. At the end of that year, the cumulative

number of unbundled broadband loops totalled 296 thousand unbundled accesses – about 30 % of all ADSL accesses. By using this resource, new operators reached consumer households directly and developed more competitive voice and broadband offerings.

In 2009 there was a decline in the number of unbundled loops. At the end of the year, the accumulated volume of unbundled broadband loops was reported at 269 thousand unbundled accesses (27 thousand fewer than at the end of 2008) – around 20 % of all ADSL accesses. However the decline seen in the number of unbundled broadband loops is due, above all, to operators developing their own access networks.

Evolution in the number of unbundled broadband accesses | Graph 115



- At the same time, the increasing coverage of the Rede ADSL PT wholesale offer (bitstream access) has contributed, in conjunction with other factors, to a strong increase in broadband penetration, as well as to the launch of new offers with higher bit rates. Rede ADSL PT makes up around 80 % of all ADSL accesses.
- The exclusive broadband services lines wholesale offer (Naked ADSL) has also driven penetration of broadband services and led to an increase in competition, reducing the total level of costs incurred by end-users in broadband Internet access by enabling broadband Internet access without the need to support the costs associated with the FTS.

At the end of 2009, around 16.7 thousand ADSL accesses were based on this form of provision.

In the last two years, Grupo PT has seen some recovery in its share of customers (+4.2 % points), especially due to expansion associated with the MEO service of PT Comunicações.

The customer shares of the other participants in the market have seen significant changes since 2007.

With the acquisition of the companies of Grupo ParfiteL and TVTEL, and as a result of the activities of its own business units, ZON/TV Cabo saw its share of customers grow 4.8 % points in 2008 and a further 0.9 % points in 2009, to stand at 32.2 %.

After a reported increase of 6.4 % points in 2007, Sonaecom has seen significant declines in its share of the market: around 4 % points in 2008 and a further 3.3 % points in 2009.

Evolution in broadband access customer shares | Table 114

Service providers	2007	2008	2009
Grupo PT	40.3 %	41.6 %	44.5 %
PT.COM	38.4 %	-	-
TV Cabo	-	-	-
PT Prime	0.5 %	0.5 %	0.5 %
Cabo TV Madeirense	-	-	-
Cabo TV Açoreana	-	-	-
PT Wi-Fi	0.1 %	0.1 %	0.1 %
PT Comunicações	1.3 %	41.0 %	44.0 %
Grupo ZON multimédia	26.5 %	31.3 %	32.2 %
TV Cabo/ZON	24.2 %	26.5 %	29.8 %
Cabo TV Madeirense	1.6 %	1.6 %	1.5 %
Cabo TV Açoreana	0.5 %	0.8 %	0.9 %
TVTEL	-	1.7 %	-
Bragatel	-	0.4 %	-
Pluricanal Leiria	-	0.2 %	-
Pluricanal Santarém	-	0.1 %	-
Alternative providers	33.2 %	27.1 %	23.3 %
Cabovisão	10.9 %	9.3 %	8.0 %
Sonaecom	16.4 %	12.5 %	9.2 %
Sonaecom	15.6 %	11.9 %	9.2 %
Tele2	0.8 %	0.6 %	0.0 %
AR TELECOM	1.1 %	1.5 %	1.4 %
TV TEL	2.0 %	-	-
Vodafone	0.9 %	2.8 %	3.9 %
ONITELECOM	0.4 %	0.1 %	0.1 %
Other alternative providers	1.5 %	0.9 %	0.7 %

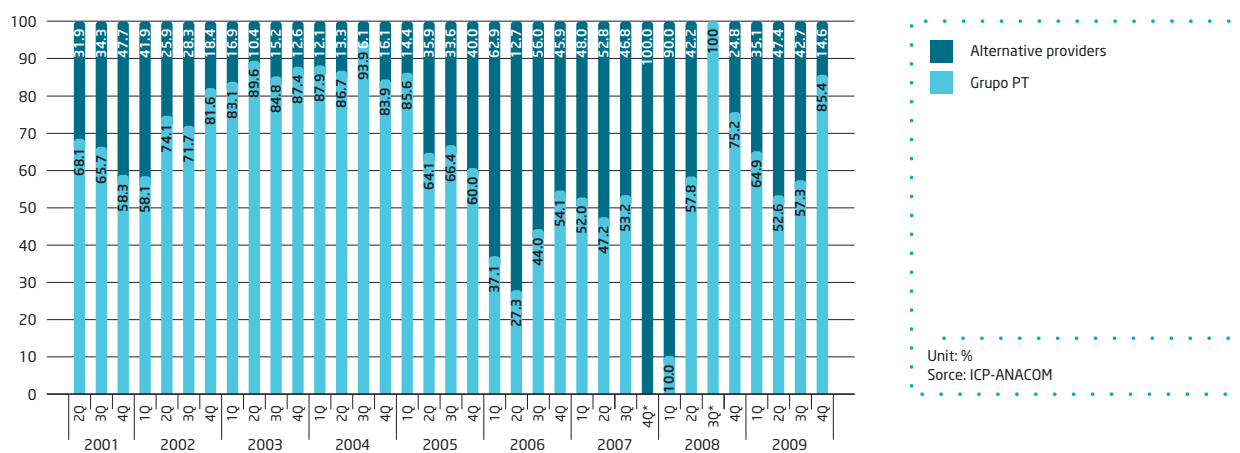
Source: ICP-ANACOM

There are therefore four undertakings with significant customer shares operating in the (fixed) broadband Internet Access Service markets: Grupo PT, Grupo ZON/TV Cabo, Sonaecom and Cabovisão. Vodafone has increased its share of customers by 3 % points since 2007, rising 3.9 % at the end of 2009.

The following graph presents the evolution of the quarterly marginal shares of fixed broadband access subscribers.

According to the available data, over the course of 2009 and in net terms, Grupo PT managed to gain the majority of new fixed broadband customers⁹⁷.

Evolution in fixed broadband subscriber quarterly marginal share | Graph 116



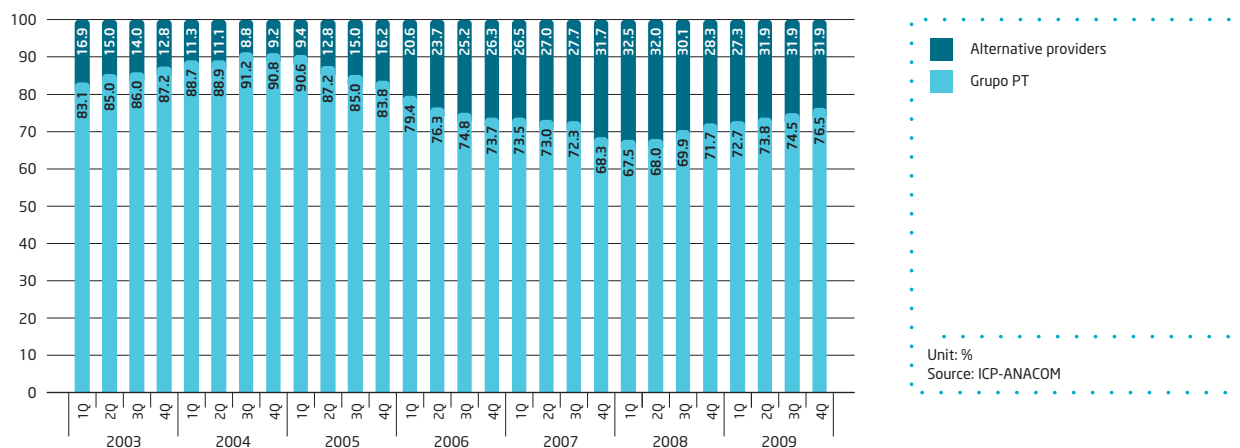
Note: During the 4Q07 there was an overall decrease in the number of broadband customers, while the alternative operators (overall and in net terms) were the only ones contributing to the increase in the number of customers, in net terms. A similar situation occurred during the 3Q08, although both types of operators inverted their roles.

Analysing the evolution of market shares by access technology, it can be seen that, in spite of the growth reported by alternative providers in ADSL, in 2009, Grupo PT continued to increase its share of customers with respect

to this access technology. This is in large part due to the expansion of the MEO service. In 2008, Grupo PT increased its ADSL customer share by 4.7 % points, achieving a market share of 76.5 %.

⁹⁷ These new customers correspond to new contracts from providers in net terms, and not necessarily to new customers of the service (i.e. these new customers may have previously been customers of another provider).

Evolution in the shares of ADSL access subscribers | Graph 117

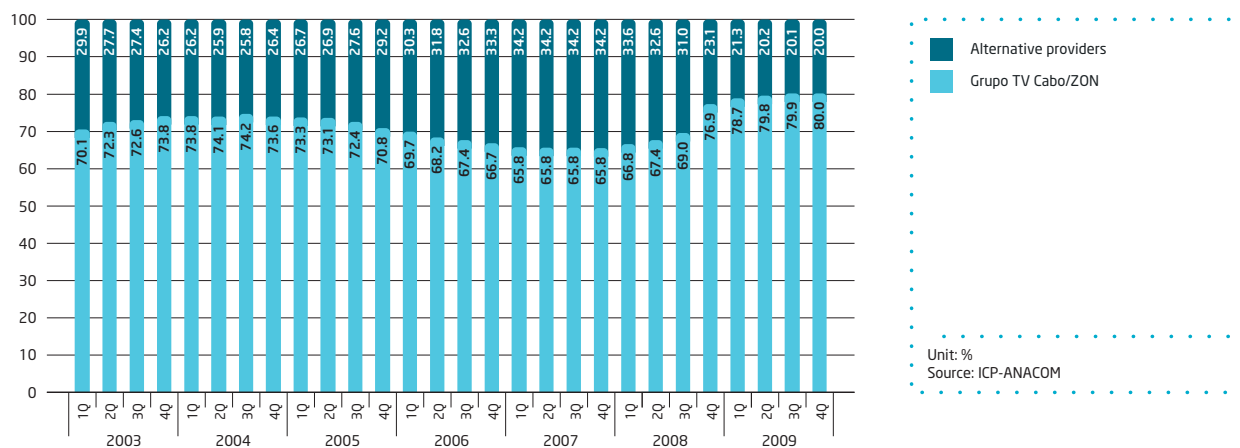


The commercial situation of the companies with this access technology has seen rapid change since the beginning of 2005. In this period, Grupo PT's share has declined by 16 % points and during 2007 nearly 50 % of new customers opted for the services of alternative operators. However, from the

2nd quarter of 2008, this trend has seen a reversal, with Grupo PT recovering share in this technology.

With respect to access via cable modem, in 2009, the share of Grupo ZON grew by 3.1 % points, rising to 80 %.

Evolution in cable modem access subscriber shares | Graph 118



Note: Data from 4Q08 includes values resulting from the acquisition of the companies of Grupo Parfite (Bragatel, Pluricanal Leiria and Pluricanal Santarém), as well as of TVTEL by Grupo TV Cabo/ZON, following the decision of non-opposition to the operation issued by Autoridade da Concorrência (Competition Authority) in November 2008.

It is noted that with the acquisition of the companies of Grupo ParfiteL and of TVTEL, Grupo ZON now competes with only four operators with respect to this technology, with the largest of these, Cabovisão, reporting a loss of customers.

In the case of dial-up, PT Group's share at the end of 2009 reached about 84 %, 11.6 % more than in 2008. This increase mainly reflects the fast reduction in the amount of customers of this type of access (20 % less compared to 2008) and the focus of operators on LLU-based business models.

In 2008, optical fibre started to emerge as an alternative technology to ADSL and cable modem, and in 2009, Grupo PT had a share of 65 % in this technology, rising 51 % points from the previous year. In second position, Sonaecom was reported with a share of 32.8 % of customers.

Regarding other technologies – essentially leased lines and FWA – Grupo PT's share has fallen considerably. In fact, the reduced number of these accesses, associated with the significant increase in FWA, means that currently Grupo PT's share is reported at just 2.2 %.

4.2.5. The evolution of the existing commercial offers in Portugal during 2009

The Internet access service offer is characterized by diversity in terms of technologies, transmission speeds and the dynamics of the offers available. During 2009, the alternative operators modified their offers by reducing the prices of the existing offers or upgrading the provided

speeds. Meanwhile a proliferation has been seen in multiple play bundle offers.

It should be noted that the present analysis does not reflect the relative weight of the offers actually chosen by consumers, but only their availability in the market. In point 5.3.2 the distribution of customers is shown according to the different types of offer based on the *Inquérito ao Consumo de Comunicações Electrónicas* (Electronic Communications Consumer Survey) conducted in 2009.

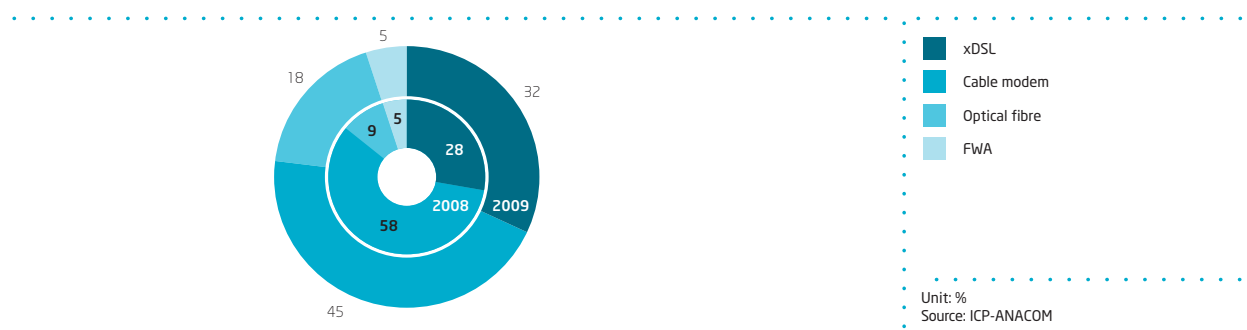
Evolution occurred in offers provided at a fixed location

Regarding offers at a fixed location, by the end of 2009 there were around 113 different offers, slightly less than the figure recorded in the previous year. This reduction in the range of available offers results from the mergers which occurred in 2008 (operations led by ZON and Sonaecom).

In 2009, Internet access at a fixed location was mainly provided using ADSL, cable modem access and optical fibre.

As shown in the following graph, the cable network supported the largest number of offers at a fixed location. In comparison to the previous year, the decline in the number of offers using cable modem results in the most part from the merger of the companies acquired by Grupo ZON.

