

# **International benchmarking study of Internet access (dial-up and broadband)**

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## Summary

### Scope

S.1 This report is an international benchmarking study of Internet access covering both basic dial-up access and broadband services (DSL and cable modem). The report covers Internet services in France, Germany, Sweden, United Kingdom and the US (the States of Ohio and California are used for dial-up services; the study covers a number of the largest providers of broadband who offer services across a range of States).

S.2 This study is a follow up to the study published by Oftel in December 2001 on dial-up and broadband Internet, based on August 2001 prices. Oftel has carried out the analysis and drafting of this report. An independent consultant, Analysys Ltd, has audited the models developed by Oftel used to generate the results contained in this report. The tariff data used in this report have been collected by consultants Total Romtec<sup>1</sup>.

S.3 A more detailed comparison of the broadband markets, and of the wholesale DSL products available, in France, Germany and the UK has also been included.

S.4 Points that should be borne in mind in interpreting the results are detailed in paragraphs 1.8 – 1.11 of this report. This report is not intended in any way to be a buyer's guide to services in the UK.

S.5 The results presented are based on a snapshot of prices as at 26 February 2002. However, prices for DSL in the UK have reduced significantly since February and a partial update has been carried out based on April 2002 tariffs.

### Results for 'basic' Internet access

S.6 Tables 1, 2 and 3 show the results for the price index for basic Internet access (ie Internet access for consumers who have no particular requirement for access speed), for residential off-peak usage, residential peak usage and for business users respectively. This is expressed relative to the UK price index.

S.7 These results show that, based on the sample of ISPs/operators selected:

- for residential consumers, UK prices are cheaper than all other countries in the study by at least 9% for unmetered services. For peak limited usage the UK compares favourably with all countries and for off-peak the UK compares favourably with the US and France but prices are above those in Germany and Sweden; and
- for business consumers, UK prices for unmetered services are well below those in France and Sweden, but above those in Germany and the US. UK prices for limited usage services are above prices seen elsewhere.

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<sup>1</sup> April 2002 data has been collected by Oftel

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S.8 In the UK and US, unmetered dial-up services are widely available. In the other European countries this is not the case, and broadband services are more cost effective than dial-up for consumers with high usage. The results are based on the average of the two cheapest available options, and hence include some broadband packages.

**Table 1: Comparison of residential off peak Internet access prices**

	<b>basket 1 res</b>	<b>basket 2 res</b>	<b>basket 3 res</b>	<b>basket 4 res</b>	<b>basket 5 res</b>	<b>Average</b>		<b>Unmetered res</b>
(UK=100)	2.7 hours per month	10 hours per month	20 hours per month	30 hours per month	40 hours per month	Metered baskets only		Off-peak
France	114	100	102	108	108	106		134
Germany	63	84	94	103	120	93		126
Sweden	65	73	96	112	113	92		113
UK	100	100	100	100	100	100		100
US, CA	206	129	98	109	109	130		109
US, OH	206	126	99	112	112	131		112

**Table 2: Comparison of residential peak Internet access prices**

	<b>basket 2p res</b>	<b>basket 3p res</b>	<b>basket 4p res</b>	<b>basket 5p res</b>	<b>Average</b>		<b>Unmetered res</b>
(UK=100)	10 hours per month	20 hours per month	30 hours per month	40 hours per month	Metered baskets only		Peak
France	95	102	108	108	103		134
Germany	99	106	114	126	111		126
Sweden	124	111	113	113	115		113
UK	100	100	100	100	100		100
US, CA	123	98	109	109	110		109
US, OH	120	99	112	112	111		112

**Table 3: Comparison of business Internet access prices**

	<b>basket 6 bus</b>	<b>basket 7 bus</b>	<b>basket 8 bus</b>	<b>basket 9 bus</b>	<b>basket 10 bus</b>	<b>Average</b>		<b>Unmetered bus*</b>
(UK=100)	9.6 hours per month	10 hours per month	20 hours per month	30 hours per month	40 hours per month	Metered baskets only		
France	37	35	52	63	81	54		375
Germany	52	49	58	64	69	58		80
Sweden	48	48	67	84	93	68		123
UK	100	100	100	100	100	100		100
US, CA	68	64	61	60	60	63		73
US, OH	68	64	61	60	60	63		73

\* only one package used for this, due to the limited number of packages in some countries

S.9 The results show a slight movement compared to the results in the August 2001 report:

- for residential services, UK prices are now below those in the US, this is due to the discontinuation of the cheapest US offerings. Price falls for metered

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services in Sweden and France have seen indexes for these countries move closer to that for the UK;

- for limited business use the UK still offers the most expensive services, and the gap has widened. This is due to price decreases in most countries and the discontinuation of the cheapest packages in the UK.

### **Results for broadband Internet access**

S.10 Table 4 and Table 5 show the results for the price level, price index (relative to the UK) and bandwidth provided for broadband residential and business services.<sup>2</sup> The results are based on the average of the two cheapest deals available from the ISPs covered in this research (it is not possible to include all operators and this study may not represent the cheapest deals available in every case). Prices shown include the monthly subscription, as well as set up costs spread over three years. Results are presented both with and without cable modem offers included.

S.11 In April 2002, BT made significant cuts to the prices of their wholesale DSL services. For example IPStream 500, which is used to provide DSL services to residential consumers, was reduced from £30 a month to £14.75 a month, a reduction of over 50%, and this has filtered through to retail prices. This has had a big impact on the results for the UK and a snapshot from April 2002 has been included. While it was not possible to recheck tariffs for all operators from other countries, tariffs for the two operators with the cheapest February prices have been rechecked as at April 2002. It was found that only the UK had any significant changes in broadband prices.

### ***Residential broadband services***

S.12 Table 4 shows the results for the price level, price index (relative to the UK) and (downstream) bandwidth provided for broadband residential services. The results are based on the average of the two cheapest deals available from the service providers covered in this study as at February 2002. The results for April 2002 are also included.

S.13 From Table 4 it is seen that as at February 2002:

- when cable modem services are included, prices in the UK are almost the same as in Germany and the US, and below prices in France; only in Sweden are prices lower than in the UK; and
- when cable modem services are excluded (ie a comparison of DSL services only) UK prices are higher than in all countries.

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<sup>2</sup> 'Broadband' has been defined as an always on service with a downstream capacity greater than 128kbit/s.

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S.14 However, with the **April 2002** price cuts:

- for DSL services only (ie cable modems excluded), prices in the UK have fallen by 22% and the UK is now cheaper than Germany and France. Although the UK remains more expensive than the US and Sweden, the index gap has narrowed; and
- the UK has improved only marginally when cable modems are included. This is due to the fact that the two cheapest broadband services in the UK are cable services. The slight drop in the index is a result of a decrease in price for one of the cable modem services.

**Table 4: Results for price level, price index and (downstream) bandwidth for residential broadband services**

	Include cable modems			Exclude cable modems		
	Price level £/month	Price index	Bandwidth kbit/s	Price level £/month	Price index	Bandwidth kbit/s
France	35	130	512	35	91	512
Germany	27	100	512	32	84	768
Sweden	21	78	512	24	63	512
UK	27	100	512	38	100	506
US	27	99	256	27	69	256
UK (April 2002)	26	99	512	30	78	512

S.15 When cable modem services are included, the UK's relative position has declined somewhat compared to the results as at August 2001 (although prices have changed by only £1-£2 a month). When results for DSL services only are considered, the UK position is seen to have improved over the period August 2001 to February 2002 and improved again from February 2002 to April 2002.

S.16 The two cheapest services in the US, which are DSL services, provide a downstream speed (and an upstream speed) of 256kbit/s, whereas the UK services have downstream speeds of 512kbit/s. Comparing UK and US DSL services that both have a minimum downstream speed of 512kbit/s, the UK is cheaper than the US as at April 2002 (though it was more expensive than the US as at February 2002). The US does not offer services at 512kbit/s, and, setting the minimum speed at 512kbit/s, the average speed of the cheapest two US DSL services is 624kbit/s.

### **Business broadband services**

S.17 Table 5 shows the results for the price level, price index (relative to the UK) and bandwidth provided for broadband business services, for a variety of consumer types. The results are based on the average of the two cheapest deals available as at February 2002. The results for April 2002 are also included.

S.18 From Table 5 it is seen that as at February 2002:

- for the most basic services available to business (ie where the business has a minimum bandwidth requirement of 129kbit/s):
  - prices in Sweden and the US are around 15% cheaper than in the UK;

- prices in Germany are about 17% more expensive than the UK; and
- prices in France are significantly more expensive than in all other countries, but provide a higher bandwidth.
- for business services where a minimum *geometric mean*<sup>3</sup> bandwidth of 500kbit/s is required:
  - prices in Sweden and the US are very much lower than elsewhere;
  - prices in the UK are about the same as France and Germany; and
  - the bandwidth in the UK is about the same as in France and Sweden but less than in Germany and the US.
- for business services where a minimum *geometric mean* bandwidth of 1000kbit/s is required:
  - services are only available in Germany, Sweden and the US;<sup>4</sup> and
  - prices in Germany are much more expensive than Sweden or the US.

S.19 However with the April 2002 price cuts:

- for the most basic services available to business (ie where the business has a minimum bandwidth requirement of 129kbit/s):
  - the UK has improved its relative position and prices are now cheaper than all other countries studied; and
- for business services where a minimum *geometric mean* bandwidth of 500kbit/s is required:
  - the April price index shows that the UK's relative position improves with the recent price drops and the UK is now 18% cheaper than France and Germany and the gap with Sweden and the US has narrowed.

**Table 5: Results for price level, price index and bandwidth for business broadband services (cable modem services included)**

	No minimum bandwidth			Minimum GM bandwidth of 500 kbit/s			Minimum GM bandwidth of 1000 kbit/s		
	Price level £/month	Price index	Bandwidth – DS kbit/s	Price level £/month	Price index	Bandwidth – GM Kbit/s	Price level £/month	Price index	Bandwidth – GM kbit/s
France	120	277	1,000	120	100	506			
Germany	50	117	456	121	101	618	380		1,000
Sweden	36	83	512	36	30	512	117		1,012
UK	43	100	506	120	100	503			
US	37	85	942	56	46	699	98		1,100
UK (April)	29	68	512	98	82	506			

Note: DS = downstream, GM = geometric mean

S.20 The UK's relative position for the most basic services in February 2002 is similar to that in August 2001, except that there has been an increase in French prices. When the April 2002 price falls are considered, the UK's position improves and the price index relative to February 2002 is 32% lower.

<sup>3</sup> The geometric mean is defined as: square root (downstream bandwidth x upstream bandwidth).

<sup>4</sup> While both France and the UK offer services with a *downstream* bandwidth of at least 1000kbit/s, these services are asymmetric and the geometric mean bandwidth is less than 1000kbit/s.

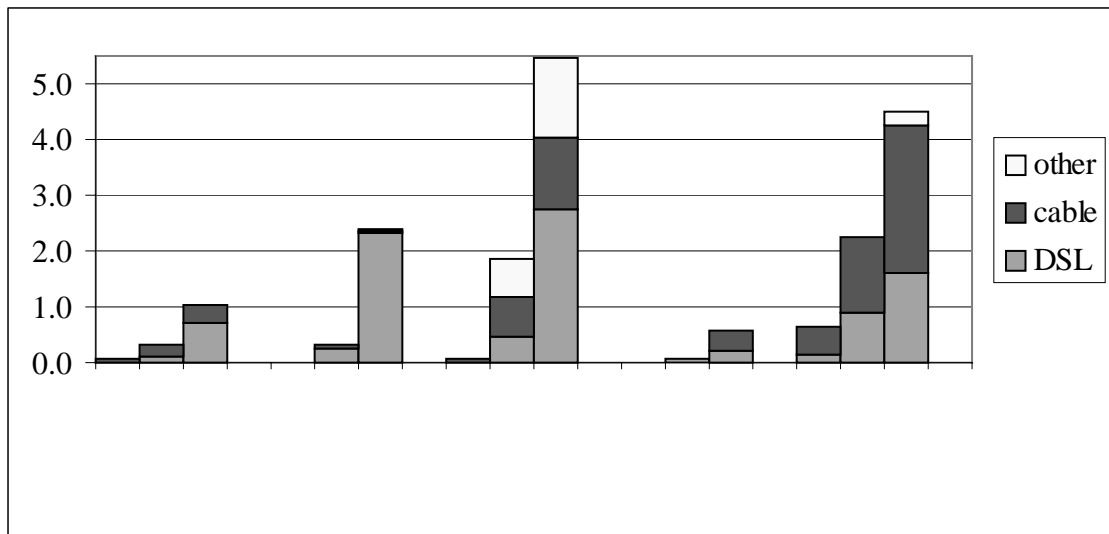
S.21 When there is a minimum bandwidth of 500 kbit/s the UK's relative position in February 2002 compared to August 2001 is similar relative to Sweden and the US, has improved against France and has deteriorated relative to Germany, where there have been price cuts. When April 2002 price drops are considered the UK's position has improved relative to that in August 2001.

### ***Take-up and availability of broadband services***

S.22 Data on take up is presented as a percentage of population (using OECD population figures for 1999) in Figure 1. Broadband take-up rates in each country are shown as at end 1999, end 2000 and end 2001.

S.23 While current levels of broadband take-up are low (below 5% of population) in all of the countries benchmarked, take-up in the US and Sweden is markedly higher than in the other European countries. It is noted that all countries tend to show a period of relatively slow take-up initially, followed by acceleration in the take-up rate. It is noted that broadband services were launched later in the UK than in other countries and this later start should be borne in mind when viewing this chart.

**Figure 1: Broadband take-up per 100 population by country for end 1999, end 2000 and end 2001.**



Source: OECD, companies



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## Comparison of broadband markets in France, Germany and the UK

S.24 Oftel has undertaken a more detailed analysis of the broadband market in France, Germany and the UK, looking in particular at the availability and pricing of end to end wholesale products.<sup>5</sup> Key conclusions are:

- while penetration of broadband services in the UK is behind that in France and Germany, the UK market is more competitive both in terms of infrastructure competition and service provider competition;
- prices for end to end wholesale DSL products in the UK are below both current French prices and the new prices proposed by France Telecom for residential DSL (note the ART, the French Telecoms regulator has concerns that the new prices proposed are anti-competitive), while there are no end to end wholesale DSL products in Germany;
- the relationship between wholesale and retail prices differs by country and by service provider (SP):
  - BT's wholesale prices allow SPs a 'margin' compared to their retail prices (ie wholesale prices clearly below SP retail prices), with a range of SP prices offered;
  - France Telecom's current wholesale prices do not allow a SP margin (based on ART's assumptions);
  - the situation in Germany is less clear, as wholesale prices are not published and appear to differ substantially for different SPs;
- wholesale DSL products in the UK are clearly transparent and non-discriminatory, while this is more difficult to assess in France and Germany; and
- there is a more straightforward 'one-stop shop' for consumers in the UK compared to Germany, and to some extent France.

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<sup>5</sup> 'End to end wholesale products' are defined as products offered by the incumbent allowing provision of a DSL service from an end user, across the incumbent network, right up to the service provider's point of presence.

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## Chapter 1

### Introduction

1.1 Oftel's aim is to provide the best possible deal for telecommunications customers in terms of quality, choice and value for money through effective competition. International comparisons of telecoms services are one way of assessing the achievement of this aim.

1.2 Oftel carries out regular reviews of the major telecom markets to determine the appropriate level of regulation for the future. Regular benchmarking exercises allow a time trend to be developed, which provides greater information than a single snapshot. The results in this report will form part of the data input for future reviews.

1.3 This study focuses on comparing the cost for representative users for Internet access in each country using a 'basket' methodology. Oftel has carried out its own benchmarking work (as opposed to using alternative published sources) to ensure that the methodology is rigorous and robust and that it addresses the following issues:

- usage baskets need to reflect a range of patterns of use representative of different groups of consumers; and
- consumers have a potentially wide range of choices for their telecoms services:
  - consumers have a choice of competing operators all of whom will offer different packages; and
  - each operator may offer a variety of different packages and discount schemes targeted at different segments of the market.

Price comparisons need to take into account the range of products available to the consumer.

1.4 The following countries are included in the analysis:

- France;
- Germany;
- Sweden;
- UK; and
- US (the States of Ohio and California are considered for dial-up Internet access; the study covers a number of the largest providers of broadband who offer services across a range of States).

1.5 This study is a follow up to the study published by Oftel in December 2001<sup>6</sup>, which was based on tariff data valid as at August 2001. A list of the 'tariffs valid at date and date of publication of previous studies is given in Table 1.1;

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<sup>6</sup> *International benchmarking study of Internet access (dial-up and broadband)*, published December 2001

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**Table 1.1: List of previous studies**

No.	Tariffs valid at date	Date published	Internet services covered	Report prepared by
1.	February 2000	April 2000	DSL	Analysys
2.	February 2000	May 2000	Dial-up	Teligen
3.	August 2000	December 2000	Dial-up	Oftel
4.	October 2000	January 2001	DSL and cable modem	Oftel
5.	February 2001	June 2001	Dial-up	Oftel
6.	August 2001	December 2001	Dial up, DSL and cable modem	Oftel
7.	February 2002*	June 2002 (current study)	Dial up, DSL and cable modem	Oftel

Reports can be found at: [www.oftel.gov.uk/publications/research/index.htm](http://www.oftel.gov.uk/publications/research/index.htm)

\* Some data for April 2002 has also been collected.

1.6 The analysis and drafting of this report has been carried out by Oftel. The models developed by Oftel used to generate the results contained in the report have been audited by an independent consultant, Analysys Ltd, who confirm the following:

- the models are logically sound (ie they correctly implement the methodology described in this report); and
- the tariff data have been checked and have been correctly entered and interpreted.

1.7 Data has been collected from the vast range of tariff packages available to residential and small/medium sized businesses, for major operators and service providers in each country as at February 2002. The tariff data used in this report have been collected by consultants Total Romtec. Oftel has also collected additional data for April 2002.

### Points to bear in mind

1.8 There are a huge range of operators and service providers offering services to consumers and it is not possible to cover all packages on offer. In addition, it is not possible to fully capture all aspects of innovative tariff products. While it is believed that the sample chosen is fully representative and covers the range of offers available by country, the possibility that consumers have access to additional offers outside the range calculated for the sample used in this report cannot be excluded. Not all tariffs included will be available to all consumers in a particular country.

1.9 The objective of this report is to provide a comparison between countries for a range of consumer usage profiles. A range of profiles is chosen to be illustrative of the most frequent types of customer calling patterns, but is not comprehensive. **Prices are based on a snap shot as at 26 February 2002.** Although providing a sound overall picture, the comparison of companies *within* a country should not be taken as necessarily being representative for an individual consumer.

1.10 The analysis is based on a basket methodology, which allows prices to be compared across different operators in different countries. It is not, however, intended to be a buyer's guide to services as:

- it provides only a snapshot of the price levels for a continually changing set of price packages; and
- the residential or business consumer will have to use more specific usage information in order to determine the best option for that person or business.

The objective is to illustrate the scale and level of prices available to consumers in different countries.

1.11 There are separate industry funded initiatives and reports which seek to help UK consumers be better informed purchasers of telecommunications services (examples are: individual enquiry based price comparisons such as – *www.phonebills.org.uk*; fixed and mobile quality of service indicators – *www.cpi.org.uk* and *www.oftel.gov.uk*; and information for small businesses about using telecoms and the internet – *www.telecomsAdvice.org.uk*). OfTel is also planning to launch an accreditation scheme for price comparison services later in 2002, which will raise consumer awareness of and confidence in such services. This report is **not** part of that body of work as it seeks to compare positions between, not within, countries and it is not, therefore, intended in any way to be a buyer's guide to services in the UK.

### **Outline of the report**

1.12 There are three subsequent chapters which present the results for:

- Internet access – basic (Chapter 2);
- Internet access – broadband (Chapter 3); and
- comparison of broadband markets in France, Germany and the UK (Chapter 4).

1.13 In general, the methodology used is very similar to that used in previous reports. The methodology is designed to allow a comparison to be made of dial-up services and broadband services as well as allowing a comparison to be made of the gap between unmetered dial-up and broadband products in each country.

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## Chapter 2

### Internet access – basic

#### Introduction

2.1 This chapter covers ‘basic’ Internet access, ie access to the Internet by consumers who have no requirement for ‘high speed’ access. Mainly this will mean PSTN dial-up access, as this is usually the cheapest option. However, there are circumstances where other access mechanisms may be cheaper. In countries where unmetered PSTN dial-up access is not available, broadband access may be a cost effective alternative for consumers with high usage. In this chapter a range of access mechanisms are considered (ie PSTN and ISDN dial-up, DSL and cable modem) and the results then focus on the cheapest available options. Price comparisons for consumers requiring greater access speed, and the ‘always on’ facility, provided by DSL and cable modem, are presented in Chapter 3.

2.2 In January 2002 Oftel published an Effective competition review for dial-up narrow band Internet access and concluded that the retail market for dial-up access is effectively competitive. Past benchmarking studies formed part of the data input to this review. This study also forms part of the ongoing monitoring of the market for dial-up Internet access and the resulting time series will be used in subsequent reviews.

2.3 The results provide an update of the results presented in the December 2001 report (based on prices as at August 2001).<sup>7</sup> This study is the fifth in a series that started with a study carried out by Telingen for Oftel published in May 2000 (based on prices as at February 2000).

2.4 This chapter follows broadly the same format as the previous reports and shows:

- a summary of developments in the UK market over the last six months;
- a summary of the methodology used;
- results for business and residential consumers showing:
  - price indices for a range of baskets;
  - price movements over the last six months;
  - charts of the spread of offers by country;
- sensitivity analysis;
- detailed results; and
- conclusions.

2.5 Detailed results for all the packages modelled are shown in Annex B.

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<sup>7</sup> *International benchmarking study of dial-up PSTN Internet access, mobile and fixed line services*, published December 2001.

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## Market developments

2.6 Results from Oftel's latest consumer research (conducted in February 2002) show 46% of homes are connected to the Internet, compared to 39% in August 2001. Table 2.1 shows that:

- there has been an increase in the number of people subscribing to a unmetered service and a decrease in the number of people paying for calls only; and
- the average number of usage hours has increased for partially unmetered services and is static for unmetered services.

**Table 2.1: Residential Internet market developments from August 2001 to February 2002**

	Package				Hours per month			
	Partially unmetered	Unmetered	Subscription and calls	Calls only	Partially unmetered	Unmetered	Subscription and calls	Calls only
August 2001	12%	28%	18%	42%	35	56	34	17
February 2002	11%	32%	22%	34%	43	56	30	17

2.7 The results also show that around 59% of small and medium sized businesses are connected to the Internet, compared with 61% in August 2001. Table 2.2 shows that:

- the business market has been stable over the period August 2001 to February 2002;
- medium sized businesses are more likely to subscribe to an unmetered service; and
- most small and medium businesses use dial-up (PSTN or ISDN) to connect to the Internet.

**Table 2.2: Business Internet market developments from August 2001 to February 2002**

		Technology		Package		
		PSTN	ISDN	Sub & calls	Calls only	Unmetered
<b>August 2001</b>	Total	73%	28%	33%	30%	37%
<b>February 2002</b>	Total	67%	23%	27%	34%	38%
	Small businesses	69%	22%	27%	35%	38%
	Medium businesses	35%	39%	35%	13%	51%

## Methodology

2.8 The methodology remains as in the December 2001 report and details are not repeated here.

## Results for residential baskets

### *Price index for residential off-peak services*

2.9 The price index (based on the average of the two cheapest packages from different operators in each country) is presented in Table 2.3 for residential off-peak baskets.

**Table 2.3 Comparison of residential off peak package prices**

	<b>basket 1 res 2.7 hours per month</b>	<b>basket 2 res 10 hours per month</b>	<b>basket 3 res 20 hours per month</b>	<b>basket 4 res 30 hours per month</b>	<b>basket 5 res 40 hours per month</b>	<b>Average</b>	<b>Unmetered res Off-peak</b>
(UK=100)						Metered baskets only	
France	114	100	102	108	108	106	134
Germany	63	84	94	103	120	93	126
Sweden	65	73	96	112	113	92	113
UK	100	100	100	100	100	100	100
US, CA	206	129	98	109	109	130	109
US, OH	206	126	99	112	112	131	112

2.10 From Table 2.3 it can be seen that:

- UK prices are the cheapest for all countries included in the study for unmetered off-peak access;
- UK prices for metered services are more expensive than in Germany and Sweden and cheaper than in France and the US; and
- UK prices for metered access compare more favourably with the other European countries studied for the higher usage levels.

2.11 In several countries, cable modem or DSL services appear as the cheapest package for some baskets. In France, Germany and Sweden, there are no dial-up unmetered packages and prices for the unmetered basket are based on DSL/cable modem offers<sup>8</sup>. In Germany broadband packages start to become cost effective at 40 hours and in Sweden after 30 hours usage per month.

