

## II.5 Internet Access Service

This chapter contains the state of the Internet Access Service at the end of 2005, as well as its recent evolution.

### II.5.1 Main items of the evolution in 2005

- The year 2005 was characterized by an important growth in the number of clients of the Internet Access Service. Indeed, at the end of last year there were about 1.48 million customers of this service, a growth of over 19 per cent vis-à-vis the same period of the previous year.
- About 35 per cent of the Portuguese households have Internet connection, 5 per cent more than at the end of 2004. Broadband became the preferred means for Internet access, being in 26 per cent of households, 8.7 per cent than in the previous year.
- 2005 registered the emergence of new broadband offers and the upgrade of already existing offers to throughput capacities equal or above 2 Mbps. By the end of the year these offers already stood for 60 per cent of all installed accesses.
- During the last year, one in each three new accesses was installed by alternative operators (one in each two accesses in the 4th quarter of 2005). The growth in the new operators' marginal share results, namely, from the improvement of the conditions of LLU, which fostered the emergence of very competitive offers, and from the considerable growth of the offers of access through cable modem alternative to Grupo PT. This led to important benefits to consumers, namely, price reduction, increase in the number of packages with several services and generalized offers with higher throughput.
- Last year saw the launch of new offers of Internet access services based on third generation mobile technologies by the three MTS providers.

- Also standing out is the launch of new residential offers based on fixed Internet technologies alternative to ADSL and cable, namely packages using Powerline and FWA technologies.

## **II.5.2 Internet Access Service's offer**

The Internet Access Service can be provided using several technologies. On the other hand, the service is provided with several transmission capacities that translate into the provision of narrow band or broadband services.

According to the legal framework in force, the service is provided by the entities with a general authorization.

The following sections describe in more detail the services provided, the evolution during the year 2005 and the entities providing these services in Portugal.

### **II.5.2.1 Internet Access Service**

This service is essentially provided using the access modes of dial up, dedicated access<sup>63</sup>, ADSL access, cable modem access and access using the 3rd mobile generation.

Following is a brief description of the main Internet access modes:

- Access using dial-up connection – The packages for this means of access have, for technological reasons, a maximum throughput of 64 kbps (narrow band). This throughput is also affected by the need to convert data between the digital and analogue formats. The connections of the switched type (dial-up) are accessible to any subscriber with a fixed telephone line and a modem, which only need to become a client of one (or several) ISP. The PSTN access

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<sup>63</sup> Dedicated connection – connection between a user and an ISP with a communication channel that is only used for the Internet connection; the channel is always open, whether the user is online or not.

provides higher throughputs, as well as the integration of voice and data services into a sole access. PSTN accesses can be basic<sup>64</sup> or primary<sup>65</sup>.

- Access using DSL (Digital Subscriber Lines or xDSL) Technologies – These technologies use sophisticated modulation systems to increase the capacity of data transmission over the copper wire, using frequency bands not used by the voice signal. They may reach average figures considerably above dial-up connections over the analogue telephone line and the dial-up connection over PSTN. The fact that voice and data are carried in different frequencies gives these technologies the advantage of supporting two types of communication simultaneously, with the Internet connection in the “always on” mode. This technology is provided in pre-defined areas where it is possible to have a connection with the minimum physical characteristics needed.

There are several xDSL variants, of which the most used is the ADSL (Asymmetric DSL)<sup>66</sup>. In terms of data throughput capacity, the ADSL offers available in Portugal vary between 256 kbps and 16 Mb. Besides ADSL there are other modes such as the SDSL (Symmetric DSL)<sup>67</sup>, HDSL (High-data-rate DSL) and VDSL (Very-high-speed DSL).

- Access using coaxial cable – The coaxial cable is the main type of cable used by the cable television industry. It is more expensive than the traditional telephone wire but its features give it a much greater data transportation capacity (greater bandwidth) and less susceptibility to electric and radio interference. The Internet access mode via cable television distribution networks, using a cable modem and an expansion card for the computer, means high access velocities, when compared to those provided using a paired copper wire in dial-up. The maximum speeds of the connections are similar to those of an ADSL access, both downstream and upstream. For the

<sup>64</sup> Basic access (Basic Rate Access 2B+D) – Access of customers to the PSTN, using a copper pair and providing two 64kbps channels (channels B1 and B2) for voice and data transfers, and a 16kbps D channel for signalling, package data transfer and telemetry. The global throughput is 192kbps.

<sup>65</sup> Primary access - 30B+D access to the PSTN, with a global throughput of 2Mbps. Both the 30 B voice/data channels and the D signalling channel carry 64kbps.

<sup>66</sup> Digital technology turning analogue or PSTN telephone lines into lines with greater capacity, making it possible to access the Internet at much higher speeds. Data transmission is done asymmetrically, *i.e.*, the velocity of information reception (downstream) is higher than the sending velocity (upstream), which currently is of 1 Mbps, the bandwidth being managed in an intelligent way. It makes it possible to simultaneously use the Internet and the traditional telephone line (for voice and fax service). An ADSL line provides three information channels: a high debit (1.5 to 8Mbps) downstream channel, a medium high debit duplex upstream channel (16 to 640kbps) and a channel for the telephone service.

<sup>67</sup> Digital technology in which data transmission is done in a symmetrical way.

Internet service to be provided over a network of this kind, it has to support bi-directionality, i.e., it has to have the capacity of receiving and sending data.

- Access using the third mobile generation – The third generation of mobile services was conceived to deploy the convergences between the fixed and the mobile and between the electronic communications and the multimedia, bringing mobile networks closer to the capacity of the fixed networks and giving mobile users the chance to access multimedia services at up to 2 Mbps. Among the third generation mobile telecommunications systems, highlight goes to the UMTS (Universal Mobile Telecommunications System), in the GHz band, identified as the European standard of the global standard family of the international mobile telecommunications systems (IMT2000). UMTS is a technology that uses the WCDMA<sup>68</sup> (Wideband Code Division Multiple Access) transmission mode, which is based on multiple access by code division.
- Other means of access<sup>69</sup> – Other technologies that may be used for Internet access are also noteworthy, namely: access using dedicated connections, access using optical fibre, access using FWA and CDMA radio connections, access using power lines (PLC), access using local radio networks and access using satellite connections.

### **II.5.2.2 New commercial offers launched in 2005**

The year 2005 was characterized by the increased interest of providers regarding offers based on the local loop unbundling.

ICP-ANACOM's interventions at the level of the LLU created conditions for greater competition in the broadband market. Using this means, the new operators directly reached the customers' households and developed more competitive voice and broadband offers.

The operators' increased interest can be assessed by the evolution of the amount of unbundled loops, which was, at the end of 2005, about eight times more than that at

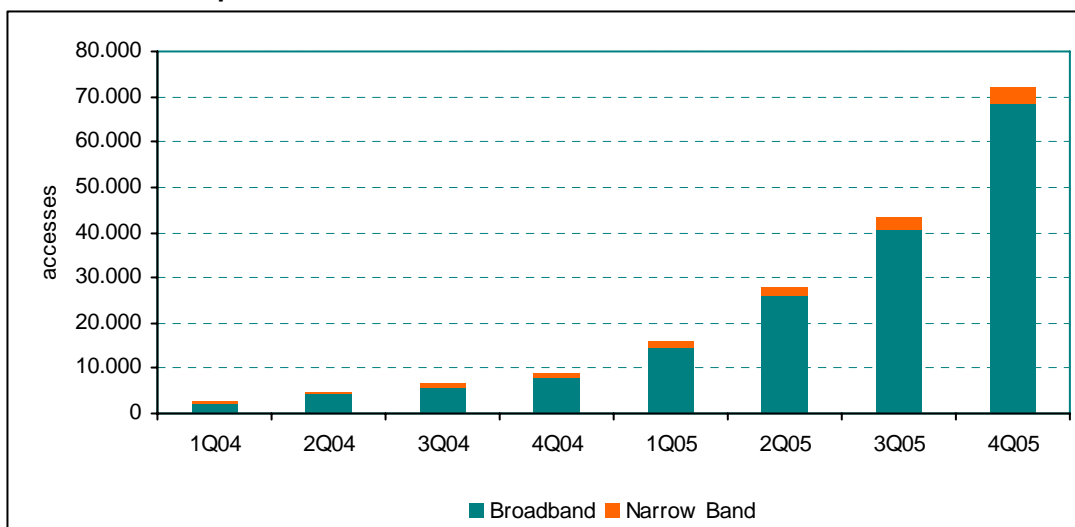
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<sup>68</sup> Broadband access system which access discipline to the several users is characterized by the sharing of the same frequency band by using different codes for each one of them.

<sup>69</sup> The 2002 regulation report includes a brief description of the characteristics of the Internet access technologies.

the end of 2004. In December 2004, there were 72,000 unbundled access (of which about 69,000 were broadband), a quarterly growth average of about 70 per cent (next graph).

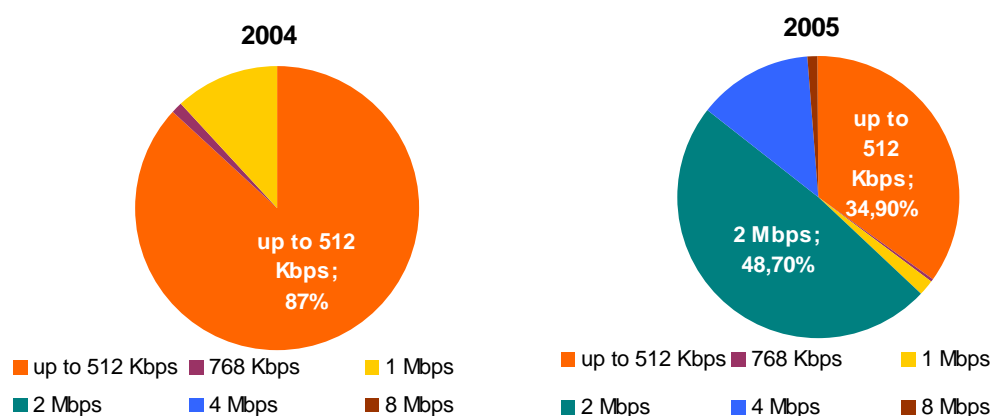
**Graph 74 – Evolution of the number of unbundled accesses**



Source: ICP-ANACOM

At the same time, the increased coverage of the *Rede ADSL PT* wholesale offer (bitstream access) contributed, with other factors, to a strong increase of broadband penetration and to the launch of new offers with higher throughputs, as shown on the following graph.

**Graph 75 – Evolution of the accesses of the ADSL network by throughput capacity**



Source: ICP-ANACOM

In 2005, highlight also goes to the launch of new residential offers based on fixed Internet technologies alternative to ADSL and cable, namely Onitelecom’s “ONI220” packages, based on Powerline technology, and AR Telecom’s triple-play packages, based on FWA technology.

Lastly, it is important to mention the launch of new offers of Internet access services based on third generation mobile technologies by the three MTS providers.

These mobile operators provided or remade the following offers:

- Optimus's "Kanguru";
- TMN's "GIGA";
- "Vodafone Mobile Connect Card".

which generically include a 3G card (with TMN and Vodafone these cards can also be GPRS) for connection to a portable computer, giving mobile access to broadband Internet (these offers are described in more detail in the sections dedicated to the MTS).

### II.5.2.3 Internet Access Service providers

At the end of 2005 there were in Portugal 42 entities registered and authorized to provide Internet Access service (table 74). These entities are also designated ISP - Internet Service Providers.

Among the 42 legally authorized ISPs, 32 were active, two more than at the end of the previous year. Regarding the ten remaining providers, nine still hadn't begun their operations and one ended or suspended the provision of the service.

**Table 61 – Number of providers of the Internet Access Service**

	2000	2001	2002	2003	2004	2005
Number of Registered Providers	41	51	57	52	38	42
Number of Active Providers	29	30	32	26	30	32

Source: ICP-ANACOM

The following table shows the evolution of the entities authorized for the provision of this service, with highlight to the entries on and exists into/from the market during that same year.

**Table 62 – Internet Access Service Providers in 2005**

Designation	2004	Entries	Exits	2005
Adianis – Telecomunicações & Multimedia, S.A.	-	X		NA

AR Telecom - Acessos e Redes de Telecomunicações, S.A. <sup>70</sup>	A			A
AT & T – Serviços de Telecomunicações, Soc. Unip., Lda.	NA			NA
Bragatel — Comp. Televisão por Cabo de Braga, S.A.	A			A
Broadnet Portugal, S.A. <sup>71</sup>	-	X		A
BT Portugal — Telecomunicações, Unipessoal, Lda.	NA			NA
Cable & Wireless Global Limited	NA		X	-
Cabo TV Madeirense, S.A.	A			A
Cabovisão — Sociedade de Televisão por Cabo, S.A.	A			A
CATVP — TV Cabo Portugal, S.A.	A			A
Clixgest — Internet e Conteúdos, S.A. <sup>72</sup>	A			A
Colt Telecom – Serviços de Telecomunicações, Unipessoal, Lda.	A			A
Eastécnica V — Comunicações Globais, S.A.	A		X	-
Equant Portugal, S.A.	A			A
Fleximedia — Serviços e Meios Inf. e Comunicação, Lda.	A			A
GC Pan European Crossing España, S.A.	-	X		NA
Hari-técnica Comércio e Indústria de Artigos Eléctricos e Electrónicos, Lda.	NA			A
KPNQwest Portugal — Telecomunicações, Lda.	A			A
Media Capital — Telecomunicações, S.A. <sup>73</sup>	A			A
Netacesso — Serviços Internet e Multimédia, Lda.	NA			NA
Netvoice — Comunicações e Sistemas, S.A.	A			A
NFSI – Soluções Internet, Lda.	A			A
Nortenet — Sistemas de Comunicação, Lda.	A			A
Novis Telecom, S.A. <sup>74</sup>	A			A
Onitelecom — Infocomunicações, S.A.	A			A
Pluricanal Leiria – Televisão por Cabo, S.A.	A			A
Pluricanal Santarém – Televisão por Cabo, S.A.	A			A
PT Acessos de Internet WI-FI, S.A.	A			A
PT Prime — Soluções Empresariais de Telecomunicações e Sistemas, S.A.	A			A
PT.Com – Comunicações Interactivas, S.A.	A			A
Radianz Portugal, Soc. Unipessoal, Lda. (*)	NA			NA
Radiomóvel – Telecomunicações, S.A.	-	X		A
Refer Telecom – Serviços de Telecomunicações, S.A.	A			A
Robot — Telecomunicações, Projectos e Serviços, Lda.	A			A
Swisscom EPWLAN – Serviços de Internet, S.A.	A			A
Telecorreio — Serv. Avançados de Telecomunicações, Lda.	NA			NA

<sup>70</sup> In September 2005, Jazztel Portugal – Serviços de Telecomunicações, S.A. changed its name to AR Telecom – Acessos e Redes de Telecomunicações, S.A..

<sup>71</sup> After the beginning of 2005, Broadnet Portugal, S.A started to provide the Data Transmission Service/Internet Access Service previously provided by EASTÉCNICA V - Comunicações Globais, S.A. (Broadnet Portugal, S.A holds 100% of Eastécnica V).