Number of broadband offers available in Portugal as at the end of each year | Graph 119



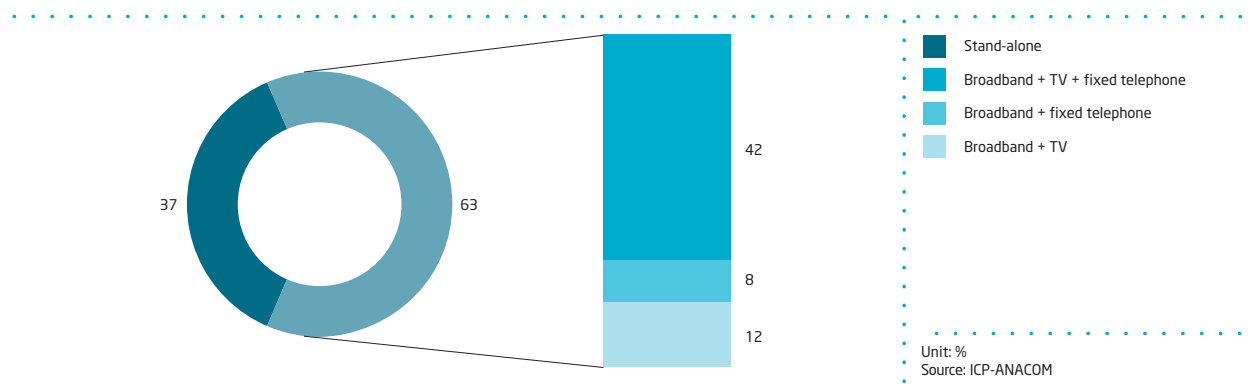
Concerning the broadband Internet access offers using cable modem, some operators also upgraded their networks, installing the EuroDOCSIS 3.0 standard. The commercial launch of offers based on the EuroDOCSIS 3.0 standard occurred at the beginning of 2009, representing 18 % of all cable modem offers by the end of the year.

Meanwhile, on the initiative of alternatives providers, new retail offers for Internet access using optical fibre appeared. This type of offer saw considerable growth, as a result of

the launch of new offers by PTC. The offers supported by this technology represented 18 % of all available broadband by the end of the year.

The number of broadband offers included in multiple play bundles also increased. Broadband offers included in bundles represent 63 % of the overall total (56 % in 2008). Around 42 % of broadband offers are included in triple-play offers, an increase of 17 % points over 2008.

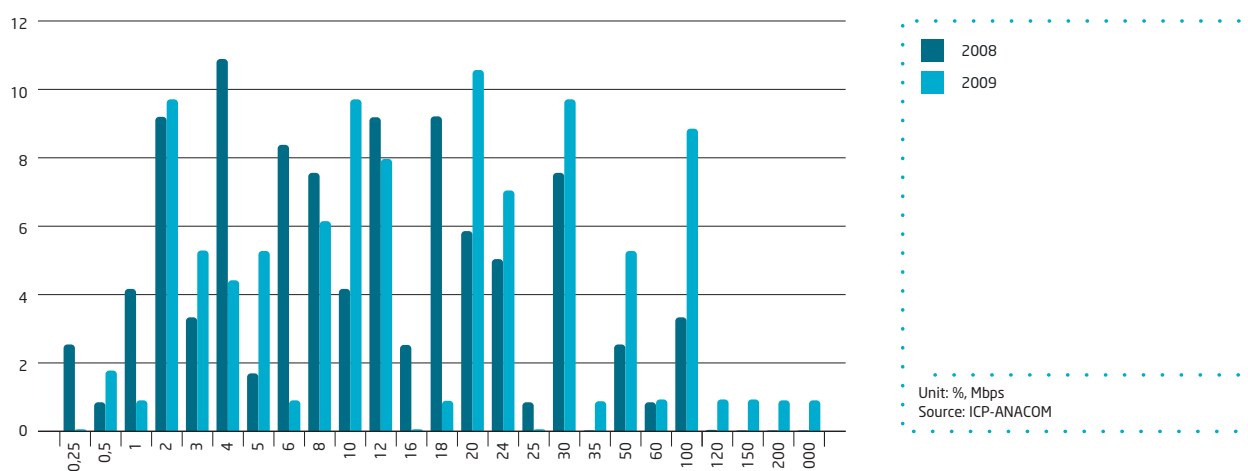
Number of broadband offers available in Portugal within bundles | Graph 120



In terms of download speeds, there were major modifications in the main speeds available. The main speeds available in 2008 were 4 Mbps and 18 Mbps. At the end of 2009, the

main speeds were 2 Mbps, 10 Mbps, 20 Mbps, 30 Mbps and 100 Mbps.

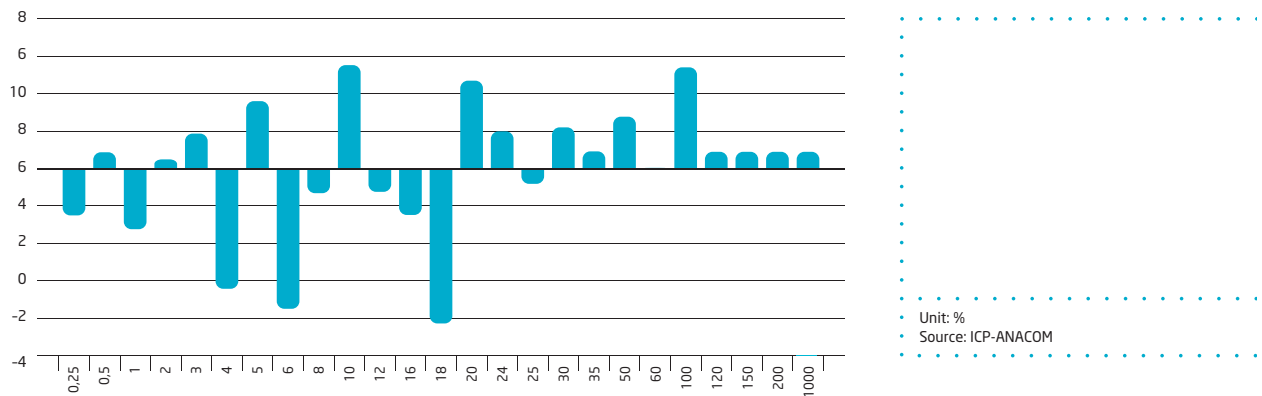
Distribution of fixed broadband offers by transmission speed in Mbps | Graph 121



On the other hand, the information available seems to suggest that operators have been upgrading the speeds available. For example, the previous offers of 6 Mbps are

now 10 Mbps, while 18 Mbps offers are now 20 Mbps or 24 Mbps.

Percentage variation in the number of fixed broadband offers per download speed in Mbps | Graph 122



The number of offers with speeds exceeding 18 Mbps also increased (47 % of all offers). The offers with higher transmission speeds are based on optical fibre or coaxial cable (HFC) using EuroDOCSIS 3.0.

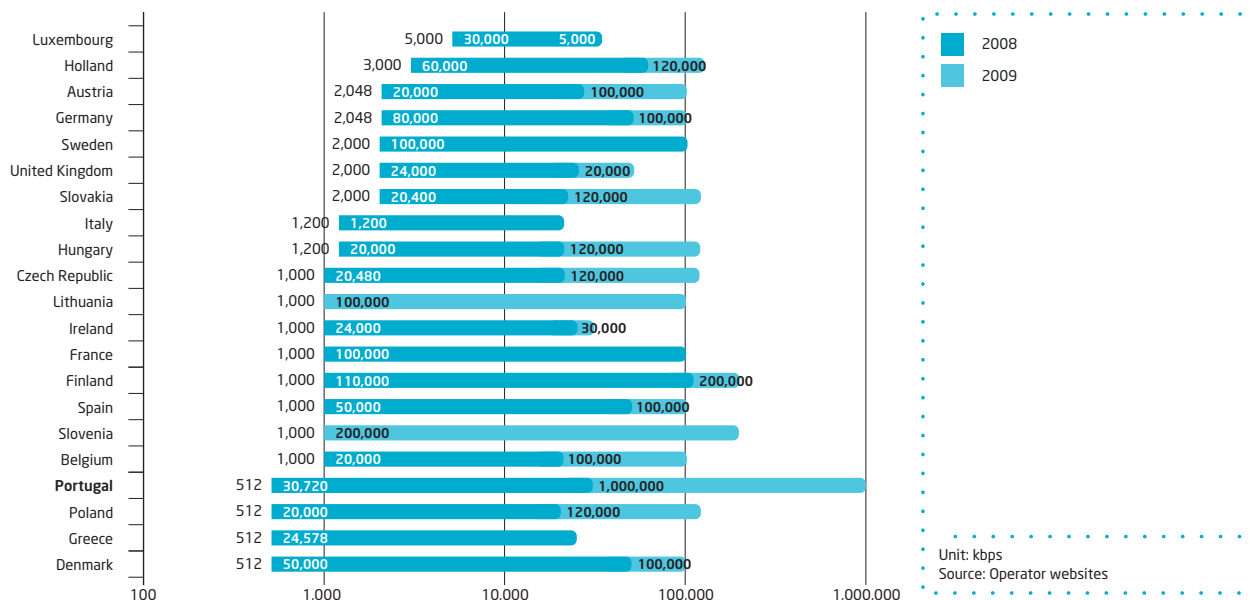
It is noted that a 1 Gbps was launched, based on optical fibre.

The following graph shows the intervals of offers available in EU countries, in terms of download speeds. Only four of the countries under consideration continue to provide speeds below 1 Mbps.

In most countries, the lowest speed offers are at least 1 Mbps.

Compared to the previous year, an increase is reported in download speeds available in the majority of countries. Only Luxembourg, France, Sweden and Greece maintained the speeds of the broadband offers.

It should be stressed that nearly all the countries have offers of at least 100 Mbps, but that Portugal is the only country with an offer of 1 Gbps.

Fixed broadband speed intervals advertised by providers, in December 2009 | Graph 123

In terms of upstream speeds in Portugal, the maximum theoretical speeds advertised increased, with 1 Mbps being the most common.

Lastly, it should be noted that about 68 % of broadband offers did not include traffic limits, whereas in 2008, just 27 % of offers allowed unlimited traffic.

Evolution occurred in mobile broadband offers

The number of mobile broadband offers increased in 2009 and is now equivalent to around 43 % of the total of fixed broadband offers.

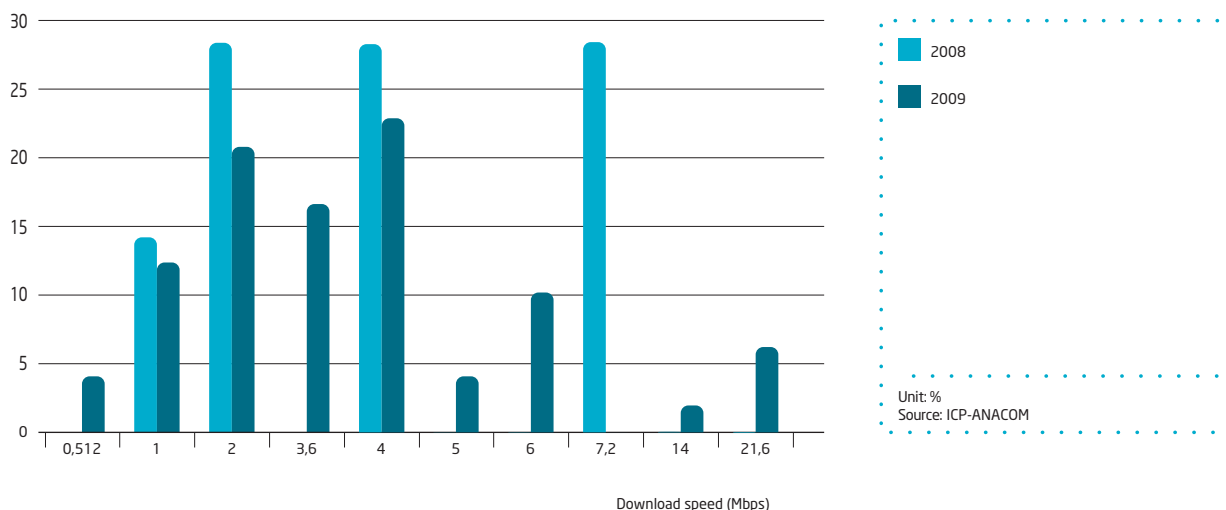
The maximum download speeds provided have been subject to considerable upgrade. At the end of 2009, the maximum download speed offered was 21.6 Mbps and the lowest speed was 512 Kbps. In mid 2008, the maximum speed was 7.2 Mbps while the minimum was 1 Mbps, with only 26 offers available on the market and with reduced diversity.

In 2009, there was a proliferation of mobile broadband offers with daily tariffs, priced at 1 euro per 10 Mb of included traffic. These tariffs provide a lower download speed, up to 512 Kbps and an upload speed up to 384 Kbps.

Certain operators make this daily tariff available to voice mobile customers without the need for any subscription.

Mobile broadband offers have also appeared as part of bundles which include voice, SMS, MMS and Internet traffic, in particular specific offers associated with Smartphones such as the iPhone or Blackberry.

The proliferation of offers in bundles has also led operators providing satellite television services to launch triple-play offers in areas where there is a lack of infrastructure to provide fixed broadband; these offers include the broadband Internet Access Service, provided using mobile access.

Mobile broadband offers available in Portugal per maximum download speed | Graph 124

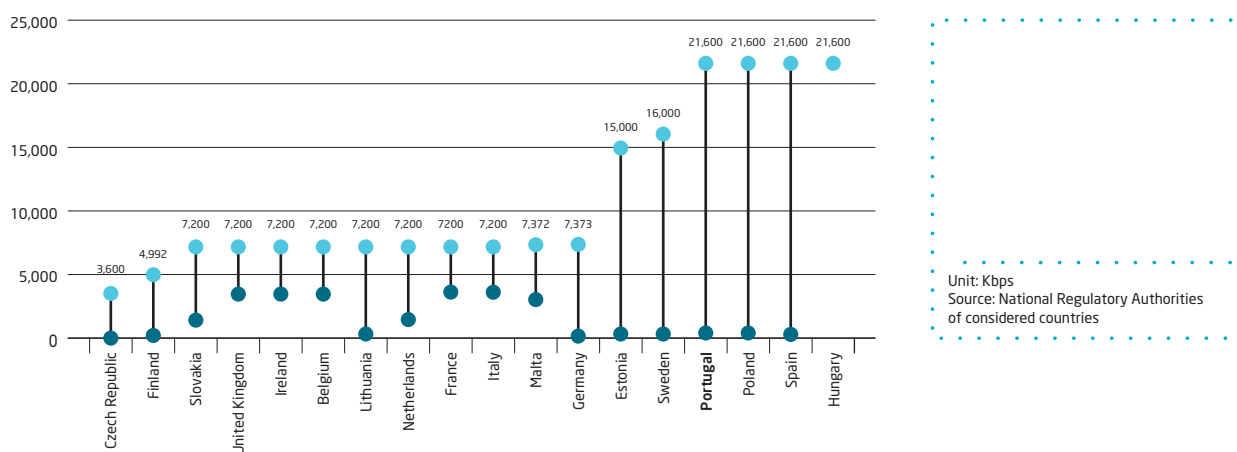
After the implementation of HSUPA was announced at the end of 2007, an increase was seen in upload speeds, and the maximum upload speed advertised at the end of 2009 was 5.8 Mbps.