2.12 The results present a positive picture for the UK. There has been some movement in the UK's relative position:

- for metered services Germany, Sweden and France have seen a decrease in their service prices and the UK has seen an increase. This has led to Germany and Sweden now offering cheaper services than the UK for lower usage baskets;
- for unmetered services the US is now more expensive than the UK. This is due to the discontinuation of the cheapest service in the last report. France

<sup>8</sup> In Germany evidence was found of some ISPs offering unmetered dial-up access on a limited basis (eg limited to a small number of new subscriptions per month or to a small geographical area. These have not been included in the analysis).

had a decrease of 24% across baskets bringing it closer in line with the other European countries.

### *Price trend*

2.13 A summary of price changes since the December 2001 study is provided in Table 2.4. The average price change shown is the mean of the percentage changes across each of the original 5 baskets.

**Table 2.4 Percentage change in price levels for residential off-peak baskets August 2001- February 2002**

	<b>basket 1 res</b>	<b>basket 2 res 10 hours</b>	<b>basket 3 res 20 hours per month</b>	<b>basket 4 res 30 hours per month</b>	<b>basket 5 res 40 hours per month</b>	<b>Average metered baskets only</b>	<b>Unmetered res</b>
(UK=100)	2.7 hours per month,	hours per month	per month	per month	per month	per month	
France	12%	-16%	-2%	-12%	-13%	-6%	-24%
Germany	4%	0%	-7%	-1%	0%	-1%	1%
Sweden	-14%	-14%	-9%	7%	8%	-4%	8%
UK	14%	0%	2%	5%	5%	5%	5%
US, CA	25%	28%	28%	24%	24%	26%	24%
US,OH	25%	29%	29%	21%	21%	25%	21%

2.14 From Table 2.4 it is seen that:

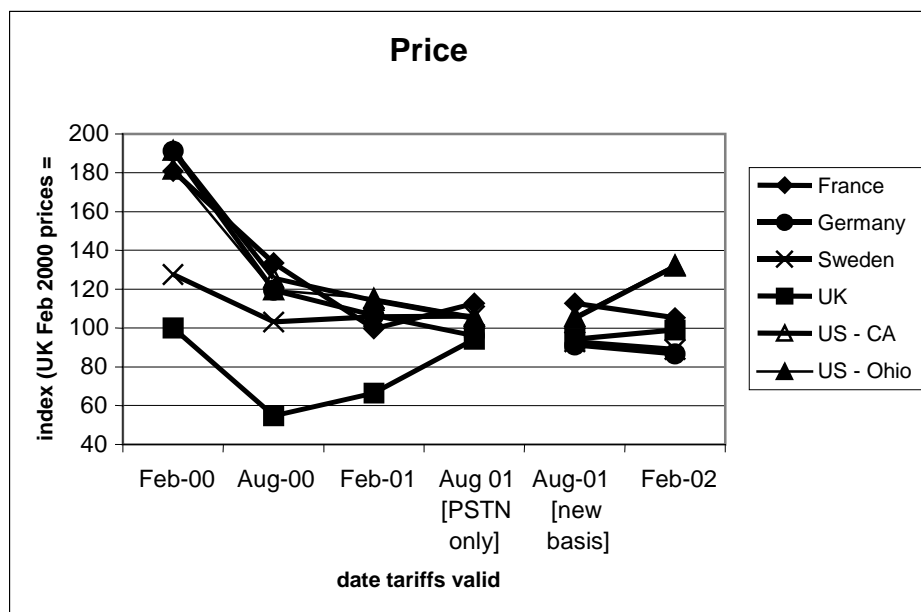
- prices in the UK have risen slightly for all baskets;
- overall prices for limited usage have fallen in Sweden, France and Germany and have risen in the US by an average of 25%. This is due to the discontinuation of the cheapest service in the last report; and
- prices for unmetered Internet access have risen slightly in the UK and Germany and more significantly in the US. Prices have fallen in France.

2.15 However, price changes need to be considered together with price levels. The following chart (Figure 2.1) shows price changes for metered baskets relative to UK prices as at February 2000. Over the period February 2000 to February 2002 there has been some convergence of prices across most of the countries benchmarked.

2.16 Since August 2001 the results have been based on a new methodology (ie including broadband products). For August 2001 a comparison of PSTN only and the new methodology have been included to ensure a consistent comparison can be made throughout the period.



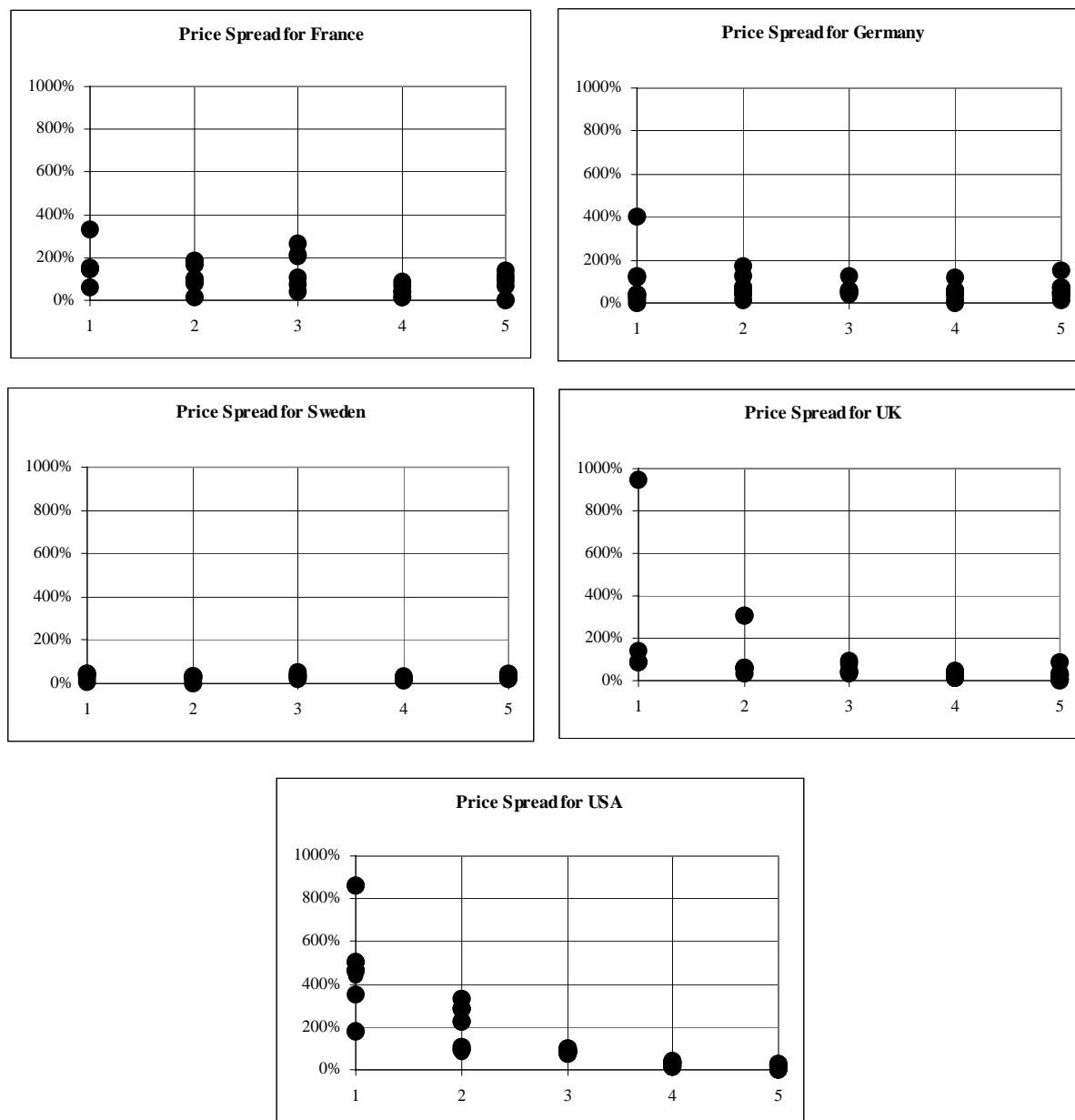
**Figure 2.1: Price trends by country from February 2000 to February 2002 for residential off-peak limited use baskets**



### *Price spread*

2.17 The spread of prices was also considered. To make this meaningful, only dial-up packages have been included (otherwise the spread for the low usage baskets would be very wide, as broadband offers are not appropriate for these usage levels). The charts in Figure 2.2 show the price for the cheapest package offered by each operator as a percentage above the cheapest price across all countries, for each basket. Amongst other things, the price spread provides an indication of the level of choice for customers at, or around, the best deal. Figure 2.2 shows that the spread of prices varies by basket. The spread of unmetered prices is not presented due to the relatively small number of dial-up packages currently on offer, ie available only in the UK and US.

2.18 The price spread for low usage baskets is particularly large for the UK and the US. In these countries there are some operators who offer only unmetered/partly unmetered packages and these are not cost-effective at low levels of usage. For higher usage the spread is generally narrower, with the highest spreads seen in Germany and France and the lowest in Sweden and the US.

**Figure 2.2 Price spread charts for residential off-peak baskets (dial-up only)**


*baskets are shown in order of usage level*

### **Price index for residential peak services**

2.19 The price index (based on the average of the two cheapest packages from different operators in each country) is presented in Table 2.5 for residential peak baskets.

**Table 2.5 Comparison of residential peak package prices**

	<b>basket 2p res 10 hours per month</b>	<b>basket 3p res 20 hours per month</b>	<b>basket 4p res 30 hours per month</b>	<b>basket 5p res 40 hours per month</b>	<b>Average</b>	<b>Unmetered res Peak</b>
(UK=100)					Metered baskets only	
France	95	102	108	108	103	134
Germany	99	106	114	126	111	126
Sweden	124	111	113	113	115	113
UK	100	100	100	100	100	100
US, CA	123	98	109	109	110	109
US, OH	120	99	112	112	111	112

2.20 From Table 2.5 it is seen that:

- overall, UK prices for limited use are cheaper than all other countries studied, although France and Germany are cheaper on the lowest use basket; and
- for unmetered access, UK prices are also the lowest of all countries studied.

2.21 As for the off-peak baskets, in several countries, cable modem or DSL services appear as the cheapest package for some baskets. In France, Germany and Sweden there are no dial-up unmetered packages, and prices for the unmetered basket are based on DSL/cable modem offers. In Germany cable modem and DSL packages start to become cost effective at 30 hours and in Sweden at 20 hours usage per month.

2.22 The results present a positive picture for the UK. There has been some movement in the UK's relative position and the UK now has the cheapest Internet offering in all countries including the US, although the gap with France has narrowed.

#### *Price trend*

2.23 A summary of price changes since the December 2001 study is provided in Table 2.6. The average price change shown is the mean of the percentage changes across each of the original four baskets.

**Table 2.6 Percentage change in price levels for residential peak baskets  
August 2001 – February 2002**

(UK=100)	basket 2p res 10 hours per month	basket 3p res 20 hours per month	basket 4p res 30 hours per month	basket 5p res 40 hours per month	Average Metered baskets only	Unmetered res peak
France	-16%	-2%	-12%	-13%	-11%	-24%
Germany	8%	-1%	9%	4%	5%	1%
Sweden	-20%	3%	8%	8%	0%	8%
UK	1%	1%	4%	4%	3%	4%
US, CA	28%	28%	24%	24%	26%	24%
US,OH	29%	29%	21%	21%	25%	21%

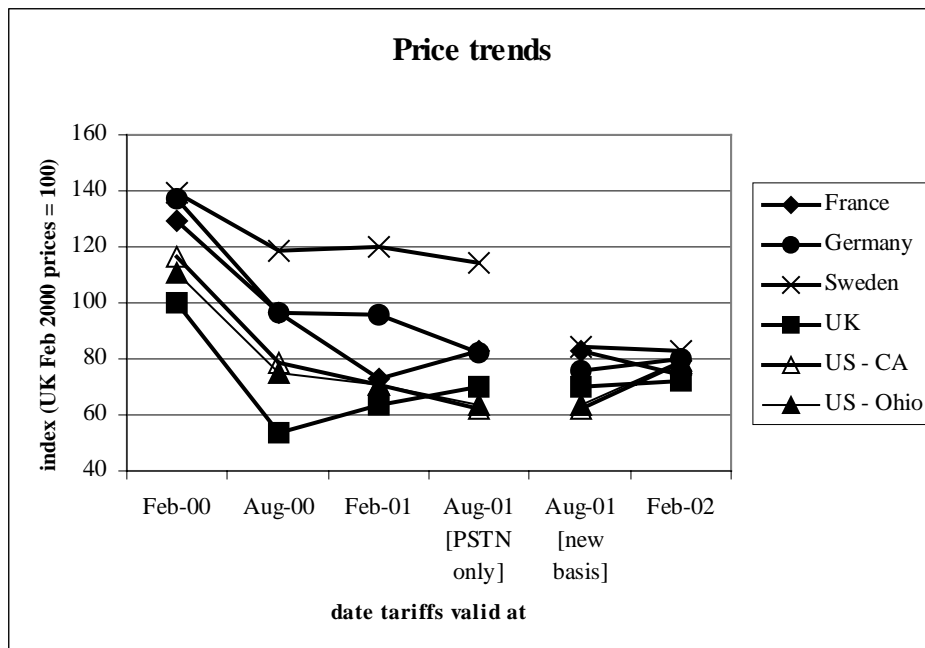
2.24 From Table 2.6 it is seen that:

- overall there has been a slight increase in the price of metered baskets in the UK, Sweden and Germany, and a significant rise in the US, this is due to the discontinuation of the cheapest US package;
- prices for metered Internet access have fallen in France; and
- prices for unmetered dial-up access have risen slightly in the UK and Sweden, and have risen more significantly in the US. Prices in France have fallen.

2.25 However, price changes need to be considered together with price levels. The following chart (Figure 2.3) shows price changes for metered baskets relative to UK prices as at February 2000. In the last six months there has been some price convergence across all countries included in the results.

2.26 Since August 2001 the results have been based on a new methodology (ie including broadband products). For August 2001 a comparison of PSTN only and the new methodology have been included to ensure some comparison can be made throughout the period. The spread of prices is much narrower when broadband services are included.

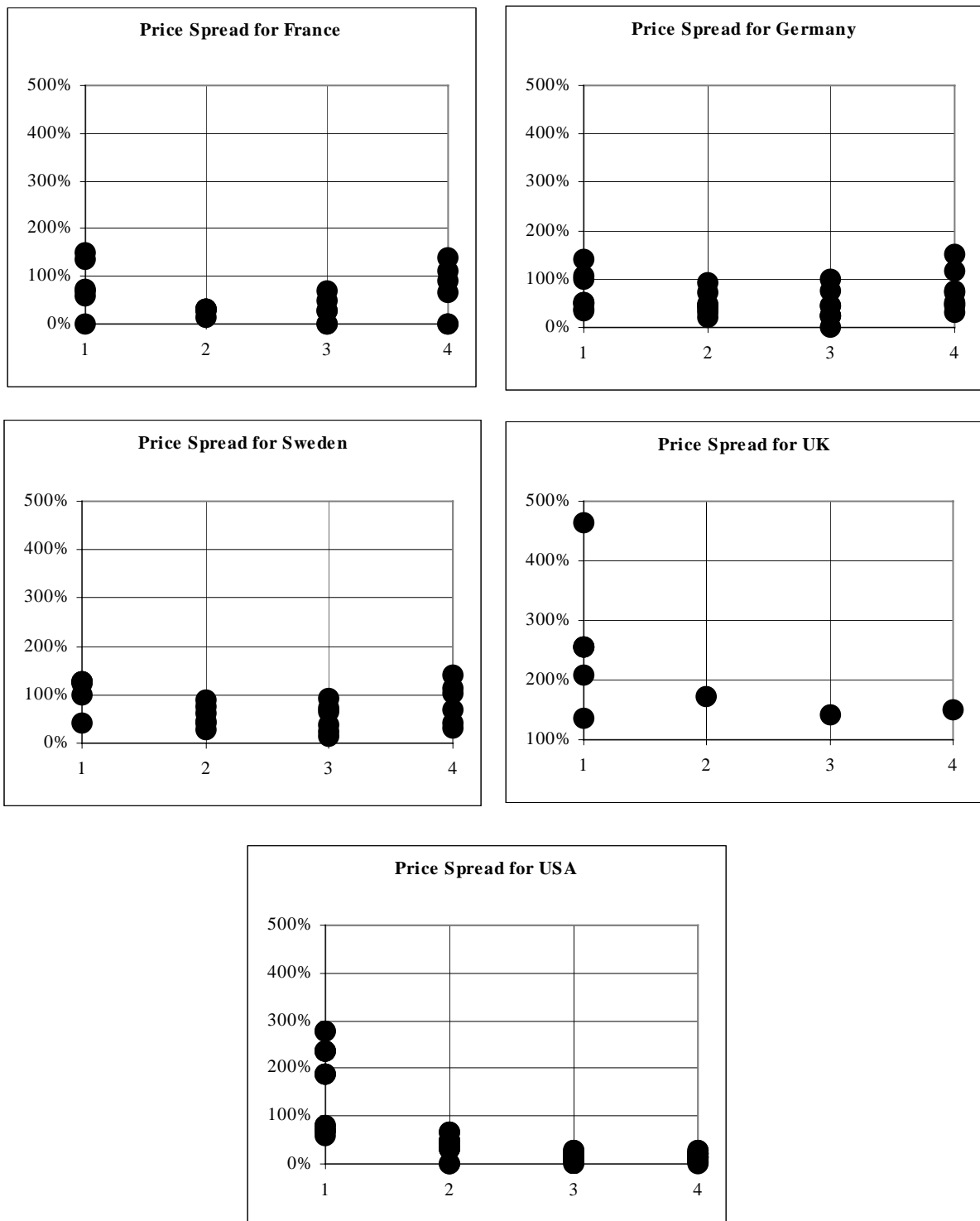
**Figure 2.3: Price trends by country from February 2000 to February 2002 for residential peak limited use baskets**



### *Price spread*

2.27 The spread of prices was also considered. To make this meaningful, only dial-up packages have been included (otherwise there would be a very wide spread for the low usage baskets, as this would include broadband offers not appropriate to these usage levels). The charts in Figure 2.4 show the price for the cheapest package offered by each operator as a percentage above the cheapest price across all countries, for each basket.

2.28 The price spread for low usage baskets is particularly large for the UK and the US. In these countries there are some operators who offer only unmetered/partly unmetered packages and these are not cost-effective at low levels of usage. For higher usage the spread is generally narrower, with the highest spreads seen in the Germany, France and Sweden.

**Figure 2.4 Price spread charts for residential peak baskets (dial-up only)**

*baskets are shown in order of usage level*

## Results for business baskets

2.29 The analysis for the business baskets is based on packages that are specifically targeted to businesses. There are, however, some packages targeted at the residential market that will also be used by small businesses (some residential packages explicitly prohibit business use while others do not). The dividing line between a business and a residential package is not always clear, and the results presented may not represent the prices actually paid by a business. In general, a business will expect to pay more for Internet access than residential consumers as they receive additional value and services in their packages, this includes email addresses or web space. Smaller businesses may not require these additional services and residential packages may be sufficient for their needs.

2.30 The price index (based on the average of the two cheapest packages from different operators in each country) is presented in Table 2.7 for business baskets.

**Table 2.7 Comparison of business package prices**

	<b>basket 6 bus</b> 9.6 hours per month	<b>basket 7 bus</b> 10 hours per month	<b>basket 8 bus</b> 20 hours per month	<b>basket 9 bus</b> 30 hours per month	<b>basket 10 bus</b> 40 hours per month	<b>Average</b>  Metered baskets only	<b>Unmetered bus*</b>
(UK=100)							
France	37	35	52	63	81	54	375
Germany	52	49	58	64	69	58	80
Sweden	48	48	67	84	93	68	123
UK	100	100	100	100	100	100	100
US, CA	68	64	61	60	60	63	73
US, OH	68	64	61	60	60	63	73

\* only one package used for this, due to the limited number of packages in some countries

2.31 From Table 2.7 it is seen that:

- UK prices for limited usage are relatively expensive compared to other countries, particularly for low usage baskets; and
- the UK position is better for unmetered access, with prices in Germany and the US lower, and prices in France and Sweden more expensive than those in the UK.

2.32 In several countries, cable modem or DSL services appear to be the cheapest package for some baskets. In France, Germany and Sweden there are no dial-up unmetered packages, and prices for the unmetered basket are based on DSL/cable modem offers. In Germany, cable modem or DSL packages start to become cost effective at 30 hours and in Sweden at 40 hours usage per month.

2.33 The main changes in the UK's relative position are due to a combination of: relatively static prices in the UK for metered services; and the discontinuation of some of the cheapest dial-up packages included in the last report.

*Price trend*

2.34 A summary of price changes since the December 2001 study is provided in Table 2.8. The average price change shown is the mean of the percentage changes across each of the original 5 baskets.

**Table 2.8: Percentage change in price levels for business baskets August 2001 – February 2002**

	basket 6 bus	basket 7 bus 10	basket 8 bus	basket 9 bus 30	basket 10 bus	Average		Unmetered bus
(UK=100)	9.6 hours per month,	hours per month	20 hours per month	hours per month	40 hours per month	metered baskets only		
France	-22%	-22%	-22%	-25%	-33%	-25%		99%
Germany	4%	3%	4%	7%	6%	5%		0%
Sweden	-12%	-12%	-6%	-7%	-14%	-10%		-2%
UK	22%	23%	15%	8%	0%	14%		2%
US, CA	-6%	-6%	-19%	-22%	-22%	-15%		-22%
US,OH	-6%	-6%	-19%	-22%	-22%	-15%		-22%

2.35 From Table 2.8 it is seen that:

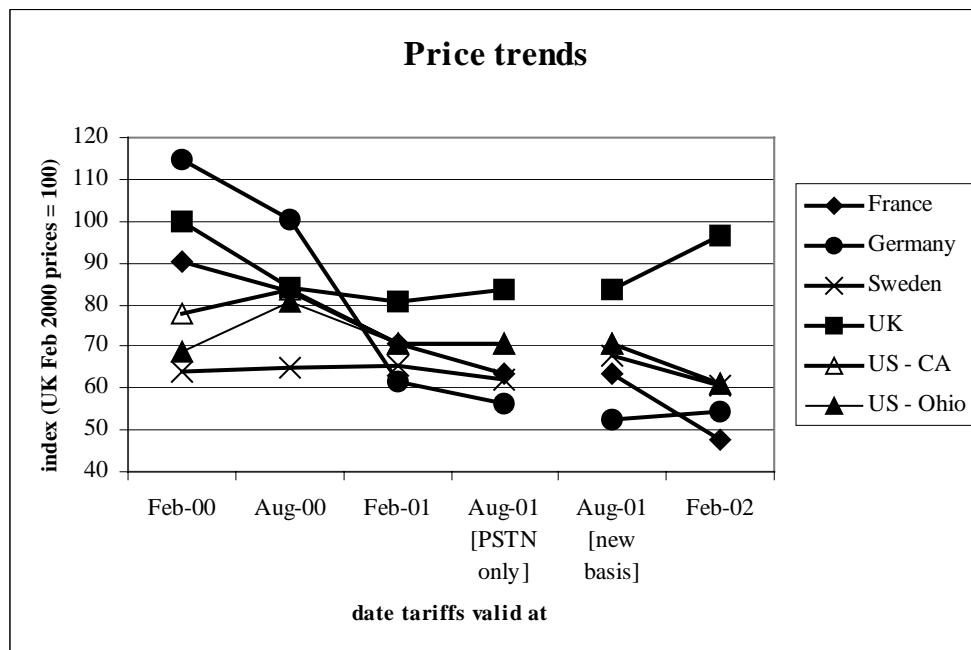
- prices have risen in the UK for all metered baskets, particularly the low usage baskets, however, this is due to the discontinuation of one of the cheapest UK services;
- overall, prices for metered baskets have fallen in France, Sweden and the US; and have risen slightly in Germany; and,
- for the unmetered basket prices have remained fairly static in Germany, Sweden and the UK, have increased in France (due to the discontinuation of the cheapest services) and have fallen in the US.

2.36 However, price changes need to be considered together with price levels. Figure 2.5 shows price changes for the limited usage baskets relative to UK prices as at February 2000.

2.37 Since August 2001 the results have been based on a new methodology (ie including broadband products). For August 2001 a comparison of PSTN only and the new methodology have been included to ensure some comparison can be made throughout the period. The spread of prices is wider when broadband services are also included.