<sup>72</sup> Following Sonaecom capital increase through the issuing of shares held by France Telecom, after October 2005 the France Telecom Group ended its direct participation in the capital of Clixgest — Internet e Conteúdos, S.A. (were it had a 43 per cent stake) with Grupo Sonae having increased its share in the capital of that company in the same proportion.

<sup>73</sup> Media Capital, SGPS is an indirect shareholder of Media Capital – Telecomunicações, S.A. (which capital is totally held by the sub-holding Meglo – Media Global, SGPS, S.A.). In November 2005, the Spanish group Prisa acquired 33 per cent of the capital of Grupo Media Capital, SGPS, S.A., becoming its major shareholder.

<sup>74</sup> Following Sonaecom's capital increase through the issuing of shares held by France Telecom, after October 2005 the France Telecom Group stopped participating directly in the capital of Novis (where it had a 43 per cent share) with Grupo Sonae having increased its share in the capital of that company in the same proportion.



TeleMilénio, Telecomunicações, Sociedade Unipessoal, Lda. (Tele2)	A			A
TVTel Grande Porto — Comunicações S.A.	A			A
Uunet — Portugal, Sociedade Unipessoal, Lda.	A			A
Via Net.Works Portugal – Tecnologias de Informação, S.A.	A			A
Vipvoz – Serviços de Telecomunicações Digitais, Lda.	-		X	NA
Vodafone Portugal — Comunicações Pessoais, S.A.	A			A
Worldbroker Telecomunicações – Sociedade de Telecomunicações e Multimédia, Lda.	-	X		NA
WTS — Redes e Serviços de Telecomunicações, S.A.	NA			NA
Total activas	30	1	1	32
Total não activas	8	4	1	10
Total geral	38	5	2	42

Source: ICP-ANACOM

A — Active NA — Not Active X – Entry or Exit

(\*) Entity authorized for the provision of the Internet access service with only data transmission service operation activities

The following table lists the operators of cable distribution networks that were offering broadband Internet services using cable modem access at the end of 2005.

**Table 63 – Cable distribution network operators providing Internet Access Service**

Bragatel – Companhia de TV por Cabo de Braga, S.A.
Cabo TV Madeirense, S.A.
Cabovisão – Soc. de Televisão por Cabo, S.A.
CATVP – TV Cabo Portugal, S.A.
Pluricanal Leiria – Televisão por Cabo, S.A.
Pluricanal Santarém – Televisão por Cabo, S.A.
TV Tel Grande Porto – Comunicações, S.A.

Source: ICP-ANACOM.

The following table shows the providers offering broadband Internet services using ADSL access.

**Table 64 – Internet Access Service Providers with ADSL access offer**

CATVP – TV Cabo Portugal, S.A.
Clixgest – Internet e Conteúdos, S.A.
Jazztel Portugal – Serviços de Telecomunicações, S.A.
KPNQwest Portugal – Telecomunicações, Lda.
Netvoice – Comunicações e Sistemas, S.A.
NFSI – Soluções Internet, Lda.
Nortenet – Sistemas de Comunicação, S.A.
Novis Telecom, S.A.
Onitelecom – Infocomunicações, S.A.
PT Acessos de Internet WI-FI, S.A.
PT Prime – Soluções Empresariais de Telecom. E Sistemas, S.A.
PT.Com – Comunicações Interactivas, S.A.
Robot — Telecomunicações, Projectos e Serviços, Lda.
TVTel Grande Porto — Comunicações S.A.
Via Net.Works Portugal – Tecnologias de Informação, S.A.
Vodafone Portugal – Comunicações Pessoais, S.A.

Source: ICP-ANACOM

Regarding the FWA technology, Table 65 identifies the providers licensed to provide Internet Access Services using this technology in the year 2005.

**Table 65 – Internet Access Service Providers with FWA offer**

Jazztel Portugal – Serviços de Telecomunicações, S.A.
Novis Telecom, S.A.
Onitelecom – Infocomunicações, S.A.
Robot — Telecomunicações, Projectos e Serviços, Lda.
Vodafone Portugal – Comunicações Pessoais, S.A.

Source: ICP-ANACOM

It should be highlighted that, besides the providers of Table 65, providers with licences of a national scope for the International Mobile Telecommunications Systems (IMT2000/UMTS) are also entitled to provide Internet Access Services.

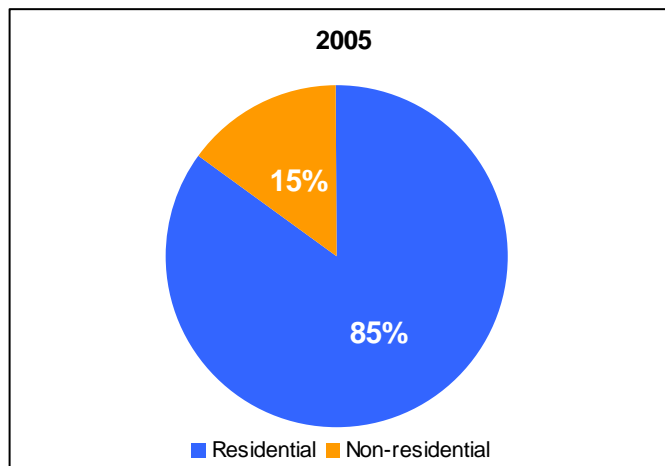
### II.5.3 Internet Access Service's customer and usage profiles

Below are some of the characteristics of the Internet's client and usage.

#### II.5.3.1 Internet Access Service's customer profile

Residential customers are the majority of the Internet Access Service's customers.

**Graph 76 – Customers of the Internet Access Service – Residential customer vs. Non-residential customer**



Source: ICP-ANACOM

According to the Survey on the consumption of broadband Internet in 2005<sup>75</sup>, the residential customer of the Internet access service lives mainly in areas with more population, in households with a greater number of residents and had an above-the-average income.

<sup>75</sup> Survey on the consumption of broadband Internet access in Portugal, 2005. The universe defined for this survey was that of individuals of both genders, aged 18 years or older, residing in Mainland Portugal and in the Autonomous Regions of Madeira and Azores. The sample's size was defined so that the maximum error was not higher than 4 per cent for broadband users and 1.5 per cent for the main results (assuming a significance degree of 95 per cent). The sample was stratified by region and habitat, based on the latest General Population Census: 2001 Census. 4,225 interviews were made, including 1,099 interviews to broadband users. The inquiry method was the telephone interview (CATI). The data collection and codification work was performed by Tns Euroteste between 19 December 2005 and 23 January 2006.

**Table 66 – Profile of households with Internet**

Habitat:	Dec. 2005
Less than 2,000 inhabitants	27.7%
Between 2,000 and 9,999 inhabitants	36.1%
Between 10,000 and 99,999 inhabitants	43.0%
More than 100,000 inhabitants	43.6%
<b>Household Size:</b>	
1 person	9.8%
2 people	19.6%
3 people	46.2%
4 or more people	48.2%
<b>Household Income:</b>	
Up to 349 Euros	0.8%
Between 350 and 749 Euros	12.4%
Between 750 and 1499 Euros	37.2%
Between 1500 euros and 2499 Euros	63.0%
More than 2500 euros	78.1%

Source: ICP-ANACOM/ Survey on the consumption of broadband Internet access in Portugal, 2005

On the other hand, about 74 per cent of students have Internet access from their homes.

Regarding the non-residential segment, data made available by the last Survey on the use of information and communication technology by companies<sup>76</sup>, by INE (National Statistics Institute), show that more than 80 per cent of companies with ten or more workers had Internet access in the first quarter of 2005. Regarding size, only companies with 10 to 49 persons had figures slightly below 80 per cent (78.6 per cent), while the remaining ones had figures above 95 per cent. Regarding economic activity, only the construction and manufacture sectors had figures below 90 per cent – 64 and 77 per cent, respectively.

The following box shows the estimated results of a multinomial model for the characterization of the Internet residential customer.

<sup>76</sup> Survey made in 2005 by INE, with the cooperation of UMIC – Agência para a Sociedade do Conhecimento, IP (Knowledge Society Agency), following Eurostat's methodological recommendations. The sample is made up of 2,075 companies of the reference universe of the Harmonized Survey to Companies, being made up of companies with 10 or more employees and which economic activity is framed by one of the following CAE (economic activity classification) Version 2.1 sections: D, F, G, H (only groups 551 and 552), I, K, O (only groups 921 and 922). The survey's reference period is January 2005.

### Qualitative dependent variable model applied to the characterization of the residential Internet user

This model was estimated based on data from the Survey on the consumption of broadband Internet Access in Portugal.

The estimated model was the multinomial logit (Table 67):

$$\text{odds}(\text{have Internet connection}) = \exp(x_j b + b_0),$$

where  $x_j$  is the vector of explaining variables (e.g., age, income, social class) and  $b$  is the vector of ratios to be estimated (with  $b_0$  constant).

The interpretation of the odds is the following:  $\text{odds} = p/(1-p)$  where  $p$  is the probability of the event. It is also possible to convert the odds into probabilities:

$$\text{prob}(\text{have an Internet connection}) = \exp(x_j b + b_0) / [1 + \exp(x_j b + b_0)].$$

In the multinomial logistical regression there are three results: 'no Internet connection', 'narrow band connection' and 'broadband Internet connection'. The chosen base result is the 'no Internet connection'.

From the estimation of the model it was possible to observe the following results:

**Table 67 – Results of the estimation of the Logit multinomial model**

variable:	Choice of narrow band			Choice of broadband		
	Ratio of cond. odds	Standard deviation <sup>+</sup>	Marginal prob. <sup>**</sup>	Ratio of cond. odds	Standard deviation <sup>+</sup>	Marginal prob. <sup>**</sup>
North*	2.15	0.63	0.05 *	0.46	0.10	-0.04
Centre*	1.91	0.59	0.04 *	0.63	0.15	-0.02
Lisbon and Tagus valley *	2.66	0.81	0.06	1.15	0.27	0.00
Alentejo	2.64	0.97	0.07 *	0.33	0.12	-0.06
Algarve	2.57	0.88	0.06	0.79	0.22	-0.01
Azores	1.42	0.51	0.02	0.83	0.25	-0.01
Madeira						

<i>Less than 100 inhabitants</i>							
100-500 inhabitants	0.96	0.23	0.00		0.98	0.26	0.00
500-1000 inhabitants	1.10	0.31	0.01		0.85	0.28	-0.01
1000-2000 inhabitants	1.04	0.30	0.00		1.47	0.47	0.02
2000-5000 inhabitants	1.28	0.33	0.01	*	1.88	0.53	0.03
5000-10000 inhabitants	0.92	0.27	-0.01	*	2.34	0.70	0.04
10000-30000 inhabitants	1.17	0.29	0.01	*	2.47	0.66	0.04
30000-80000 inhabitants	1.17	0.34	0.01	*	4.02	1.18	0.07
80000-125000 inhabitants	1.02	0.33	0.00	*	3.35	0.98	0.06
125000-500000 inhabitants	0.97	0.37	-0.01	*	3.58	1.26	0.06
Over 500000 inhabitants	0.89	0.34	-0.01	*	2.50	0.89	0.04
Gender	1.68	0.20	0.03	*	2.56	0.28	0.04
Employees	1.08	0.14	0.00		1.19	0.15	0.01
<i>Less than 25 years old</i>							
25-40 years old	0.91	0.15	0.00	*	0.68	0.11	-0.02
40-55 years old*	0.65	0.11	-0.03	*	0.53	0.08	-0.03
55-65 years old*	0.42	0.09	-0.05	*	0.33	0.07	-0.05
More than 65 years*	0.12	0.04	-0.13	*	0.07	0.02	-0.12
Households with 10 year old children	0.98	0.14	0.00		0.98	0.13	0.00
Households with 11-17 year old children	1.31	0.18	0.02	*	1.89	0.24	0.03
Households with children aged above 17 years old *	1.57	0.19	0.03	*	1.73	0.20	0.02
<i>Upper class</i>							
Upper middle class	1.47	0.77	0.02		1.38	0.58	0.01
Middle class	1.06	0.52	0.01		0.51	0.20	-0.03
Lower middle class	0.62	0.32	-0.03	*	0.32	0.13	-0.05
Lower class*	0.25	0.14	-0.08	*	0.11	0.06	-0.10
<i>Below average education</i>							
Up to average education*	2.94	0.58	0.06	*	7.04	1.73	0.09
Incomplete higher education*	9.63	2.18	0.13	*	24.61	6.63	0.15
Complete higher education *	15.97	3.49	0.16	*	38.32	10.16	0.16
Wald $\chi^2$ (df=64)	1082.82						
Pseudo R <sup>2</sup>	0.32						
Observations	4596						

Source: ICP-ANACOM

*Significant ratios at 5% are marked with \*. The standard deviations are strong regarding a general form of heterocedasticity. Dummy base variables are in italic.*

\*The standard deviation of the odds ratio.

\*\*Marginal probabilities are reckoned using explicative variables.

From the analysis of the estimated model's table, one concludes that:

- Algarve, Lisbon and Tagus Valley, and Alentejo have greater probabilities<sup>77</sup> of having Internet. Although there aren't major differences between regions regarding narrow band Internet accesses, there are great differences regarding broadband. Lisbon and Madeira stand as tie regions were the probability of

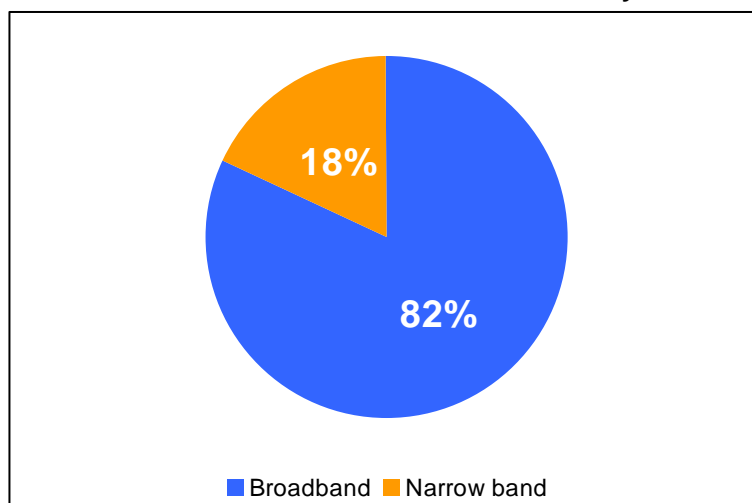
having broadband Internet is higher. North and Alentejo are the regions with lower odds.

- Having narrow band Internet does not seem to depend on the size of the location of the residence (in inhabitants). Having broadband in the household seems to depend on this variable, although in a non-linear way. The probability of having broadband is higher for habitats of 30,000 to 80,000 inhabitants and smaller for the small size ones (less than 2,000 inhabitants).
- The odds ratios of having Internet are greater for men than for women.
- Surveyed younger people, with higher education and from an upper social class have greater odds of having Internet, both narrow band and broadband. Nevertheless, the odds ratios are higher for broadband, which suggests that the latter is more sensitive to demographic factors than having Internet. For example, 'having completed secondary education' is associated to three times more odds of having narrow band Internet, while for broadband, this odd increases seven times (which corresponds to a 9 per cent increase of probabilities).