In 2009, commercial offers were launched of services based on HSPA+, making use of the latest 64QAM modulation techniques, allowing mobile Internet navigation with a theoretical speed of up to 21.6 Mbps. Maximum theoretical speeds could reach up to 28.8 Mbps with MIMO, which uses various antennae at the base station and in the data equipment - testing in Portugal began in 4Q09.

Testing is also being conducted on the evolution of 3G access through the use of "Dual Carrier" technology, which will enable download speeds of up to 42 Mbps.

The following graph presents the offer intervals available in different EU countries, in terms of download speeds. Only nine of the countries under consideration continue to provide speeds below 1 Mbps.

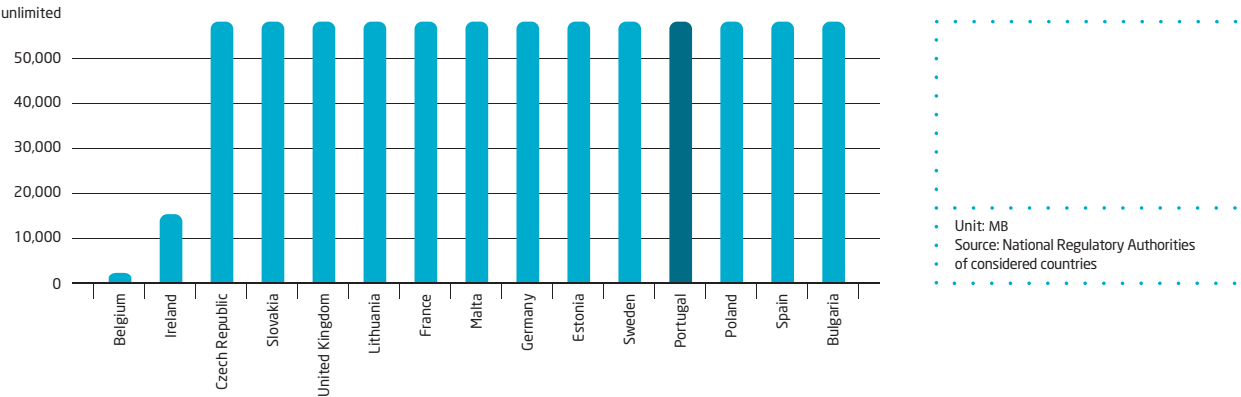
For the majority of countries, the highest speed offers are 7.2 Mbps.

Mobile broadband speed intervals advertised by providers, in March 2009 | Graph 125

In terms of traffic limits, the advertised limits presently range between 5 MB/day for daily tariffs and 100 MB per month, or have unlimited traffic, with some adjustments seen in the offers. Only two of the countries considered

don't have offers with unlimited traffic. The number of offers with unlimited traffic makes up 30 % of the total number of mobile broadband offers.

Maximum traffic limit included in mobile broadband offers, by country | Graph 126



In the context of mobile broadband, tests with Femtocells were also announced, and offers launched enabling the amplification of the communications signal in indoor environments using equipment installed on customer premises.

4.2.6. Broadband Internet Access Service price level

Regarding the price level of fixed broadband (excluding equipment or activation / installation fees or additional services), and taking into account promotions lasting one year or more, prices range between 10 euros (average per month in the first year of subscription to the service) and 249.9 euros (including bundles with voice and television service).

The range in prices reflects not just the download and upload speed of the Internet service and the quantity of

available channels, but also the type of technology and also the packages of voice minutes included.

Stand-alone offers of the Internet Access Service generally vary widely in pricing due to the different download and upload speeds, as well as the amount of traffic included in the offer. The average price of all stand-alone offers included in the comparison is 33 euros.

In terms of technology, it appears that the minimum price of stand-alone offers of the Internet Access Service are identical for identical download speeds, regardless of the platform used, whether cable and ADSL.

The maximum prices have a greater degree of variability, considering the different features of the offers analyzed, especially with respect to included traffic and maximum download speed.

Internet access service pricing by technology and type of bundle (I) | Table 115

	Minimum price	Download (Mbps)	Average price	Average download (Mbps)	Maximum price	Download (Mbps)
ADSL	10 €	2	33 €	12	72 €	8
stand-alone	16 €	2	33 €	8	72 €	8
NET+STF	20 €	12	21 €	21	25 €	24
TV+NET+BLM	40 €	20	40 €	20	40 €	20
TV+NET+STF	10 €	2	26 €	9	47 €	20
TV+NET+STF+BLM	19 €	24	42 €	23	60 €	24
Cable	15 €	2	45 €	25	100 €	200
stand-alone	15 €	2	34 €	16	59 €	30
NET+STF	15 €	2	17 €	6	20 €	10
TV+NET	25 €	8	46 €	22	62 €	100
TV+NET+STF	25 €	8	52 €	33	100 €	200
FTTH	15 €	50	57 €	119	250 €	1000
stand-alone	15 €	50	29 €	100	43 €	150
NET+STF	35 €	30	45 €	77	55 €	100
TV+NET+BLM	40 €	20	47 €	60	55 €	100
TV+NET+STF	40 €	30	101 €	295	250 €	1000
TV+NET+STF+BLM	40 €	10	51 €	40	65 €	100
	10 €	2	42 €	35	250 €	1000

Unit: euros; Mbps

Source: Websites of providers of the Internet access service.

The offers based on optical fibre have values which are very competitive compared to similar offers based on other platforms. It should be noted however, that this technology is not yet available throughout the national territory, with some of the lowest price offers available only in certain geographical areas.

In terms of packages of service which include the Internet Access Service, it appears that the minimum prices, by

download speed, are slightly lower for products supported over cable TV networks. However, not all services included in the packages have the same characteristics, which justifies a difference in terms of pricing. For example, the triple-play offer with 20 Mbps Internet via ADSL only includes 10 television channels while the cable and FTTH offers include 70 and 116 channels, respectively.

Internet Access Service pricing by technology and type of bundle (II) | Table 116

Mbps	Stand-alone			NET+STF			TV+NET			TV+NET+STF		
	ADSL	Cable	FTTH	ADSL	Cable	FTTH	ADSL	Cable	FTTH	ADSL	Cable	FTTH
Min. price	16 €	15 €	15 €	20 €	15 €	35 €	40 €	25 €	40 €	10 €	25 €	40 €
0-2	16 €	15 €			15 €					10 €	35 €	
3-8	18 €	20 €						25 €		20 €	25 €	
9-12	20 €	25 €		20 €	20 €			35 €		40 €	40 €	40 €
18-24	30 €	25 €		20 €			40 €		40 €	19 €	45 €	45 €
25-50		35 €	15 €			35 €		52 €		50 €	55 €	40 €
55-100			29 €			45 €		62 €	55 €		65 €	65 €
110-200			43 €								59 €	
>200												250 €

Unit: Mbps; euros

Source: Websites of providers of the Internet Access Service.

With respect to the price level of fixed broadband, the results are presented below of an international comparison of prices for residential ADSL offers from 30 European countries. For this purpose, use was made of the database of prices and usage baskets defined by Teligen and marketed under the name T-Connect. The reference date is June 2009.

The results presented consist of the monthly bills of residential customers of incumbents and alternative providers calculated according to the following profiles and usage parameters defined by Teligen:

Usage baskets defined by Teligen | Table 117

Basket	Hours per month	Minutes per session	Gbps / month
1	10	20	1
2	15	20	2
3	30	30	5
4	50	30	5
5	75	60	10
6	100	60	20

Prices calculated by Teligen include, in addition to the monthly service, non-recurring costs, amortized over three

years, and usage costs (calculated from a selected usage profile).

Incumbent operators

The table below shows the percentage deviations from the average⁹⁸ and ranking⁹⁹ of the monthly bills of the

Portuguese incumbent operator's ADSL offers, for each of the usage baskets defined by Teligen.

Monthly billing of residential ADSL offers of the incumbent operator in Portugal: deviation from average and ranking | Table 118

Download speed	Basket 1 (1 Gbps)		Basket 2 (2 Gbps)		Basket 3 (5 Gbps)	
	% Deviation from average	Ranking	% Deviation from average	Ranking	% Deviation from average	Ranking
All speeds	-6.9 %	11	-7.4 %	11	-9.7 %	10
Offers 0 - 1 Mbps	n.a	n.a	n.a	n.a	n.a	n.a
Offers 1 - 4 Mbps	n.a	n.a	n.a	n.a	n.a	n.a
Offers 4 - 10 Mbps	-35.3 %	5	-35.3 %	5	-35.3 %	5
Offers > 10 Mbps	-40.4 %	4	-40.4 %	4	-40.4 %	4
Download speed	Basket 4 (5 Gbps)		Basket 5 (10 Gbps)		Basket 6 (100 Gbps)	
	% Deviation from average	Ranking	% Deviation from average	Ranking	% Deviation from average	Ranking
All speeds	-9.7 %	10	-11.4 %	10	-5.4 %	12
Offers 0 - 1 Mbps	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Offers 1 - 4 Mbps	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Offers 4 - 10 Mbps	-35.3 %	5	-30.5 %	7	365.8 %	28
Offers > 10 Mbps	-40.4 %	4	-40.4 %	4	-40.4 %	4

The following conclusions are noted:

- when the results are calculated independently of speed of access, that is, when seeking to determine the lowest price for each consumption profile considered, it appears that PTC is positioned in the top half of the ranking, with deviations from the average of less than 7 %. PTC is behind the Baltic countries and other Eastern European countries, Italy and Belgium. However, the offer of PTC has download speeds (8 Mbps) which are

higher than those of Spain, France or Germany (equal to or less than 1 Mbps) and is included in a bundle that also includes the telephone service;

- in cases of offers between 4 Mbps and 10 Mbps, PTC, with an offer of 8 Mbps, occupies the top places in the ranking, surpassed only by Latvia, Bulgaria, Romania and the United Kingdom;

⁹⁸ This is the simple average excluding the price reported for Portugal.

⁹⁹ Number of countries considered in each ranking varies according to the offers available in each country. The number of countries considered was the following:

	No. of countries
All	30
0 - 1 Mbps	7
1 - 4 Mbps	23
4 - 10 Mbps	28

- finally, with respect to offers in excess of 10 Mbps, the price of PTC's 12 Mbps offer is significantly below average and very close to the top of these rankings. The price of the offer of 15 Mbps from Slovakia is, however, lower.

Incumbent operators and main competitors

The following tables sets out the % deviations from the average¹⁰⁰ and the rankings¹⁰¹ with respect to the monthly bills of the ADSL offers of Portugal's incumbent operator and of an alternative operator, for each of the usage baskets defined by Teligen.

Monthly billing of residential ADSL offers of the incumbent operator and main competitor: deviation from average and ranking | Table 119

	Basket 1 (1 Gbps)		Basket 2 (2 Gbps)		Basket 3 (5 Gbps)	
Download speed	% Deviation from average	Ranking	% Deviation from average	Ranking	% Deviation from average	Ranking
All speeds	7.4 %	18	6.9 %	18	4.9 %	17
Offers 0 - 1 Mbps	n.a	n.a	n.a	n.a	n.a	n.a
Offers 1 - 4 Mbps	-6.2 %	12	-0.1 %	13	-13.2 %	10
Offers 4 - 10 Mbps	-4.5 %	8	-30.9 %	8	-31.1 %	8
Offers > 10 Mbps	-36.7 %	8	-36.7 %	8	-36.9 %	8
	Basket 4 (5 Gbps)		Basket 5 (10 Gbps)		Basket 6 (100 Gbps)	
Download speed	% Deviation from average	Ranking	% Deviation from average	Ranking	% Deviation from average	Ranking
All speeds	4.9 %	17	4.9 %	17	13.7 %	17
Offers 0 - 1 Mbps	n.a	n.a	n.a	n.a	n.a	n.a
Offers 1 - 4 Mbps	-17.5 %	10	-26.2 %	10	3.0 %	22
Offers 4 - 10 Mbps	-31.1 %	8	-31.4 %	8	2.7%	17
Offers > 10 Mbps	-36.9 %	8	-36.9 %	8	-37.4%	7

The following conclusions are noted:

- when the results are calculated independently from access speed, it is seen that Portugal's position is above average. However the offer considered is a PTC offer with download speeds (8 Mbps) which exceed those of Spain, France or Germany (equal to or less than 1 Mbps) and refers to a package which includes the telephone service;
- in the case of offers in the 1 Mbps to 4 Mbps range, Portugal has offers which are below average, with a 1 Mbps from Sonaecom (Clix) considered;
- in the case of offers in the 4 Mbps to 10 Mbps range, PTC was 31 % below average with an offer of 8 Mbps;

¹⁰⁰ Simple average excluding price in Portugal.

¹⁰¹ Number of countries considered in each ranking varies according to the offers available in each country. The number of countries considered was the following:

	No. of countries
All	30
0 - 1 Mbps	12
1 - 4 Mbps	26
4 - 10 Mbps	29

- finally, with respect to offers exceeding 10 Mbps, PTC's 12 Mbps offer has a price which is significantly below the average. However, the offers of the United Kingdom (24 Mbps), Slovakia (15 Mbps), Greece (24 Mbps), France (20 Mbps) and the Czech Republic (16 Mbps) have lower pricing.

Comparison of monthly fee by download speed

If the Teligen information is used and a comparison is made between the monthly fees of the various offers of PTC in June 2009¹⁰² and the similar offers of the incumbent operators of the considered countries, it is concluded that the monthly fees of PTC are below average for all considered download speeds.