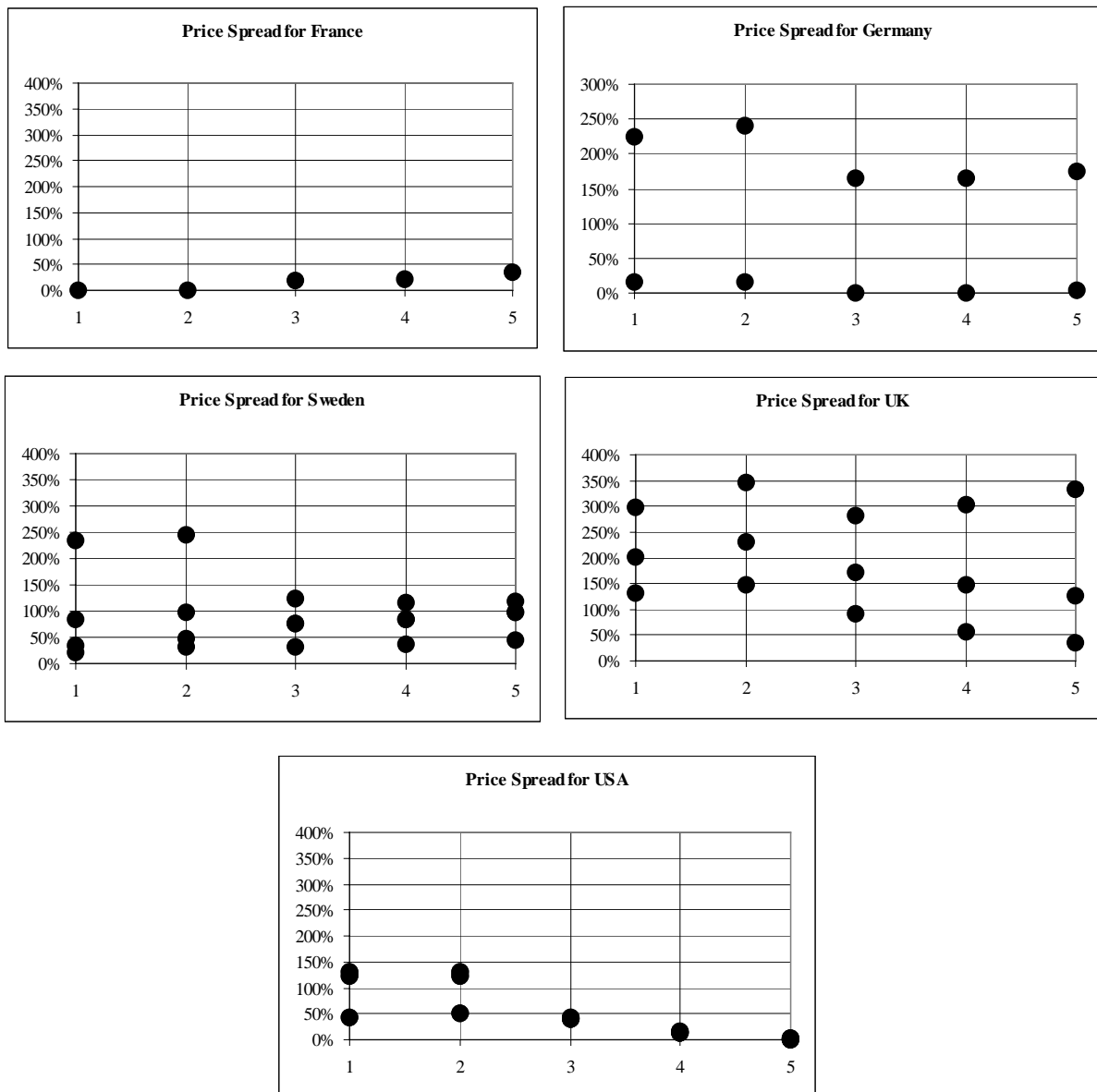


**Figure 2.5: Price trends by country from February 2000 to February 2002 for business limited use baskets**



### *Price spread*

2.38 The charts in Figure 2.6 show the price for the cheapest package offered by each operator as a percentage of the cheapest price across all countries, for each basket (including PSTN and ISDN only). There are relatively few packages designed specifically for business in some countries, which limits the usefulness of the comparison. For France, only one operator is included and the chart illustrates the price level for this operator, but does not provide any indication of price spread.

**Figure 2.6: Price spread charts for business baskets (dial-up only)**

*baskets are shown in order of usage level*

## Sensitivity analysis

2.39 In order to ensure that the results are robust, a number of alternative assumptions have been examined. The following sensitivities have been considered:

- removing the fixed PSTN charges from the overall price;
- removing cable modem/DSL packages; and
- additionally removing packages with limited availability (cable only offers in UK).

2.40 Results showing the effects for residential users of each sensitivity are presented in Tables 2.9 and 2.10 for off-peak and peak usage respectively. The results consider the effect on the average index across all metered baskets and on the index for unmetered use.

**Table 2.9 Results of sensitivity tests for residential off-peak baskets**

(UK=100)	Average metered baskets				Unmetered basket only			
	Headline Index	Exclude fixed PSTN charges	Exclude broadband offers	Exclude cable only offers	Headline Index	Exclude fixed PSTN charges	Exclude broadband offers	Exclude cable only offers
<b>France</b>	106	104	105	103	134	248		
<b>Germany</b>	93	105	93	92	126	233		
<b>Sweden</b>	92	100	91	90	113	209		
<b>UK</b>	100	100	100	100	100	100	100	100
<b>US, CA</b>	130	134	133	129	109	119	101	99
<b>US, OH</b>	131	132	134	130	112	116	103	101

**Table 2.10 Results of sensitivity tests for residential peak baskets**

(UK=100)	Average metered baskets				Unmetered basket only			
	Headline Index	Exclude fixed PSTN charges	Exclude broadband offers	Exclude cable only offers	Headline Index	Exclude fixed PSTN charges	Exclude broadband offers	Exclude cable only offers
France	103	100	98	92	134	248		
Germany	110	129	112	106	126	233		
Sweden	115	139	121	114	113	209		
UK	100	100	100	100	100	100	100	100
US, CA	110	115	104	97	109	119	101	101
US, OH	111	112	105	98	112	116	104	104

2.41 For both peak and off-peak use the UK position is slightly improved if fixed PSTN charges are ignored, this has changed since the last report where the UK's position improved by a minimum of 30% relative to all countries. This reflects the decreasing fixed PSTN prices in the UK. This effect is much higher for the unmetered baskets. Excluding broadband services increases the price in Germany and Sweden, as these countries have broadband offers included in the cheapest two services, but also increases the price in the UK where a relatively cheap, low bandwidth cable modem offer is available. Excluding cable only offers (as well as excluding broadband services) has relatively little effect.

2.42 Table 2.11 presents the same sensitivity analysis for business customers:

**Table 2.11 Results of sensitivity tests for business peak baskets**

(UK=100)	Average metered baskets				Unmetered basket only			
	Headline Index	Exclude fixed PSTN charges	Exclude broadband offers	Exclude cable only offers	Headline Index	Exclude fixed PSTN charges	Exclude broadband offers	Exclude cable only offers
<b>France</b>	54	50	52	52	316	442		
<b>Germany</b>	58	64	62	62	70	103		
<b>Sweden</b>	68	74	67	67	174	240		
<b>UK</b>	100	100	100	100	100	100	100	100
<b>US, CA</b>	63	62	61	61	60	55	55	73
<b>US, OH</b>	63	62	61	61	60	55	55	73

2.43 The exclusion of PSTN charges has a relatively small effect on the metered baskets. The UK's position improves relative to Sweden and Germany. This reflects the fact that UK fixed PSTN charges are relatively high compared to these two countries. Excluding broadband has a relatively small effect on the metered baskets. The results are not affected by cable only offers.

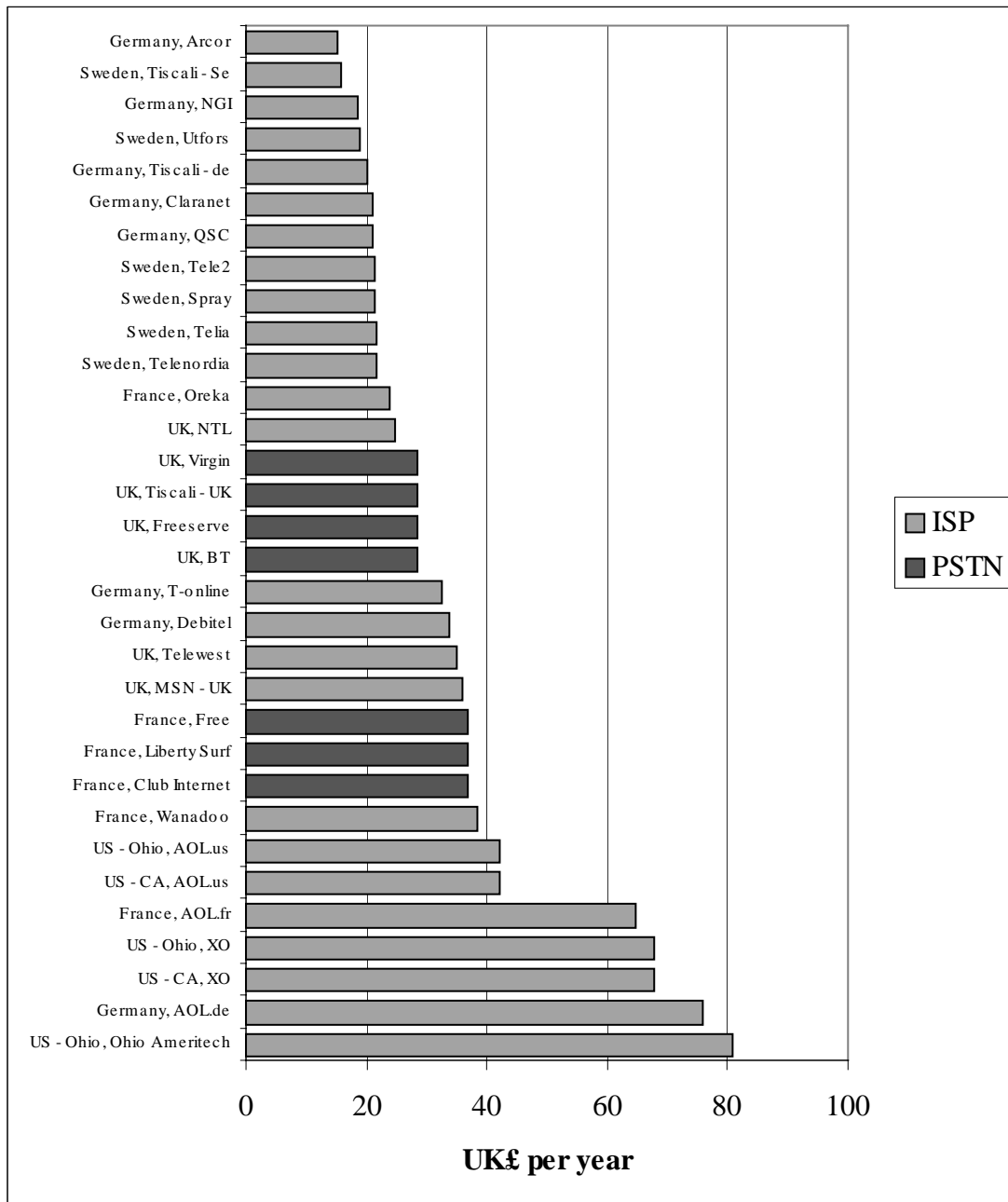
2.44 A 'business' service has been defined as a service that is clearly targeted at the business market. Some businesses may be able to use services that are targeted at residential use. The existence of 'home workers' also blurs the distinction between residential and business use. In the UK, there is a substantial gap between prices for the metered business dial-up packages and metered residential dial-up packages and small to medium businesses may use residential packages (that do not prohibit business use) to reduce costs. In other countries the differential is not as large and cost savings will not be as significant.

### Detailed results

2.45 More detailed charts showing results by operator are shown in this section. Results for the top 30 operators are shown.

## Residential basket 1

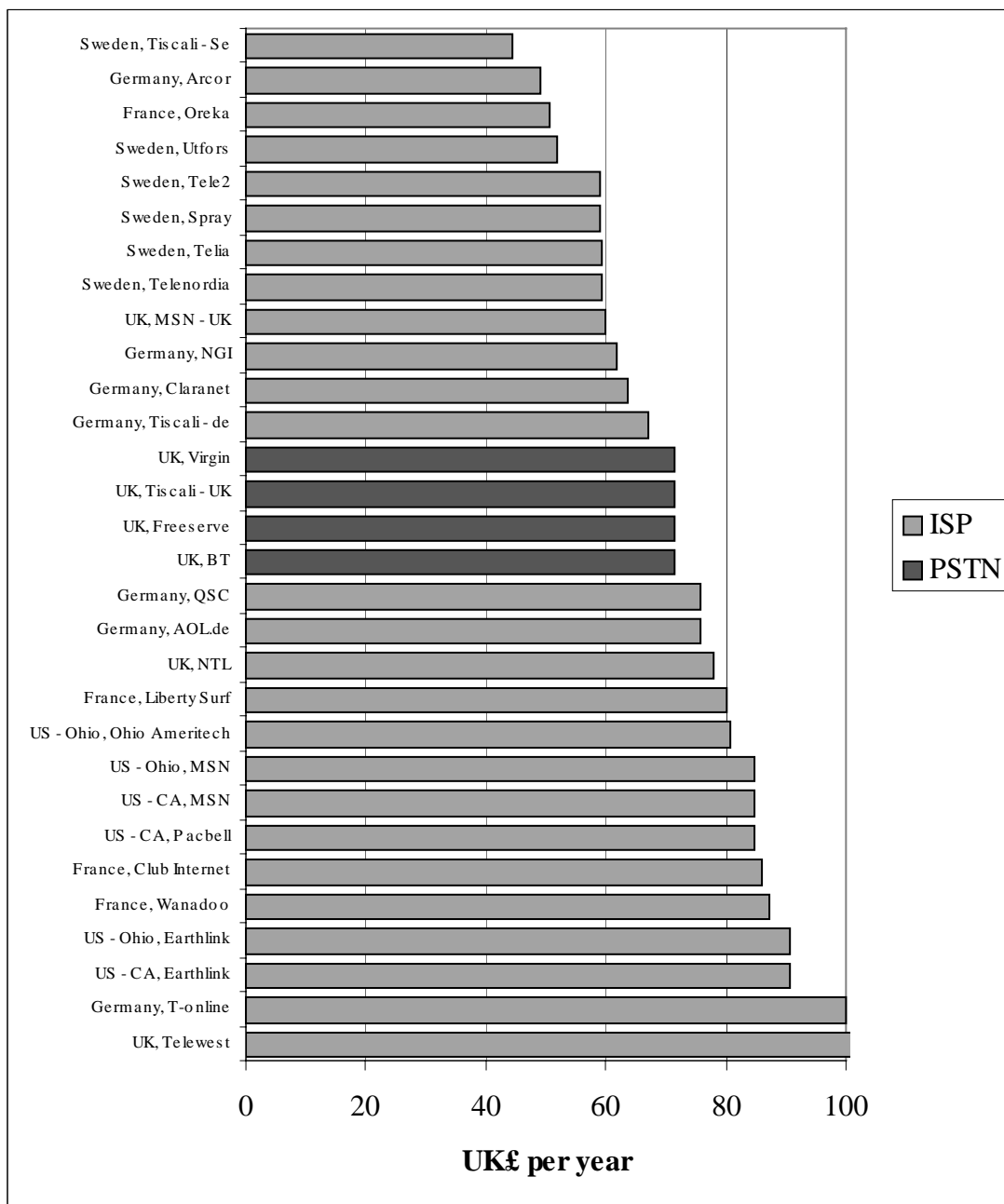
This basket includes 2.7 hours of calls per month, 80% of which are off-peak, 20% peak.



Prices in UK£ as at February 2002

## Residential basket 2

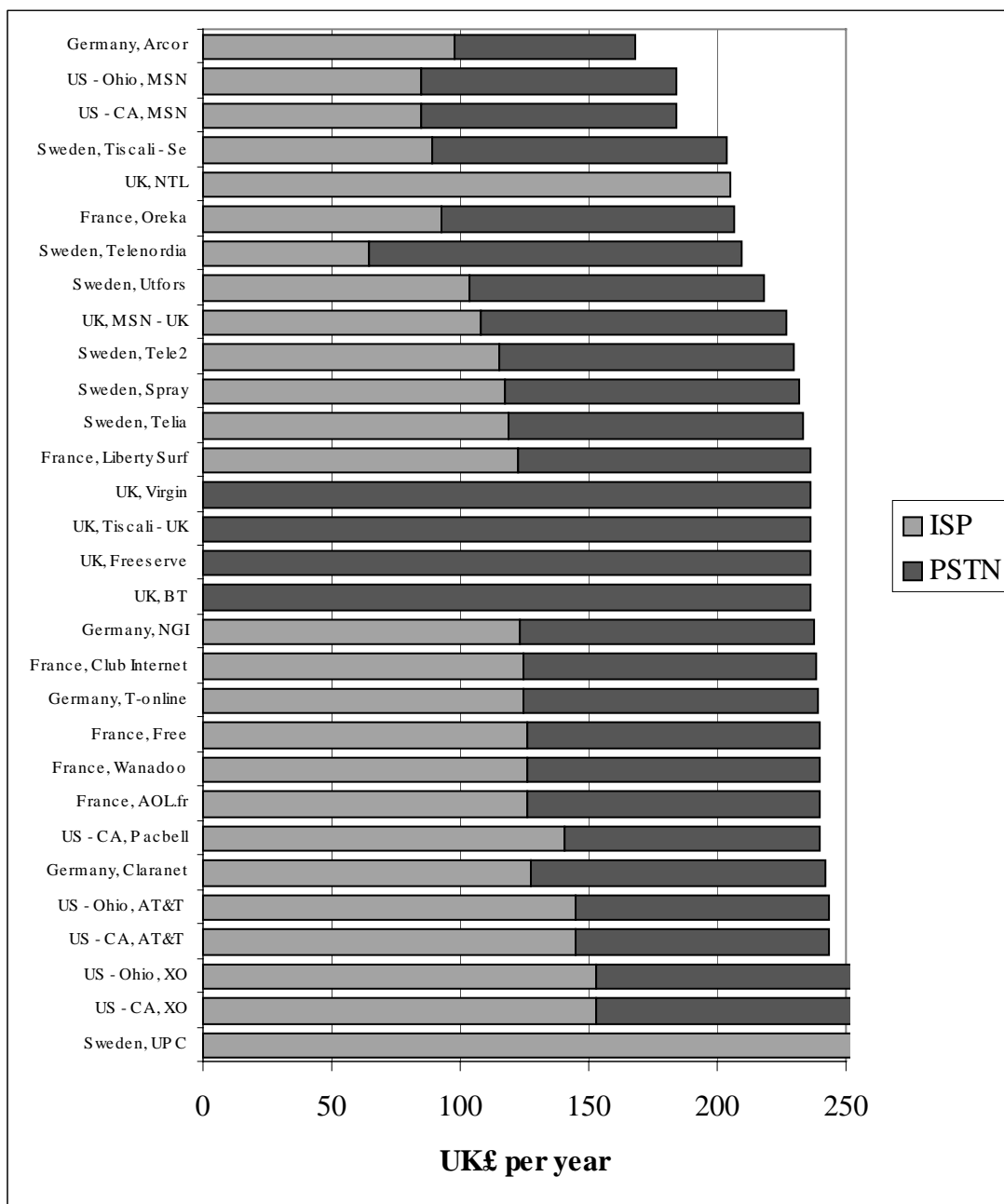
This basket includes 10 hours of off-peak calls per month.



Prices in UK£ as at February 2002

### Residential basket 3

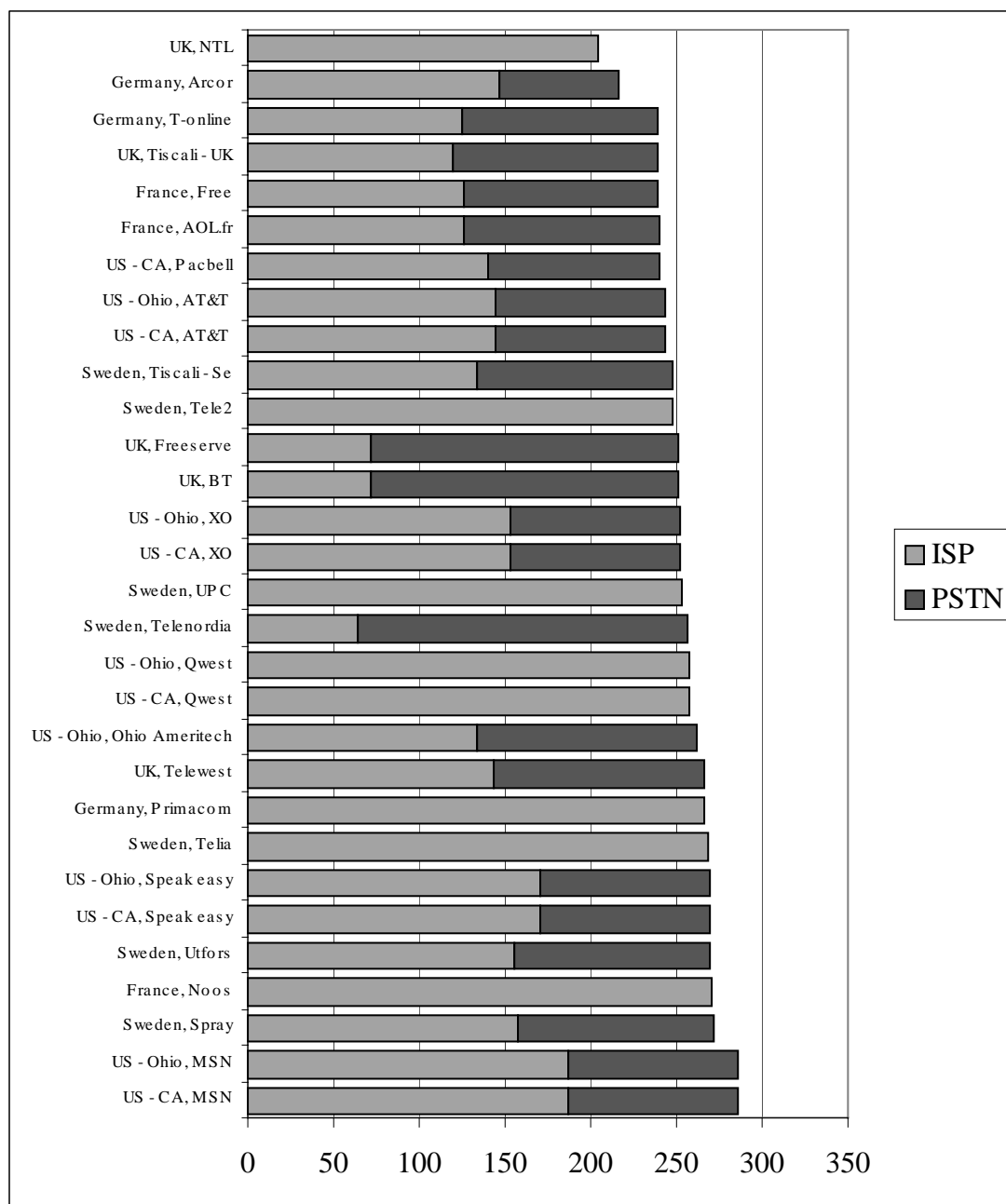
This basket includes 20 hours of off-peak calls per month.