### II.5.3.2 Internet Access Service's usage profile

Most of the users of the Internet Access Service use broadband. At the end of 2005, the proportion of broadband customers in the overall customers was already above 80 per cent.

**Graph 77 – Rates of Internet Access Service customers by bandwidth – 2005**



Source: ICP-ANACOM

According to INE/Survey on the use of information and communication Technologies by families<sup>78</sup>, about 59 per cent of users access the Internet every day or almost every day.

Regarding the location where they use it, 61 per cent access it from home and 48 per cent at their job. In third place is school or university, with 24 per cent.

According to this study from INE, among the main purposes of using the Internet, highlight goes to sending/receiving e-mail, research of information on goods and services and reading/downloading online newspapers and magazines.

**Table 68 – Purposes of Internet use**

Activities	
Communication	
To send/receive e-mails	80.5%
To call via Internet/videoconference	10.0%



Other (access to chats, etc.)	38.9%
Information research and use of online services	
To search goods and services	80.8%
To use travelling and lodging services	32.8%
To listen to radio/watch television over the Internet	28.1%
To play or download games, images, music	44.0%
To download software	27.6%
To read/download online newspapers/magazines	51.3%
To search for job or send applications/ <i>curricula</i>	12.4%
Purchasing and selling goods and services, bank services	
To use bank services using the Internet – Internet banking	26.2%
Other financial services (e.g., buying shares)	3.3%
To purchase/order goods or services (excluding financial services/shares)	11.5%
To sell goods or services (e.g., through auctions)	2.1%
Connection to civil services	
To obtain information on the websites of the Public Administration	36.7%
To download official forms	25.8%
To fill and send online official forms	28.0%
Using the Internet to interact with public services	43.8%
Education and training	
To pursue formal education activities	18.8%
To attend post-formal education courses	4.1%
To attend courses specifically related to job opportunities	1.9%
Health-related activities	
Search information on health issues (lesions, diseases, nutrition, etc.)	31.3%

Source: INE/ Survey on the use of information and communication technologies by families, 2005<sup>78</sup>

### II.5.3.3 Barriers to service subscription

The following table shows the main barriers to having Internet at home.

The main reason for not subscribing to the Internet is lack of interest or lack of utility (38.3 per cent). In second place is not having a computer (34 per cent). The service's price is also a barrier to subscribing (8.6 per cent).

**Table 69 – Main barrier to having Internet connection at home**

No need / no interest	38.3%
Has no computer	34.0%
Price is too high	8.6%
Has no time	3.5%
Has access at other locations	2.5%

Source: Survey on the consumption of broadband in Portugal, 2005

## II.5.4 The evolution of the Internet Access Service in 2005

Below is the evolution of the service's geographical availability, penetration, usage level, prices, quality of service, innovation, and development of competition, in 2005.

### II.5.4.1 Geographical availability of this service

Internet Access Service was, in 2005, available in almost all the national territory. Particularly, the dial-up access is available in the entire public switched telephone network.

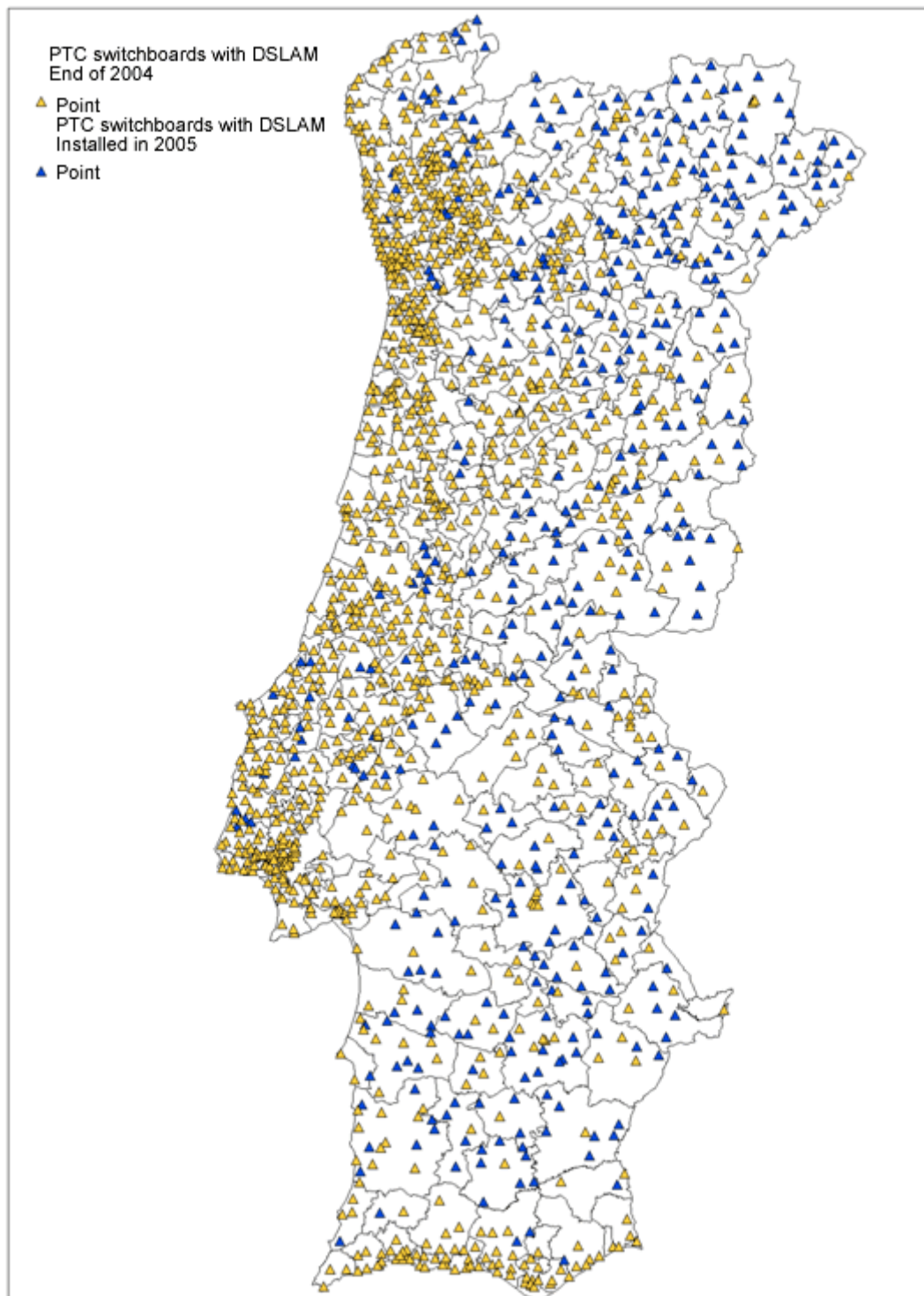
The availability of broadband offers depends on the existence of public switched telephone network switchboards with DSLAM (digital subscriber line access multiplexer) or on existing cable TV distribution networks prepared to provide broadband.

At the end of 2005, there were 1,726 switchboards with DSLAM, 93 per cent of all PT's switchboards. This number of switchboards is about 37 per cent higher than that of the end of the previous year. It should be stressed out that these switchboards serve more than 90 per cent of the customers of the public telephone service at a fixed location,

These infrastructures are concentrated in the regions of Greater Lisbon and Greater Porto, in the North coast and in Algarve. In the interior of the country, the density of switchboards with DSLAM is lower, as is the population density. However, there was a considerable improvement in the country's inner areas.

In the Autonomous Regions of Madeira and the Azores the percentages of switchboards with DSLAM are already quite high, over 97 and 96 per cent, respectively.

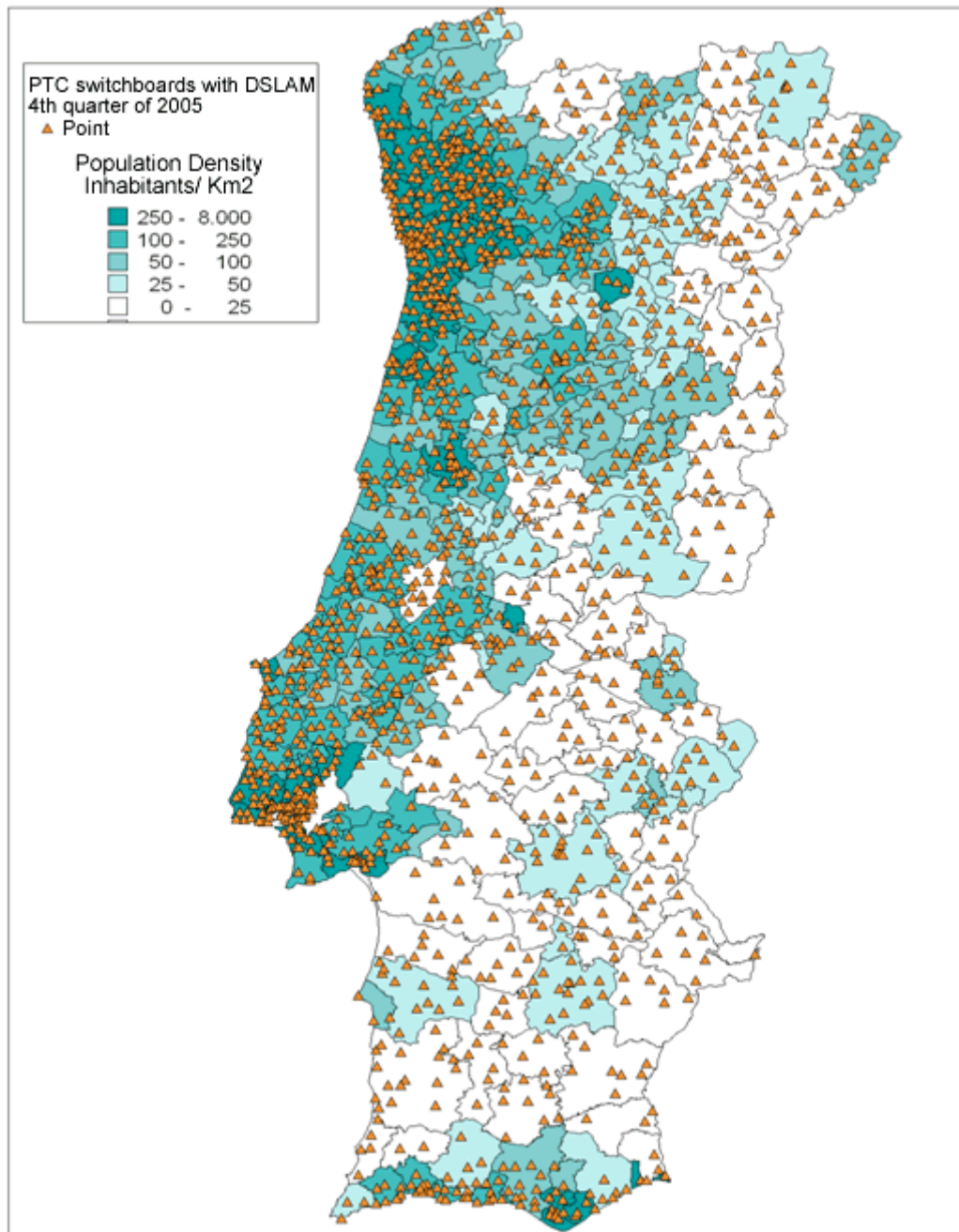
**Graph 78 – Distribution by municipality of switchboards with DSLAM at the end of 2004 and 2005**



Source ICP-ANACOM

It should be underlined that there are exceptional cases where it may not be possible to provide ADSL services over a given loop, due to its physical characteristics (namely the loop's length, section and conservation state).

**Graph 79 – Distribution by municipality of switchboards with DSLAM in September 2005 and population density (Mainland Portugal)**



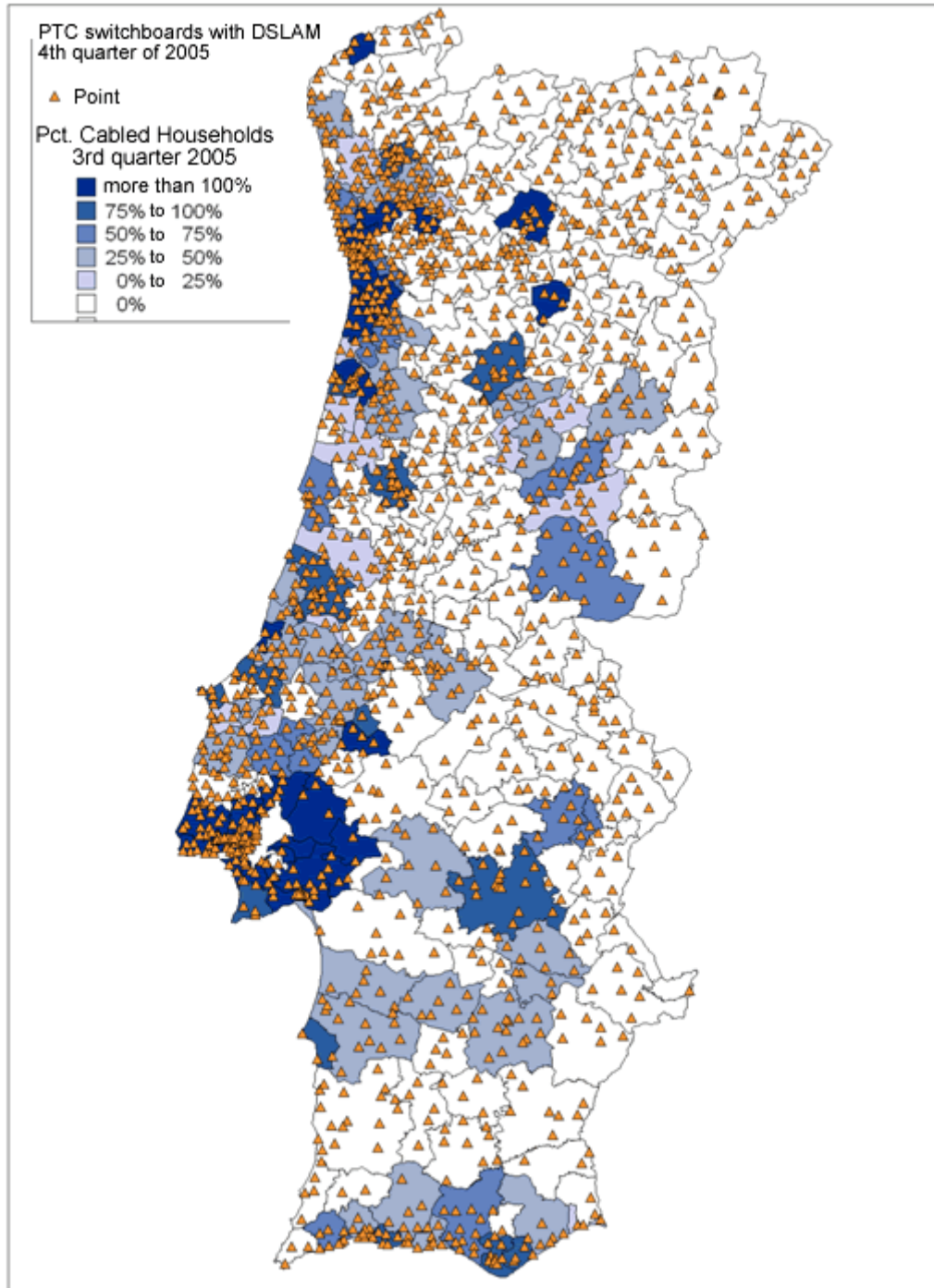
Source: ICP-ANACOM

Regarding broadband Internet access using cable modem, the mainland's cable

distribution networks are concentrated in the Greater Lisbon and Greater Porto areas.