Residential ADSL monthly fees - incumbent operators | Table 120

	8 Mbps	12 Mbps	24 Mbps
Belgium		40.35	
Bulgaria		12.37	
Czech Republic	28.91		
Finland	44.94		51.69
France	32.90		
Greece	33.15		33.64
Hungary	27.95		
Iceland	39.63	42.66	
Luxembourg	50.58		
Malta	57.23	78.38	
Holland	36.32		
Portugal	24.02	26.52	33.02
Romania	17.45		
Slovakia		120.30	
Sweden	34.57		39.25
United Kingdom	17.17		
Average excl. Portugal	35.07	58.81	41.53
Portugal deviation for average	-32%	-55%	-20%

¹⁰² Prices calculated by Teligen comprise non-recurring costs, amortized over three years, monthly fee and usage costs (calculated from a selected usage profile).

It is further noted that the monthly fee of PTC's 8 Mbps offer is the third lowest, and is below the average of 1 Mbps offers (not shown in the table).

The monthly fee of the 12 Mbps offer has the lowest value and is below the average of 8 Mbps.

The price of the 24 Mbps offer is likewise below average. However, there are offers with higher speeds (30 Mbps) with lower monthly fees (Slovakia).

4.3. The Internet Access Service customer and usage profile

A range of the characteristics of the Internet user and usage is set out below, with details of the evolution occurring in 2009.

4.3.1. The Internet Access Service customer profile

Residential customers¹⁰³ make up the great majority of the Internet access service's customers, constituting around 87 % of total customers.

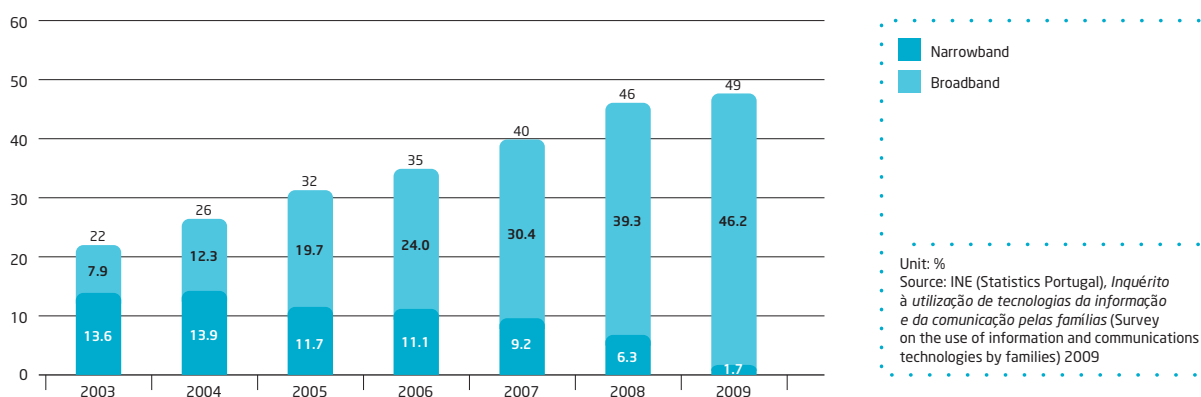
Characteristics of Internet Access Service customers according to customer segment | Graph 127



According to INE (Statistics Portugal) data, during the 1st quarter of 2009, about 47.9 % of Portuguese households

had an Internet connection, 1.9 % point more than a year before.

Evolution of the Internet Access Service residential penetration rate | Graph 128



¹⁰³ Any customer who doesn't use the service mainly as a means to pursue their economic activity is considered a residential customer.

In the residential segment, available data shows the existence of regional differences in terms of Internet penetration. Lisbon and Vale do Tejo remains the region with the highest Internet Access Service penetration. On

the contrary, Internet penetration in the Azores, Alentejo and Algarve regions remains below the national average (47.9 per 100 inhabitants in 2009).

Possession of Internet connection by domestic households, by NUTS II | Table 121

Regions	Mar. 06	Mar. 07	Mar. 08	Mar. 09
North	31.3	32.7	45.5	47.3
Centre	36.3	41.1	39.6	41.4
Lisbon	40.7	46.4	54.1	55.4
Alentejo	27.4	37.1	38.0	38.5
Algarve	34.3	42.0	46.3	50.6
A.R. Azores	37.8	39.9	41.1	46.7
A.R. Madeira	37.1	40.9	44.7	49.7

Unit: %

Source: INE (Statistics Portugal), *Inquérito à Utilização de Tecnologias da Informação e da Comunicação pelas Famílias* (Survey on the use of information and communications technologies by families) - 2006, 2007, 2008 and 2009.

The regions reporting the most significant growth were the Algarve (+4.3 % points), the Autonomous Region of the Azores (+5.6 % points) and the Autonomous Region of Madeira (+5 % points), whereas all other regions also saw Internet penetration grow between 2008 and 2009.

In terms of the socio-economic characterisation of the user, and according to the *Inquérito ao Consumo de Comunicações Electrónicas* (Electronic Communications Consumer Survey) - 2009¹⁰⁴, the residential customer of the Internet Access Service has above-average income.

104 ICP-ANACOM, *Inquérito ao Consumo dos Serviços de Comunicações Electrónicas* (Electronic Communications Services Consumer Survey), December 2009. The universe is composed of individuals of 15 years or more who reside in private housing units located in Mainland Portugal or in the Autonomous Regions (Azores and Madeira). The sample is representative at the level of NUTS II (with sampling errors not exceeding 5.5 % points for the smaller regions - Alentejo, Algarve, A.R. Azores and A.R. Madeira and not exceeding 4.5 for the others) having been composed of 3,106 interviews. Households were selected by means of proportional stratified random sampling according to the crossing of the NUTS II Region variables and the size of the household. Within each household one individual was selected by means of sampling by quotas guaranteeing the marginal totals of the sex, age class, level of education and employment status variables, according to the General Population Census (2001) of INE - Instituto Nacional de Estatística (Statistics Portugal). Information compilation was performed using CAPI - Computer Assisted Personal Interviewing between 6 November and 20 December 2009. The results regarding the Mobile Telephone Service are based on the universe of the individuals and present a maximum margin of error of less than 2 p.p. (with a degree of reliability of 95 %). The results regarding the Fixed Telephone Service, internet Service and paid Television Service are based on the universe of the households and present a maximum margin of error of less than 2.6 p.p. (with a level of reliability of 95 %). Fieldwork and data processing was performed by the company GFK Metris.

Penetration of Internet Access Service by level of social class | Table 122

Social class	Dec. 2009
A/B	82.7
C	68.1
D	31.4
E	38.4 *

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo de Comunicações Eletrónicas* (Electronic Communications Consumer Survey), December 2009

Base: Households according to social class.

Nota 1: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#)Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*)Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

Note 2: The proportions highlighted in blue indicate those that are significantly different (column) in accordance with the test of two samples for proportions. Higher proportions are highlighted in light blue and lower proportions in dark blue.

Note 3: Social class is determined according to the level of education and profession of the individual in the household with the highest income. Social class A is the highest and social class E is the lowest.

Note 4: Internet service includes fixed and/or mobile access.

The existence of the Internet Access Service in the home is statistically correlated with the social class of the family households (V Cramer coefficient of 0.402).

It is likewise noted that Internet penetration is highest among lower age groups. Over the last four years, penetration of the service has grown among all age groups.

Internet penetration per age group | Table 123

Age group	2006	2007	2008	2009
16 - 24	75.2	84.8	87.4	88.1
25 - 34	53.9	58.4	69.5	77.1
35 - 44	36.3	40.5	47.3	53.3
45 - 54	24.0	26.0	30.5	36.0
55 - 64	12.1	16.7	18.7	21.4
64 - 74	3.0	4.0	5.2	6.6

Unit: %

Source: INE (Statistics Portugal), *Inquérito à Utilização de Tecnologias da Informação e da Comunicação pelas Famílias* (Survey on the use of information and communications technologies by families) - 2006, 2007, 2008 and 2009

According to the *Inquérito ao Consumo de Comunicações Eletrónicas* (Electronic Communications Consumer Survey) - 2009¹⁰³, larger family sizes are more likely to have Internet

access. Over 50 % of households with more than three individuals have Internet at home.

103 Any customer who doesn't use the service mainly as a means to pursue their economic activity is considered a residential customer.

Internet Access Service penetration by family size | Table 124

Family size	Dec. 2009
1 individual	18.7 *
2 individuals	30.2 *
3 individuals	57.7
4 or more individuals	68.4

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo de Comunicações Electrónicas* (Electronic Communications Consumer Survey), December 2009

Base: Family households with Internet access according to family size.

Note 1: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#)Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*)Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

Note 2: The proportions highlighted in blue indicate those that are significantly different (column) in accordance with the test of two samples for proportions. Higher proportions are highlighted in light blue and lower proportions in dark blue.

Note 3: Internet service includes fixed and/or mobile access.

The existence of the Internet Access Service in the home is statistically correlated with the size of the family household (V Cramer coefficient of 0.391).

Regarding the non-residential service, about 92.7 % of companies have Internet access, and about 81 % use broadband. The larger the size of the company, the greater likelihood that it will have broadband Internet access.

Internet penetration by company size | Table 125

	Internet	Broadband
10 to 49 staff	91.6	80.3
50 to 249 staff	99.2	88.7
250 or more staff	100.0	98.0
Total	92.7	81.7

Unit: %

Source: INE (Statistics Portugal). *Inquérito à Utilização de Tecnologias da Informação e da Comunicação nas Empresas* (Survey on the use of information and communications technologies in companies) 2009

Meanwhile, by activity, only Lodging and Restaurants and similar activities have a level of Internet penetration significantly below 90 % (69.6 %). In the case of broadband,

only the construction industry (76.1 %) and lodging and restaurants and similar (53.8 %) have penetration rates that are considerably below 80 %.

Internet penetration by sector of activity ⁽¹⁾ | Table 126

	Internet	Broadband
C - Transforming industries	94.0	82.0
D+E - Electricity, gas, hot and cold water and cold air, capture, treatment and distribution of water; sanitation, waste management and pollution cleanup	98.9	87.3
F - Construction	89.7	76.1
G - Wholesale and retail; repair of automobile vehicles, motorcycles	97.0	90.5
H - Transport and storage	100.0	88.3
I - Lodging and restaurants	69.6	53.8
J - Information and communication activities	99.2	96.5
K - Financial and insurance activities	100.0	93.0
L - Real-estate activities	99.2	96.8
M - Consultants, scientific technical and similar activities	99.3	95.7
N - Administrative and support services	99.9	80.5
Total	92.7	81.7

Unit: %

Source: INE (Statistics Portugal). *Inquérito à Utilização de Tecnologias da Informação e da Comunicação nas Empresas* (Survey on the use of information and communications technologies in companies) 2009

(1) Economic activity according to CAE Rev.3

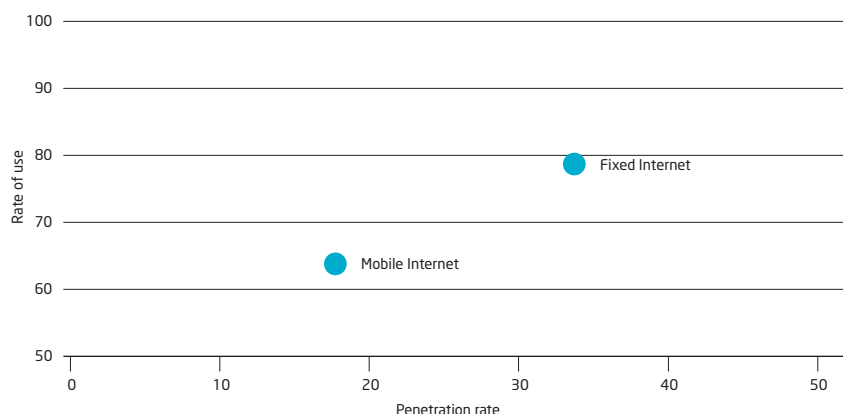
Fixed broadband users vs. mobile broadband users

According to the *Inquérito ao Consumo dos Serviços de Comunicações Electrónicas* (Electronic Communications Services Consumer Survey) conducted by ICP-ANACOM in 2009¹⁰⁵, it is estimated that 34 % of portuguese family households subscribe to the fixed Internet and 18 % to mobile Internet.

In terms of use, it is reported that, considering individuals 15 years or older, fixed Internet (79 %) tends to receive more use by the different family members than mobile Internet (64 %).

¹⁰⁵ The universe is composed of individuals of 15 years or more who reside in private housing units located in Mainland Portugal or in the Autonomous Regions (Azores and Madeira). The sample is representative at the level of NUTS II (with sampling errors not exceeding 5.5 % points for the smaller regions - Alentejo, Algarve, A.R. Azores and A.R. Madeira and not exceeding 4.5 for the others) having been composed of 3,106 interviews. Households were selected by means of proportional stratified random sampling according to the crossing of the NUTS II Region variables and the size of the household. Within each household one individual was selected by means of sampling by quotas guaranteeing the marginal totals of the sex, age class, level of education and employment status variables, according to the General Population Census (2001) of INE - Instituto Nacional de Estatística (Statistics Portugal). Information compilation was performed using CAPI - Computer Assisted Personal Interviewing between 6 November and 20 December 2009. The results regarding the Mobile Telephone Service are based on the universe of the individuals and present a maximum margin of error of less than 2 p.p. (with a degree of reliability of 95 %). The results regarding the Fixed Telephone Service, Internet Service and paid Television Service are based on the universe of the households and present a maximum margin of error of less than 2.6 p.p. (with a level of reliability of 95 %). Fieldwork and data processing was performed by the company GFK Metris.

Penetration rate and use of fixed Internet and mobile Internet | Graph 129



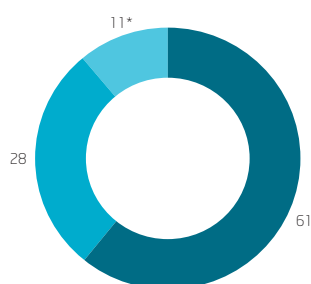
Unit: %
Source: ICP-ANACOM, *Inquérito ao Consumo das Comunicações Eletrónicas* (Electronic Communications Services Consumer Survey) December 2009

Base: Total of family households (penetration rate); Total of individuals aged 15 or more with access to the service (rate of use).

Note: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. Coefficient of variation less than 10 % (reliable estimate).

Around 11 % of households have both types of access - fixed and mobile. The exclusive use of mobile broadband is reported in 28 % of the family households of this group.

Broadband Internet service with fixed and / or mobile connection | Graph 130



■ FBB only
■ MBB only
■ BLF and BLM

Unit: %
Source: ICP-ANACOM, *Inquérito ao Consumo das Comunicações Eletrónicas* (Electronic Communications Services Consumer Survey) December

Base: Total of family households with Internet access.