Prices in UK£ as at February 2002

## Residential basket 4

This basket includes 30 hours of off-peak calls per month

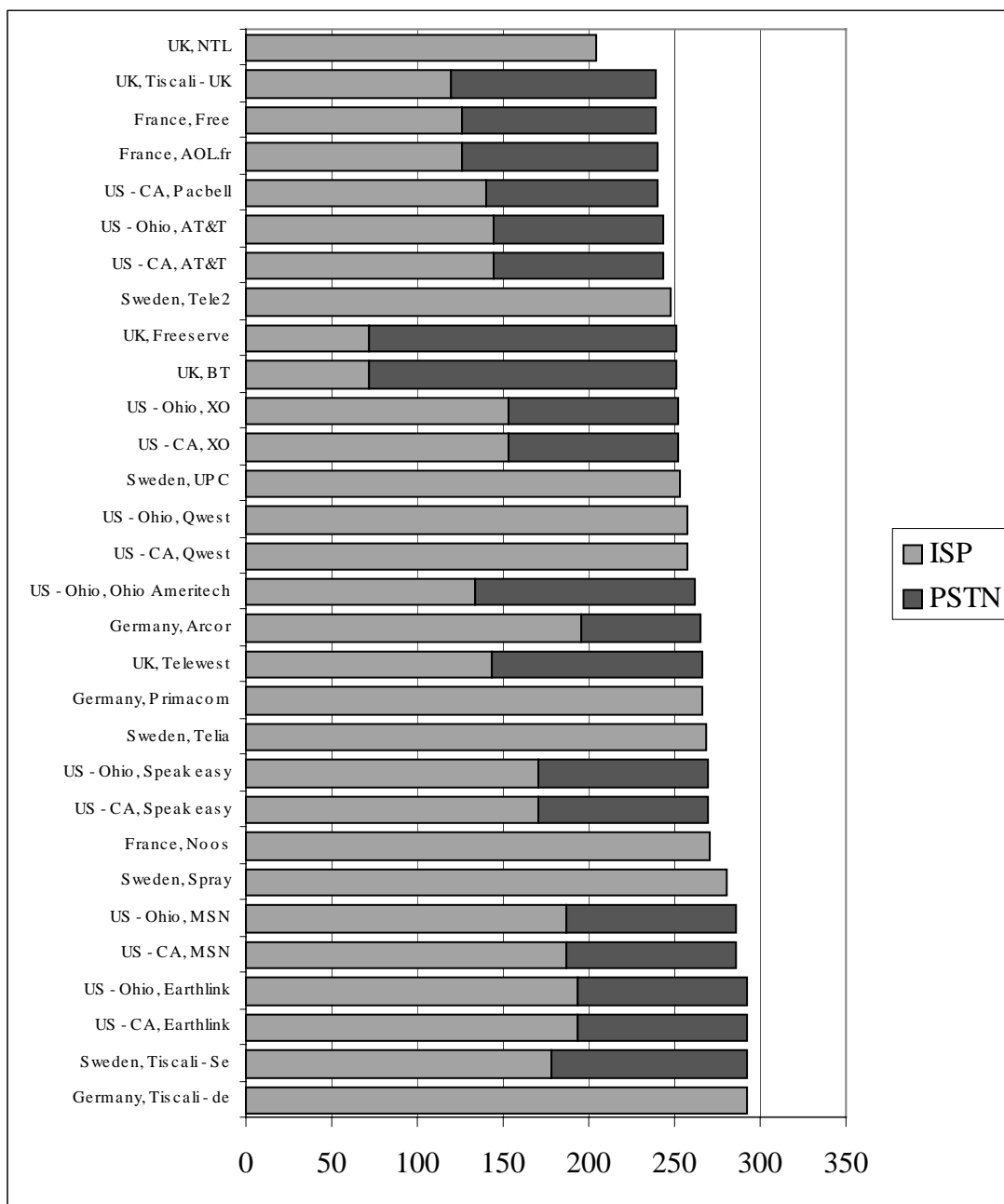


*Prices in UK£ as at February 2002*



## Residential basket 5

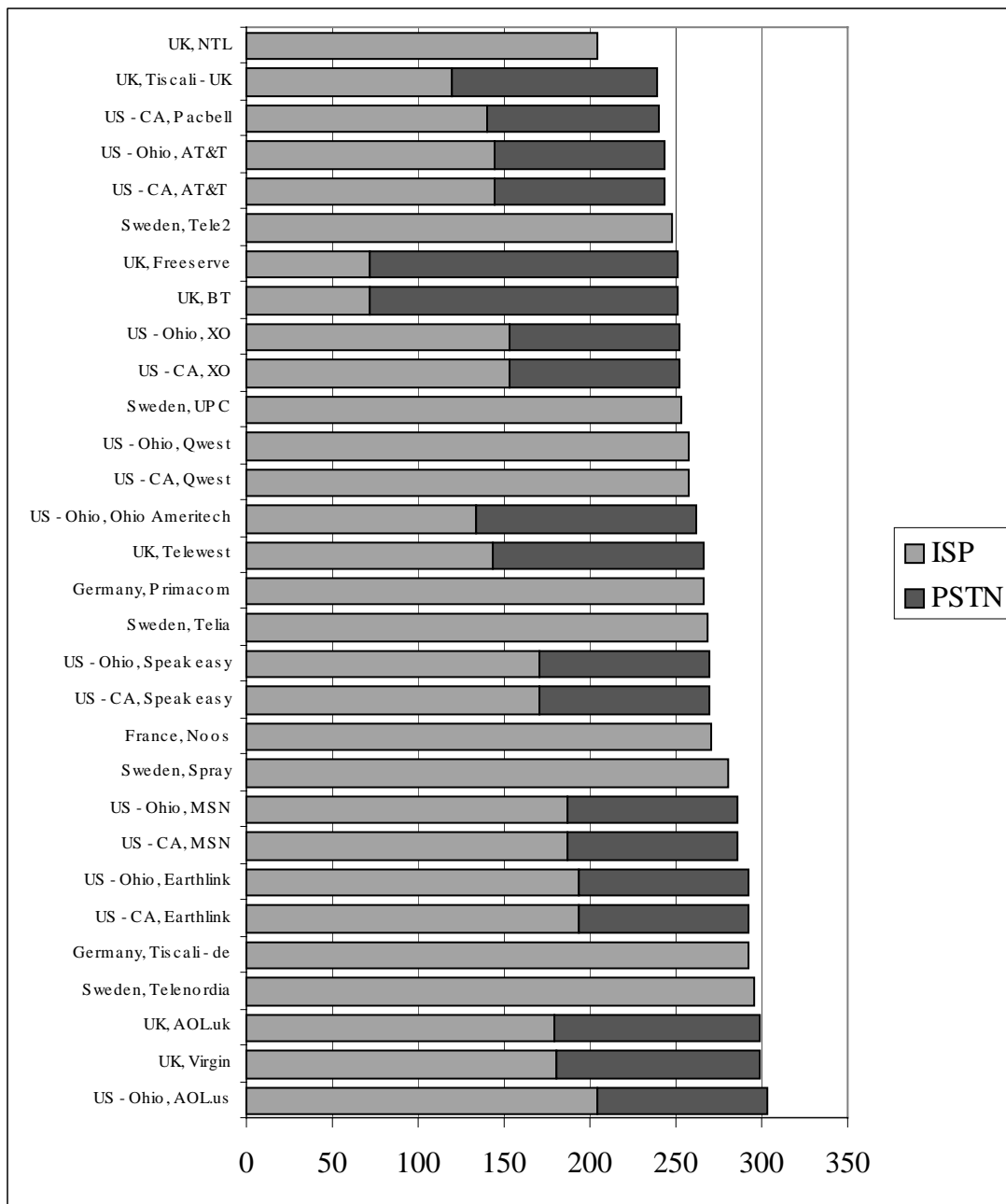
This basket includes 40 hours of off-peak calls per month



Prices in UK£ as at February 2002

## Unmetered residential basket

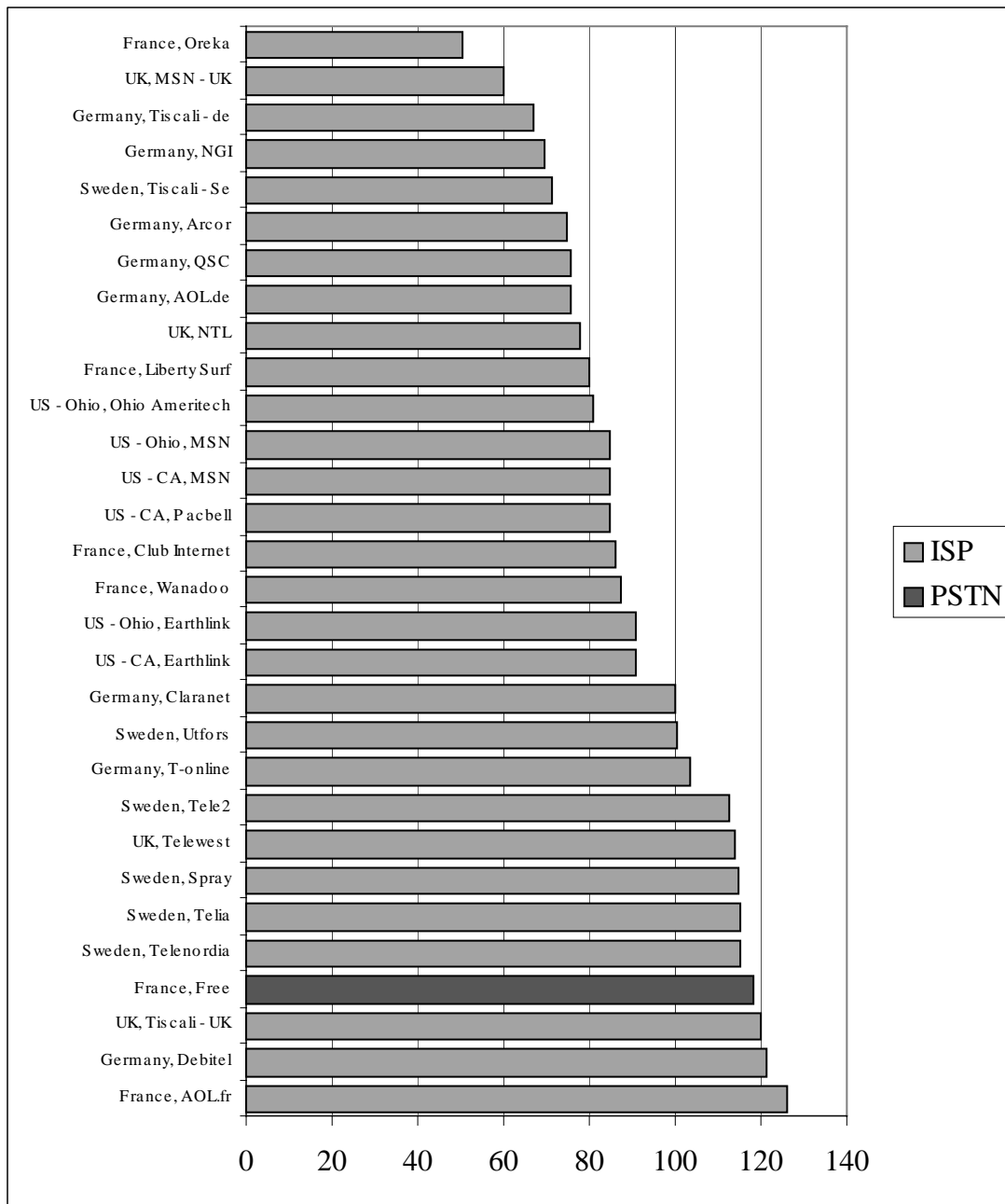
This basket includes unlimited off-peak calls. (For metered packages “unlimited” is modelled as 150 hours).



Prices in UK£ as at February 2002

## Residential basket 2p

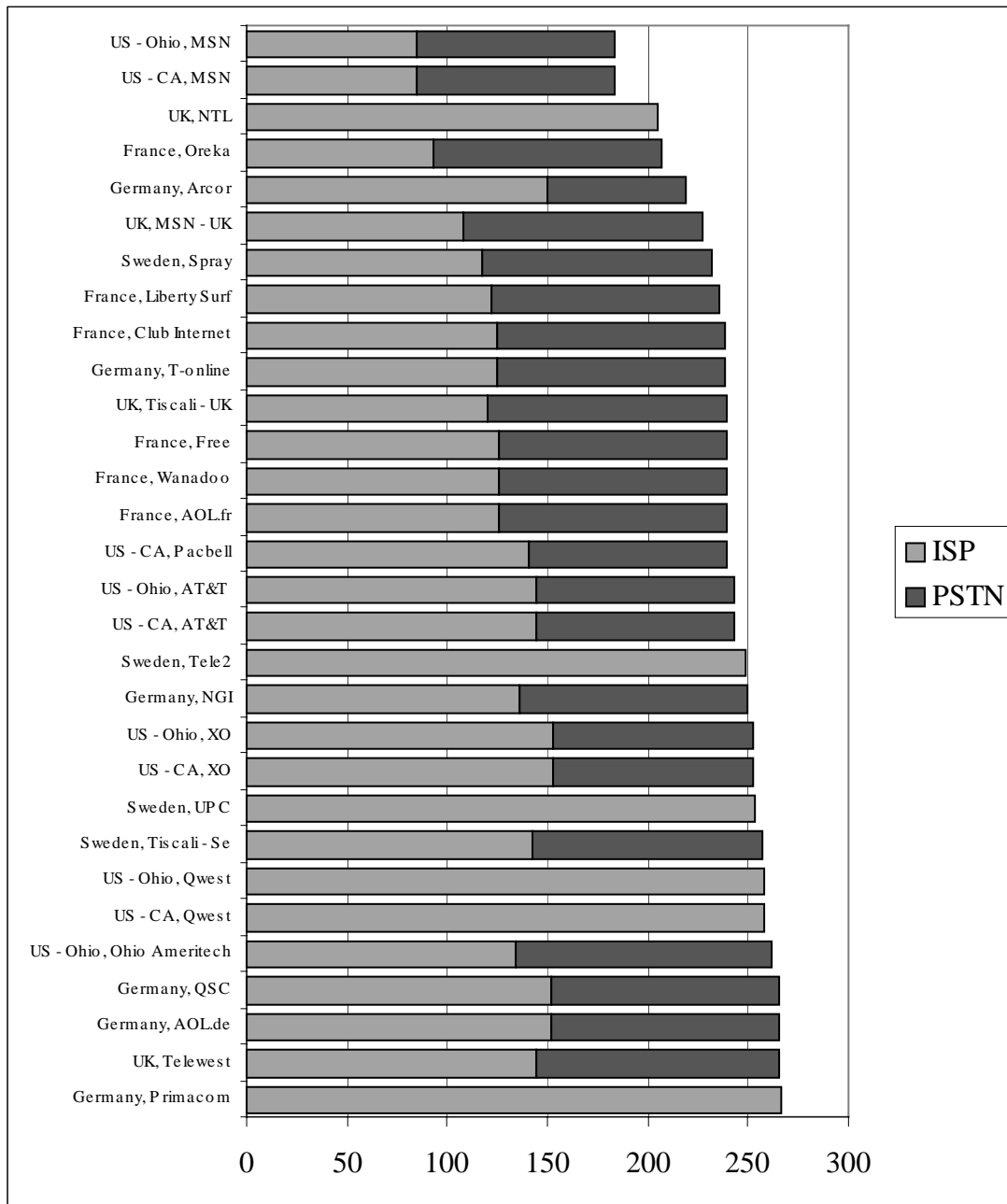
This basket includes 10 hours of peak calls per month



Prices in UK£ as at February 2002

## Residential basket 3p

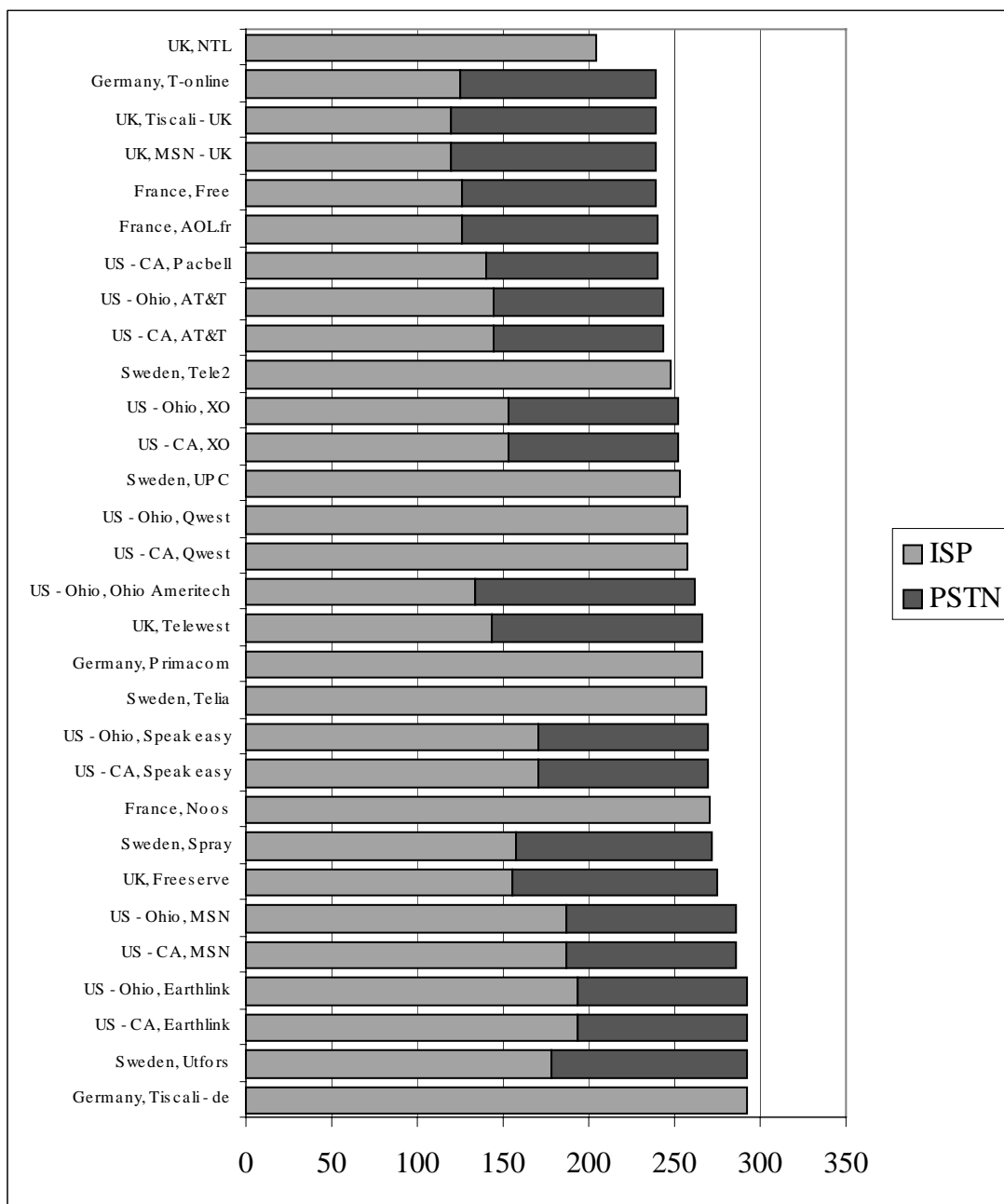
This basket includes 20 hours of peak calls per month



Prices in UK£ as at February 2002

## Residential basket 4p

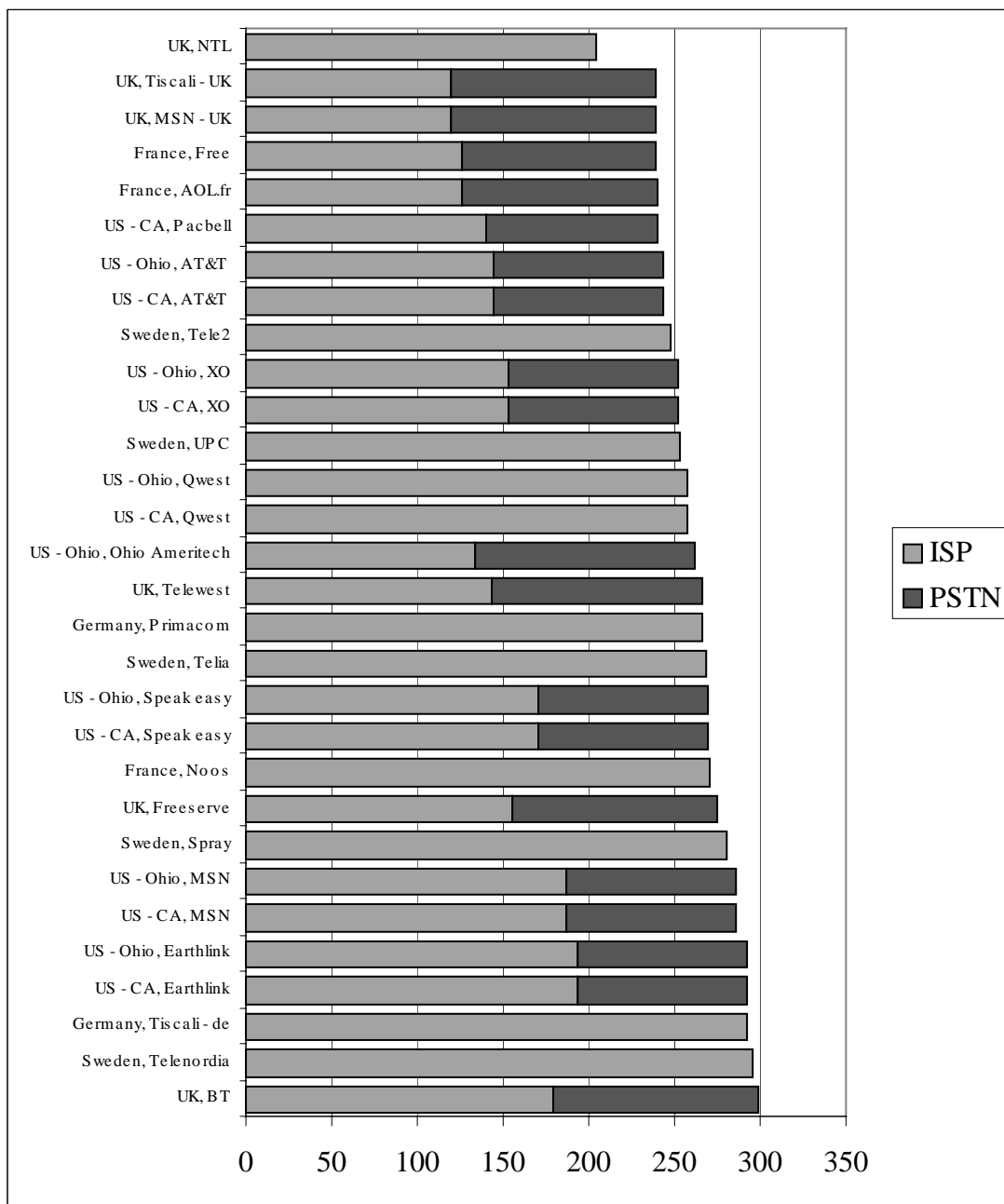
This basket includes 30 hours of peak calls per month



Prices in UK£ as at February 2002

## Residential basket 5p

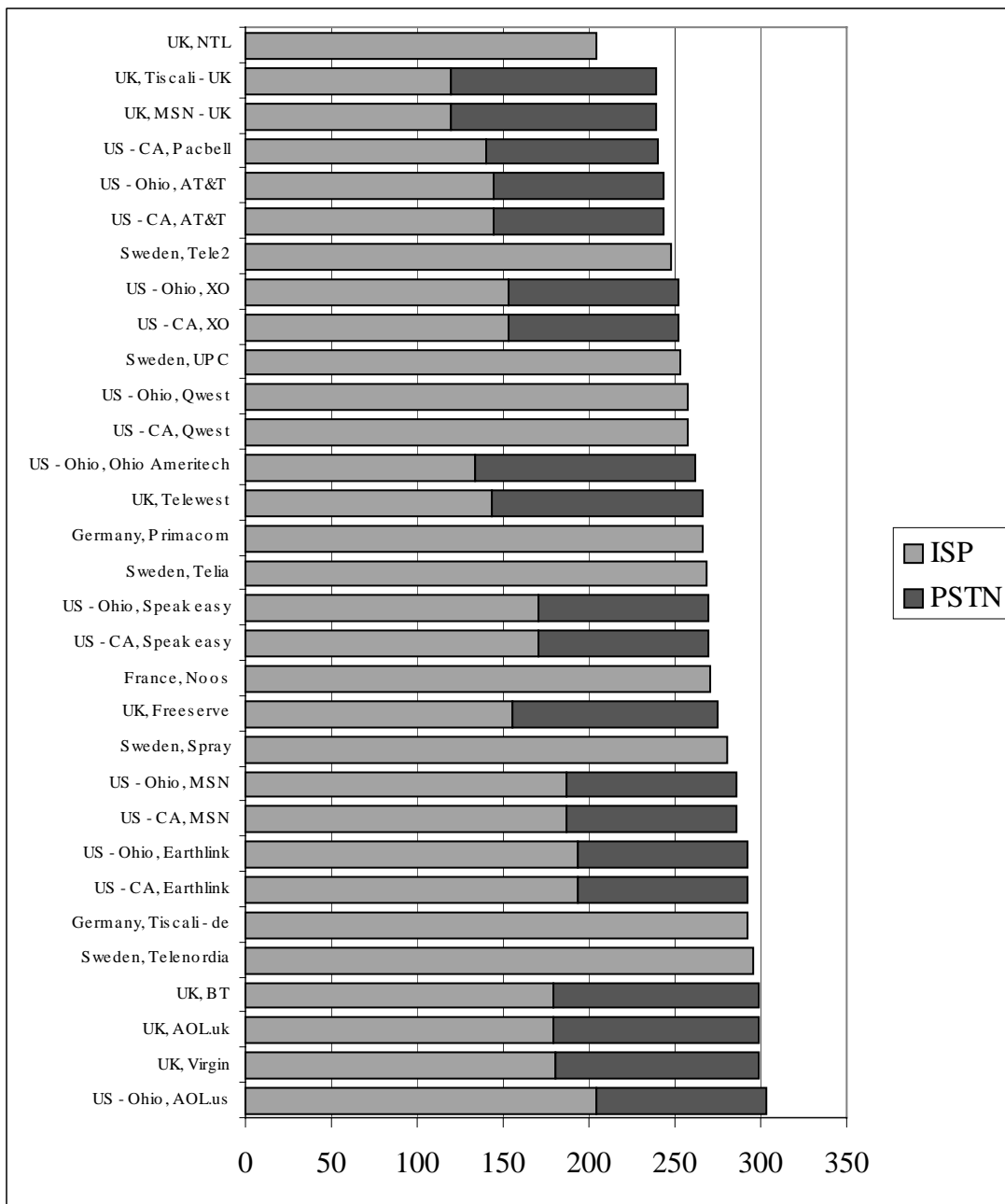
This basket includes 40 hours of peak calls per month