In the case with the autonomous regions, Madeira has a rate of cabled households above 93 per cent, while in the Azores the figure for this indicator is 60 per cent. The rate in the Autonomous Region of Madeira is explained by the Protocol established on 6 August 2004 between the Government of the Republic, the Regional Government of Madeira, ICP-ANACOM and Cabo TV Madeirense, S.A., with the objective of guaranteeing the conditions needed for the citizens of the Autonomous Region of Madeira to be able to have access, for free, to the broadcasts of the general non-conditioned access channels available in the Mainland, namely, RTP1, RTP2, SIC and TVI.

**Graph 80 – Distribution by municipality of switchboards with DSLAM in 2005 and rate of cabled households (Mainland Portugal)**



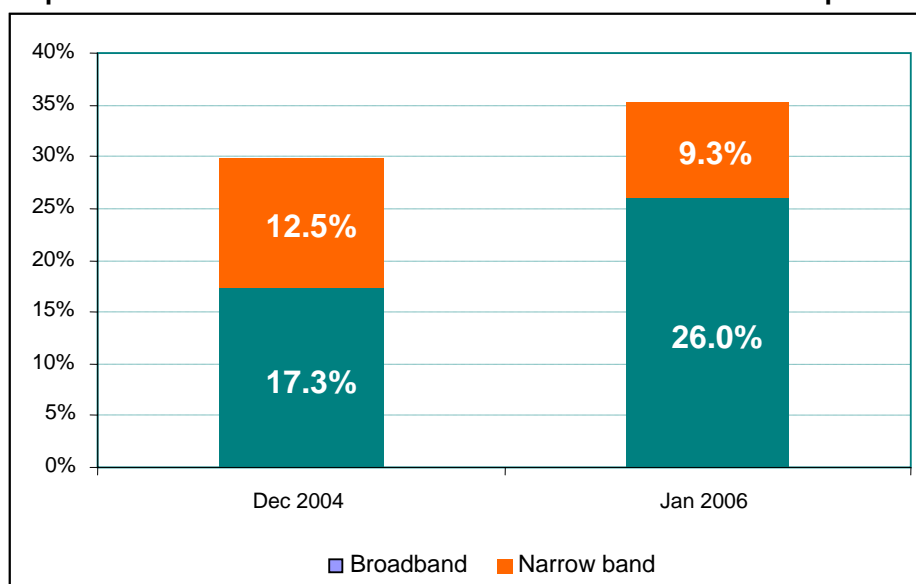
Source: ICP-ANACOM

Considering the previously mentioned data, broadband access density follows the territory's population density.

### II.5.4.2 Service's penetration

About 35 per cent of Portuguese households have internet connection, 5 per cent more than at the end of 2004. Broadband became the preferential means of Internet access, being in about 26 per cent of homes, 8.7 per cent more than in the previous year.

**Graph 81 – Evolution of the Internet Access Service's residential penetration rate**



Source: ICP-ANACOM, Survey on the consumption of broadband – January 2006 and December 2004

In the residential segment, the data provided by the Surveys on the consumption of broadband Internet in Portugal, promoted by ICP-ANACOM in December 2004<sup>79</sup> e 2005, show regional asymmetries in Internet penetration.

Indeed, in spite of the generalized growth between 2004 and 2005, the Lisbon and Algarve areas have much higher rates than regions such as the Azores or Alentejo. However, the approximation between the maximum and minimum rates should be stressed; the difference between the region with greater penetration and the region with lowest penetration went from 16.5 per cent in 2005 to 13.4 per cent in 2005.

**Table 70 – Internet connection by households, by NUTS II regions**

Regions	2004	2005
North	24.4%	30.6%
Centre	25.0%	35.9%
Lisbon and Tagus Valley	36.5%	42.5%



Alentejo	20.8%	30.0%
Algarve	26.8%	40.1%
Azores	21.1%	29.1%
Madeira	24.0%	32.5%

Source: ICP-ANACOM, Survey on the consumption of broadband Internet in Portugal, 2004 and 2005

### II.5.4.3 Service's usage level

Below is the evolution of the service's usage levels measured in terms of customers, accesses and revenues.

#### II.5.4.3.1 Customers: narrow band/broadband

As shown on the following table, by the end of 2005 there were about 1.4 million customers of the Internet Access Service, 19 per cent more than at the end of 2004.

There was also a transition from narrow band to broadband, this type of access reaching 1.2 million customers at the end of 2005, 43 per cent more than in the same quarter of the previous year. Regarding dial-up access, in December 2005 there were around 271,000 customers, a little more than two thirds of the customers at the end of the previous year. Thus the proportion of broadband clients in the overall number of clients reached 82 per cent, a figure that is 14 per cent above that of 2004.

**Table 71 – Total number of clients (accumulated)**

	2000	2001	2002	2003	2004	2005
Customer's total	n.a.	n.a.	n.a.	n.a.	1,243,124	1,482,613
Broadband access	27,215	99,316	262,789	503,128	848,769	1,212,034
Dial-up access	n.a.	n.a.	n.a.	n.a.	394,355	270,578

Source: ICP-ANACOM

Unit: 1 customer

#### II.5.4.3.2 Customers: ADSL/cable modem

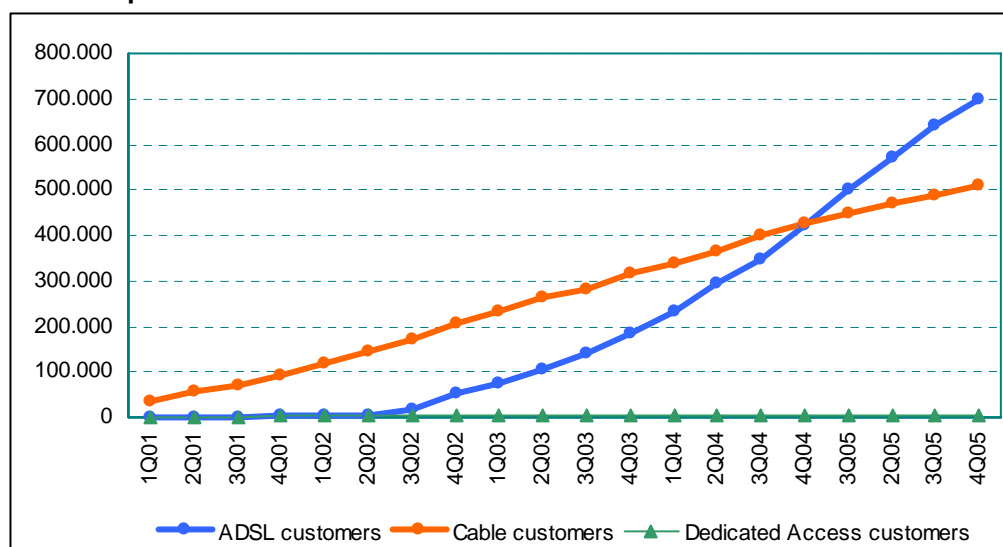
ADSL is the main responsible for the growth of Internet in Portugal in 2005. Between the end of 2004 and the end of 2005, three out of each four new broadband customers chose ADSL access, resulting in a year-to-date growth of 66 per cent. The predominance of ADSL is explained by the greater geographical availability of this kind of access and by the deployment of offers based on the local loop unbundling.

Regarding access using cable modem, although it is no longer the predominant access technology, it still registers high growth rates. In 2005, Internet access using cable modem had an annual growth rate above 20 per cent.

**Table 72 – Number of clients of broadband access modes**

	2000	2001	2002	2003	2004	2005	Var. 2005/2004
Customer's total	27,215	99,316	262,789	503,128	848,769	1,212,034	42.8%
ADSL access	n.a.	2,886	52,005	184,344	420,631	697,652	65.9%
% of broadband total	n.a.	2.9%	19.8%	36.6%	49.6%	57.6%	-
Cable modem access	2,154	93,721	207,486	315,577	425,308	511,635	20.3%
% of broadband total	92.4%	94.4%	79.0%	62.7%	50.1%	42.2%	-
Dedicated access	2,061	2,709	3,298	3,207	2,830	2,747	-2.9%
% of broadband total	7.6%	2.7%	1.3%	0.6%	0.3%	0.2%	-

Source: ICP-ANACOM

**Graph 82 – Evolution of the number of broadband access customers**

Source: ICP-ANACOM

### Residential/Non-residential customers

At the end of 2005 there about 1.25 million active residential customers of the Internet access service, a figure about 16 per cent higher than that of the end of 2004. During the same period, there were about 228,000 non-residential customers, 44 per cent more than in the end of 2004.

**Table 73 – Number of residential and non-residential customers in 2004 and 2005**

	2004	2005
<b>Total customers</b>	1,243,124	1,482,613
Residential <b>customers</b>	1,084,073	1,254,307
Residential <b>customers</b>	159,051	228,305

Source: ICP-ANACOM

#### II.5.4.3.3 Broadband accesses

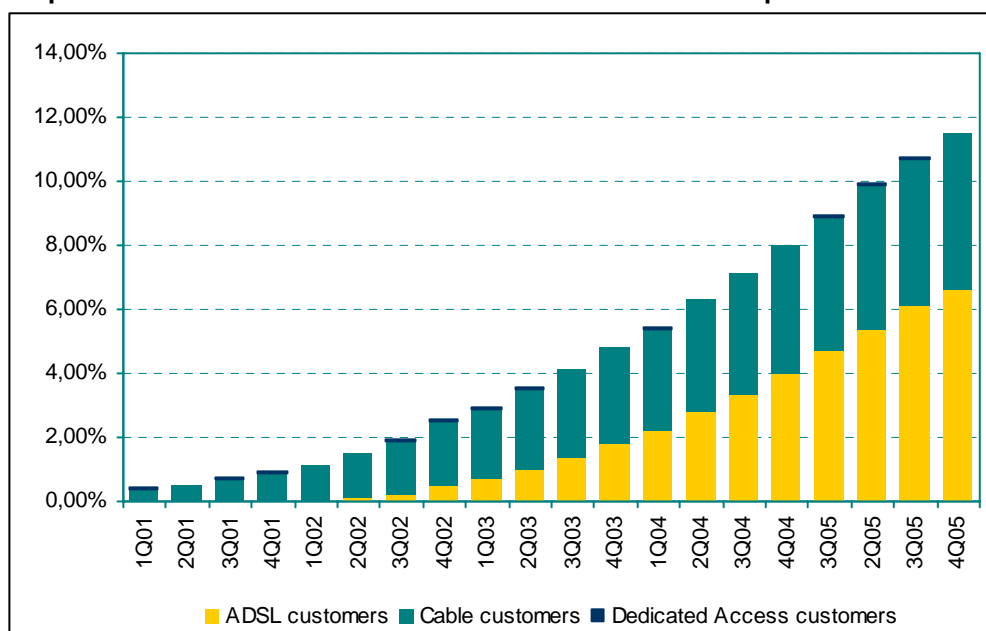
The following table shows the evolution of the number of broadband access in Portugal, where the previously mentioned ADSL predominance is already noticeable.

**Table 74 – Number of broadband accesses**

	2000	2001	2002	2003	2004	2005
Total accesses	27,831	99,590	263,932	503,967	852,759	1,219,384
ADSL accesses	n.a.	2,886	52,810	184,860	424,169	706,665
Cable modem accesses	25,154	93,836	207,486	315,577	425,308	509,501
Dedicated accesses	2,677	2,868	3,636	3,530	3,282	3,218

Source: ICP-ANACOM

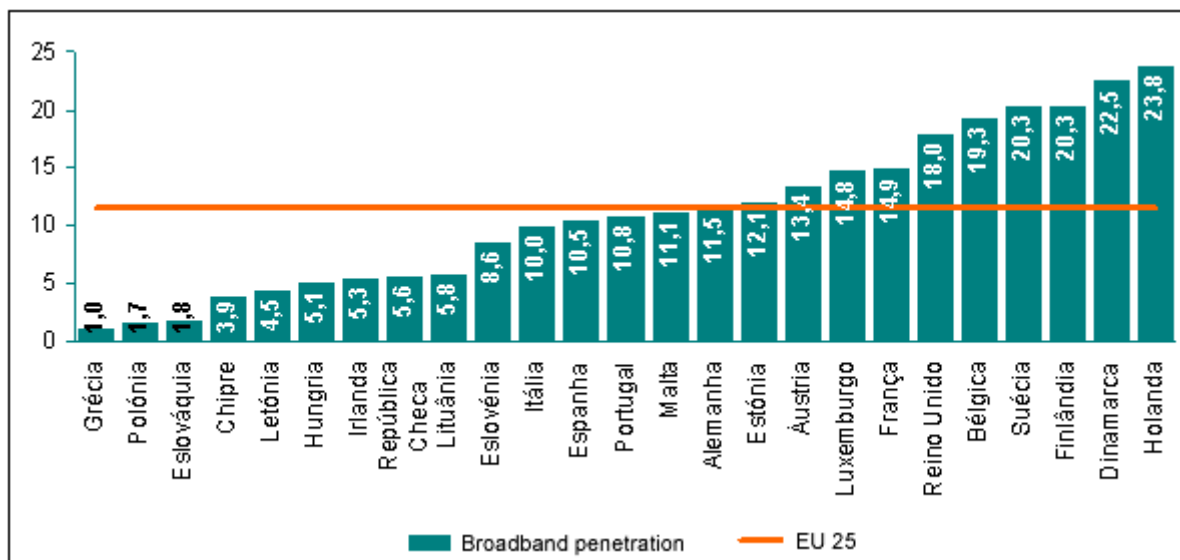
The following graph shows the evolution in the number of accesses per 100 inhabitants in Portugal since 2000. At the end of 2005 this indicator was at 11.6 per cent, 4.5 per cent above the figure for the same quarter of the previous year.

**Graph 83 – Evolution in the number of broadband accesses per 100 inhabitants**

Source: ICP-ANACOM

According to the European Commission, the penetration rate of broadband accesses in Portugal reached 10.8 per 100 inhabitants in the 3rd quarter of 2005. This figure was close to the EU average (11.5 per cent).