Note 1: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#) Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*) Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

There are differences between the characteristics of family households which consume fixed broadband and the characteristics of family households which use mobile broadband.

Using cluster analysis, it was possible to identify three broadband usage profiles. The following table illustrates the main characteristics identified in each of the obtained groups, enabling a comparison between the incidence of each characteristic in the respective group and to the total population.

User profile of fixed and / or mobile broadband | Table 127

	GROUP 1			GROUP 2			GROUP 3		
	Non-user of broadband			User of fixed broadband simultaneously or not with mobile broadband			User of mobile broadband		
		% group	% global		% group	% global		% group	% global
Broadband user	Without broadband	95.2	6.5	FBB only	58.6	18.8	MBB only	20.0	19.8
				FBB+MBB	10.1	7.2			
Size of households	Up to 2 individuals	80.7	45.7	3 or more individuals	63.5	54.3	3 or more individuals	79.3	54.3
Children elderly present	Elderly	41.9	19.4				Children	43.8	25.6
Age group	55 years or more	85.0	34.4	15-34 years	53.3	32.7	35-54 years	49.3	33.0
Education level	Up to 1st stage primary	92.5	42.0	Secondary or higher education	78.8	25.2	2nd or 3rd stage primary	68.3	32.7
Employment status	Retired / other inactive	78.3	32.2	Employed/ student	87.1	60.3	Employed/ Unemployed	83.4	59.9
Social class	D	82.4	52.4	A/B/C	92.5	31.4	D/E	90.0	68.5

Source: ICP-ANACOM, *Inquérito ao Consumo das Comunicações Electrónicas* (Electronic Communications Services Consumer Survey) December 2009
Base: Total of family households.

Note 1: Cluster analysis using K-means method with three classes. According to the distance matrix between the groups, it is observed that groups 1 and 3 present greater respective dissimilarities (2,14); i.e. they refer to groups who have the least in common.

Note 2: NUTS II was not included in the analysis as it does not provide differentiation at a statistical level in conjunction with the other variables.

The identified groups have the following characteristics:

- The first group indicated refers to households which do not use broadband. These households are particularly characterised by consisting of one or two individuals with elderly members and with a low social class (D). The individual respondents of these family households have a more senior age, lower levels of education and are retired or have a non-active employment status.
- The second group refers to households which have fixed broadband Internet, used simultaneously, or not, with mobile broadband. The group is mostly made up of households with three or more individuals with a higher social class (A/B/C). In terms of the individual characteristics, note is made of a trend towards lower age groups, with higher levels of education and individuals who are employed or students.
- Finally, the third group refers to households which have mobile broadband only. These families tend to be

larger with children, but with a lower social class (D/E). The individual respondents of these households have intermediate levels of education (secondary), middle age (35-54 years) and are in the most part employed or unemployed.

4.3.2. Internet Access Service usage profile

Most Internet Access Service users use broadband. At the end of 2009, the ratio of broadband customers versus the overall amount of customers was 98.3 %. The growing weight of broadband mainly reflects the availability of applications and contents requiring larger bandwidths and the appearance of always-on offers at a fixed monthly rate that also give users a more economic and cost-controlled use.

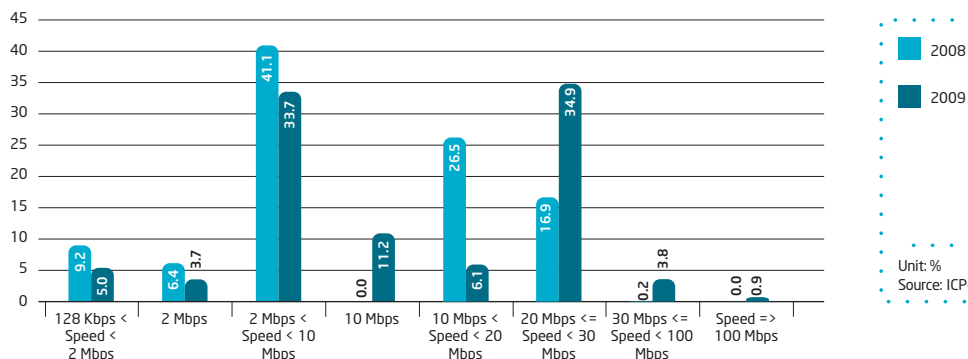
Distribution of Internet Access Service customers per bandwidth in 2009 | Graph 131



On the other hand, and according to the previously mentioned data from INE (Statistics Portugal), at the end of the 1st quarter of 2009, 92.7 % of companies with more than ten employees had Internet, and 81.7 % used broadband¹⁰⁶.

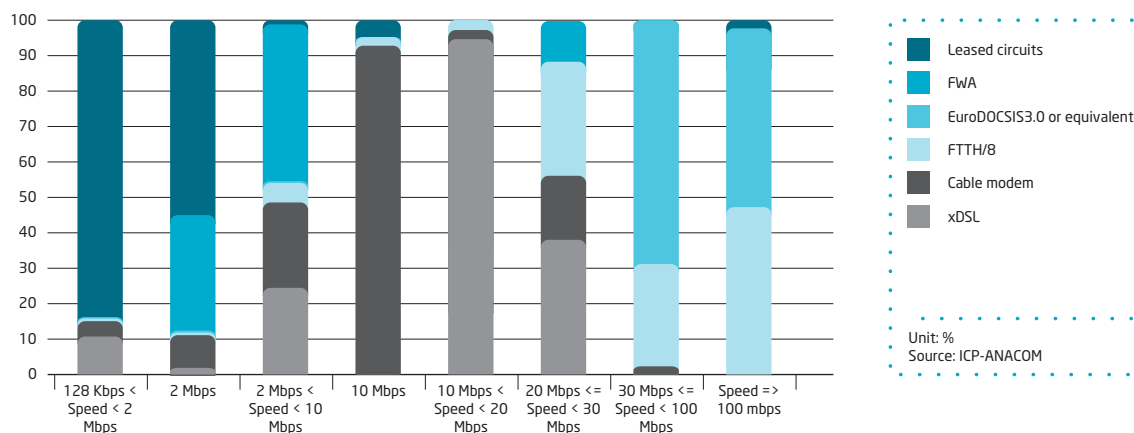
Regarding the access speeds chosen by users, in 2009, most residential customers (60 %) used accesses above 10 Mbps and 35 % had access above 20 Mbps. Around 34 % used speeds between 2 Mbps and 10 Mbps.

¹⁰⁶ See INE (Statistics Portugal), *Inquérito à Utilização de Tecnologias da Informação e da Comunicação nas Empresas* (Survey on the use of information and communications technologies in companies) - 2009.

Broadband accesses, by download speed | Graph 132

The number of broadband Internet accesses by class of service (defined in terms of download speed) varies according to the supporting technology. At the end of 2009, optical fibre and cable modem with EuroDOCSIS3.0 or equivalent

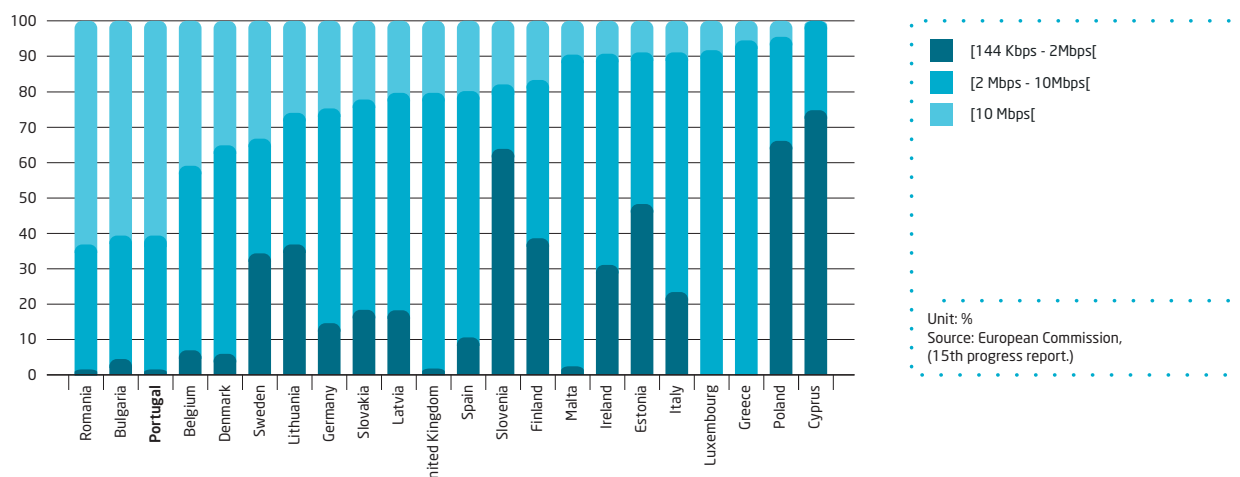
had the fastest accesses. The largest % of leased circuits refers to 2 Mbps.

Broadband accesses, by technology and download speed | Graph 133

It is noted that in the EU, the average proportion of accesses with capacity of 10 Mbps or higher is 23.2 %. In the majority

of the considered countries, the most used access speed are in the range between 2 and 10 Mbps.

International comparison of broadband accesses by download speed, December 2009 | Graph 134



Regarding the most used tariff, according to the *Inquérito ao Consumo de Comunicações Eletrónicas* (Electronic Communications Consumer Survey) - 2009¹⁰³, it is seen that the type of access, fixed or mobile, has significant impact on the choice of tariff.

Mobile Internet users choose monthly tariffs with traffic limits, while the majority of fixed Internet users choose monthly tariffs without traffic limits. Around 29.4 % of mobile Internet users prefer pre-paid tariffs.

The preferences are clearly associated with the prices in each mode, as well as offer existing in the market.

Type of tariff in Internet Access (mobile and fixed), in December 2009 | Table 128

Type of mobile Internet access tariff		Type of fixed Internet access tariff	
Pre-paid	29.4 *	Pre-paid	3.8 #
Daily tariff	3.8 #	Timed tariff (billing by period of 10 minutes)	0.1 #
Monthly tariff with traffic limit	38.8 *	Monthly tariff with traffic limit	18.4 *
Monthly tariff without traffic limit	24.9 *	Monthly tariff without traffic limit	68.5
Ns/Nr	3.0	Ns/Nr	9.2
Total	100	Total	100

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo de Comunicações Eletrónicas* (Electronic Communications Consumer Survey), December 2009

Base: Mobile Internet - individuals of 15 years or more with mobile Internet access; Fixed Internet - Family Households with fixed Internet access.

The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#) Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*) Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

Goals of Internet usage

Concerning the use that each individual makes of ICTs, in the first quarter of 2009, 87.3 % engaged in activities connected to communication. In particular, note is made of posting personal content on a website (26.5 %), placing

messages on chats, newsgroups or online discussion forums (44.6 %), making telephone calls or video calls via webcam (25.4 %) and creating or maintaining own blog (14 % of users).

Advanced activities conducted on the Internet, related to communication practices | Table 129

	2007	2008	2009
Making telephone calls or video calls via webcam	x	x	25.4
Placing messages on chats, newsgroups or online discussion forums	x	x	44.6
Communications via real time written messages (e.g.: messenger)	56.8	63.5	x
Posting personal information on a website	x	16.9	26.5
Creating or maintaining own	13.7	11.4	14.0

Unit: %

Source: INE (Statistics Portugal) /UMIC (Knowledge Society Agency) *Inquérito à Utilização de Tecnologias da Informação e da Comunicação pelas famílias* (Survey on the use of information and communications technologies by families) 2007-2009

With regard to activities related to obtaining and sharing audiovisual content, the most mentioned activities are: gaming or downloading games, images or music (44.1 %) and listening to the radio and watching television over the

Internet (47.1 %). Note is also made of posting personal content on websites to be shared (26.5 %).

Advanced activities conducted on the Internet, related to obtaining and sharing audiovisual content | Table 130

	2007	2008	2009
Listening to radio or watching television	36.2	41.2	41.7
Gaming / downloading games, images or music	52.6	x	44.1
Using the podcast service to automatically receive audio and video files	x	5.3	9.1
Online gaming with other players	x	17.0	14.5
Posting personal content on websites to be shared (text, images, videos, music etc.)	28.3	16.9	26.5
Using programmes to manage information archives (news feeds) to read new contents published on websites (ex: RSS)	x	7.6	8.5

Unit: %

Source: INE (Statistics Portugal), *Inquérito à Utilização de Tecnologias da Informação e da Comunicação pelas Famílias* (Survey on the use of information and communications technologies by families) - 2007- 2009.

According to the *Inquérito ao Consumo de Comunicações Eletrónicas* (Electronic Communications Consumer Survey) - 2009¹⁰³, the majority of Internet users, fixed and mobile, connect to the Internet various times per day. The % of fixed

users who are always connected exceeds 15 %. Around 69 % of mobile Internet users connect, at least, once per day.

Frequency of use of the Internet service by access type (fixed or mobile) | Table 131

	Fixed Internet user	Mobile Internet user
Permanently connected	15.8 *	6.6 #
Various times per day	33.5	49.8 *
Once per day	22.1 *	18.9 *
Less than once per day	20.3 *	23.7 *
Don't know/no response	8.4	1.0
Total	100	100

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo de Comunicações Eletrónicas* (Electronic Communications Consumer Survey), December 2009

Base: Individuals aged 15 years or older with fixed or mobile Internet access.

Note: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#) Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*) Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

4.3.3. Barriers to joining the service

At the end of 2009, as in previous years, the main reason cited for not subscribing to the Internet Access Service

was lack of interest or usefulness (32.3 %). In second place, reasons emerged associated with the computer (22 %). The price of the service also emerges as a barrier to accessing the service (11.3 %).

Main reasons for not having Internet at home | Table 132

	Dec.08	Dec.09
Has no need / interest	33.5	32.3
None of the individuals in the household knows how to use the Internet	21.3	16.3 *
Has no computer or the computer lacks the capacity	16.9	22.1
The price of access to the Internet is too high	10.0 *	11.3 *
The cost of the computer is too high	9.6 *	7.0 *
Has access at another location (school, work)	5.0 *	5.1 *
Another reason	2.0 #	4.8 *
Don't know / no response	1.7	1.1
Total	100	100

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo das Comunicações Eletrónicas*, December 2008 and 2009

Base: Family households without access to the Internet at home.