Prices in UK£ as at February 2002

## Unmetered residential basket

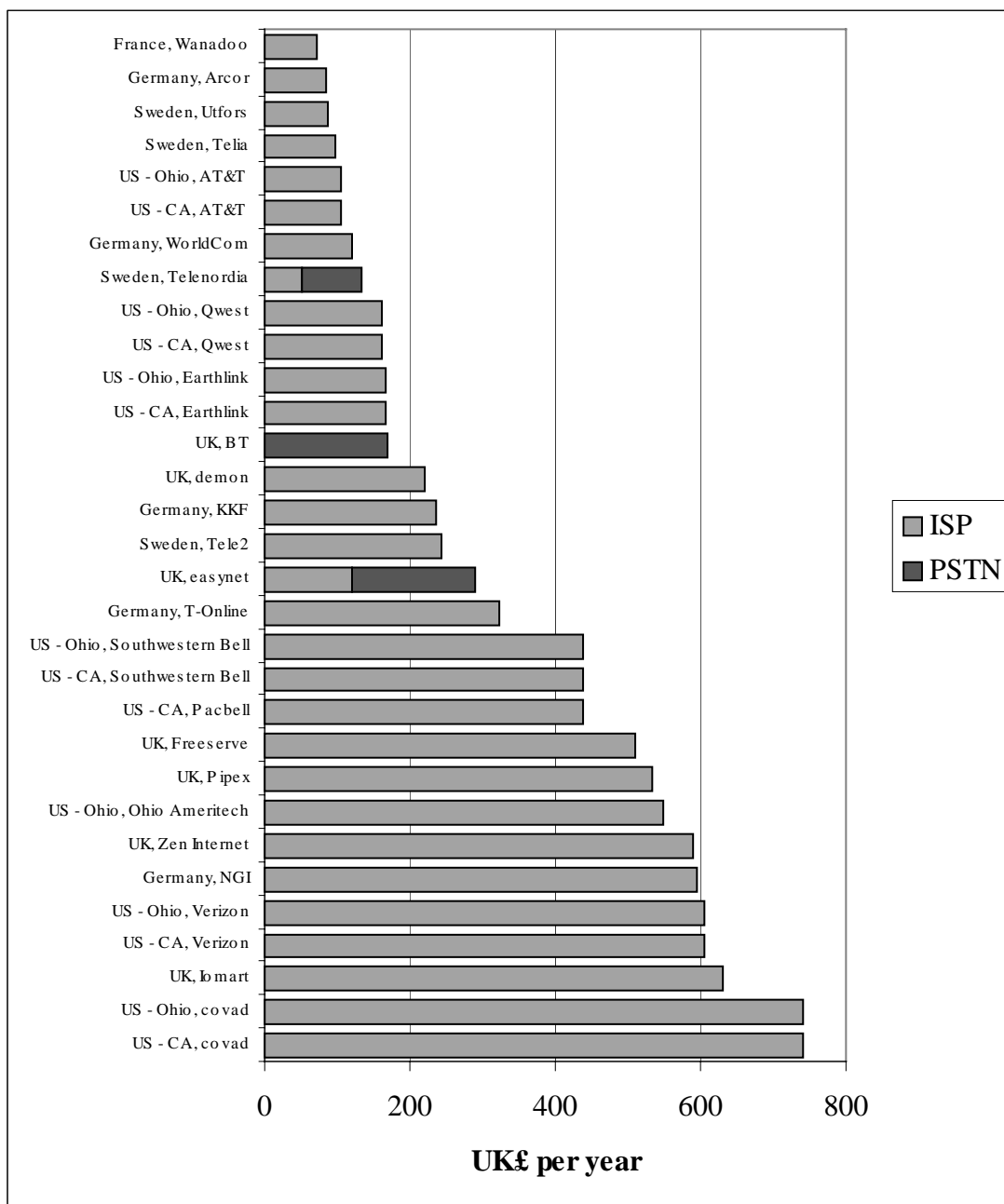
This basket includes unlimited calls at any time. (For metered packages “unlimited” is modelled as 150 hours).



Prices in UK£ as at February 2002

## Business basket 6

This basket includes 9.6 hours of calls per month; 80% peak and 20% off-peak

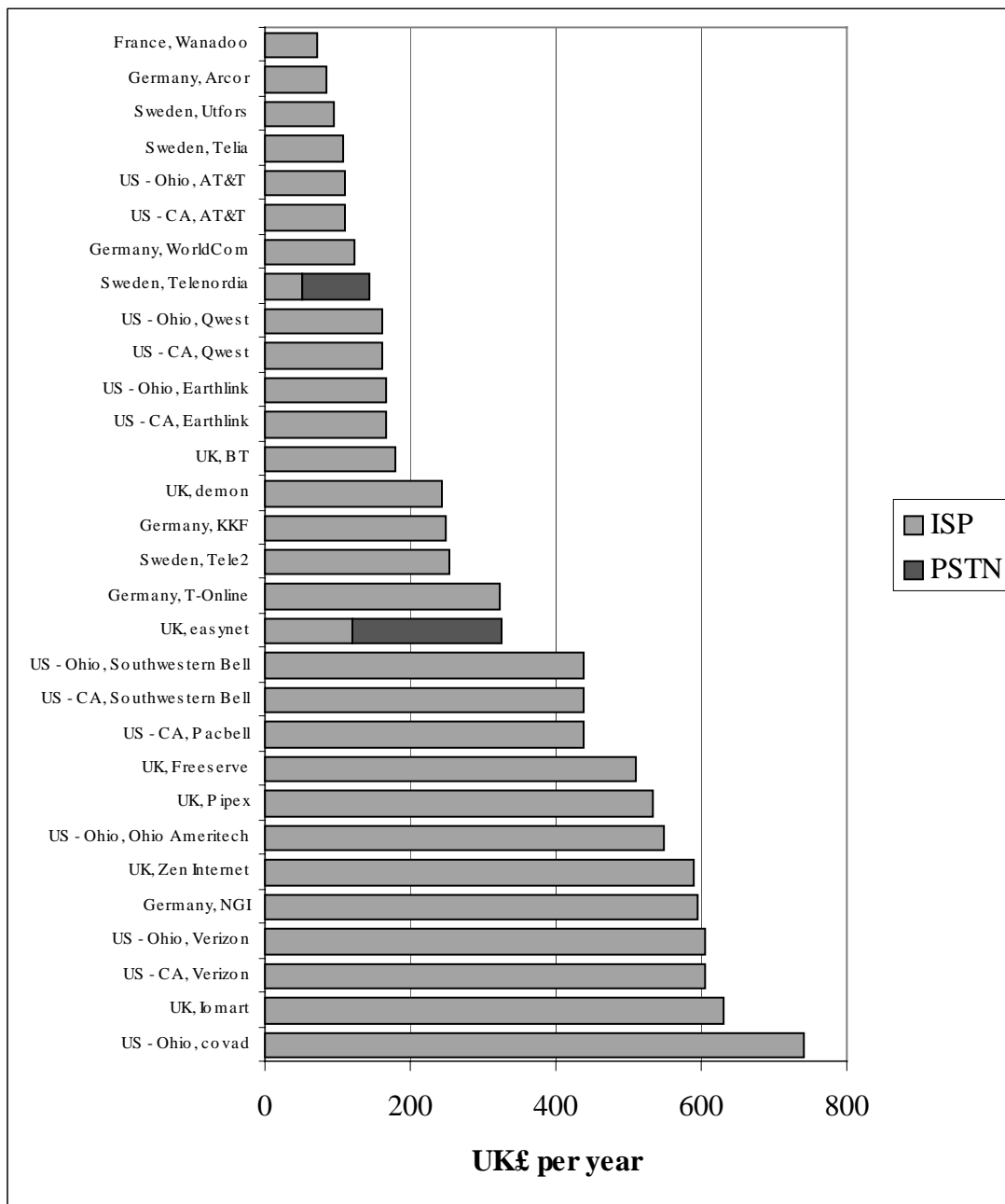


Prices in UK£ as at February 2002



## Business basket 7

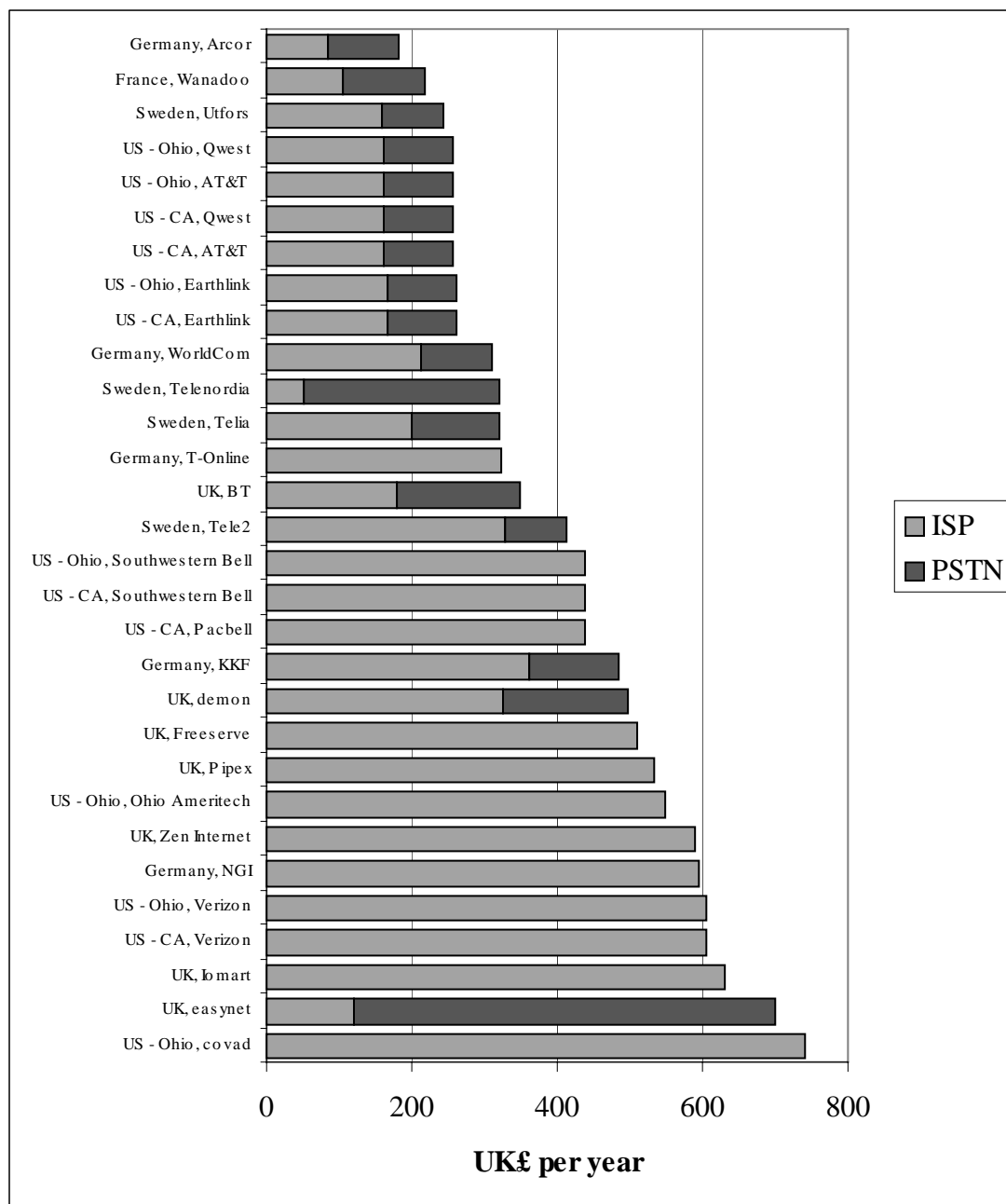
This basket includes 10 hours of peak calls per month



Prices in UK£ as at February 2002

## Business basket 8

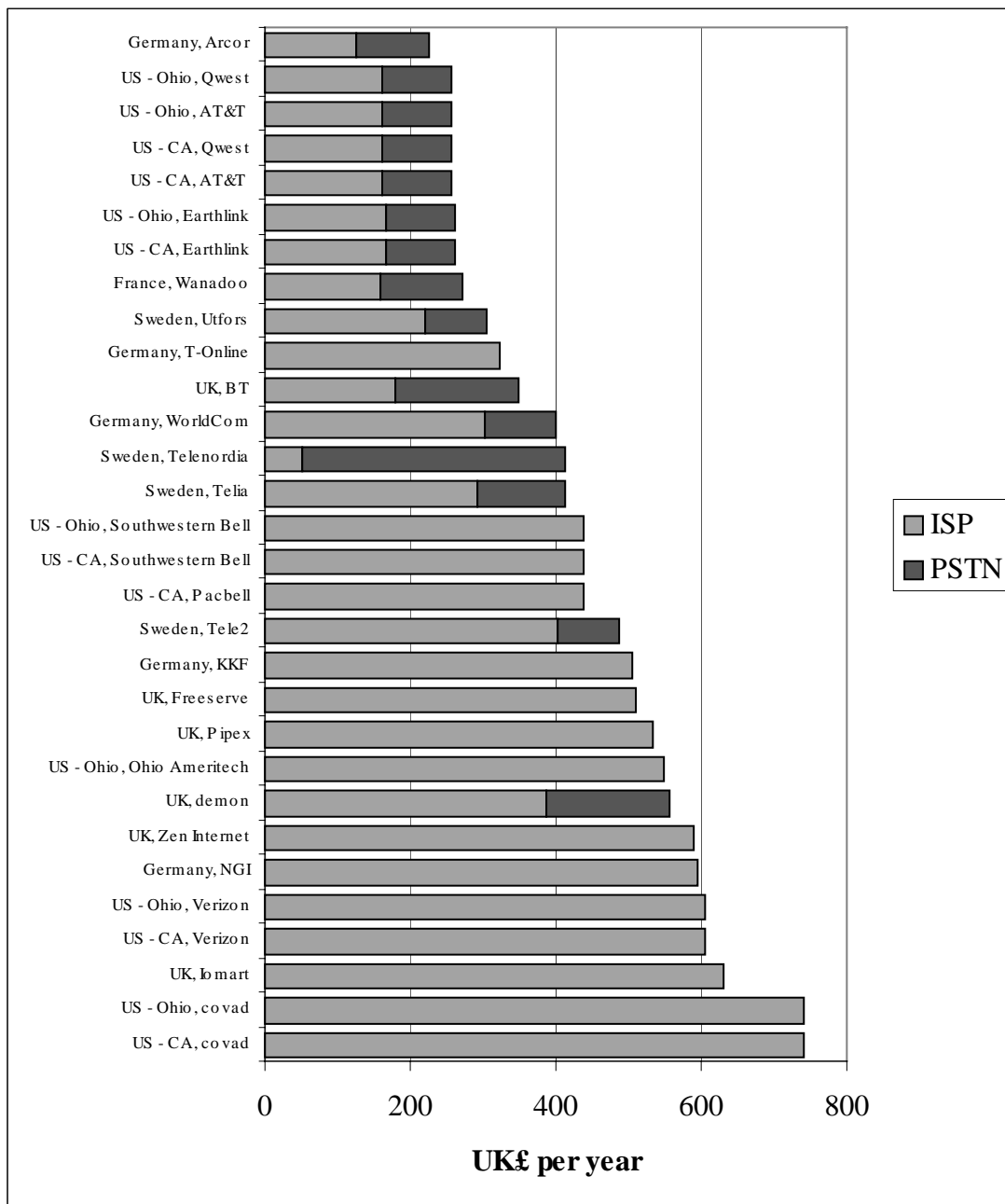
This basket includes 20 hours of peak calls per month



Prices in UK£ as at February 2002

## Business basket 9

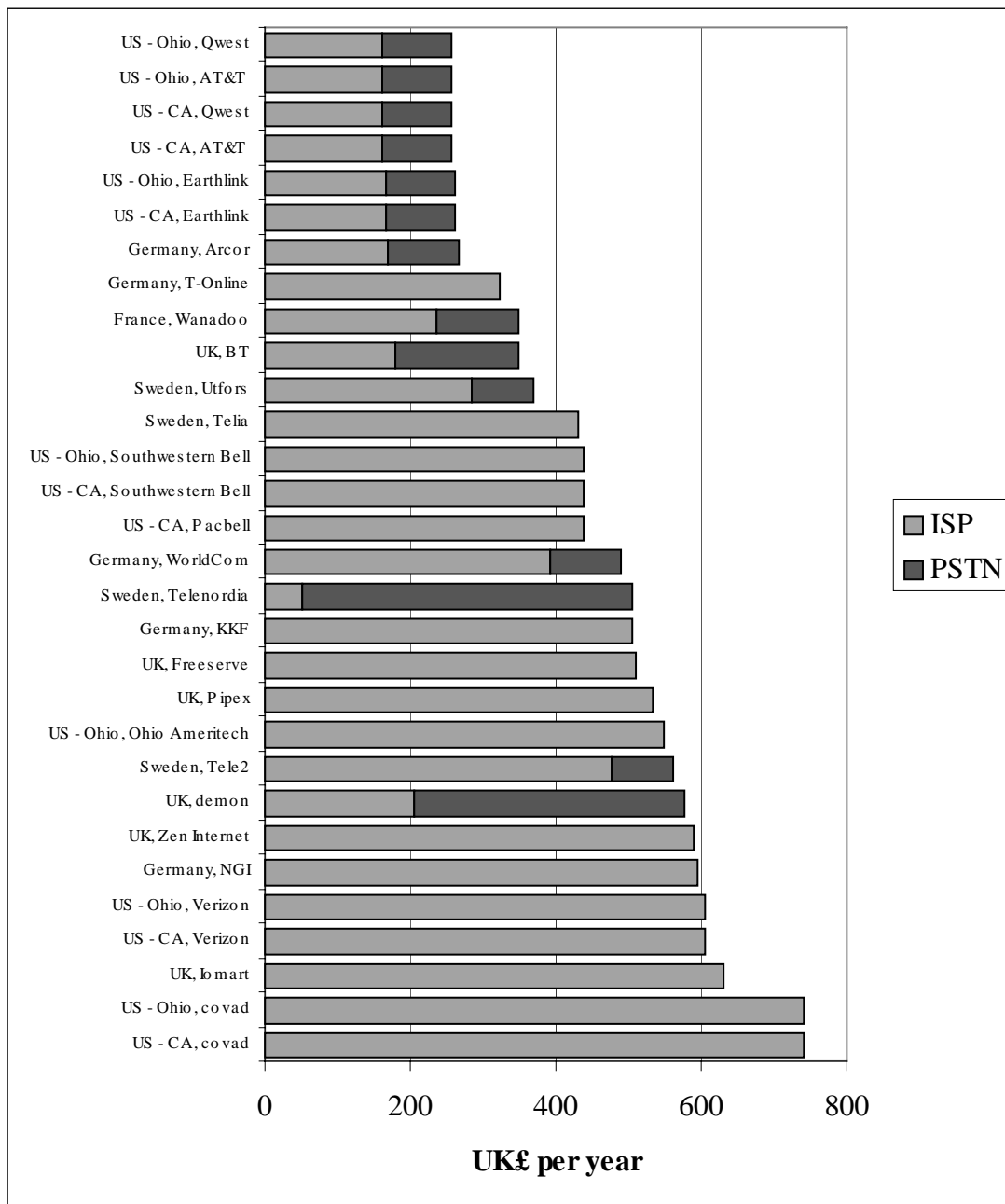
This basket includes 30 hours of peak calls per month



Prices in UK£ as at February 2002

## Business basket 10

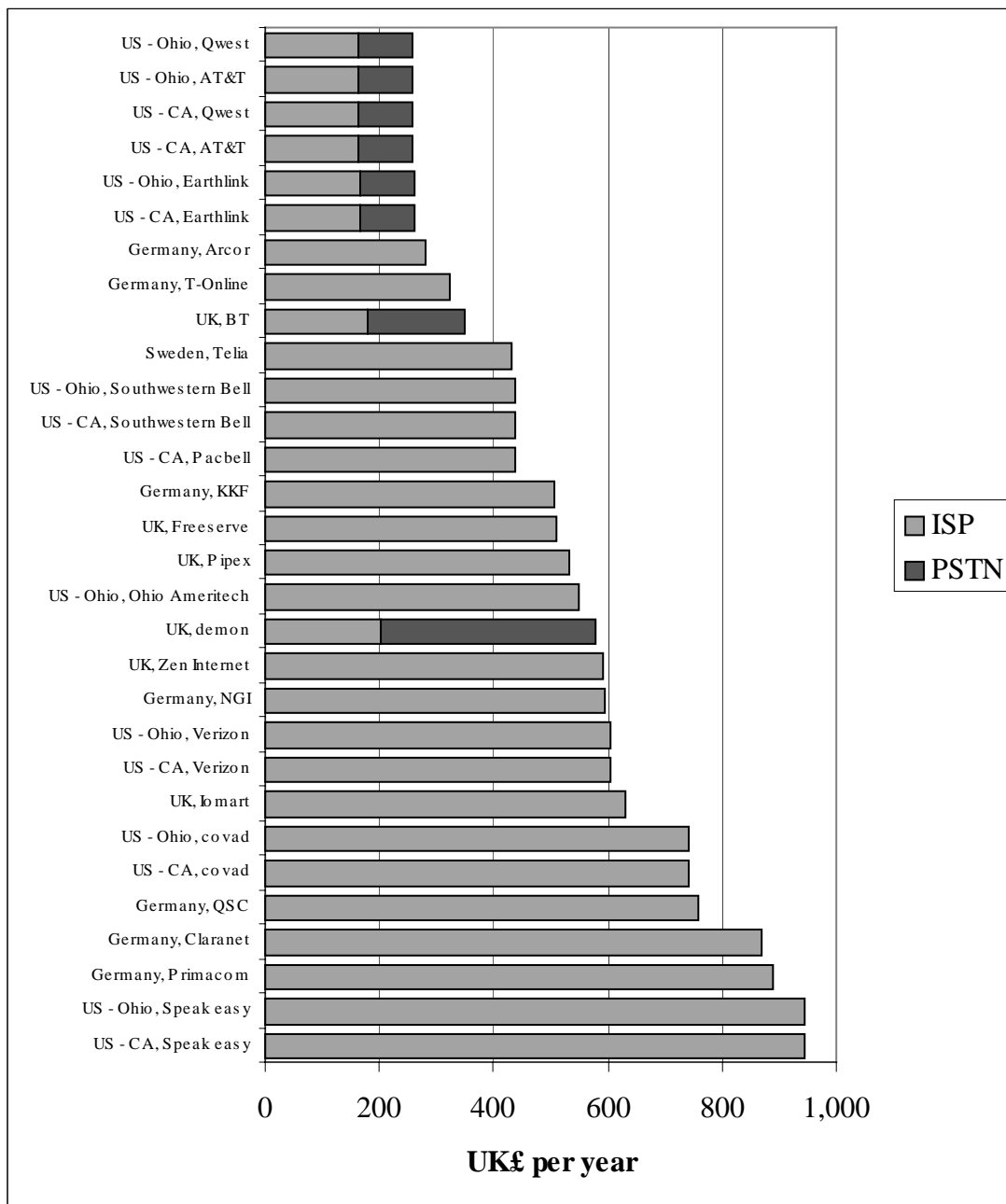
This basket includes 40 hours of peak calls per month



Prices in UK£ as at February 2002

## Unmetered business basket

This basket includes unlimited calls at any time. (For metered packages “unlimited” is modelled as 150 hours).



Prices in UK£ as at February 2002

## **Conclusions**

2.46 The UK continues to have close to the cheapest prices for both limited use and unmetered Internet access for residential consumers compared to the other countries studied. There is some evidence of 'catch-up' in the other European countries for the limited use baskets.

2.47 For business customers with limited usage, UK prices are generally above those of other countries in the study. For unlimited access, UK prices are more expensive than the US and Germany and cheaper than in France and Sweden. In Germany, France and Sweden, unmetered dial-up access is not available, and broadband access is more cost effective than dial-up PSTN. In Germany, broadband prices are below unmetered dial up prices in the UK.

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## Chapter 3

### Internet access – broadband

#### Introduction

3.1 This chapter covers Digital Subscriber Line (DSL) and cable modem services (referred to collectively as ‘broadband’ services). These services provide high-speed telecom services to consumers over the local loop/cable network. These services are relatively new but are becoming increasingly important in providing consumers with access to a range of services, such as fast Internet access and video on demand. This study focuses on comparing the cost for different types of users of broadband services providing Internet access. Further information on the broadband markets in France, Germany and the UK is given in Chapter 4, where comparisons of wholesale DSL products are presented.

3.2 As part of the process of implementing the EC directives<sup>9</sup> Oftel will be reviewing the broadband market. The directives must be implemented by July 2003 so the market review will need to have been completed by then. The benchmarking study will provide information for the market review process.

3.3 The results provide an update of the results presented in the December 2001 report (based on prices as at August 2001).<sup>10</sup> This study is the fourth in a series, which started with a study carried out by Analysys for Oftel and published in April 2000 (based on prices as at February 2000).