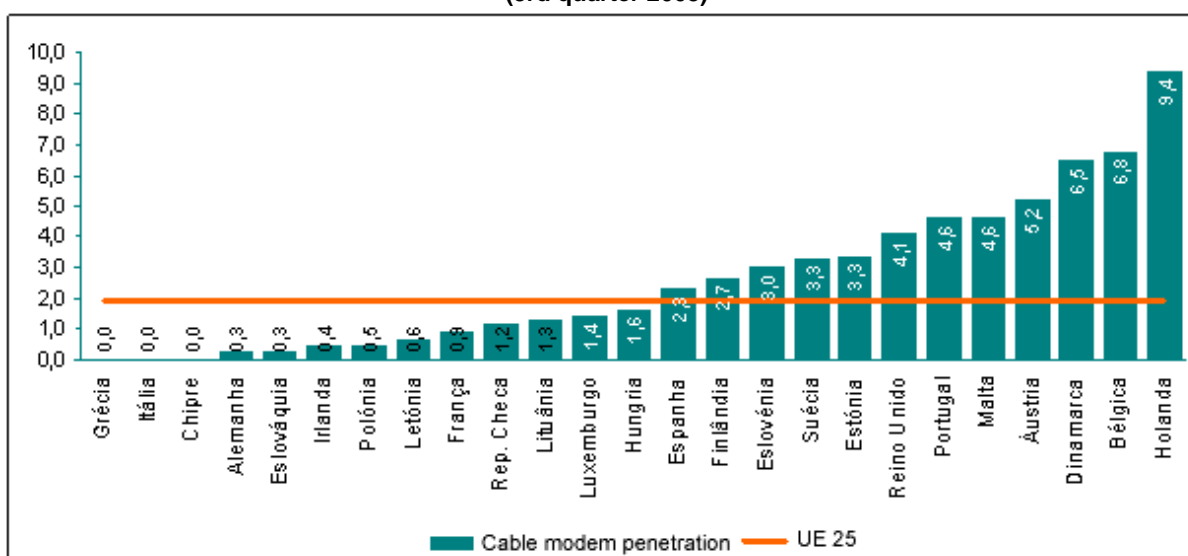
**Graph 84 – Number of broadband accesses per 100 inhabitants in the EU25 (3rd quarter 2005)**



Source: European Commission, 11th Implementation Report.

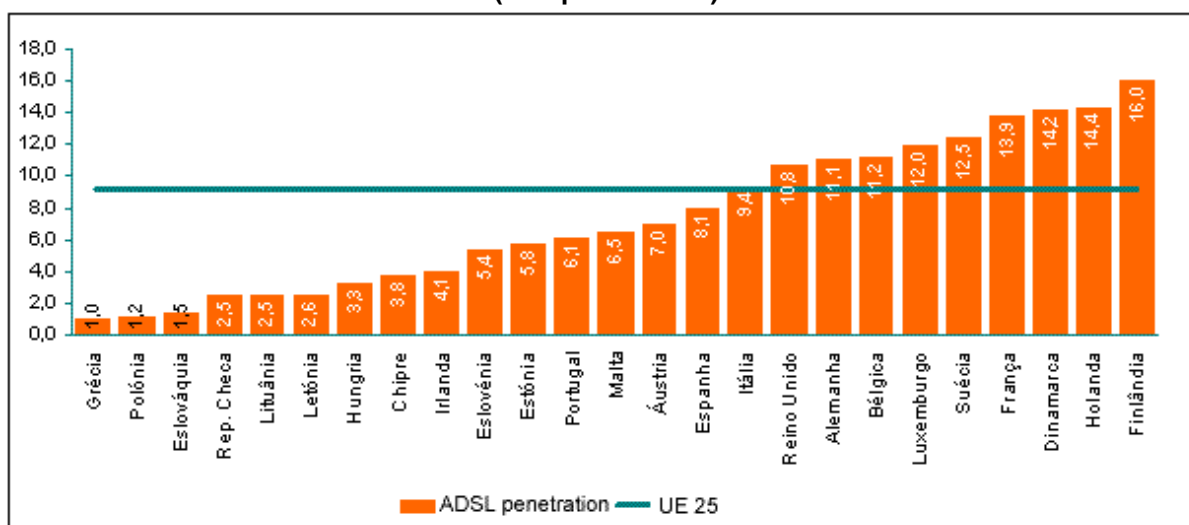
It should be mentioned that cable modem access penetration is considerably high in Portugal (4.6 per cent) when compared to the EU average (1.9 per cent). Regarding ADSL, in spite of its fast growth, its penetration in Portugal is about 3.1 per cent below the European average.

**Graph 85 – Number of cable modem accesses per 100 inhabitants in the EU25 (3rd quarter 2005)**



European Commission, 11th Implementation Report.

**Graph 86 – Number of broadband accesses using ADSL per 100 inhabitants in the EU25 (3rd quarter 2005)**



Source: European Commission, 11th Implementation Report.

#### II.5.4.3.4 Sector's revenues<sup>80</sup>

In 2004, the revenues of the Internet access service registered, as in previous years, a high growth rate. It's noteworthy mentioning the strong growth of revenues from the ADSL access, which in the year 2004 were two and a half times higher than in the previous year.

**Table 75 – Sector's revenues**

	2000	2001	2002	2003	2004
<b>Internet access service</b>	<b>82,139</b>	<b>140,429</b>	<b>220,825</b>	<b>302,011</b>	<b>362,677</b>
Dial-up access	n.a.	80,228	119,033	120,287	78,099
ADSL access	n.a.	1,178	12,172	54,482	134,984
Cable modem access	n.a.	15,106	44,803	67,574	105,160
Other types of Internet access	n.a.	24,196	25,646	31,806	32,628
Other revenues	n.a.	19,721	19,170	27,863	11,807

Source: ICP-ANACOM

Unit: Thousand euros

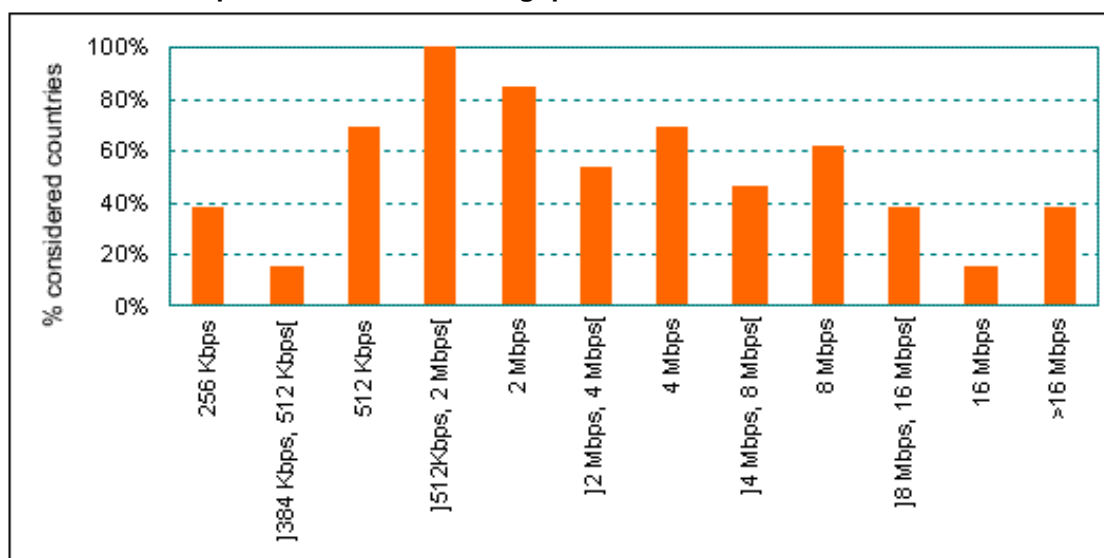
#### II.5.4.4 Diversity and innovation in broadband offers

Based on the fixed broadband residential offers available in 13 European countries<sup>81</sup>, we intended to verify up to what extent did the entities providing broadband access services in Portugal were satisfying consumers' needs in terms of the offers' availability and diversity.

It was registered that in Portugal, as with the remaining countries, there are ADSL-based (LLRO and PTC's wholesale offer) and cable modem-based offers. Furthermore, there are package offers in Portugal that include Internet using powerline (Onitelecom) and FWA (AR Telecom) technologies. In other countries offers were identified using optical fibre (e.g. Sweden). In Ireland there is an FWA offer.

Regarding throughput speeds, the download throughputs offered in Portugal are similar to those of other countries. However, in Portugal there are no download throughputs between 512 kbps and 1 Mbps, and between 2 Mbps and 4 Mbps (*exclusive*), which are relatively common in other countries. Also, there are no offers with throughputs above 16 Mbps.

**Graph 87 – Download throughputs in the considered countries**



Source: ICP-ANACOM

Regarding upload speeds, there is a considerably smaller availability of upload throughputs than in the remaining countries.

Regarding the applying tariffs, and as in other countries, in Portugal there are package offers (TV, FTS, terminal equipment, PC, etc.). There were also time-based and non time-based offers, which are also quite common in the studied countries.

The items of these tariffs are also similar to those existing in other countries: activation prices, installation prices, equipment prices (e.g. modems), flat-rate monthly fees (access+traffic<sup>82</sup>), prices per minute (in the case with the time-based offers), and prices for traffic exceeding the defined limits. It is also common to find offers including e-mail and space for hosting websites. In many cases, the ISP imposes contracts with a minimum sojourn time of 12 months.

There is some linearity in the rate between the prices and the download throughput, and also the upload throughput.

It is usual to have promotional offers with no subscription /activation/installation prices, reduced or no monthly fees in the first months after subscribing to the service, offers of terminal equipment, content offer, etc..

The following types of tariff discrimination were also identified: residential/non-residential; student/non-student.

Regarding traffic limits, all the studied countries have offers with traffic limit.

There are three types of traffic limits: (1) traffic in MB (total; in peak hours; download/upload); (2) traffic in hours; (3) fair use policy (limits not defined/published).

Portugal is the sole country among those considered with a considerable set of offers (namely the incumbent operator's offers) discriminating the traffic limits according to their origin (national/international)

When the traffic limits are exceeded, the following penalties are identified: (1) given amounts are charged by amount of traffic or time; the offer's data transmission throughputs are reduced to a stage below or to levels similar to narrow band; (3) the user is invited to subscribe to another offer (in some cases, ISP provide optional tariffs for users to buy additional traffic blocks)



In Portugal, the operator charges certain amounts by MB when the traffic limits are exceeded.

#### **II.5.4.5 Price level of the broadband Internet Access Service**

This section contains some of the results of the international broadband price comparison made by ICP-ANACOM in November 2005<sup>83</sup>. According to the collected data it was concluded that:

- Broadband's minimum price in Portugal is 21.7 per cent below the average of the considered countries and is similar to that of Holland and Belgium, countries with a higher broadband penetration. The minimum price of the incumbent operator in Portugal is the 6th lowest among the incumbent operators of the 13 considered countries.

**Table 76 – Broadband minimum monthly fee – November 2005**

Broadband monthly fees	Minimum price			Minimum price – Incumbent Op.		
	Absolute minimum price			Absolute minimum price		
	Price	Ranking	Tr.Lim.	Price	Ranking	Tr.Lim.
Germany	17.07	10		18.91	7	
Austria	15.75	7	*	16.58	2	*
Belgium	12.36	1	*	24.75	10	*
Denmark	21.39	12		25.68	12	
Spain	15.90	9	*	29.90	13	*
France	12.46	2		23.33	9	*
Holland	12.56	3	*	18.45	5	
Ireland	15.66	6		16.52	1	
Italy	15.79	8		16.63	3	
Luxembourg	22.70	13	*	25.22	11	*
<b>Portugal</b>	<b>12.74</b>	<b>4</b>		<b>18.91</b>	<b>6</b>	
United Kingdom	18.73	11		22.47	8	*
Sweden	14.74	5		17.36	4	
Total/Average w/out Portugal	16.26			21.32		
% deviation of Portugal vs. average	-21.7%			-11.3%		

\* Offer with traffic limit. It was not always possible to identify the traffic limits.

Source: ICP-ANACOM

Unit: Euros w/out VAT

- Comparing the minimum broadband prices by download throughput practiced in Portugal with the average price in the considered countries, prices in Portugal are below the average, except with the 256 kbps, which price stands 31.9 per cent above the average. Regarding 2 Mbps, Portugal even has the lowest price of the analyzed offers. It should be mentioned that the relatively low number of offers at 8 Mbps and 16 Mbps, and the price dispersion of these offers make it impossible to draw safe conclusions on the level of prices in Portugal. Indeed, it would be enough to exclude the highest price of each of these access classes to considerably change Portugal's relative standing.

**Table 77 – Minimum broadband price by access speed – November 2005**

Broadband monthly fees	256 kbps		2 Mbps		4 Mbps		8 Mbps		16 Mbps	
	Price	Rank	Price	Rank	Price	Rank	Price	Rank	Price	Rank
Germany			23.26	6						
Austria	15.75	3 *	24.95	7	40.00	8 *			74.17	2 *
Belgium	12.36	1 *			20.45	1 *	42.98	6 *		
Denmark	+		21.39	5	53.63	9	85.86	7		
Spain			42.00	11	29.95	7	+			
France					25.00	4	23.33	3 *		
Holland			25.17	8	27.69	5	41.97	5		
Ireland			28.93	9 *						
Italy			16.63	2	24.13	2				
Luxembourg			36.78	10 *						
<b>Portugal</b>	18.84	4 *	<b>16.12</b>	1 *	<b>28.10</b>	6 *	<b>34.71</b>	4 *	<b>69.83</b>	1 *
United Kingdom			18.73	4	24.97	3	22.47	2 *		
Sweden	14.74	2	17.93	3			19.57	1		
Average w/out Portugal	14.28		25.58		30.73		39.36		74.17	
% deviation of Portugal vs. average	31.9%		-37.0%		-8.5%		-11.8%		-5.8%	

\* Offer with traffic limit. It was not always possible to identify the traffic limits.

+ Offers which prices are excessively high or excessively low.

Source: ICP-ANACOM

Unit: Euros w/out VAT

- If instead of the minimum price, only the simple average of the minimum prices practiced by the several ISP for the several transmission speeds is considered, Portugal falls slightly in the rankings of the several throughput speeds, although the signs of the differences regarding the average are kept unchanged.