Note: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#) Coefficient of variation greater than or equal to 25 % (unreliable estimate)

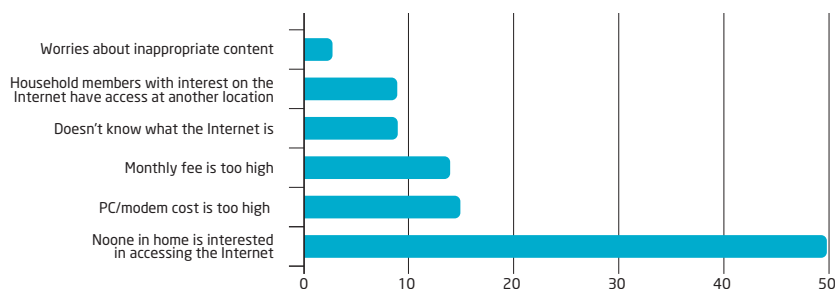
(*) Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

It should be noted that the main reasons mentioned above are identical to those cited by EU consumers for not joining the Internet. However greater importance is given to the

barriers "lack of interest" and "PC/modem cost" by European consumers.

Main reasons for not having Internet at home in EU27 | Graph 135



Unit: %
Source: European Commission, E-communications household survey, 2008.

It should be mentioned that, in 2008, according to this publication, the reason "don't know what the Internet is" has its highest value in Portugal (among EU27 countries).

4.3.4. Service usage level: evolution in the amount of customers, traffic and revenues

Evolution in the service's usage level, measured in terms of customers, accesses and revenue, is detailed below.

Internet access customers

At the end of 2009, there were a reported 1.9 million Fixed Internet Access Service customers, about 13 % more than in 2008.

Mobile broadband users reached 3.8 million, of which 2.17 million were active in the last month of 2009. Compared to the previous year, the number of mobile broadband users increased by 1.4 million.

Number of customers | Table 133

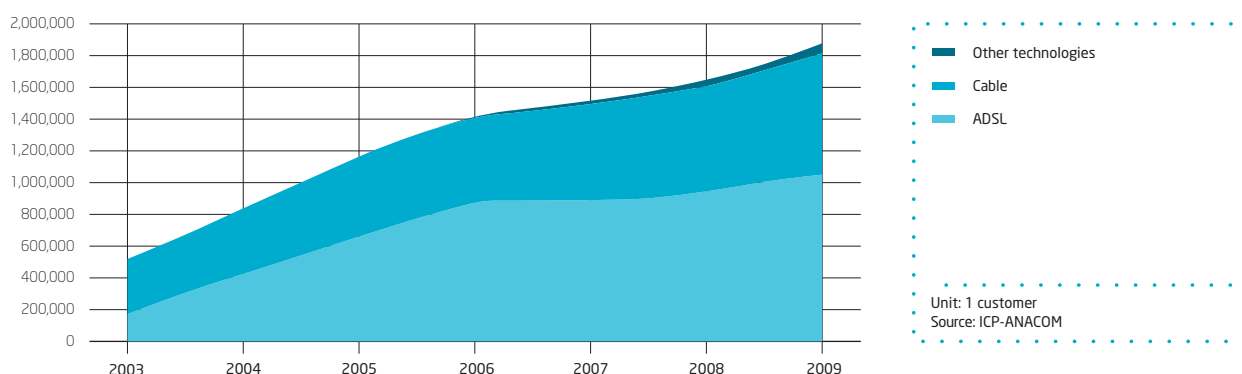
	2008	2009	Var. (%) 2008/2009	Var. (%) Annual average 2005/2009	Var. (%) Accumulated 2005/2009
Total fixed Internet customers	1,676,402	1,898,008	13.2 %	7.2 %	32.1 %
Dial-up access	40,975	32,883	-19.7 %	-41.0 %	-87.9 %
Fixed broadband access	1,635,427	1,865,125	14.0 %	12.5 %	60.0 %
Mobile broadband users	2,378,800	3 792 501	59.4 %		

Unit: 1 customer, %
Source: ICP-ANACOM

The trend of migration from narrowband to broadband continued. The number of fixed broadband customers grew 14 % in 2009, while the number of dial-up access customers decreased by 20 %. The ratio of broadband customers versus the overall number of customers reached 98.3 %, 0.7 % points more than in 2008.

In 2009, there were 230 thousand new fixed broadband customers, 107 thousand more than the year before, a higher growth rate than the average during the period 2005/2009.

Evolution in the number of fixed broadband access customers | Graph 136



While ADSL continues to be the main access technology, a position which it has maintained since the end of 2004, its relative weight saw a slight decrease in 2009. ADSL's

predominance is explained by the broader geographic availability of this type of access, and by the development of offers based on local loop unbundling.

Number of customers per fixed broadband access mode | Table 134

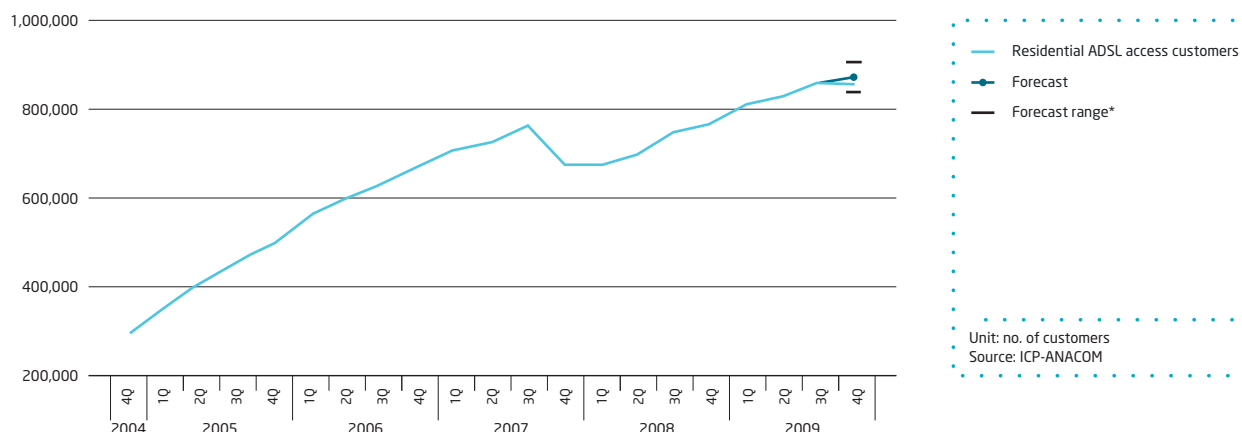
	2008	2009	Var. (%) 2008/2009	Annual average var. (%) 2005/2009	Accumulated var. (%) 2005/2009
Total fixed broadband customers	1,635,427	1,865,125	14.0 %	12.5 %	60.0 %
ADSL access	947,165	1,059,817	11.9 %	12.0 %	57.5 %
% of total fixed broadband	58 %	57 %			
Cable modem access	662,724	750,300	13.2 %	11.2 %	53.2 %
% of total fixed broadband	41 %	40 %			
Other Access Technologies	25,538	55,008	115.4 %	111.5 %	>100 %
% of total fixed broadband	2 %	3 %			

Unit: 1 customer; %
Source: ICP-ANACOM

In 2009, the number of ADSL customers grew by 11.9 %. The evolution seen in the number of residential ADSL customers in 2009 is compatible with the historic trend -

an uptrend can be seen with a slight softening (negative quadratic trend) -, with the number of customers reported in 4Q09 within the estimated forecast range.

Evolution in the number of residential ADSL access customers | Graph 137

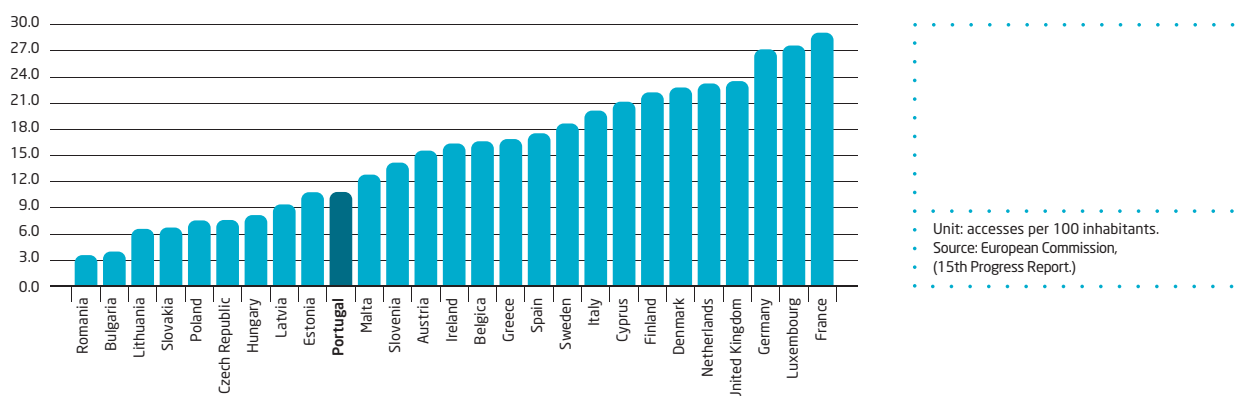


Notes: * Forecast range with % significance level

A linear regression model was used estimated with the following significant independent variables at a 95 % confidence level: quadratic trend (t and t2) and seasonal dummies for change in structure as of 4th quarter 2007. Model adjusted R2 at 0.994. Estimate made with observations from 4th quarter 2004, with linear regression model with improved adjustment and comparison with other conducted trials.

In spite of the predominance and growth recorded, DSL penetration in Portugal remains one of the lowest within the EU27.

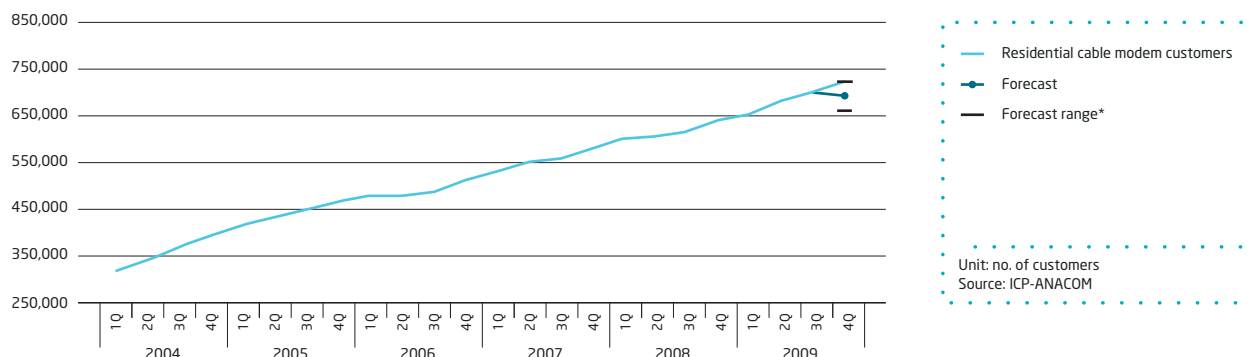
DSL broadband accesses per 100 inhabitants in the EU27 - 4Q09 | Graph 138



Internet access using cable modem grew 13.2 % in 2009, a growth rate above DSL's. The number of residential cable modem customers in fourth quarter 2009 was slightly above the historic trend. This higher than expected level of

growth may result from competition between PTC and ZON after the spin-off, leading to a reversal in the trend reported in cable modem customers.

Evolution in the number of residential cable modem access customers | Graph 139



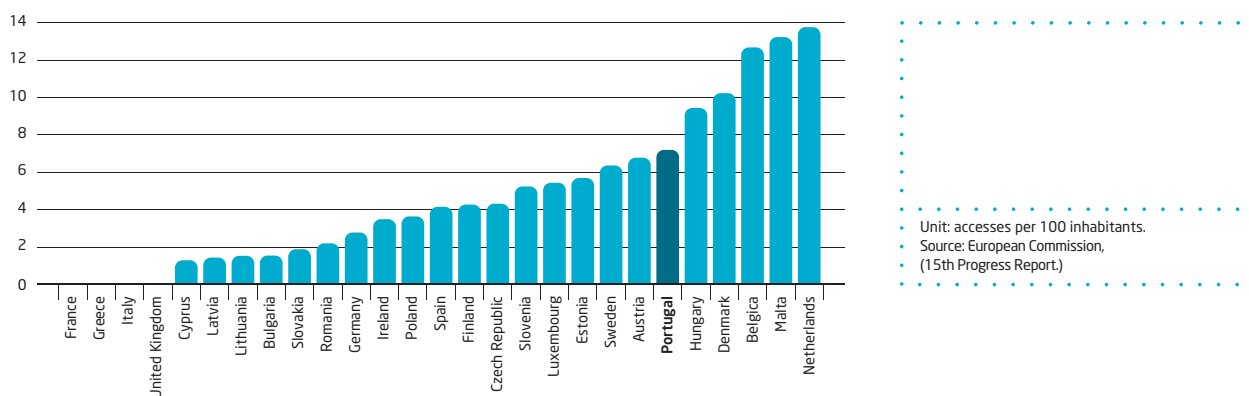
Notes: * Forecast range with 95 % significance level

A linear regression model was used estimated with the following significant independent variables at a 95 % confidence level: quadratic trend (t and t2). Model adjusted R2 at 0.996.

Estimate made with observations from 1st quarter 2000, with linear regression model with improved adjustment and comparison with other conducted trials.

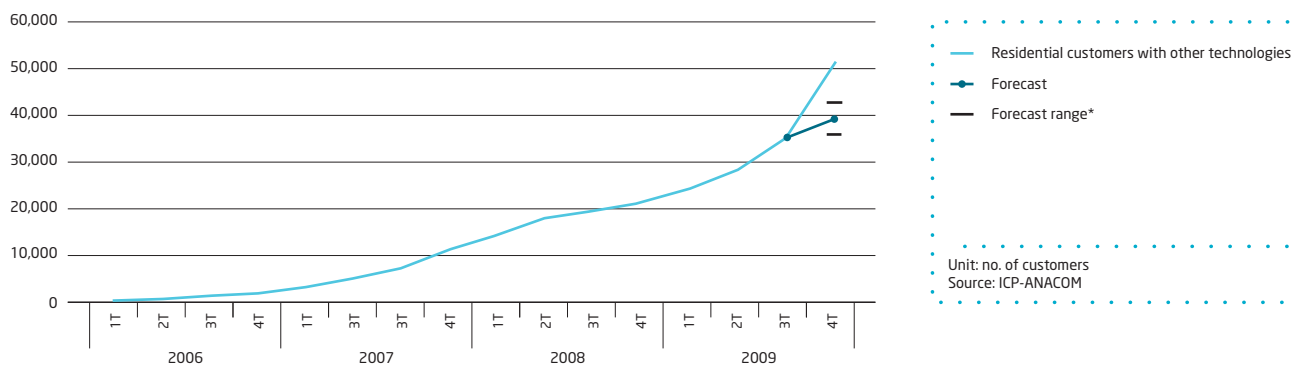
Cable modem access penetration is relatively high in Portugal, about 4.3 % above the EU27 average. Portugal ranks 6th in this ranking.