3.4 A full update of prices has been carried out based on tariffs as at February 2002. However, BT cut its wholesale DSL prices in April 2002 a partial update of tariffs as at April 2002 has been undertaken. These cuts had a big impact on retail prices for the UK. While it was not possible to recheck all tariffs for service providers from other countries, tariffs for the two operators with the cheapest prices included in the study as at February 2002 have been rechecked as at April 2002.

3.5 Since services differ in the amount of bandwidth (both downstream to the consumer and upstream from the consumer) that is available, price comparisons presented are viewed in the context of the bandwidth provided.

3.6 Results are presented for two market segments: residential and business. For the business market, results are further split into low, medium and high bandwidth services. However, it is noted that there is not necessarily a clear dividing line between residential and business services. A significant number of home workers and small businesses may well find an entry-level service, aimed primarily at residential consumers, adequate for their needs.

3.7 As well as price, it is also important to consider issues such as current availability, take-up and future rollout plans. Information is also presented for these.

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<sup>9</sup> For more information on the directives: [http://europa.eu.int/eur-lex/en/oj/2002/l\\_10820020424en.html](http://europa.eu.int/eur-lex/en/oj/2002/l_10820020424en.html)

<sup>10</sup> *International benchmarking of DSL and cable modem services*, published December 2001, <http://www.oftel.gov.uk/publications/research/2001/dslb1201.pdf>

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38 This chapter covers:

- a summary of the main changes in the UK market over the last nine months;
- a summary of price developments from February 2002 to April 2002;
- a summary of the methodology used;
- results for a range of residential and business baskets, showing:
  - price indices and detailed results;
  - price movements over the period August 2001 to February 2002;
  - the effect of the new UK DSL prices introduced in April 2002;
  - charts which show the spread of offers by country;
- sensitivity analysis;
- comparison of relative prices of dial-up and broadband internet access;
- comparison of availability and take up for broadband services; and
- conclusions.

3.9 Detailed results are shown in Annex C to this report.

### **Market developments**

3.10 The total number of broadband lines (DSL plus cable modem) in the UK is estimated to be around 376,000 (corresponding to approximately 0.63 lines per 100 population) as at February 2002. However this has risen to 545,000 at the beginning of May 2002. This compares to only 179,000 (0.30 lines per 100 population) as at the end of August 2001. As of February 2002, 60% of households were covered by DSL enabled exchanges. Cable modem services were available to approximately 38% of households.

### **Summary of price developments from February 2002 to April 2002**

3.11 In April 2002, BT made significant cuts to the price of their wholesale DSL services. For example IPStream 500, which is used to provide DSL services to residential customers, was reduced from £30 a month to £14.75, a reduction of over 50% and this has filtered through to retail prices. This has had a big impact on the results for the UK and a snapshot from April 2002 is included in the results to show the effect of these price cuts.

3.12 In the period February 2002 to April 2002, there have been the following changes:

- only the UK had significant decreases in DSL prices;
  - in Sweden DSL prices had increased slightly for some service providers, however, these services were not among the cheapest two services in the benchmark;
  - although Deutsche Telekom made some changes to the price of their T-DSL access product in February 2002, this had relatively little effect on the total price paid by consumers for an Internet service over ADSL (this price change was already captured in the February 2002 results); and
  - France Telecom proposed price cuts to their wholesale DSL products but as yet there is no effect on retail prices.
-



## Methodology

3.13 The methodology is as used in the December 2001 study and the details are not repeated here. The methodology takes into account any one-off charges for connection or modem purchase and it is assumed these costs will be written off over three years. The following definition of “broadband” has been chosen:

“an always on service with a minimum downstream capacity in excess of 128Kbit/s.”

3.14 This definition is consistent with the definition used by Oftel in the Internet market review and will capture all services with downstream capacities exceeding that provided by basic ISDN. This definition of ‘broadband’ services differs (in terms of the capacity threshold) from other definitions used by other organisations: work carried out by the Office of the e-envoy uses a definition of 200kbit/s downstream; the OECD use a minimum of 256kbit/s downstream and the FCC a minimum of 200kbit/s in both directions for advanced services. The effect of changing the precise definition is considered as part of the sensitivities. In practice there are no residential services with downstream capacity between 129 and 256kbit/s and the use of any of these definitions yields the same results. For business users, however, some low capacity services are available in Germany and the choice of definition does have some impact.

3.15 Table 3.1 provides a summary of the comparisons undertaken. Usage per month in GigaByte (GB) was estimated for businesses in December 2001 study by analysing the pricing structure for some German operators who offered both a flat rate and volume based tariffs. A similar analysis has been carried out based on February 2002 tariffs and the results are consistent with the values used last time, so these have not been changed. For residential consumers, usage in GB per month was estimated at 1.2GB per month as shown in table 3.1. This is based on the average of the maximum GB allowed with certain broadband services in Germany. The effect of varying the usage rates is considered as part of the sensitivities.

**Table 3.1: Summary of the comparisons undertaken**

No	Description	Min bandwidth required (kbit/s – GM)	Usage per month (GigaByte )	VAT incl.?	Bandwidth measure
1	Residential	129	1.2	Yes	Downstream
2	Business – low	129	6	No	Downstream
3	Business – medium	500	9	No	Geometric mean
4	Business – high	1000	16	No	Geometric mean

*Note: GM = geometric mean*

3.16 As in the December 2001 study, price comparisons are presented for both DSL and cable modem services taken together, and for DSL services only. Cable modem services are expected to provide a close substitute for DSL services, especially for residential consumers.

3.17 Price comparisons are presented alongside comparisons of bandwidth. Care needs to be taken in interpreting the results – there are a number of factors which will affect the actual speed experienced by the user when using the service and it has not been possible to take these into account. In particular the ‘contention ratio’ (the ratio of the potential maximum demand to the actual bandwidth) will be an important contributor to the speed obtained in practice. However, this information is not readily available other than in the UK.

3.18 Additional assumptions need to be made to model the prices of particular services. The main assumptions made are as follows:

- for certain German services, DSL is only available over an ISDN (rather than PSTN) line. In these cases the additional cost of an ISDN line, compared to a PSTN line, is included in the DSL price. Where DSL is available over both PSTN and ISDN, the service over PSTN has been modelled;
- in Sweden, a ‘group’ tariff may be available at a lower price than the price for an individual household. To obtain the cheaper tariff, several households within a limited area need to be connected and, householders need to enter into a separate ‘collaborative’ agreement with the DSL provider. The prices for individual households have been used for the main analysis;
- for cable modem services, the price may be lower for customers who subscribe to other services (TV or telecoms) with the cable operator. The cheaper price available to cable customers has been used; and
- services have been designated residential or business based on the market sector that the operator/service provider appears to be targeting. However, while certain ‘residential’ services specifically prohibit business use, others allow it. The distinction between residential and low-end business use is, therefore, not clear-cut.

3.19 Some of these assumptions are varied as part of the sensitivity analysis.

## **Results for residential users**

### ***Price index***

3.20 Table 3.2 below shows the results for the price level, price index and (downstream) bandwidth provided for residential services. All these measures are constructed using the average of the two lowest priced residential offers from different operators/service providers included in this study, in each country (it is not possible to include all operators and this study may not represent the cheapest deals available in every case). Results are presented both with, and without, cable modem offers included. Results for all countries are shown using February 2002 prices and results for the UK are additionally shown using prices as at April 2002.

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**Table 3.2: Results for price level, price index and (downstream) bandwidth for residential broadband services**

	Include cable modems			Exclude cable modems		
	Price level £/month	Price index	Bandwidth kbit/s	Price level £/month	Price index	Bandwidth kbit/s
France	35	130	512	35	91	512
Germany	27	100	512	32	84	768
Sweden	21	78	512	24	63	512
UK	27	100	512	38	100	506
US	27	99	256	27	69	256
UK (April)	26	99	512	30	78	512

3.21 From Table 3.2 it is seen that as at February 2002:

- when cable modems are included:
  - prices in the UK are almost the same as in Germany and the US, and below prices in France; only in Sweden are prices lower than in the UK; and
  - the capacity offered is comparable in France, Sweden, Germany and the UK, but the US services with the lowest prices offer lower capacity; and
- when cable modem services are excluded (ie a comparison of DSL services only):
  - UK prices are higher than in any other country; and
  - the amount of capacity is comparable in France, Sweden and the UK, but higher in Germany and lower in the US.

3.22 However with April 2002 price cuts:

- when including cable modems there is a slight decrease in the UK (as a result of a price reduction in a cable modem service); and
- when DSL only prices are considered the UK position has changed relative to other countries. Prices are 22% cheaper in April compared to February 2002 and the UK is now below Germany and France, and the gap with the US and Sweden has narrowed.

3.23 Looking at the more detailed results underlying Table 3.2, it is seen that:

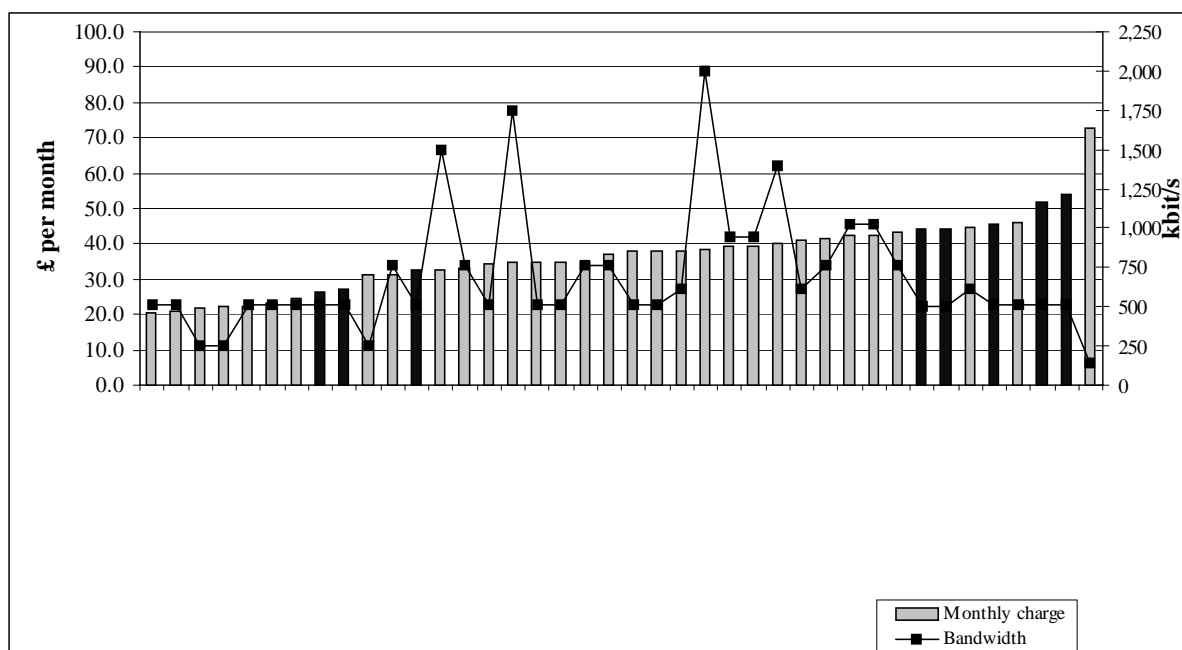
- in the UK, cable modem services from NTL and Telewest are cheaper than any DSL service. In Sweden two cable modem services also make up the cheapest services;
- in Germany the index of cheapest services is made up of one cable modem and one DSL service and in France and the US, DSL services make up the two cheapest broadband services; and
- the cheapest DSL services in the US have lower capacity than in Europe – however the US services are symmetric, while the European services are generally asymmetric.

3.24 The results for the UK as at February 2002 are mixed: UK cable modem prices compare favourably with prices for broadband services elsewhere, but UK prices for DSL services were higher than elsewhere. The UK was the only country studied with

such a clear price gap between DSL and cable modem services. The April price changes have reduced this gap and UK DSL services at April 2002 compare favourably with France and Germany.

3.25 The results can also be presented by considering a chart which lists the cheapest offers of the operators/service providers considered in this study (arranged in price order), with downstream bandwidth superimposed. See Figure 3.1 below (note UK operators/service providers are highlighted using darker coloured bars). The results are from February 2002.

**Figure 3.1: Residential DSL and cable modem services in ascending order of price, with 'speed' of service (downstream bandwidth) shown separately.<sup>11</sup>**



*Note: cable modem services have (CM) after the operator's name. UK services are shown in bold.*

3.26 From Figure 3.1 it is seen that:

- the UK DSL services appear to provide high priced services (as at February 2002) with a bandwidth (at around 500kbit/s) which is fairly typical for residential services; the cable modem services appear to be mid to low priced and again have a fairly typical bandwidth for residential services; with the April 2002 prices (not shown) UK DSL services are about average;
- the Swedish services are all at the cheap end of the chart, with typical bandwidth for residential services;
- cable modem services in the US such as Roadrunner and Comcast appear to provide a low to mid priced service plus high bandwidth; and
- the US, France and Germany appear to have some offers available spread throughout the price range; the cheapest US services all have relatively low capacity (although they are symmetric).

<sup>11</sup> As previously stated in this report, these charts should not be seen as a buyer's guide.

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### **Price trend**

3.27 A summary of price changes since August 2001 is provided in Table 3.3. This table also includes the UK price change for the period February 2002 to April 2002. This shows:

- including cable modems, the cheapest broadband prices in the UK have risen by 5% (this is due to an increase in cable modem monthly rental prices); they did however decrease by 1% in April 2002 with a reduction in the connection fee of the cheapest cable modem service;
- DSL prices in the UK dropped by 22% from August 2001 to February 2002 and dropped by another 22% to April 2002 with the introduction of new wholesale price. This is an overall fall of 39%;
- prices for broadband services including cable modems have dropped in Germany, this is due to the inclusion of a cable modem service that was previously excluded due to low speed (the speed for this service has increased); and
- DSL prices increased in Germany and Sweden and fell in the US.

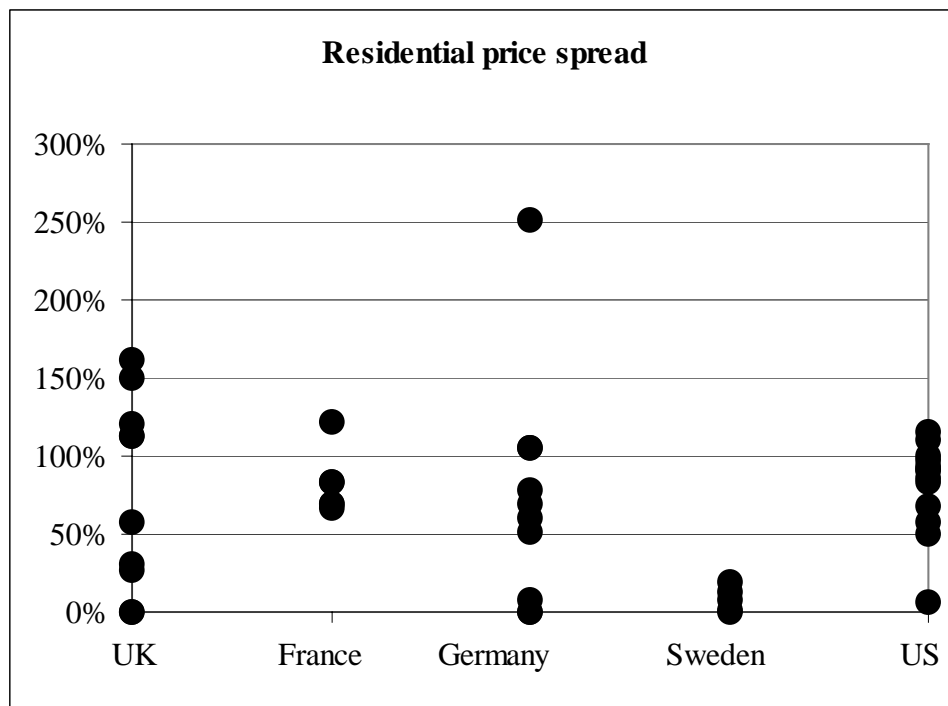
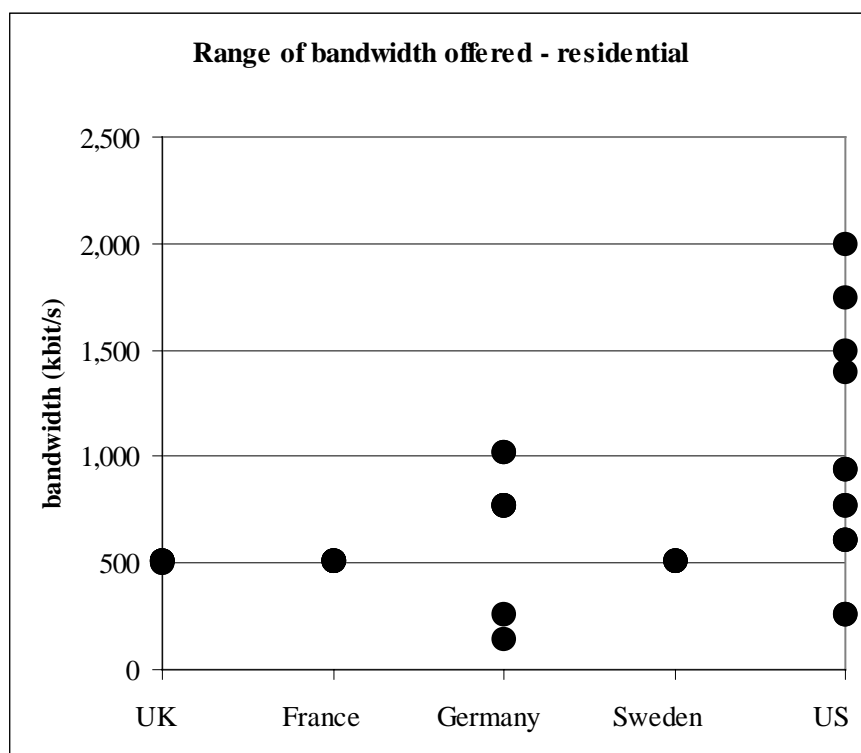
**Table 3.3: Percentage change in price levels between August 2001 and February 2002 (UK: February 2002- April 2002) – residential services**

	Including cable modems	DSL only
France	2%	0%
Germany	-9%	8%
Sweden	8%	6%
UK	5%	-22%
US	-5%	-6%
UK (April 2002)	-1%	-22%

### **Price and bandwidth spread**

3.28 Charts showing the spread of prices and bandwidths are shown in Figures 3.2 and 3.3 respectively. The price spread chart (Figure 3.2) shows the price for the cheapest package offered by each operator as a percentage increase over the cheapest price across all countries. The bandwidth spread chart (Figure 3.3) shows the range of bandwidths on offer (based on the lowest and highest bandwidth offered by each operator).

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**Figure 3.2: Price spread chart (February 2002)****Figure 3.3: Bandwidth spread chart (February 2002)**

3.29 Figures 3.2 and 3.3 show:

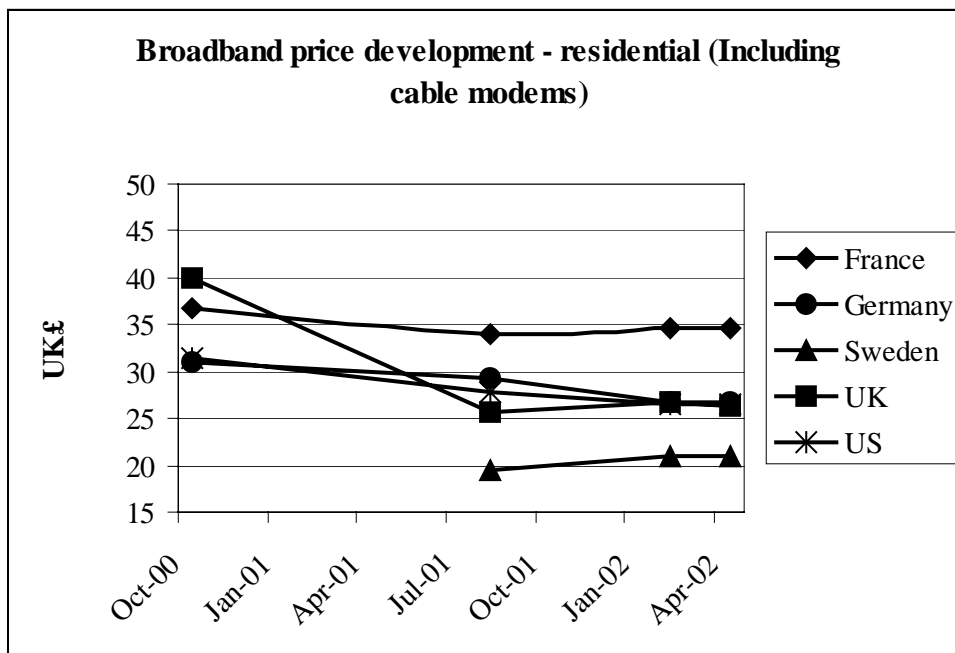
- the range of prices in France, Sweden and the US are narrower than in other countries;

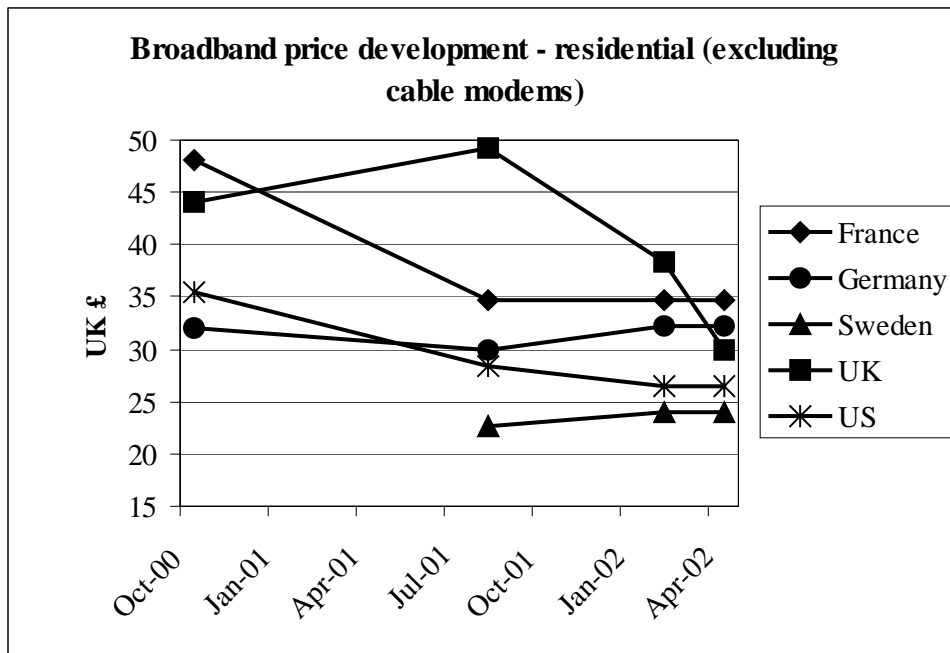
- the range of bandwidth on offer in Sweden, the UK and France is relatively limited; and
- the US offers the widest range of bandwidth, though the range in Germany is also wider than in the other European countries.

3.30 Price developments (including cable modem and excluding cable modem) over the research period October 2000 until April 2002 are depicted in figures 3.4 and 3.5. These figure show:

- when cable modems are included prices in all countries dropped between October 2000 and August 2001 and have remained relatively stable since;
- DSL only prices dropped significantly in France and the US between October 2000 and August 2001 and have remained stable since. Prices in Germany have been relatively low and stable across the period and prices in the UK have been relatively high until the recent price falls in February 2002 and April 2002; and
- April 2002 is the first time UK DSL prices have dropped beneath those in France and Germany.

**Figure 3.4: Broadband (including cable modem) price developments since October 2000**



**Figure 3.5: DSL only price developments since October 2000**

3.31 Looking at the more detailed results underlying figures 3.4 and 3.5 specific market developments can be tracked. In February 2002 the drop in UK DSL prices from August 2001 reflects the introduction of the self-install wholesale DSL products which reduced the price of services to end users. The additional fall in price from February 2002 to April 2002 is due to the further reduction of prices for wholesale services from BT.

### Results for business users

#### *Price index*

3.32 Table 3.4 below shows the results for the price level, price index and bandwidth provided for business services. All these measures are constructed using the average of the two lowest priced business offers (from different operators/service providers considered in this study) in each country. Results for all countries are shown using February 2002 prices and the results for the UK are additionally shown using prices as at April 2002.