**Table 78 – Average broadband price by access speed – November 2005**

Broadband monthly fees	256 kbps		2 Mbps		4 Mbps		8 Mbps		16 Mbps	
	Price	Rank	Price	Rank	Price	Rank	Price	Rank	Price	Rank
Germany	-		26.41	5	-		-		-	
Austria	15.75	3	35.35	9	61.25	8	-		74.17	2
Belgium	12.36	1	-		24.27	1	42.98	4	-	
Denmark	25.68	5	35.00	8	53.63	7	85.86	7	-	
Spain	-		58.49	11	62.98	9	150.57	8	-	
France	-		-		27.09	4	25.42	2	-	
Holland	-		25.17	3	27.69	5	51.51	6	-	
Ireland	-		34.25	7	-		-		-	
Italy	-		16.63	1	26.63	3	-		-	
Luxembourg	-		41.91	10	-		-		-	
<b>Portugal</b>	<b>23.79</b>	4	<b>25.38</b>	4	<b>33.29</b>	6	<b>46.87</b>	5	<b>69.83</b>	1
United Kingdom	-		27.89	6	24.97	2	22.47	1	-	
Sweden	14.82	2	22.76	2	-		27.80	3	-	
Average w/out Portugal	17.15		32.38		38.56		58.09		74.17	
% deviation of Portugal vs. average	38.7%		-21.6%		-13.7%		-19.3%		-5.8%	

Source: ICP-ANACOM

Unit: Euros w/out VAT

- The prices of the incumbent operator's 256 kbps, 2 Mbps and 4 Mbps offers in Portugal are, respectively, 12.1 per cent, 13.8 per cent and 16.5 per cent below the prices of the incumbent operators of the considered countries;

**Table 79 – Minimum broadband price by access speed of the incumbent operator – November 2005**

Broadband monthly fees	256 kbps			2 Mbps			4 Mbps			8 Mbps		
	Price (€)	Speed (Mbps)	Notes	Price (€)	Speed (Mbps)	Notes	Price (€)	Speed (Mbps)	Notes	Price (€)	Speed (Mbps)	Notes
Germany				25,81	2	*						
Austria				45,75	8							
Belgium							33,02	3				
Denmark	25,68	3		42,88	7		53,63	4		+		
Spain				+			+			+		
France										27,51	1	
Holland										62,98	4	
Ireland				35,00	5	*						
Italy							30,79	1				
Luxembourg				40,87	6	*						
<b>Portugal</b>	18,91	2	*	29,40	4	*	32,69	2	*	50,41	3	*
United Kingdom				22,47	1	*						
Sweden	17,36	1		26,08	3					31,31	2	
Average w/out Portugal	21,52			34,12			39,14			40,60		
% deviation of Portugal reg. the average	-12,1%			-13,8%			-16,5%			24,2%		

\* Offer with traffic limit. It was not always possible to identify the traffic limits.

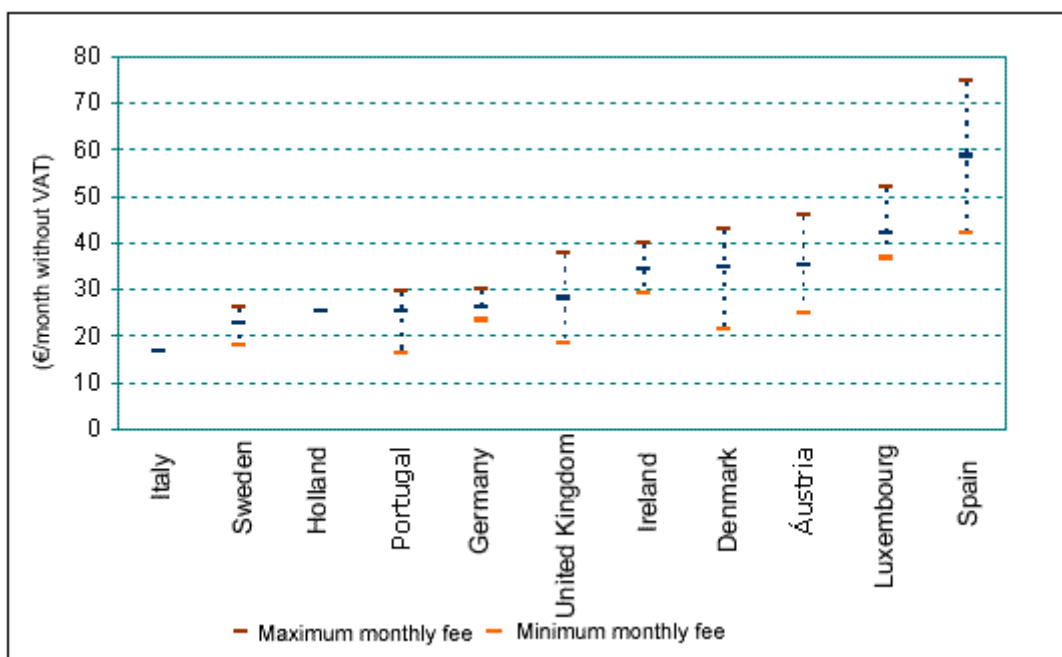
+ + Offers which prices are excessively high or excessively low.

Source: ICP-ANACOM

Unit: Euros w/out VAT

- Portuguese people currently using the Internet mostly use 2 Mbps offers. The minimum price of the 2 Mbps offers practiced in Portugal is the lowest among the considered countries. It is the offer of a CATV operator. In Portugal, most alternative operators' 2 Mbps offers have prices between 18 euros (without VAT) and 26 euros (without VAT). Considering the variation interval and the average price of the 2 Mbps offers in the considered countries, it was concluded that the prices practiced in Portugal are close, or even below, the European average patterns.

**Graph 88 – Average variation interval of the prices of the 2 Mbps offers**



Source: ICP-ANACOM

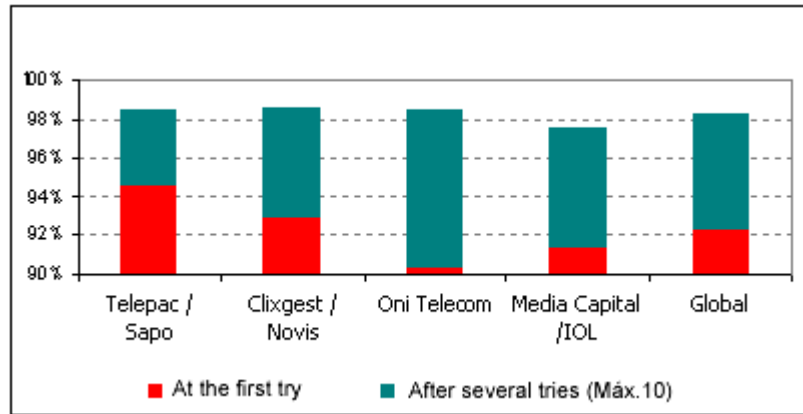
#### II.5.4.6 Quality of service

In 2005, ICP-ANACOM conducted for the first time, survey on the quality of the Internet access services provided by ISP in Portugal<sup>84</sup>.

On a first phase of the study, conducted between June and July 2005, analysis was made to the narrow band (dial-up) offers, for the residential market segment, provided by the four biggest Portuguese ISPs providing this kind of access, which stand for 90 per cent of the market.

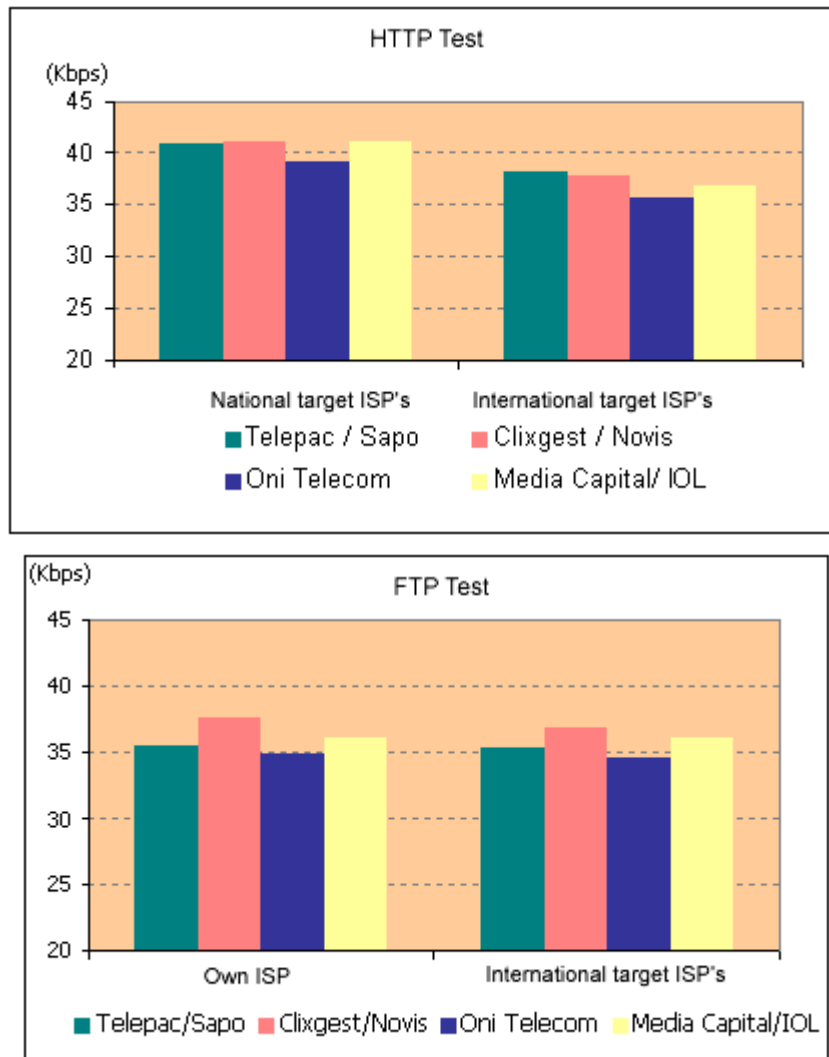
The study was based on 1) service availability/reliability indicators; and 2) throughput indicators (upload and download speeds). The results of this first phase were considered globally good, with very small differences among the several operators, for the analysed availability/reliability and throughput indicators.

**Graph 89 – Rate of successful dial-up connections**



Source: ICP-ANACOM

**Graph 90 – Download speed of all pages (HTTP and FTP tests)**



Source: ICP-ANACOM

Furthermore, it is possible to conclude that the indicators' variations registered during the day and along the week are of low importance for any of the analysed operators,

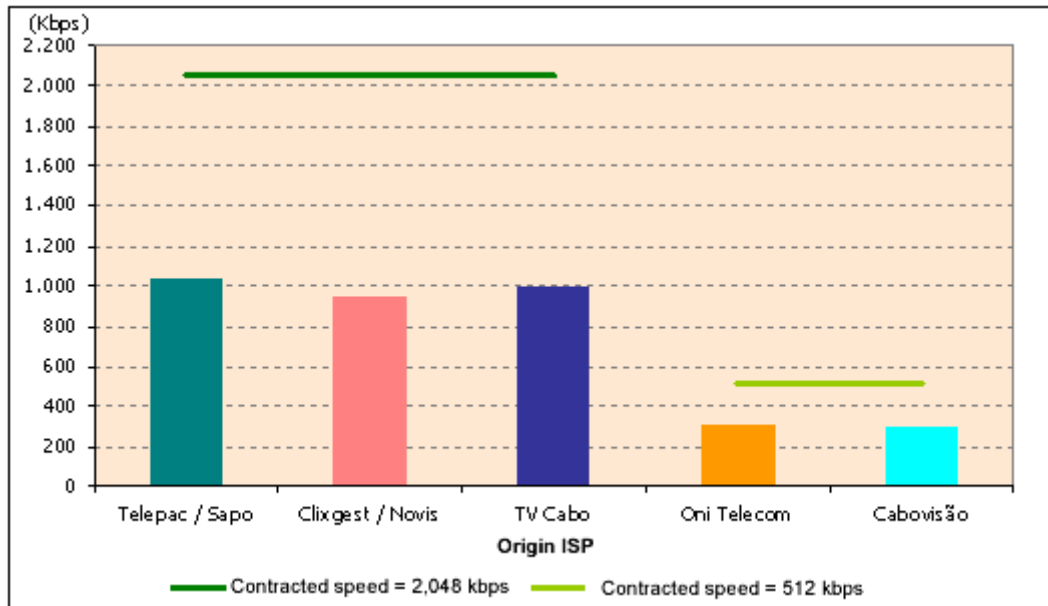
although it is possible to observe that, generally, the lowest values were recorded on week days and in the 12:00h to 18:00h time period. It was also possible to observe that the throughput indicators have slightly lower values for international connections, thus showing some constraints in the international bandwidth provided by national operators.

The second phase of the project, conducted between September and October 2005, aimed to analyse the broadband offers (ADSL and cable) provided by the five biggest Portuguese ISPs providing this type of access, and standing for more than 90 per cent of the offer available in the market. This phase's sole base was the measurements of throughput indicators, where once again the reception (download) and transmission (upload) speeds were assessed.

The results obtained on this second phase of the project are as follows:

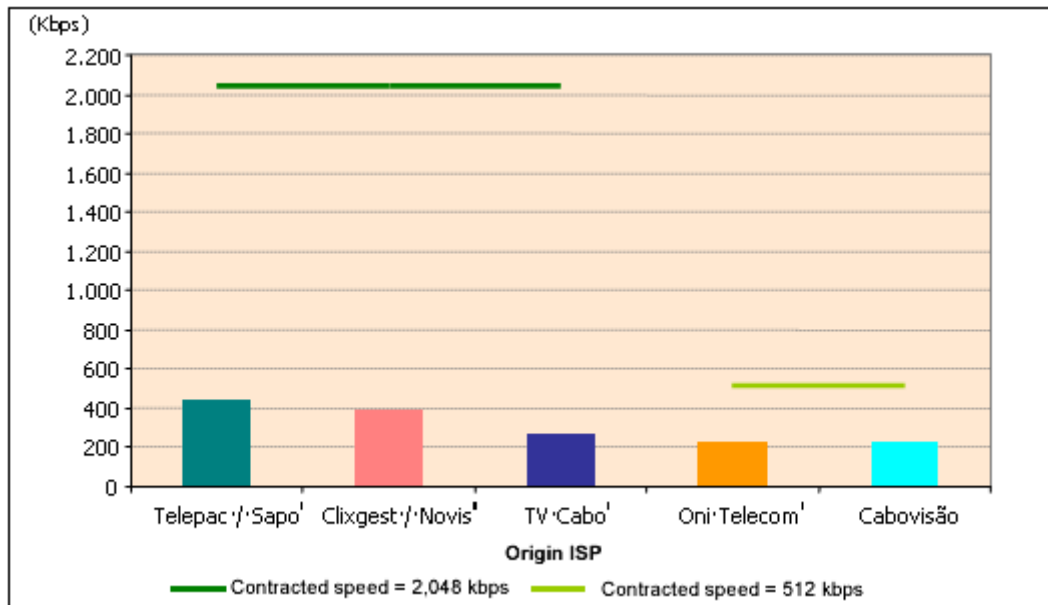
- Regarding download, although most operators had good results, these were clearly higher when the target ISPs are national, which, once again, comes to show constraints in the international bandwidth provided by operators.