Cable modem accesses per 100 inhabitants in EU27 - 4Q09 | Graph 140



In spite of its small weight within the overall number of fixed broadband customers (3 % of all broadband customers), other access technologies grew about 115 % over the previous year. This growth is mainly explained by the evolution of the offer of Internet access using optical fibre. The growth seen far exceeded the forecast. It is noted that in the last quarter of 2009, the net addition of optical fibre customers approached the figures reported for new ADSL or cable modem customers.

This trend reflects the life cycle of the offers supported using this technology, which, despite being launched in 2008, have been given new impetus with the appearance, in second quarter 2009, of offers from the incumbent operator *Meo Fibra*.

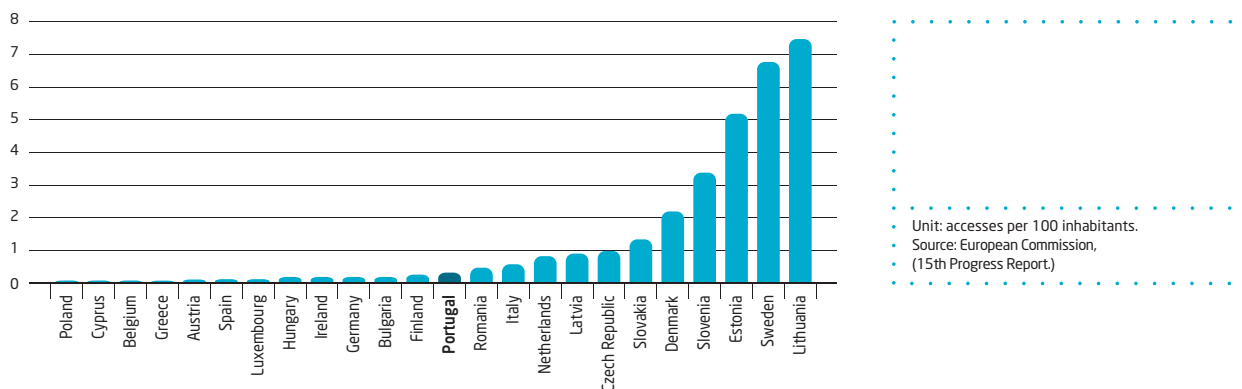
Evolution in the number of residential customers with other types of access | Graph 141

Notes: * Forecast range with 95 % significance level.

A linear regression model was used estimated with the following significant independent variables at a 95 % confidence level: quadratic trend (t2).

At the end of 2009, there were around 30 thousand customers with Internet access using optical fibre, double

the number reported in the previous quarter. Around 95 % of these customers are residential.

FTTH accesses per 100 inhabitants in EU27 - 4Q09 | Graph 142

Note: Data unavailable for France and United Kingdom.

Optical fibre penetration in Portugal is reported at 0.3 per 100 inhabitants, slightly less than the European average (0.4 %).

As can be seen in the above graph, besides the countries of Eastern Europe, optical fibre remains undeveloped in the majority of EU27 countries.

Mobile broadband users

The number of mobile broadband users grew exponentially during 2009.

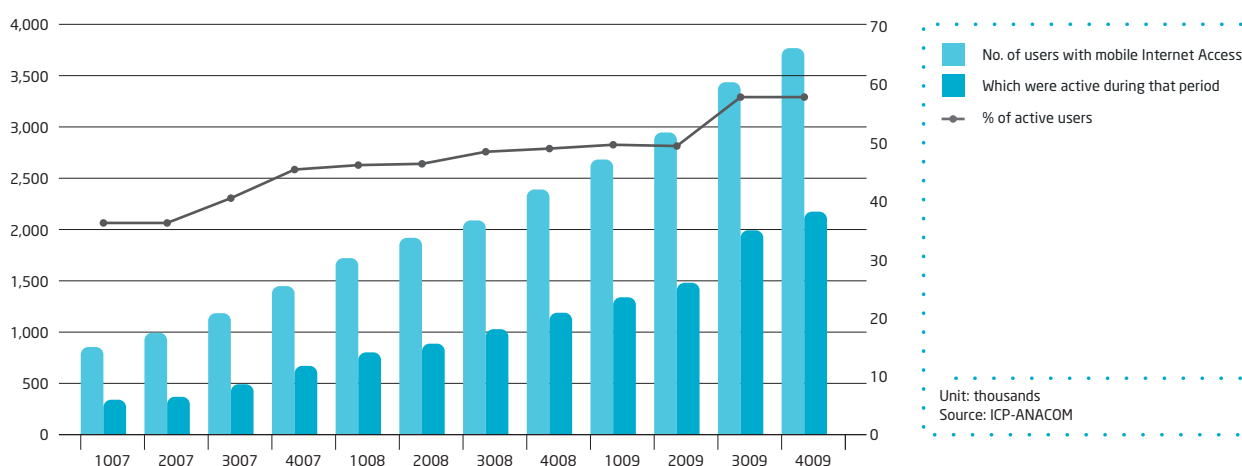
Evolution in the number of mobile broadband users | Table 135

	2008	2009	Var. (%) 2008/2009
No. of users with mobile broadband Internet access	2,378,800	3,792,501	59.4 %
of which were active during reported period	1,160,767	2,169,894	86.9 %
% of total	49 %	57 %	

Unit: 1 user; %
Source: ICP-ANACOM

Between the end of 2008 and the end of 2009, the number of users increased 59 % and the number of active users increased 87 %.

Evolution in the number of mobile broadband users | Graph 143



The evolution in the number of users of this service was not only influenced by the operators' commercial policies, which provided flat-rate offers since the beginning and actively promoted this service, but also by Government policies promoting the information society, providing, in conjunction with the operator's low-priced computers and mobile broadband Internet access to students, teachers and trainees.

The high rate of growth reported in the number of active users is due, above all, to the launch of new offers, in particular with daily tariffs. One of daily products available on the market, started in third quarter 2009, has the particularity of not requiring previous subscription, whereby the customer, not having another Internet tariff, is automatically subscribed

to the daily tariff. This offer sets out to allow use of the Internet service on mobile telephones (previously tariffs were based on the volume of traffic).

Likewise, the intensity of the service's use increased over the course of the year. In third quarter 2009 new products appeared associated with Smartphones, in particular the iPhone 3G and BlackBerry Curve. In the last six months of the year, new services were presented, such as access to and management of accounts on Facebook, or content aggregators.

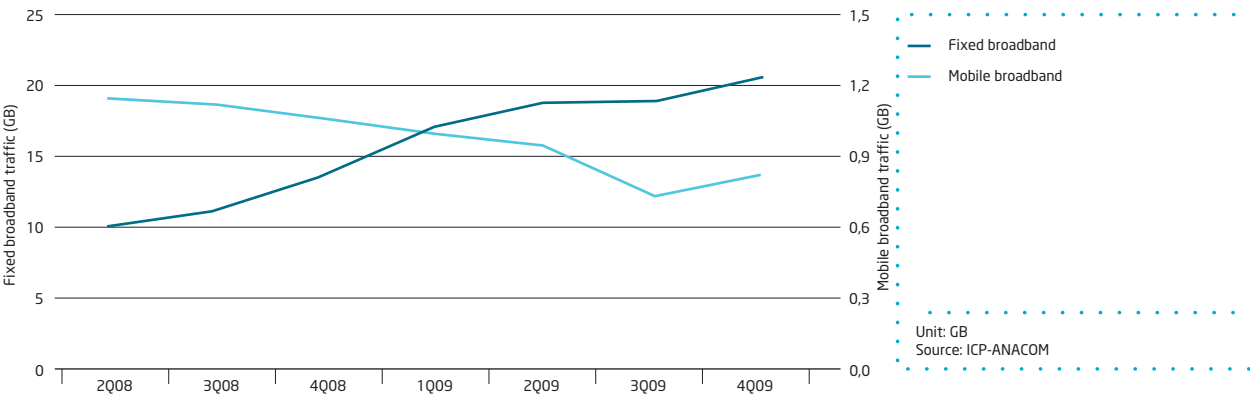
At the end of 2007, around 57 % of potential users actually made use of the service.

Traffic

Traffic originated by fixed broadband customers during the final quarter of 2009 totalled 116 million GB. Average traffic

per customer was reported at 20.4 GB per month, increasing 51 % over the same quarter of 2008.

Average monthly traffic per broadband Internet customer (fixed and mobile), in GB | Graph 144



In terms of mobile broadband, traffic per Internet session increased by around 17.5 % - possibly due to the launch of offers without traffic limits - while monthly traffic per active user fell in 2009 by around 23 %. This fall results,

in the most part, from the large increase in the number of active users.

Evolution in traffic per sessions and per user | Table 136

	2008	2009	Var. (%) 2008/2009
MB per session	31	36	17.5 %
MB per active user (monthly)	1,083	835	-22.9 %

Unit: MB, %
Source: ICP-ANACOM

The traffic generated by the active customers of mobile broadband, on average (0.8 GB per customer per month), is significantly less than average fixed broadband traffic.

In terms of its evolution, average traffic per active user reported a strong growth trend up to the first quarter of 2008, reaching around 1.3 GB, stabilised in the second and third quarters of 2008, and began a progressive decline into the end of the year.

The increase seen in the number of active mobile broadband users and the Internet access offers have led to an

alteration in usage patterns, perhaps due to the increase in heterogeneity among users and to the limits on traffic and usage duration of the new tariffs.

The difference between the traffic generated by fixed and mobile broadband customers results from the traffic limits of mobile broadband, far lower than those of fixed broadband, the pricing practised with respect to each technology and the different profiles of the users and of usage associated with these two types of broadband Internet access.

Service revenue

In the case of services included in multiple play offers it is not always possible to separate the revenues derived from each of the services included in the bundle, and as such the option was taken to separate those that could be associated with the Internet access service only and those that result from the provision of the services in which Internet access is only one of the components.

In 2009, separable revenues from the Internet access service (fixed) totalled around 426.5 million euros. These revenues are derived from stand-alone offers or from multiple-play offers where the Internet component is separable.

Revenues from mobile Internet grew by around 32.6 % compared to 2008.

Separable revenues from Internet Access Service (accumulated since beginning of year) | Table 137

	2008	2009	Var. (%) 2008/2009
Revenue from fixed Internet access (separated)	460,679	426,509	-7.4 %
Revenue from mobile Internet access	262,801	348,484	32.6 %

Unit: thousands of euros
Source: ICP-ANACOM

Note: These values do not refer only to the separable Internet offers but also to those Internet offers included in bundles of services where revenues are separable.

Revenues from bundles which include the fixed Internet where revenues from the service cannot be separated are presented in the following table.

Non-separable revenues from bundles of services with fixed Internet¹⁰⁷ (accumulated since beginning of year) | Table 138

	2008	2009	Var. (%) 2008/2009
2 Play			
Internet+TV	155	8,046	>100 %
Internet+Fixed telephone	7,122	19,977	>100 %
3 Play			
Internet+TV+Fixed telephone	62,387	111,122	78.1 %
TOTAL	69,663	139,145	99.8 %

Unit: thousands of euros, %
Source: ICP-ANACOM

Note: These values do not refer to all revenues of the bundles mentioned in the table, but only those which are non-separable by service.

Non-separable revenues from bundles of services which include the fixed Internet Access Service reached 139 million euros.

¹⁰⁷ Non-separable revenues from bundles of services which include the Fixed Internet Access Service.

4.3.5. Evaluation by consumers

According to the results of the *Inquérito ao Consumo dos Serviços de Comunicações Electrónicas* (Electronic Communications Services Consumer Survey)¹⁰³, and in line

with previous years, consumer perception of the quality of the broadband services is generally positive. Nevertheless, 25 % of those interviewed gave an evaluation of less than 7 (on a scale of 1, "very dissatisfied" to 10, "very satisfied").

Level of satisfaction with the fixed Internet service provided | Table 139

Level of satisfaction with ...	Internet Access Service provided by operator	Speed of service
Negative (1 to 4)	5.3 #	5.9 *
Low positive (5 and 6)	20.7 *	18.9 *
Medium positive (7 and 8)	52.4	57.0
Highly positive (9 and 10)	21.6 *	18.2 *
Total	100	100

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo de Comunicações Electrónicas* (Electronic Communications Consumer Survey) 2009

Base: Households with fixed Internet access (not including non-responses).

Note 1: Original scale: 1: very dissatisfied; ...; 10: very satisfied

Note 2: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#) Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*) Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

Analysing, in particular, satisfaction with speed of access, it is reported that around 75 % of those surveyed give this aspect of the service a clearly positive evaluation.

In terms of satisfaction with the mobile Internet Access Services, data from the same survey reveals that 70 % of those surveyed are satisfied (with a level of satisfaction

equal to or exceeding 7). In terms of speed of transmission, the corresponding satisfaction level is slightly lower (around 60 %). When compared to the fixed broadband service, the mobile service does not receive such a positive evaluation.

Level of satisfaction with the mobile Internet service provided | Table 140

Level of satisfaction with ...	Internet Access Service provided by operator	Speed of service
Negative (1 to 4)	5.3 #	9.7 #
Low positive (5 and 6)	24.5 *	30.1 *
Medium positive (7 and 8)	53.6	48.3 *
Highly positive (9 and 10)	16.6 *	12.0 #
Total	100	100

Unit: %

Source: ICP-ANACOM, *Inquérito ao Consumo de Comunicações Electrónicas* (Electronic Communications Consumer Survey) 2009

Base: Individuals 15 years and older with mobile Internet access (not including non-responses).

Note 1: Original scale: 1: very dissatisfied; ...; 10: very satisfied

Note 2: The coefficient of variation is considered as sampling error indicator, based on the variance of the "proportion" estimator of a simple random sample and assuming a significance level of 95 %. The following key is used:

(#) Coefficient of variation greater than or equal to 25 % (unreliable estimate)

(*) Coefficient of variation greater than or equal to 10 % and less than 25 % (acceptable estimate)

(no symbol) Coefficient of variation less than 10 % (reliable estimate)

In line with the general satisfaction with the service, just 9 % of those surveyed report having made a complaint to their operator in the last year.