**Table 3.4: Results for price level, price index and bandwidth for business broadband services (cable modem services included)**

	No minimum bandwidth			Minimum GM bandwidth of 500 kbit/s			Minimum GM bandwidth of 1000 kbit/s		
	Price level £/month	Price index	Bandwidth – DS kbit/s	Price level £/month	Price index	Bandwidth – GM kbit/s	Price level £/month	Price index	Bandwidth – GM kbit/s
France	120	277	1,000	120	100	506			
Germany	50	117	456	121	101	618	380		1,000
Sweden	36	83	512	36	30	512	117		1,012
UK	43	100	506	120	100	503			
US	37	85	942	56	46	699	98		1,100
UK (April)	29	68	512	98	82	506			

Note: DS = downstream, GM = geometric mean

3.33 From Table 3.4 it is seen that as at February 2002:

- for the most basic services available to business (ie where the business has a minimum bandwidth requirement of 129 kbit/s):
  - prices in Sweden and the US are around 15% cheaper than in the UK;
  - prices in Germany are 17% more expensive than the UK; and
  - prices in France are significantly more expensive than in other countries – but services provide a higher average bandwidth.
- for business services where a minimum *geometric mean* bandwidth of 500kbit/s is required:
  - prices in Sweden and the US are very much lower than elsewhere;
  - UK prices are similar to those in France and Germany;
  - the bandwidth in the UK is about the same as in France and Sweden but less than in Germany and the US; and
- for business services where a minimum *geometric mean* bandwidth of 1000kbit/s is required:
  - services are only available in Germany, Sweden and the US;<sup>12</sup> and
  - prices in Germany are much more expensive than Sweden or the US.

3.34 However with the April 2002 price cuts;

- for the basic service, prices in the UK decreased by 32% making the UK the cheapest basic broadband offer available; and
- for services with a minimum geographic mean of 500kbit/s UK prices decreased by 18% making it cheaper than France and Germany and narrowing the gap between Sweden and the US.

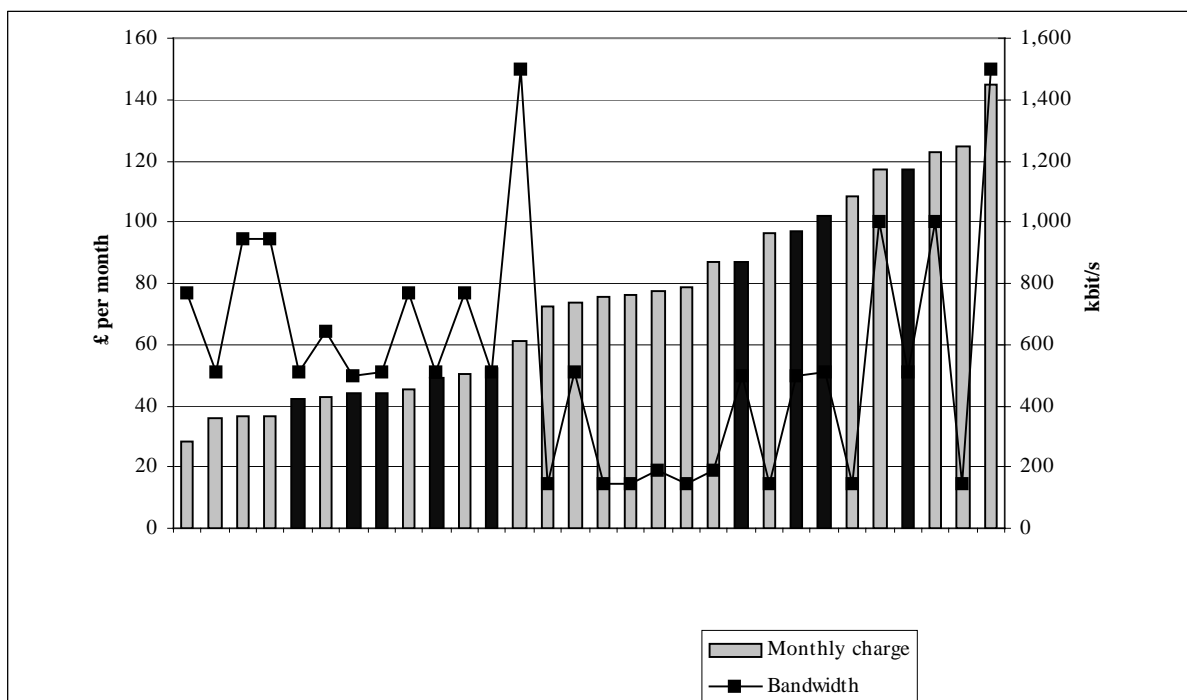
3.35 The results can also be run excluding cable modems. Fewer cable modem services are available to business than residential, and, generally, the cheapest DSL services are cheaper than the cheapest cable modem services. The only country in which a cable modem service features in the index is Germany – excluding cable modem services, therefore, has a negative effect on relative prices in Germany.

<sup>12</sup> While both France and the UK offer services with a *downstream* bandwidth of at least 1000kbit/s, these services are asymmetric and the geometric mean bandwidth is less than 1000kbit/s.

3.36 In both Germany and the US, a range of symmetric services are offered, while in the UK, France and Sweden all services are asymmetric.

3.37 The results can also be presented by considering a number of charts which list the cheapest offers of the operators/service providers considered in this study (arranged in price order), with the relevant measure of bandwidth superimposed. See Figures 3.6 to 3.8 below (note UK operators/service providers are highlighted using darker coloured bars).

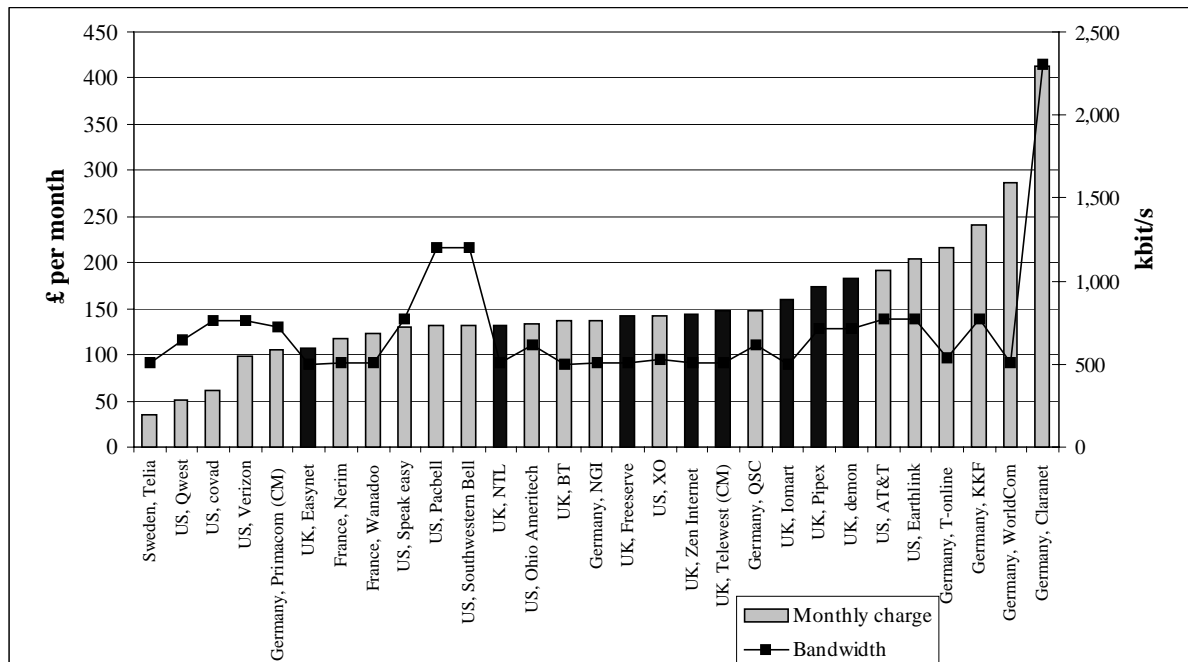
**Figure 3.6: Business DSL and cable modem services in ascending order of price, with 'speed' of service (downstream bandwidth) shown separately – minimum bandwidth 129kbit/s (downstream).<sup>13</sup>**



Note: cable modem services have (CM) after the operator's name. UK services are shown in bold.

<sup>13</sup> See footnote 11.

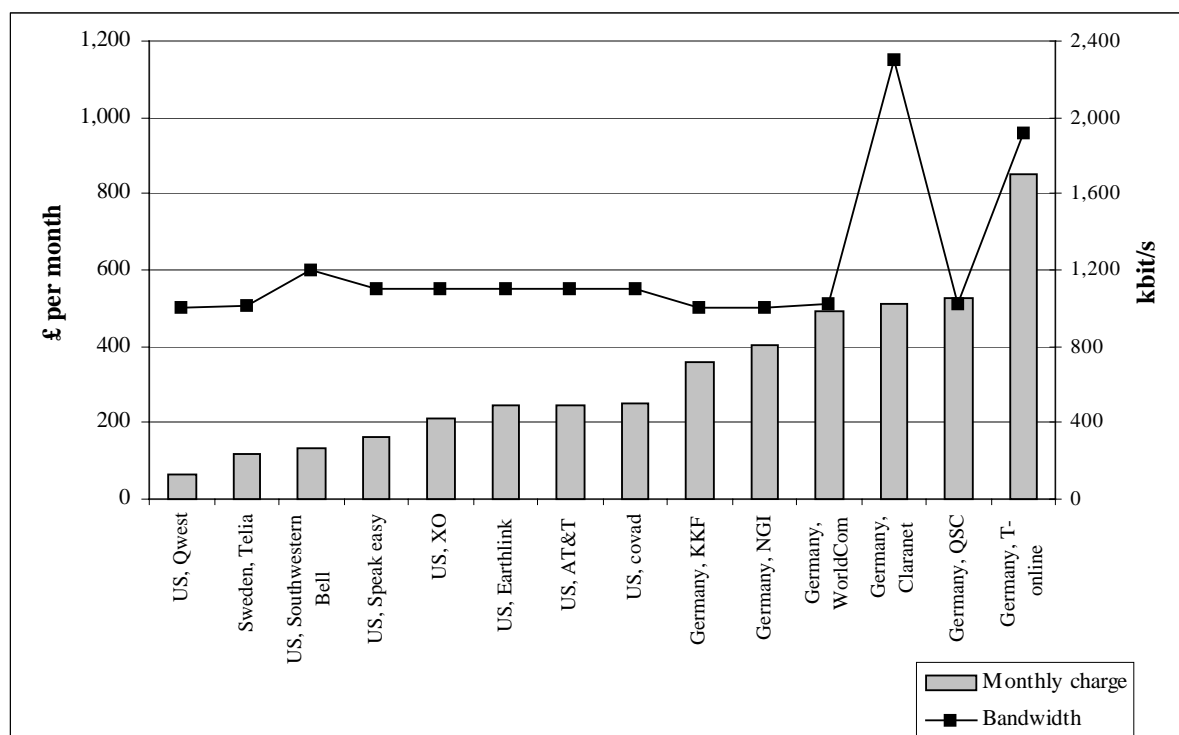
**Figure 3.7: Business DSL and cable modem services in ascending order of price, with 'speed' of service (geometric mean bandwidth) shown separately – minimum bandwidth 500kbit/s (GM).<sup>14</sup>**



Note: cable modem services have (CM) after the operator's name. UK services are shown in bold.

<sup>14</sup> See footnote 11.

**Figure 3.8: Business DSL and cable modem services in ascending order of price, with 'speed' of service (geometric mean bandwidth) shown separately – minimum bandwidth 1000kbit/s (GM).<sup>15</sup>**



Note: cable modem services have (CM) after the operator's name. UK services are shown in bold.

### Price trend

3.38 A summary of price changes since August 2001 is provided in Table 3.5. This table also includes the UK price change for the period February 2002 to April 2002. This shows:

- for the most basic services available to business (ie where the business has a minimum bandwidth requirement of 129kbit/s):
  - in France prices have increased significantly, due to the discontinuation of a business cable modem service which was cheapest in August 2001;
  - in Germany prices have also increased by 12%, due to a slight increase in the two cheapest services;
  - in Sweden, the UK and the US prices have decreased slightly; and
  - in the UK prices decreased a further 33% with the introduction of the new April 2002 prices.
- for business services where a minimum *geometric mean* bandwidth of 500kbit/s is required:
  - in France prices have increased due to the discontinuation of a business cable modem service; and
  - prices have fallen significantly in Germany due to the inclusion of a cable modem services which was previously not included due to low capacity,

<sup>15</sup> See footnote 11.

- 
- prices have fallen slightly in Sweden, the UK and the US;
  - in the UK prices have then fallen by another 18% after the introduction of the April 2002 prices.
  - for business services where a minimum *geometric mean* bandwidth of 1000kbit/s is required:
    - prices have risen significantly in Germany and fallen slightly in the US and Sweden. Prices in Germany are significantly more expensive than in the US.

3.39 The price rises seen in France are reduced if cable modem services are excluded.

**Table 3.5: Percentage change in price levels between August 2001 and February 2002 – business services.**

	No minimum bandwidth	Minimum GM bandwidth of 500 kbit/s	Minimum GM bandwidth of 1000 kbit/s
France	71%	9%	
Germany	12%	-15%	25%
Sweden	-2%	-2%	-2%
UK	-7%	-2%	
US	-1%	-1%	-4%
UK (April 2002)	-33%	-18%	

### ***Price and bandwidth spread***

3.40 Charts showing the spread of prices and bandwidths are shown in Figures 3.9 and 3.10 respectively. The price spread charts (Figure 3.9) show the price for the cheapest package offered by each operator as a percentage increase over the cheapest price across all countries for each business type. The bandwidth spread chart (Figure 3.10) shows the range of bandwidths on offer (based on the lowest and highest downstream bandwidth offered by each operator).

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Figure 3.9: Price spread charts

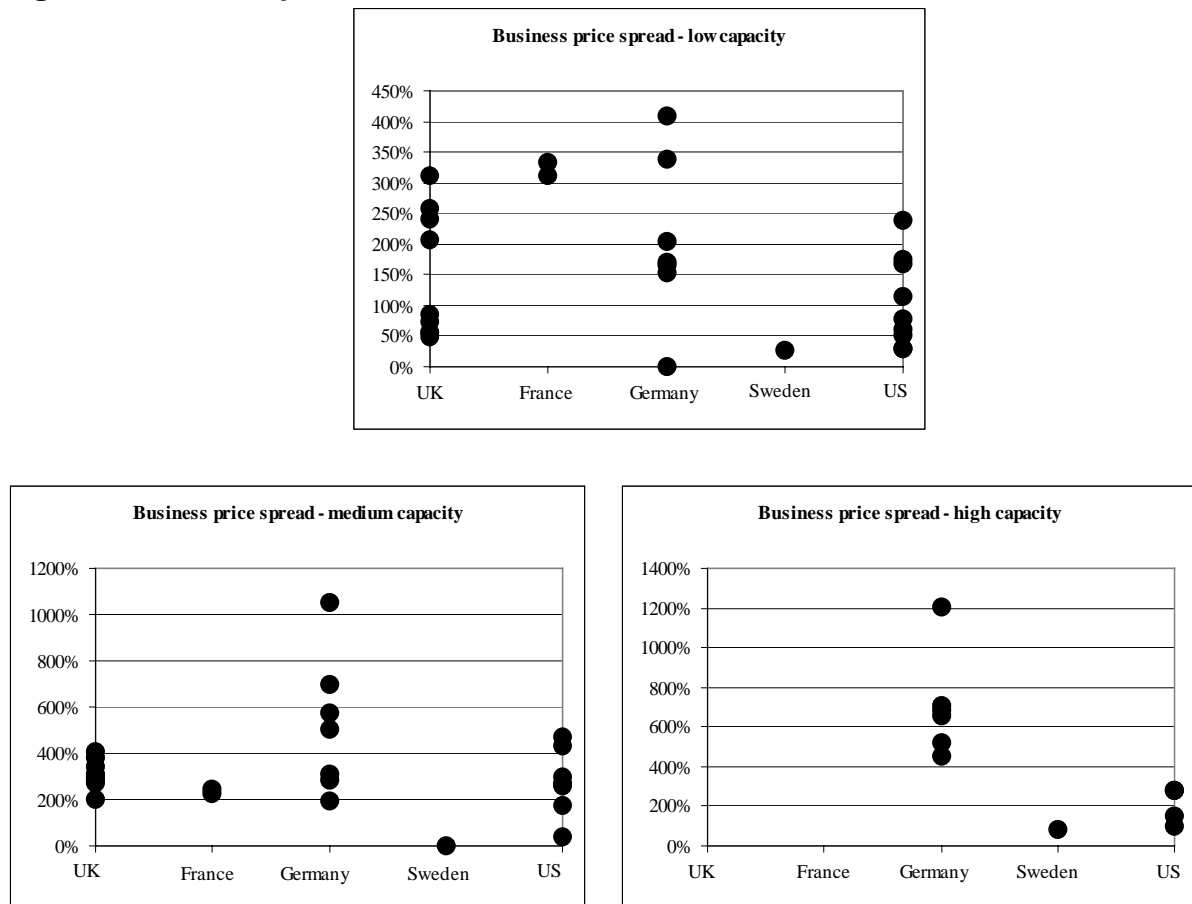
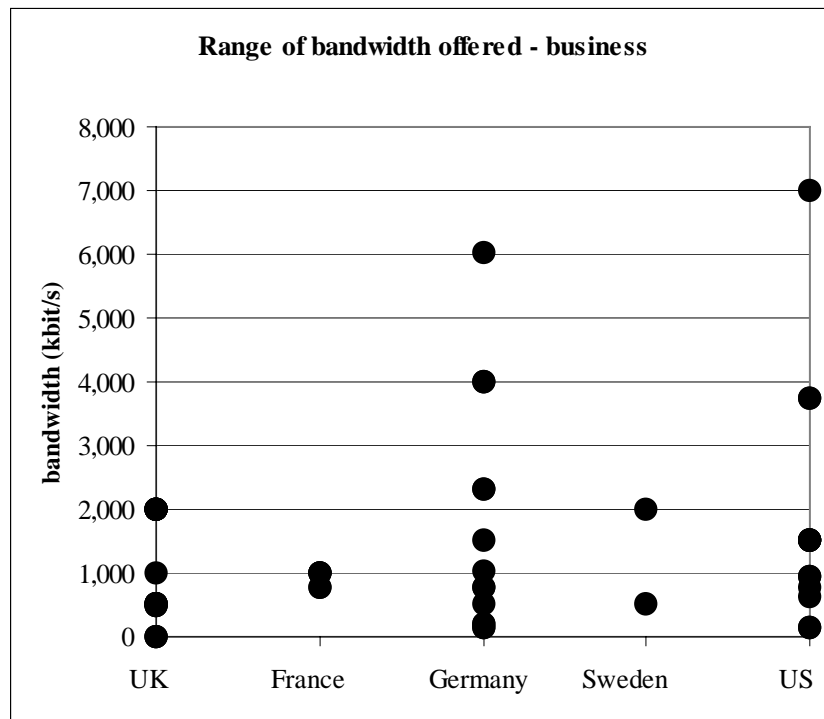


Figure 3.10: Bandwidth spread chart



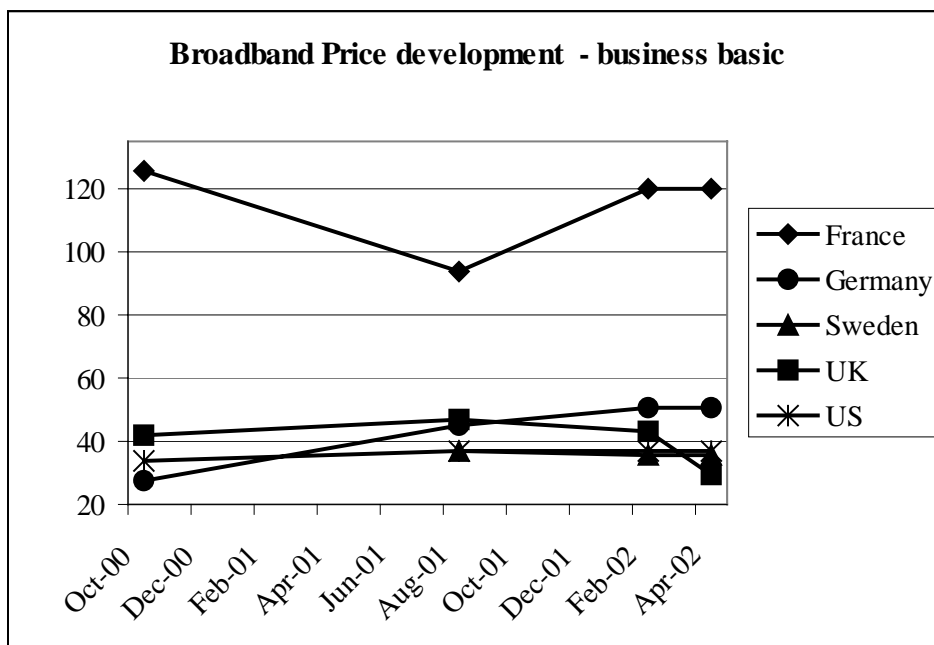
3.41 Figures 3.9 and 3.10 show that:

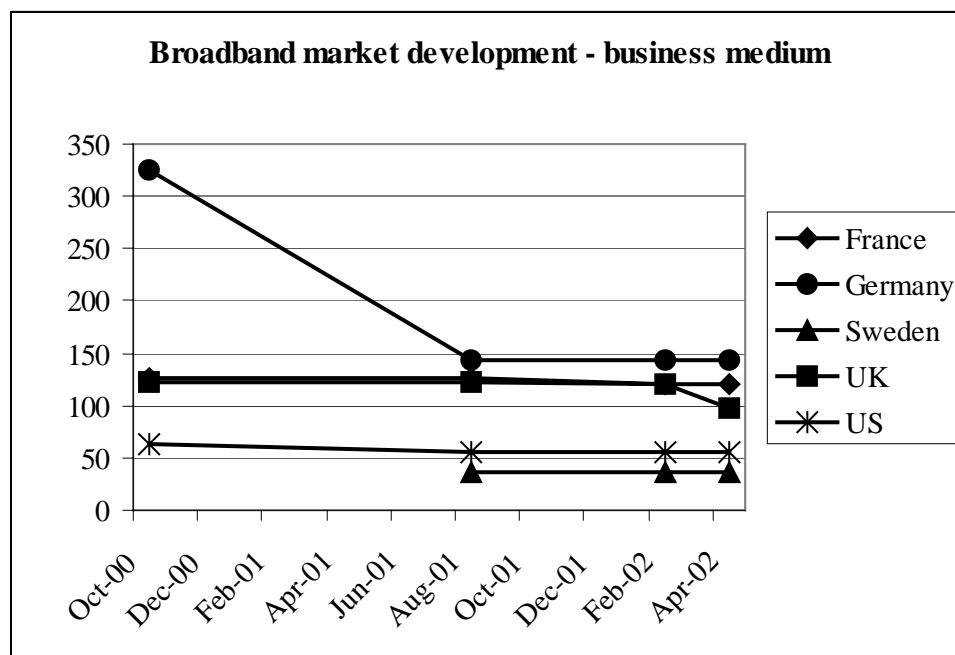
- for the most basic services available to business (ie where the business has a minimum bandwidth requirement of 129kbit/s), the price spread is widest in Germany and narrowest in the US (for Sweden only one operator is included and for France only two operators are included, therefore the figures do not illustrate the price spread, though they do indicate the price levels);
- for business services where a minimum bandwidth of 500kbit/s (geometric mean) is required, the spread of prices in the UK is comparable to that in the US. Germany has a wider spread;
- for business services where a minimum bandwidth of 1000kbit/s (geometric mean) is required, only the US and Germany offer services. Prices in Germany are both higher and more widely spread; and
- taking all services on offer, the range of capacities on offer in Germany and in the US was much wider than elsewhere. The range is similar in the UK and Sweden while in France it is narrower.

3.42 Price developments over the research period October 2000 until April 2002 are depicted in figures 3.11 and 3.12. These figures show:

- for basic business services (services without any minimum capacity) the UK, USA, Germany and Sweden all offer a service similar in price and services in France were significantly more expensive' although services had a higher bandwidth;
- Germany, Sweden and the US have experienced stable prices throughout the study period and the UK has seen price falls in February 2002 and again in April 2002;
- for medium capacity services prices have remained steady in most countries across the study period (though prices in Germany showed a big drop from October 2000 to August 2001); prices in the UK fell in April 2002.

**Figure 3.11: Broadband price developments since October 2000**



**Figure 3.12: Broadband price developments since October 2000**

### Sensitivity analysis

3.43 There are a number of assumptions that have been made which potentially affect the results. These include:

- the definition of "broadband";
- the usage rate included for tariffs which depend on volume; and
- the treatment of some country specific issues:
  - the treatment of ISDN costs in Germany;
  - the treatment of 'group' tariffs in Sweden;
  - the treatment of costs for non-cable subscribers; and
  - availability of 'residential' services to business customers.

3.44 To test the robustness of the results, a sensitivity analysis has been carried out. The sensitivities for which detailed results are presented are as follows:

- i. Change the definition of "broadband", so that the downstream capacity must be at least 500kbit/s;
- ii. Double and half the usage rate;
- iii. Exclude the additional ISDN costs in Germany and include the cheaper 'group' tariffs in Sweden (residential only).

3.45 The impact of additional costs for non-cable customers and business use of residential tariffs is commented on.

3.46 The results of the sensitivity analysis for residential and business customers is shown in Tables 3.6 and 3.7. Detailed results for business are shown only for 'low capacity' business services – the impact on consumers requiring higher bandwidth is commented on.