**Graph 91 – User’s perception of HTTP reception:  
download average speed (target national ISP)**



Source: ICP-ANACOM

**Graph 92 – User’s perception of HTTP reception:  
download average speed (target international ISP)**

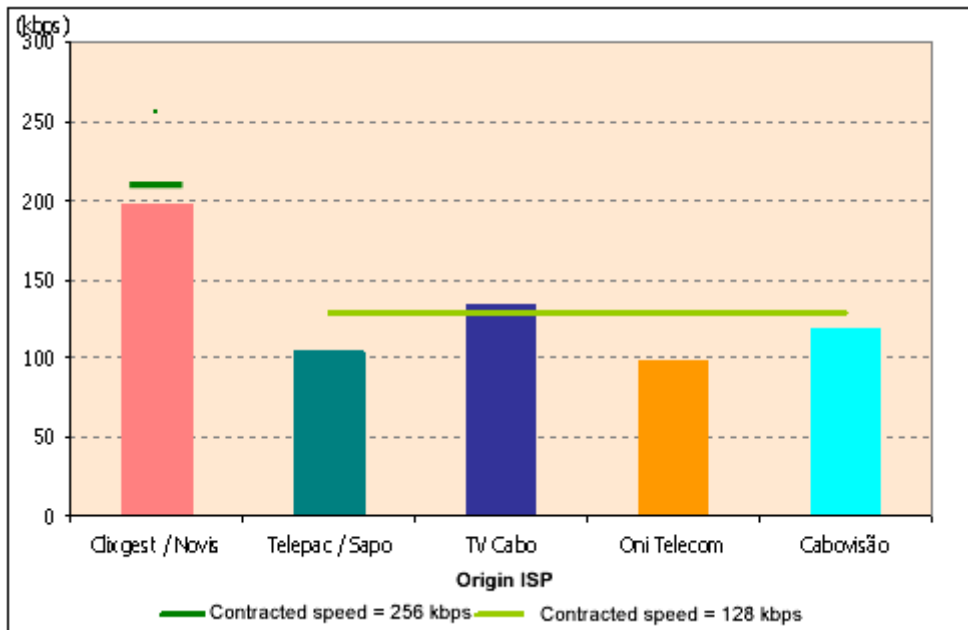


Source: ICP-ANACOM

- Regarding upload, results are also satisfactory. Contrary to the previous case, no major differences were registered among the results obtained for national and international target ISP.

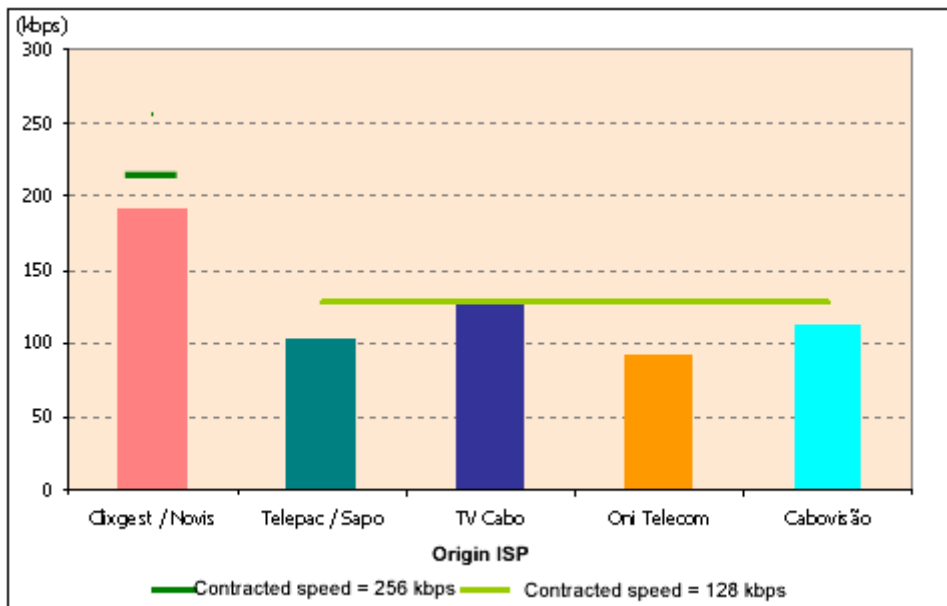


**Graph 93 – User’s perception of FTP reception: upload average speed (target national ISP)**



Source: ICP-ANACOM

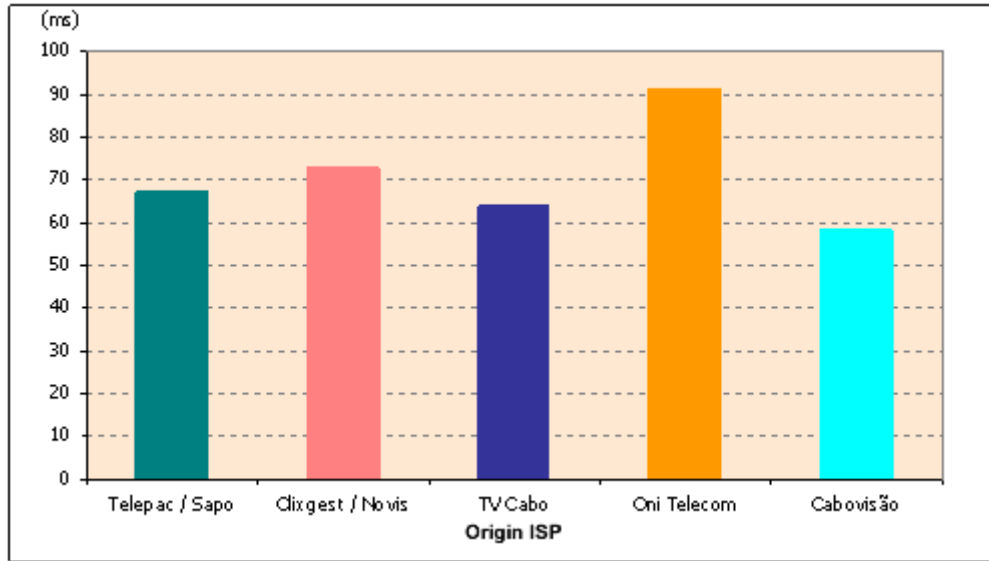
**Graph 94 – User’s perception of FTP reception: upload average speed (target international ISP)**



Source: ICP-ANACOM

- The Ping indicator, which measures the latency time, *i.e.*, communication’s instantaneity (which is particularly relevant when using interactive applications – online games, for example) between the user and the standard website, has good results in the cases with most operators.

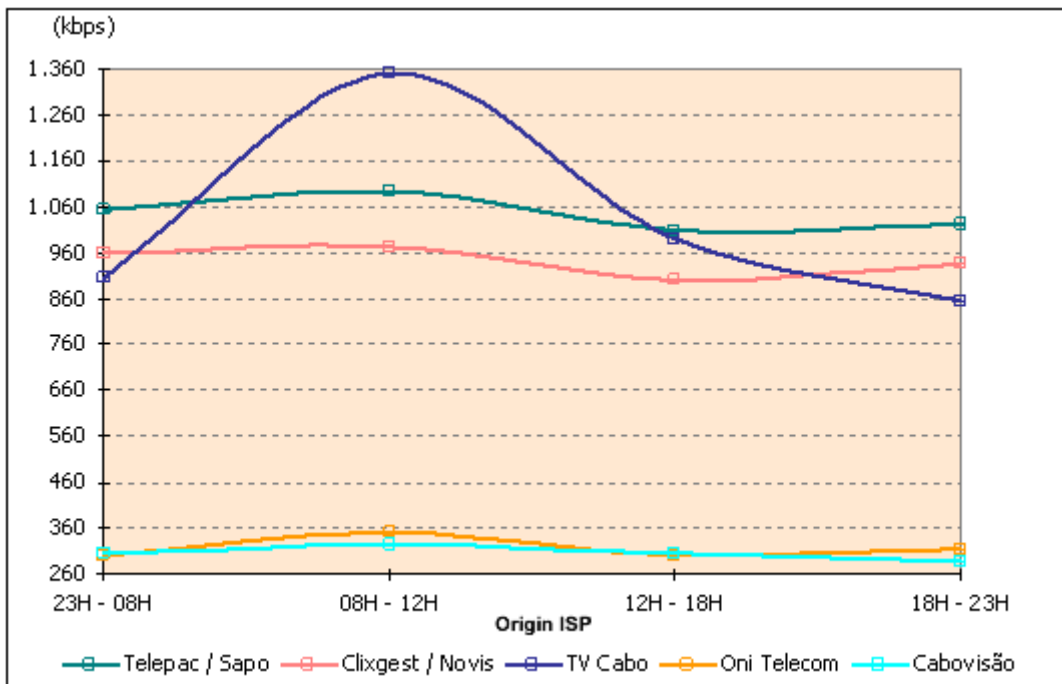
**Graph 95 – Ping Time (average figures in ms)**



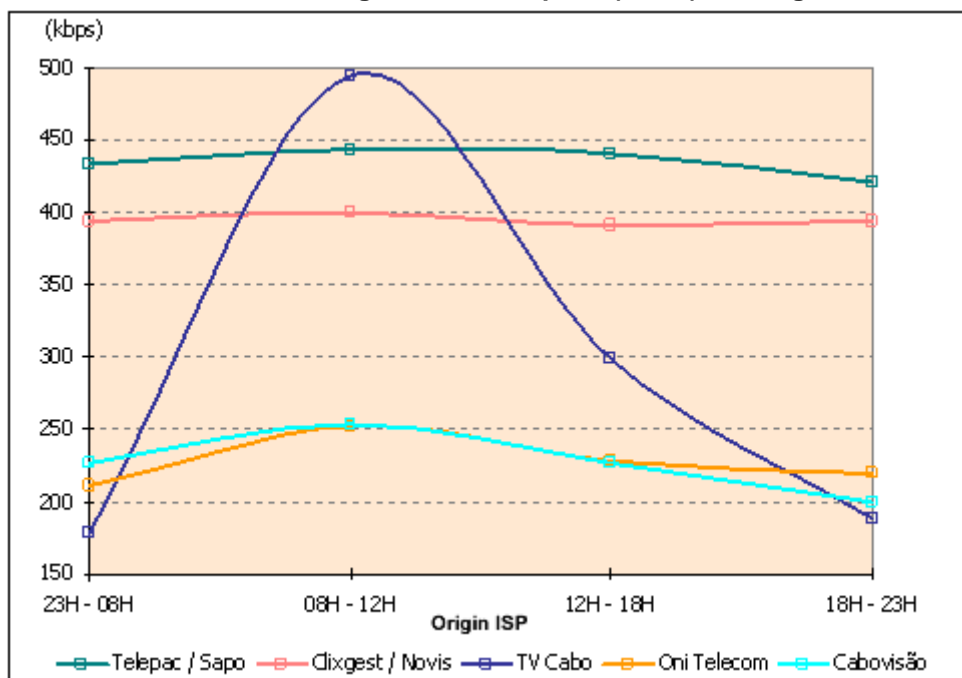
Source: ICP-ANACOM

- Lastly, the indicator variations recorded between week days and weekends are of little importance, or even non-existent, some indicator variations along the day notwithstanding, mainly in the download speed ones: FTP, HTTP and Ping.

**Graph 96 – Variation of the average download speed (HTTP), for target national ISP**



Source: ICP-ANACOM

**Graph 97 – Variation of the average download speed (HTTP), for target international ISP**

Source: ICP-ANACOM

### II.5.4.7 Consumers' evaluation

According to the results of the Survey on the use of broadband Internet access in Portugal 2005, consumers' perception of the quality of broadband services is generally positive. With respect to the expectation created by the service, 21 per cent of broadband consumers consider that the service is better than expected, while 65 per cent consider that the performance fulfils the expectations.

**Table 80 – Evaluation of the service regarding broadband consumers' expectations<sup>85</sup>**

Much better than expected	2.6%
Better than expected	17.8%
As expected	65.2%
Worse than expected	8.0%
Much worse than expected	0.8%
Doesn't know/Doesn't answer	5.7%

Source: Survey on the use of broadband in Portugal, 2005<sup>75</sup>

Analysing in detail some of the features of the service, it is possible to observe that the levels of satisfaction with the service's throughput and reliability are high, above 83 per cent. Satisfaction regarding invoicing transparency is slightly lower.

**Table 81 – Evaluation of the service regarding the service’s throughput, reliability and invoicing transparency**

	Speed	Reliability	Billing/Invoicing
Very satisfied	17.6%	32.0%	28.2%
Satisfied	67.7%	51.1%	48.3%
Unsatisfied / Not satisfied	9.3%	10.6%	10.0%
Very unsatisfied	2.6%	3.1%	3.3%
Doesn't know / Doesn't answer	2.8%	3.2%	10.3%

Source: Survey on the use of broadband in Portugal, 2005

Regarding complaints, 36 per cent of those interviewed have already filled a complaint with their operator. The table below shows that more than 40 per cent of those interviewed that filled a complaint were not satisfied with the way their problem was solved, which is a high figure.

**Table 82 – Evaluation of complaint solving<sup>86</sup>**

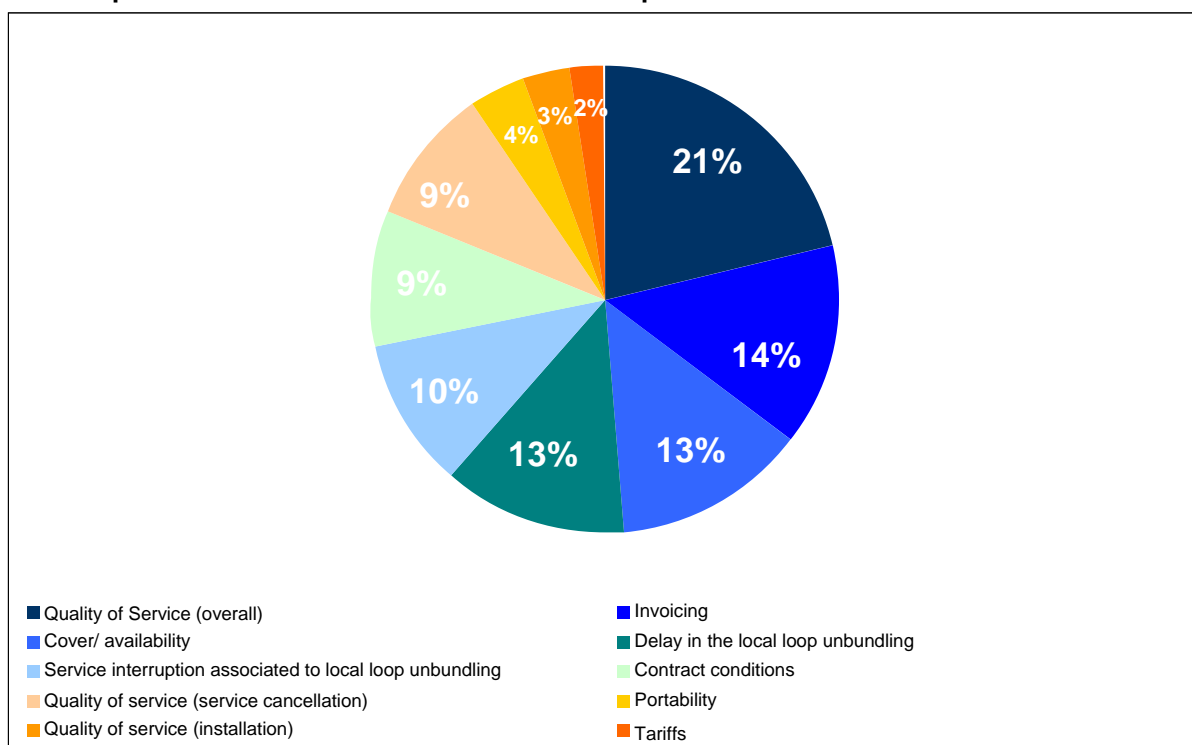
Very satisfied	17.0%
Satisfied	38.0%
Unsatisfied / Not satisfied	25.0%
Very unsatisfied	17.4%
Doesn't know / Doesn't answer	2.5%

Source: Survey on the use of broadband in Portugal, 2005

It should be mentioned that ICP-ANACOM’s UM-TSM (Mission Unit for the Handling of Market Requests) received during 2005 about 2,110 complaints regarding the Internet Access Service and corresponding providers.