4.4. Broadband penetration

At the end of 2009, broadband Internet access penetration rate stood at 17.6 per 100 inhabitants for fixed accesses, and 35.7 per 100 inhabitants for mobile accesses.

Evolution of broadband penetration rates | Table 141

	2008	2009	Var. (pp) 2008/2009	Var. (pp) Annual average 2005/2009	Var. (pp) Accumulated 2005/2009
Broadband customers (fixed)	15.4	17.6	2.2	1.6	1.6
ADSL customers	8.9	10.0	1.1	0.9	0.9
Cable modem customers	6.2	7.1	0.8	0.6	0.6
Other type of access customers	0.2	0.5	0.3	0.1	0.1
Broadband customers (mobile) ¹	22.4	35.7	13.3		

Unit: customers per 100 inhabitants

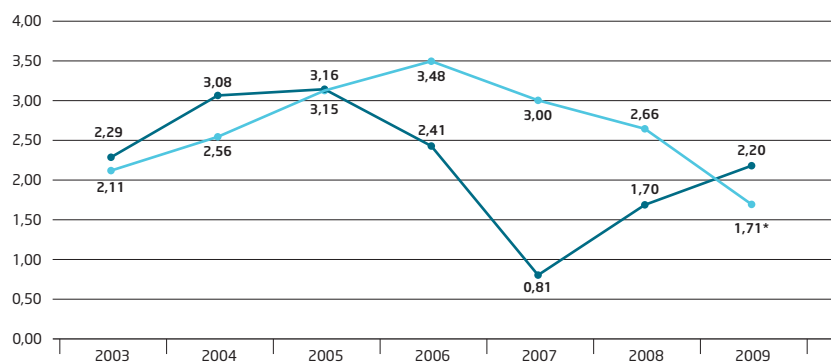
Source: ICP-ANACOM

¹ Mobile operators' customers may access mobile broadband Internet, which they did at least one time since the service was launched, per 100 inhabitants.

In the specific case of fixed accesses, broadband penetration is about 2.2 % above the figure recorded at the end of the previous year. The growth recorded in broadband penetration in Portugal exceeded that registered in the countries of the

OECD. The difference between the growth of broadband penetration recorded in the OECD and the broadband growth in Portugal is reported at 0.5 % points.

Variation in the fixed broadband access penetration rate | Graph 145

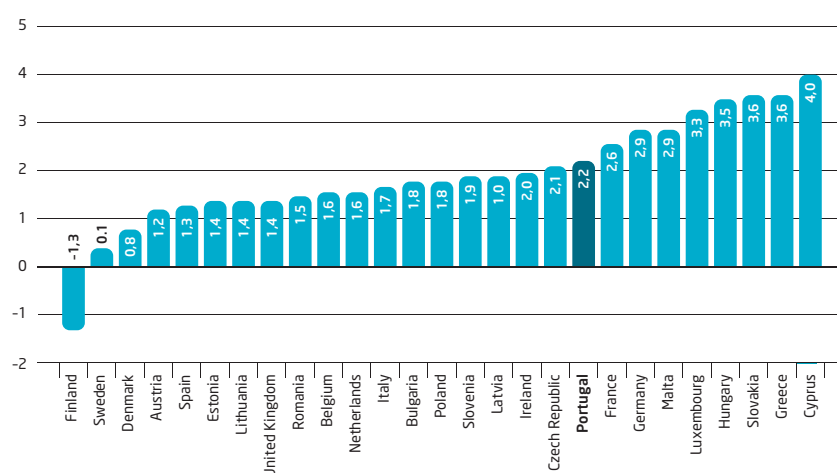


*Variation between June 2008 and June 2009

Unit: p.p.
Source: ICP-ANACOM, OECD.

Compared to 2008, broadband penetration in Portugal grew by around 2.2 % points and is the country with the ninth largest increase in broadband lines per 100 inhabitants.

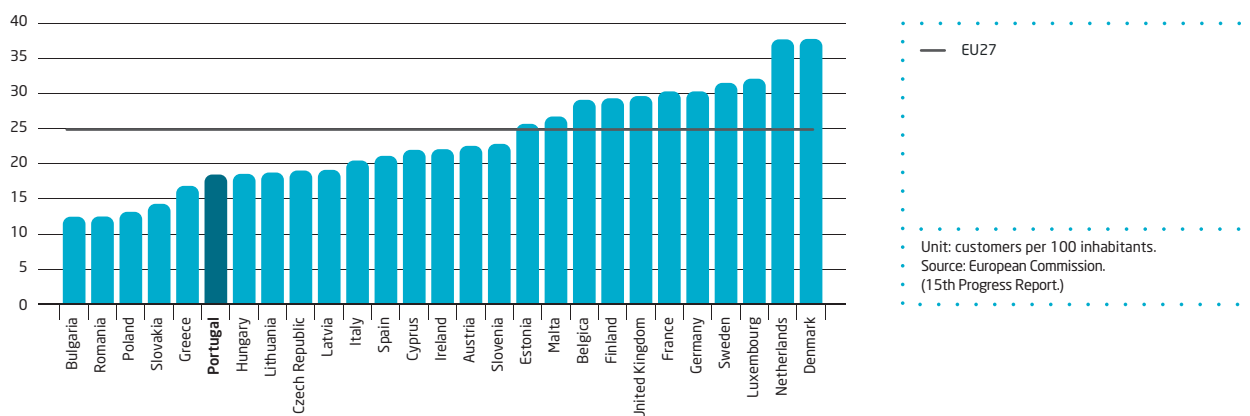
New fixed broadband access per 100 inhabitants between January 2009 and January 2010 | Graph 146



Unit: p.p.
Source: European Commission.
(15th Progress Report.)

Portugal is found in 22nd position in the ranking of fixed broadband penetration in EU27.

Fixed broadband penetration in EU27 - 4Q09 | Graph 147



Portugal's position in these rankings may have been influenced by the following factors:

- Launch of broadband mobile offers: it is possible that fixed broadband consumption has been partly deviated to mobile broadband, which has been marketed as a fixed broadband replacement for some market segments. Additionally, younger population groups, individuals living alone and those with higher social status are more likely to have mobile broadband¹⁰⁸.
- The relatively low personal computer (PC) penetration in households. As previously mentioned, the lack of a PC is a barrier to joining the Internet. The EC, among others¹⁰⁹, also reports that:

"... The correlation between PC rate ... and Internet rate (Y-axis) is almost linear (Pearson equals 0.97). It can thus be said that the lack of PCs is an obstacle to Internet access."¹¹⁰

In Portugal, in the first quarter of 2009, around 56 % of domestic households¹¹¹ had access to a computer, whereas in EU27, PC penetration in the home is 67.9 % t¹¹².

- Below average human capital level. The lack of interest shown by consumers may be connected to the relatively low human capital level. Statistics on the education level and the digital literacy level, in this scope, are quite explanatory. It is even possible to conclude that the higher the education level, the more likely it is to have Internet access¹¹³. Additionally, as previously mentioned, Internet penetration is already high among population groups with higher education levels and among younger population groups.
- Service's price levels. Some consumers indicate the price level as a barrier to joining the service.

This is a well known set of factors in the socio-economic context which can have considerable importance in explaining fixed broadband penetration, as George Ford from the Phoenix Center⁷⁰ seems to demonstrate.

In the case of mobile broadband and according to the EC, Portugal ranks 9th in the EU ranking, 5.3 % points above the European average¹¹⁴.

108 In order to characterize the choice of access provider, a model was estimated with a dependent variable equal to 1 when the chosen operator is a mobile Internet access operator, and equal to 0 when the interviewee is the customer of a fixed Internet access provider. It used the replies given during the electronic communications consumer survey. The theoretical model used for the estimate was the simple logit.

109 See The Broadband Performance Index: A Policy-Relevant Method of Comparing Broadband Adoption Among Countries, Phoenix Center for Advanced Legal and Economic Public Policy Studies, July 2007.

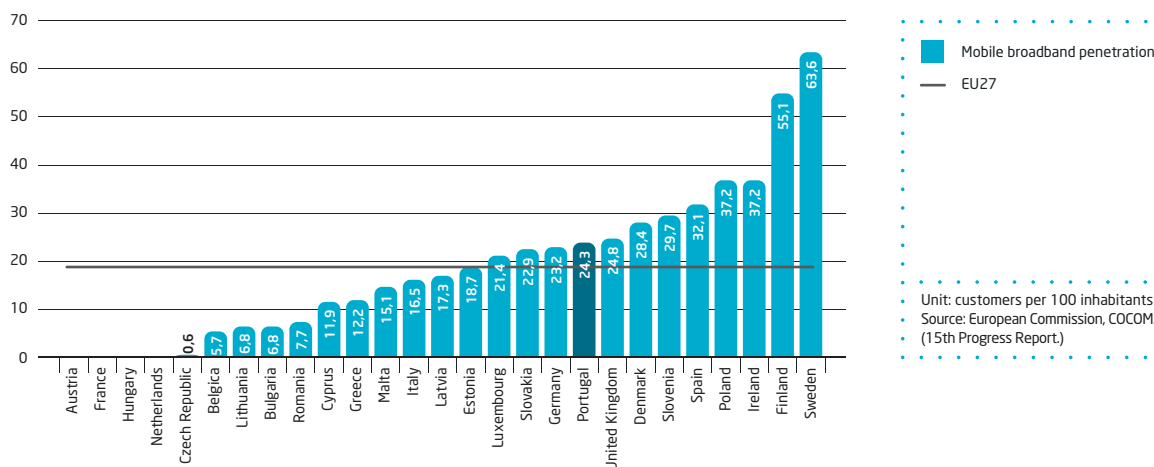
110 European Commission, E-Communications Household Survey, April 2007.

111 *Inquérito à Utilização de Tecnologias da Informação e da Comunicação pelas Famílias* (Survey on the use of information and communications technologies by families) 2009

112 OECD, ICT database and Eurostat, Community Survey on ICT usage in enterprises, May 2009

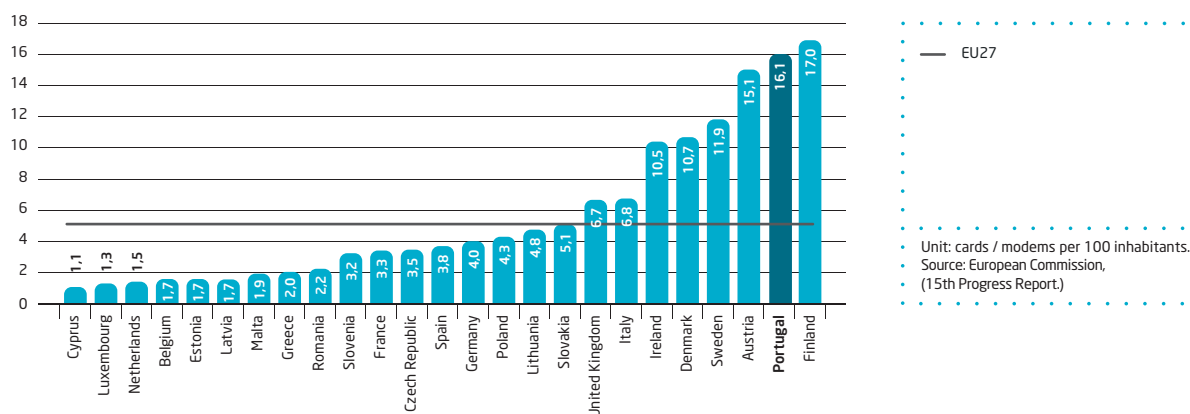
113 In order to characterize the Internet, three models were estimated based on the data collected during the 2007 electronic communications consumer survey. The theoretical model used for the estimate was the simple logit. Several independent variables were introduced in the models concerning the interviewee's sex, age, education level, social status, the presence of individuals aged between 7 and 24 years old in the household, and the NUTS II region where the interviewee lives. This data is included in the current model via binary variables, with value 1 in the positive cases, and values 0 for the opposite.

114 The base information used by the EC differs from that published by ICP-ANACOM. The information of COCOM refers to the number of mobile access customers who were active in the period.

Mobile broadband penetration in EU27 - December 2009 | Graph 148

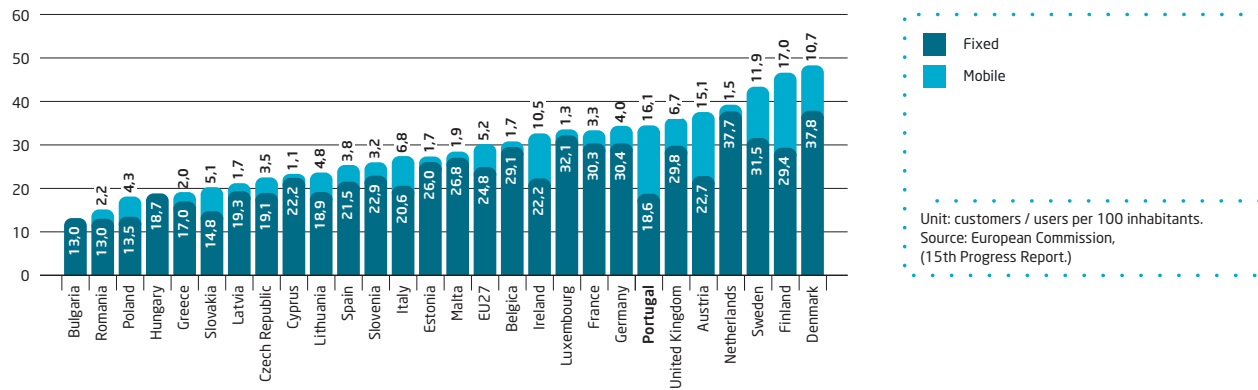
At the end of 2009, around 66 % of these mobile accesses in Portugal corresponded to PCMCIA cards or USB modems used to access the Internet with desktop and laptop computers. The number of users with this type of equipment increased by around 83 % in the last year. At the end of 2009, the

EC compiled information on this specific indicator, allowing a comparison of the penetration of the mobile broadband format which is most similar to fixed broadband in the countries of the EU27. In this ranking, Portugal is listed in 2nd place.

Penetration of mobile broadband access using PCMCIA cards or USB modems, in EU27 - December 2009 | Graph 149

Overall, broadband penetration (fixed and mobile) in Portugal is 34.7 per 100 inhabitants, putting Portugal in 7th place in the EU rankings, 4.7 % above the EU27 average.

Broadband penetration in EU27 - December 2009 | Graph 150



The positions reported for Portugal in these rankings have already been addressed above, and have in the most part

been achieved as a result of the Government's e-initiatives, launched in partnership with the mobile operators.