Most of these requests concern the service’s global quality (21 per cent) and invoicing (14 per cent). The figures concerning coverage and availability (13 per cent) and the issues relating to the delay in the local loop unbundling (13 per cent) are also a considerable proportion of the complaints that were put forward.

**Graph 98 – Distribution of the number of complaints received at ICP-ANACOM – 2005**



Source: ICP-ANACOM

#### II.5.4.8 Development of competition

As shown on the following table, there was in 2005 an inversion in the growth trend of Grupo PT’s broadband shares. At the end of the year the alternative operators’ market share was 23 per cent, about 4.2 per cent above that of 2004.

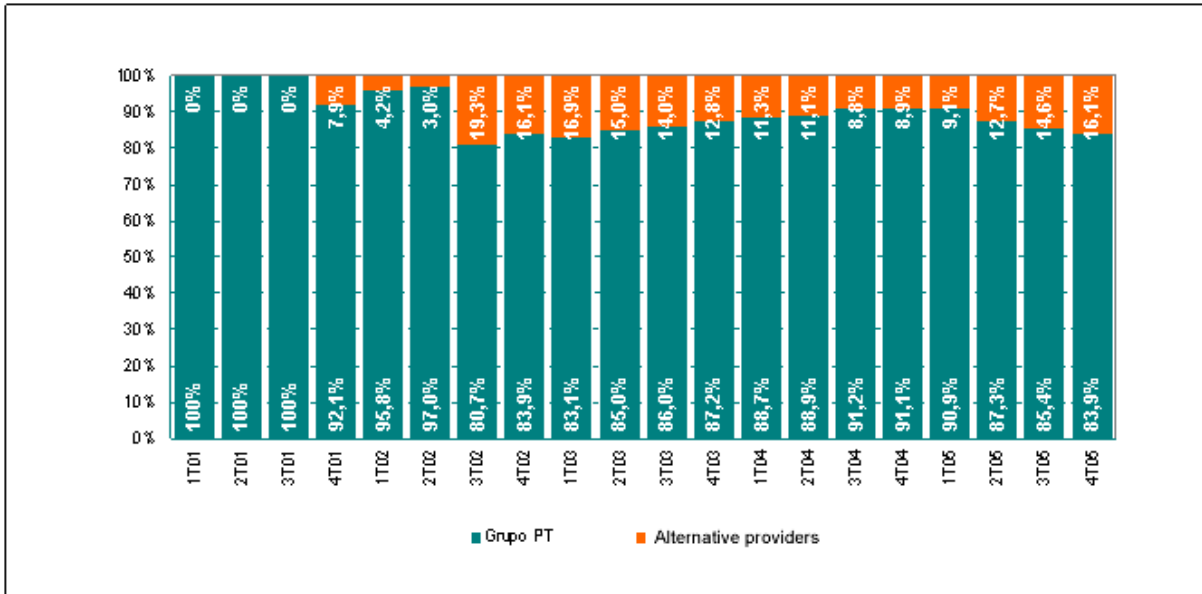
**Table 83 – Grupo PT’s market shares of broadband subscribers**

	2000	2001	2002	2003	2004	2005
Customers total	71.5%	66.0%	70.5%	78.3%	81.2%	77.0%
ADSL access customers	n.a.	92.1%	83.9%	87.2%	91.1%	83.9%
Cable modem access customers	74.6%	66.1%	67.6%	73.5%	71.8%	67.8%
Dedicated access customers	33.4%	34.9%	40.7%	41.0%	44.9%	45.3%

Source ICP-ANACOM

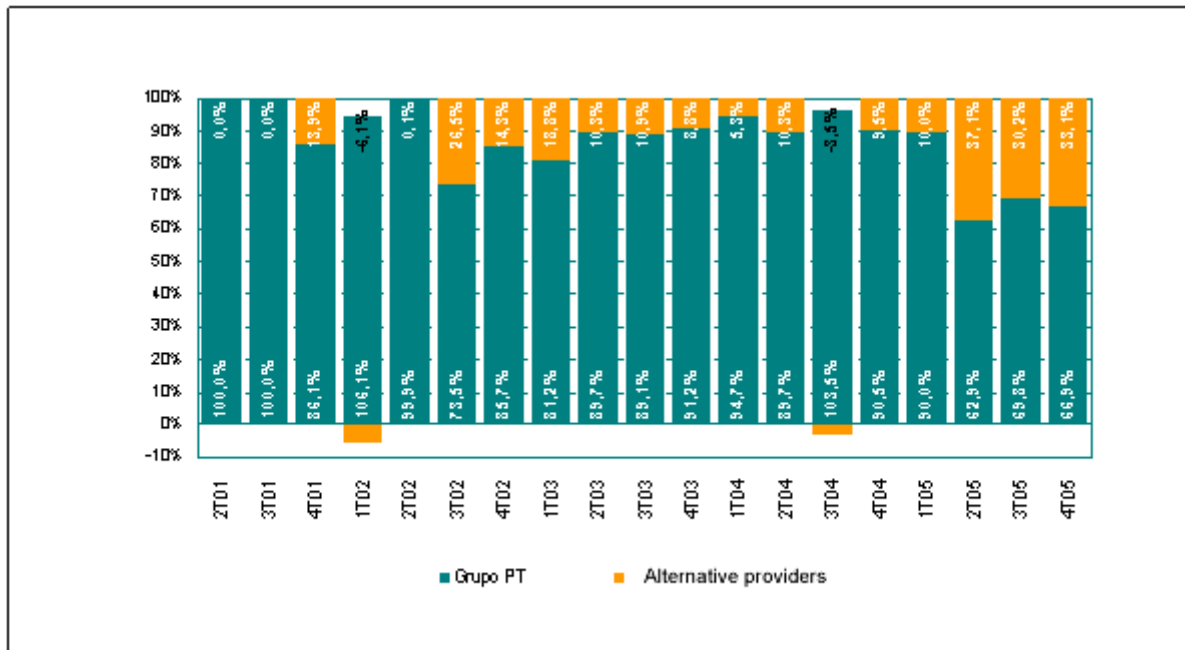
This trend is reflected on both main access technologies, with highlight to the 7.2 per cent raise in the new operators’ share in the ADSL access. Contribution to the expansion of the new operators’ broadband share came from the growth in the number of unbundled loops, reflecting the operators’ purpose of reaching consumers directly, and the improvement of the LLRO.

**Graph 99 – Evolution of ADSL access subscriber shares**



Source: ICP-ANACOM

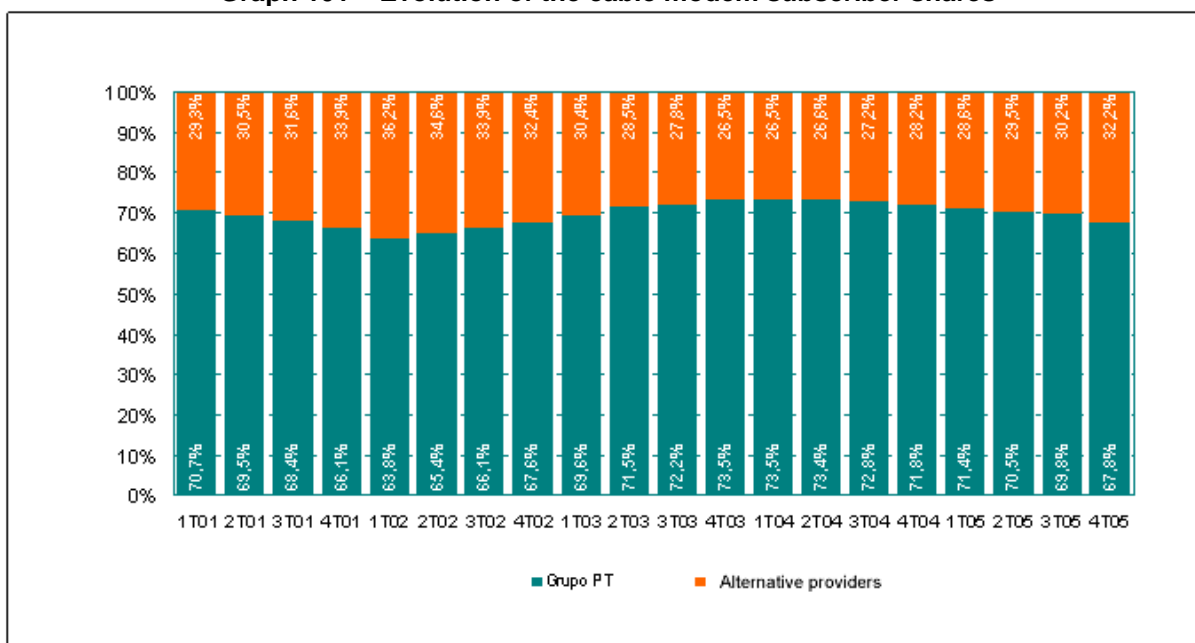
**Graph 100 – Evolution of the ADSL access subscribers' quarterly marginal shares**



Source: ICP-ANACOM

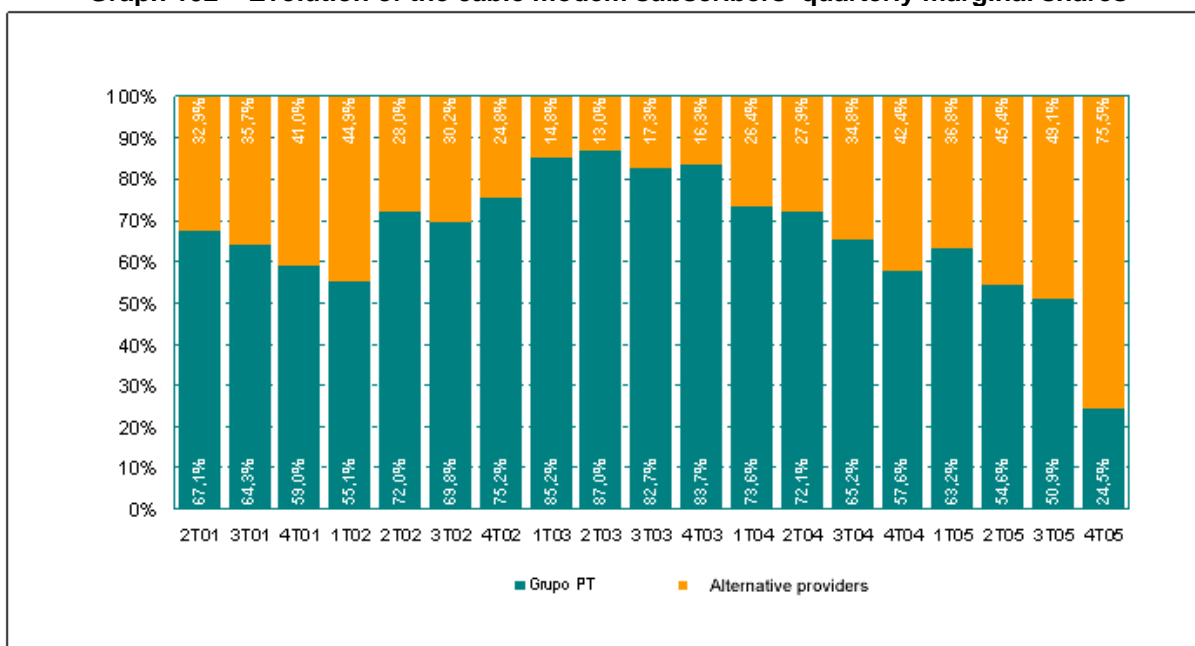
Concerning access using cable modem, in 2005 about 52 per cent of new clients were the alternative providers', against 33 per cent in 2004.

**Graph 101 – Evolution of the cable modem subscriber shares**



Source: ICP-ANACOM

**Graph 102 – Evolution of the cable modem subscribers' quarterly marginal shares**



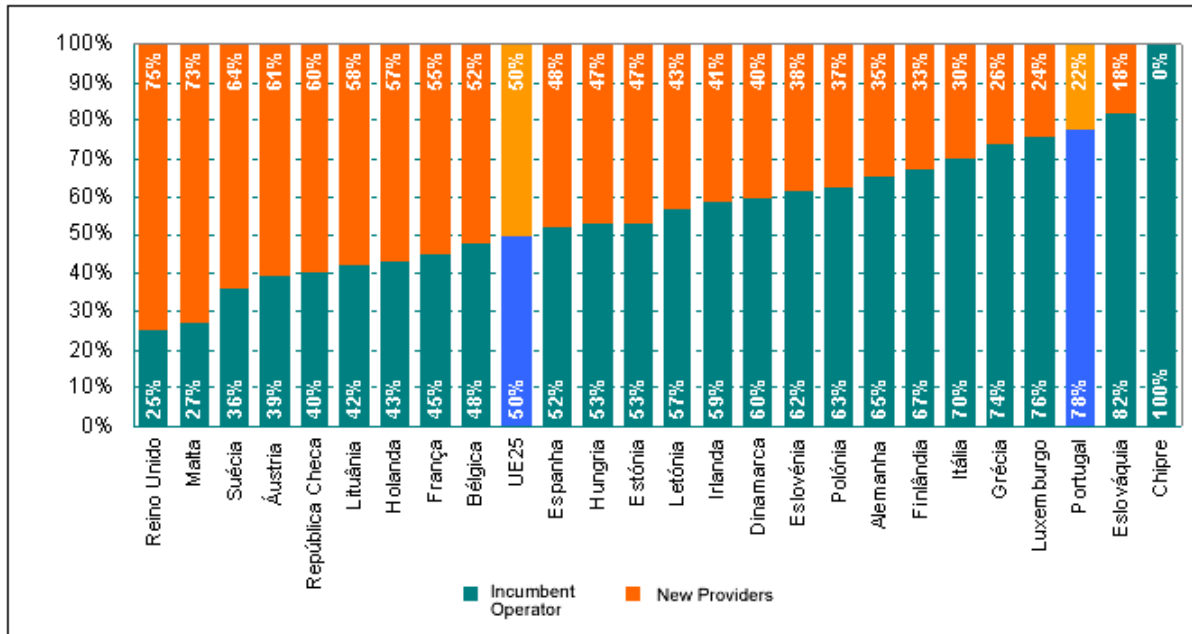
Source: ICP-ANACOM

Comparing the aforementioned results with the shares of the incumbent operators in the EU, in the 3rd quarter of 2005 the share of the incumbent operator in Portugal (78 per cent) is above the European average. This may be the result of Portugal being the only country in the EU where the incumbent is the main holder of the cable



distribution network, a technology which, as previously mentioned, still stands for more than 40 per cent of the installed accesses – with more than two thirds (67.8%) belonging to Grupo PT (TV Cabo and Cabo TV Madeirense)

**Graph 103 – Broadband access shares in the Internet Access Service in the EU25**



Source: European Commission, 11th Implementation Report.

Lastly, in the case with dial-up, Grupo PT’s share at the end of 2005 stood at 28 per cent.