**Table 3.6: Sensitivity analysis for price index for residential DSL and cable modem services**

	Base case	Sens i: Increase min capacity to 500kbit/s	Sens iia: Double usage rate	Sens iib: half usage rate	Sens iii: remove ISDN costs in Germany and include 'group' tariffs in Sweden
France	130	130	130	130	130
Germany	100	119	100	94	80
Sweden	78	78	78	78	55
UK	100	100	100	100	100
US	99	116	99	99	99

**Table 3.7: Sensitivity analysis for price index for business DSL and cable modem services ('low' capacity basket)**

	Base case	Sens i: Increase min capacity to 500kbit/s	Sens iia: Double usage rate	Sens iib: half usage rate	Sens iii: remove ISDN costs in Germany
France	277	277	277	277	277
Germany	117	118	117	117	104
Sweden	83	83	83	83	83
UK	100	100	100	100	100
US	85	85	85	85	85

3.47 The results of the sensitivity analysis for residential services shows:

- changing the definition of broadband to include only services with > 500kbit/s downstream capacity has no effect on the UK, France and Sweden results but increases the prices in the US and Germany (ie one of the two cheapest services in both countries has a relatively low capacity);<sup>16</sup>
- increasing the usage level has no on the results, and halving the usage level reduces German prices slightly; and
- changing the treatment of some German and Swedish tariffs improves their relative positions – in Germany taking out the incremental cost of having an ISDN line places Germany below the UK index for residential services.

3.48 For business use ('low' capacity basket), the results of the sensitivity analysis show:

- changing the definition of broadband to include only services with > 500kbit/s downstream capacity, has little effect on the results;<sup>17</sup>
- doubling and halving the usage rate has no impact on the result;

<sup>16</sup> Increasing the threshold to only 250kbit/s has no effect on the base case results.

<sup>17</sup> Increasing the threshold to only 250kbit/s has no effect on the base case results.

- taking out the incremental cost of ISDN access in Germany improves the German prices, but does not alter the country ranking.

3.49 Results have also been run for the other business baskets. These show that:

- changing the definition of broadband has no impact in these cases (as these baskets already have higher capacity thresholds); and
- changing the usage rates has no impact on the results.

3.50 The results of the sensitivity analysis illustrate that changes in assumptions can have an impact on the result for an individual country, but do not alter the overall conclusion regarding the UK's relative position.

3.51 A couple of other areas have also been considered:

- costs for non-cable customers; and
- business use of residential services.

3.52 Full information on the price of cable modem services to non-cable customers has not been collected, and it is not possible to test in detail the effects of including these additional costs. Most (but not all) cable operators appear to charge some additional amount to customers who are not taking other telephony or TV services. As cable modem services feature in the index for all countries for residential services, including these costs would raise prices in all countries.

3.53 A 'business' service has been defined as a service that is clearly targeted at the business market. Some businesses may be able to use services that are targeted at residential use. The existence of 'home workers' also blurs the distinction between residential and business use. In the UK, prices for the most basic business DSL services are similar to the prices for residential DSL, hence there is little scope for business to reduce costs by using 'residential' packages. In other countries the differential is bigger and it is possible that business costs can be reduced in this way.

### **Comparison of dial-up and broadband prices**

3.54 Comparisons can be made of the cost of always on 'broadband' services compared to unmetered dial-up for residential and business consumers in each country.

3.55 For residential consumers, Table 3.8 compares the cost of broadband to the cost of 'unmetered' dial-up access (based on the average of the two cheapest deals in both cases). Where unmetered dial-up access is not available, the cost used is for 150 hours' access (definition as used by OECD). In these cases the cost of dial up exceeds the cost of broadband. Clearly the precise ratio depends on the usage rate assumed.

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**Table 3.8: Comparison of broadband and dial up cost per annum for residential users**

	Broadband	Dial-up [150 hours]	Ratio
France	417	1,378	0.30
Germany	322	569	0.57
Sweden	251	743	0.34
UK	321	245	1.31
US	319	242	1.32

3.56 The figures in table 3.8 highlight the fact that for consumers in France, Germany and Sweden where dial-up unmetered Internet access is not widely available, broadband is likely to be a cost effective alternative for high usage customers. The usage rate used (150 hours per month) is high, and in practice the difference in price is likely to be lower. However, even with a usage of 60 hours a month, the cost of dial up exceeds that of broadband in these three countries. Of the two countries where unmetered dial-up is available, the price gap is very similar.

3.57 The equivalent figure/table for business consumers is shown in Table 3.9 (using the 'low' capacity basket):

**Table 3.9: Comparison of broadband and dial up costs per annum for business users**

	Broadband	Dial-up [150 hours]	Ratio
France	1440	1,309	1.10
Germany	606	1,018	0.59
Sweden	431	1,063	0.41
UK	519	464	1.12
US	439	257	1.71

3.58 Again, the figures highlight the differences between countries where unmetered dial-up is and is not available. However in France, although there are no unmetered dial-up packages there is a package with 100 included hours, and this package is cheaper than broadband products.

3.59 The availability of unmetered dial-up Internet access may influence the rate of take up of broadband services, discussed in the following section.

### **Service availability and take-up**

3.60 This section provides a summary of the broadband options available to consumers in the benchmarked countries and compares take-up, availability and roll-out plans. This is based mainly on OECD data, with some additional information from regulators and operators.

***Overview of broadband options***

3.61 Table 3.10 provides an overview of the main options available to consumers regarding types of broadband product and providers.

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**Table 3.10: Summary of Broadband options**

<b>Country</b>	<b>Overview of services/providers</b>
France	<p><b>DSL:</b> DSL products are provided on the basis of France Telecom's products. End users can either buy a full ADSL product from an ISP (who uses France Telecom wholesale inputs to provide service) or they can buy ADSL access from France Telecom with an ISP service bought separately (with the ISP providing transport based on France Telecom wholesale inputs). The former 'resale' option (which is self-install) is more popular. Wanadoo, France Telecom's ISP, has a large proportion of the market (over 90% at the end of 2001).</p> <p>LLU has yet to make much of an impact. An estimated 650 unbundled loops are being used to provide SDSL services to businesses.</p>
	<p><b>Cable modem:</b> France Telecom owns and operates the second largest cable network and also has interests in other cable companies, although these are being sold off. NOOS, the largest cable operator, had an estimated 50% share of the cable modem market at end 2001.</p>
Germany	<p><b>DSL:</b> Deutsche Telekom is by far the biggest provider of DSL services. An end user purchases a DSL product directly from Deutsche Telekom, but must then purchase an ISP service as well to obtain internet access. T-online, Deutsche Telekom's ISP, has a large percentage of end users (over 85% of subscribers at Q1 2002). Other products are available from providers such as QSC, who provide DSL services over leased local loops both directly to end users and on a wholesale basis to other providers. Approximately 3% of DSL lines are provided via LLU or direct build.</p>
	<p><b>Cable modem:</b> The development of cable modem services in Germany has been relatively slow. The failure so far of Deutsche Telekom to sell its cable assets is holding back the development of cable modem services.</p>
Sweden	<p><b>DSL:</b> Telia is the largest provider of DSL services, with around 80% of subscribers at end of 2001.</p>
	<p><b>Cable modem:</b> Telia own one of the largest cable networks and had approximately 20% market share of cable modem subscribers at end of April 2002.</p>
	<p><b>Other:</b> Ethernet LANs or so called 'property networks' also represent a relatively large proportion of broadband connections and this has brought additional competition to the market.</p>
UK	<p><b>DSL:</b> DSL products are provided on the basis of BT's wholesale products. These are provided to BT Openworld and other operators on the same basis, and BT Openworld has approximately 50% market share. Kingston is the sole provider in the Hull area.</p> <p>LLU has yet to have a big impact. About 300 local loops are being used to provide DSL service to business consumers.</p>
	<p><b>Cable modem:</b> NTL and Telewest provide cable modem services that</p>

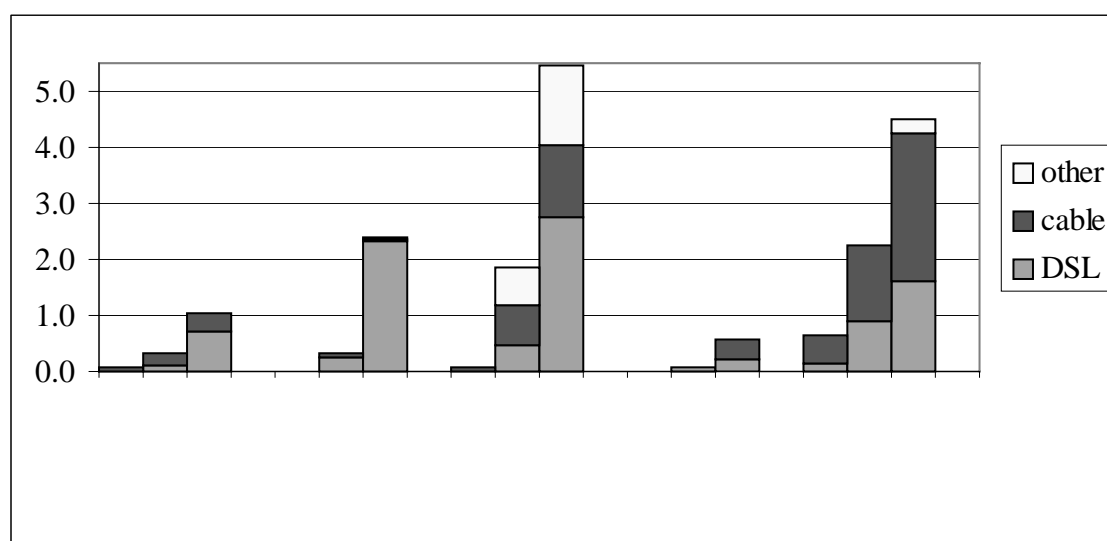
	are available to approximately 38% of households.
US	<b>DSL:</b> DSL services are provided by a variety of operators. four of the 5 largest providers are regional bell operating companies (RBOCs – local incumbents). New entrants (such as Covad and Rythmys, offering services over leased local loops) had a market share of around 7% at June 2001, down from 16% at the end of 2000, due to several of these companies reporting financial difficulties. DSL services are estimated to be available to approximately 50% of US homes at the end of 2001.
	<b>Cable modem:</b> the three largest companies are AT&T Broadband, AOL Time Warner and Comcast. Together they account for around 42% of the cable modem market. Cable modem services are available to around 70% of US homes at the end of June 2001.

Source: OECD, Ofcom, regulators and operators.

### Take-up

3.62 Data on take up are presented as a percentage of population (using OECD population figures for 1999). In figure 3.13, broadband take up rates in each country is shown as at end 1999, end 2000 and end 2001. The end of 2001 is the most recent data on which information on all countries is available.

**Figure 3.13: Broadband take-up per 100 population by country for end 1999, end 2000 and end 2001.**

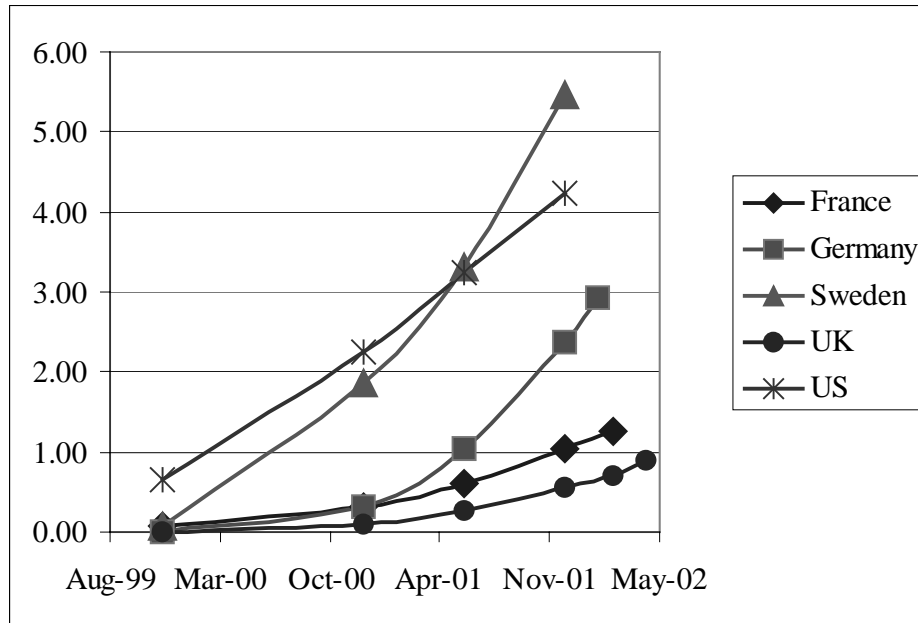


Source: OECD, companies

3.63 While current levels of broadband take-up are low (below 5% of population) in all of the countries benchmarked, take-up in the US and Sweden is markedly higher than in the other European countries. The increase in broadband take-up over 2001 shows a wide variation: in Sweden the increase corresponds to 3.5 percent of population, in the US and Germany the increase is 2.1 and 2.3 percent respectively, while in France and the UK the increase has only been 0.7 and 0.5 percent respectively.

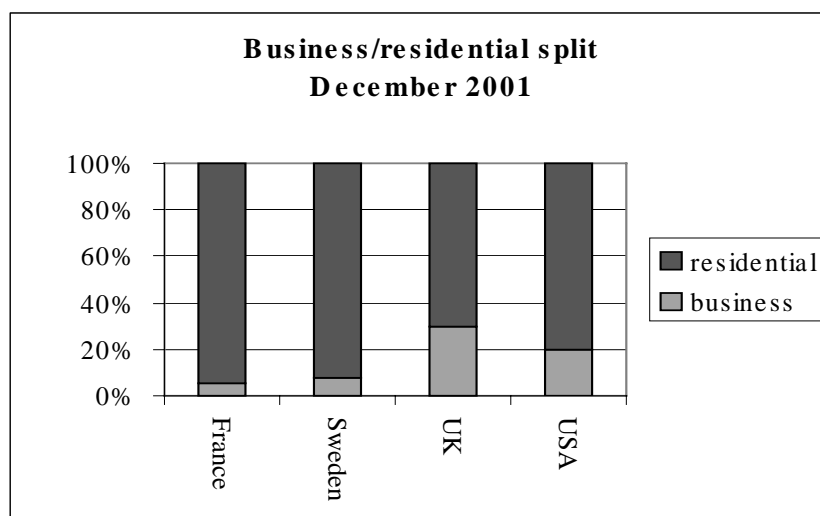
3.64 An alternative way of viewing the data is shown in Figure 3.13: here overall broadband penetration is shown over time, with more recent data for the UK, France and Germany included.

**Figure 3.14: Broadband take-up over time**



3.65 This again illustrates that UK take-up is behind that in other countries, with take-up in Germany and Sweden in particular showing a rapid increase. It is noted that all countries tend to show a period of relatively slow take-up initially, followed by acceleration in the take-up rate. It is noted that broadband services were launched later in the UK than in other countries and this later start should be borne in mind in viewing this chart. For the European countries, the current ranking of countries by penetration rate mirrors the ranking of date of launch of DSL by the incumbent operator.

3.66 The business residential split is indicated in figure 3.14. Information on business and residential split is limited for Germany so this has not been included.

**Figure 3.14: DSL residential and business split**

*USA is for Bell South only*

3.67 Figure 3.14 indicates:

- the business proportion of DSL lines in France and Sweden is very low at 5% and 8% respectively;
- in the US, Bell South has reported that 20% of its lines are for business users at the end of 2001; and
- the UK has the largest proportion of business DSL subscribers and at the beginning of May BT reported that approximately 30% of DSL lines were for business users.

### ***Availability and roll-out***

3.68 Comparisons can also be made of the extent to which services are available. Figures are shown in table 3.14 for DSL coverage as at end 2001 together with forecasts for the future.

3.69 The figures in the table show that roll out in the UK is ahead of the US and behind Sweden, Germany and France. These figures should be treated with caution, as they are not provided on a comparable basis. Limited information is available for Sweden.



**Table 3.14: DSL coverage**

<b>DSL coverage</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
<b>France (% of lines)</b>	32	66	76	81
<b>Germany (% of households)</b>	60	90		
<b>Sweden (% of lines)</b>		70		
<b>United Kingdom (% of households)</b>	50	60	66	
<b>United States (% of households)*</b>	36	50	62	

Source: OECD, companies

\*some carriers may have higher availability in their own service areas such as Bell South with 70%.

3.70 Very little information is available on the availability of cable modem services. Figures for network coverage of cable companies provide an indication of the potential availability, but current availability may be very different to this. The following figures provide an indicative comparison:<sup>18</sup>

- in France 32 percent of households passed. Cable modem services became available in 1997 and cable networks were rapidly digitised;
- in Germany 86 percent of households passed. By September 2000 cable modem services were available to less than one per cent of households;
- in Sweden 65 percent of households are passed. There is no information available on the availability of cable modem services;
- in the UK 51 percent of households passed. Cable modem services were available to around 38 percent of households as at February 2002; and
- in the US 96 percent of households passed. Cable modem services were available to around 71 percent of households by the beginning of 2002.

## Conclusions

3.71 In February 2002, for residential broadband services, UK prices were cheaper than France, more expensive than Sweden and similar to prices in Germany and the US. This is a change since August 2001 when the UK was cheaper than all other countries except Sweden. This change has come about from relatively stable UK results and decreasing prices in many other countries. For DSL only, the UK remained the most expensive of the countries studied, although the gap had narrowed.

3.72 However with the UK April 2002 price cuts, when DSL only prices are considered, the UK improved relative to all other countries and prices are now cheaper than in France and Germany, and the gap has narrowed with the US and Sweden. When cable modems are included there is very little movement in the positioning indicating the cheap cable modem services available in the UK.

<sup>18</sup> Source: OECD. Figures for households passed are based on 1999.

3.73 For business services as at February 2002, the UK's relative position varies according to the capacity requirements of the end user. For a 'low' capacity broadband service, UK prices were below those in France and Germany but prices in Sweden and the US were around 15% cheaper. For a 'mid' capacity service, UK prices were similar to Germany and France but prices in Sweden and the US were considerably lower. Neither France nor the UK offers as wide a range of capacities as in the other countries.

3.74 However with the April 2002 prices cuts, the UK improves its relative position and for 'low' capacity services is the cheapest by at least 23%. For 'mid' capacity services the UK is now cheaper than France and Germany and has narrowed the gap with Sweden and the US.

3.75 UK take-up for broadband is behind that in the other countries benchmarked, although this is at least partly explained by the later launch date in the UK. Only in the UK and the US are unmetered dial-up packages widely available. The lack of unmetered dial-up Internet access in other countries may provide an additional explanation for the higher rates of broadband take-up in the other European countries.

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## Chapter 4

# Comparison of broadband markets in France, Germany and the UK

### Introduction

4.1 Oftel has undertaken a more detailed analysis of the broadband market in France, Germany and the UK with a view to:

- understanding the types of wholesale products available elsewhere, and the pricing of these products, to put BT's wholesale DSL products in context;
- understanding better the results presented in chapter 3 regarding retail prices and take-up; and
- allowing Oftel to assess the validity of claims made elsewhere regarding the relative pricing of BT's wholesale products.

4.2 The information is based on published information and discussions with the ART and RegTP (the French and German telecommunications regulators respectively).

4.3 This has included price benchmarking of wholesale products. Price comparisons of wholesale products are complicated and require a detailed understanding of the products available to ensure a like for like comparison is made.

4.4 This chapter presents summary tables and charts allowing cross-country comparisons of:

- subscriber numbers and the split of the market by type of provider;
- the types of retail and wholesale products available from the incumbent operator; and
- price comparisons:
  - of wholesale products; and
  - of the relationship between wholesale and retail products.

4.5 Further details are given in Annexes D and E which provide:

- an overview for each country; and
- further details of the comparisons made and the assumptions used.

4.6 In this chapter the term "customer" is used to mean a service provider (SP) who is purchasing wholesale products from the incumbent telco. "End user" is used to refer to consumers purchasing a retail broadband service.

### Subscriber numbers by type of provider

4.7 Table 4.1 shows a comparison of the number of subscribers to broadband products (note the figures are approximate and may not always relate to precisely the same point in time).

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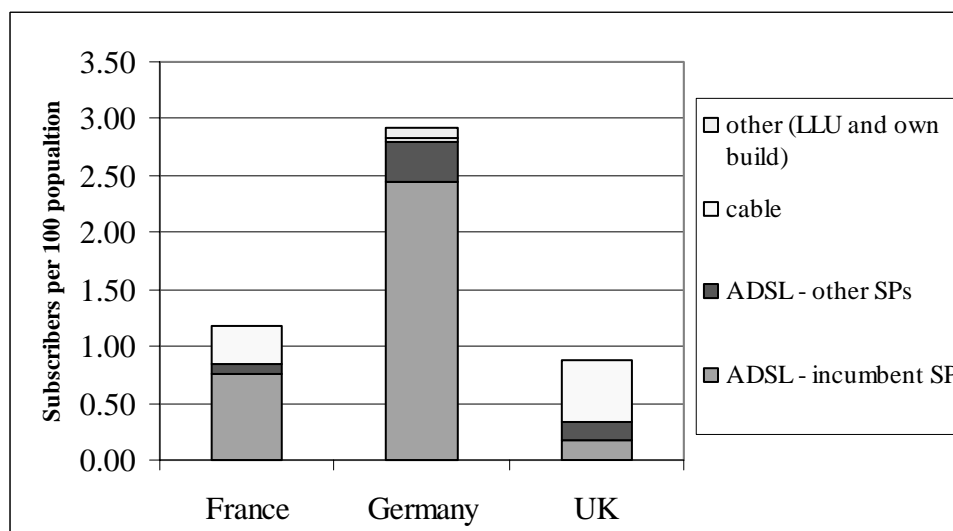
**Table 4.1 – Take up of broadband services in France, Germany and the UK.**

	<b>France</b>	<b>Germany</b>	<b>UK</b>
ADSL provided by service provider (SP) using incumbent network (Q1 2002)	550,000	2,300,000	200,000 (April)
% of consumers using SP of the incumbent for ADSL services	90% (approx for residential consumers)	87% (approx)	50% (approx)
DSL provided over LLU or own build	650 (ART estimate)	70,000	300
Total DSL end users per 100 population	0.93	2.89	0.28
Cable modem subscribers	200,000 (end 2001)	30,000 (end 2001)	328,000 (beginning May 2002)
Cable modem subscribers per 100 population	0.34	0.04	0.34
Total DSL+cable modem subscribers	750,650	2,400,000	528,000
<b>Total DSL+cable modem subscribers per 100 population</b>	<b>1.27</b>	<b>2.92</b>	<b>0.89</b>

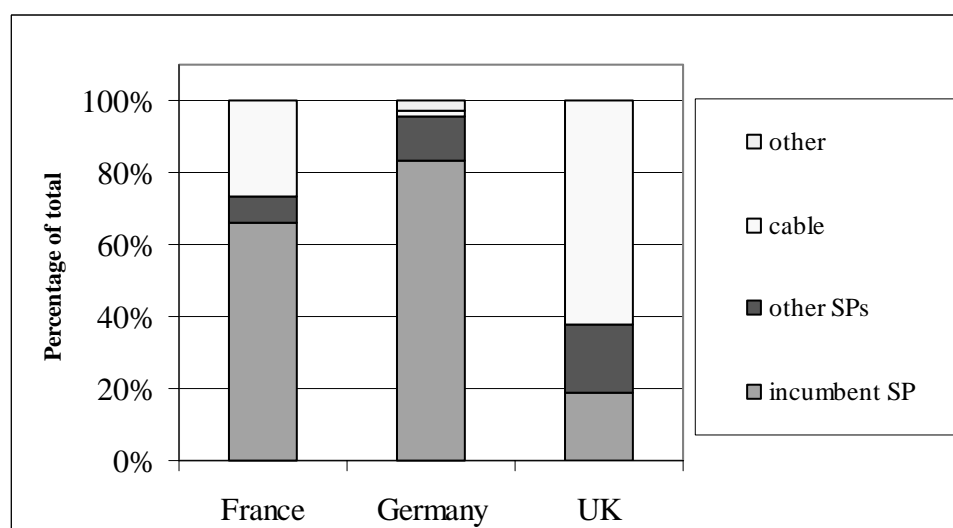
*Note there is some inconsistency in the time period particularly for cable modem subscribers. However in France and Germany the number of cable modem subscribers is significantly lower than the number of DSL subscribers and the inconsistencies should not affect the overall comparisons.*

4.8 The subscriber numbers are also illustrated graphically in figures 4.1 and 4.2, focussing on subscriber numbers per 100 population and on the way the market is split between: DSL provided by the incumbent's SP; DSL provided by other SPs using the incumbent's wholesale DSL products; cable modem services; and other broadband services (provided over unbundled local loops or own build).

**Figure 4.1 – Subscriber numbers per 100 population**



**Figure 4.2 – Split of market by different types of provider (approx)**



4.9 The figures illustrate:

- UK take-up is currently behind that in France and Germany (although provision of broadband services in the UK started later); and
- the broadband markets in France and particularly Germany are dominated by the incumbent's SP. This is not the case in the UK.

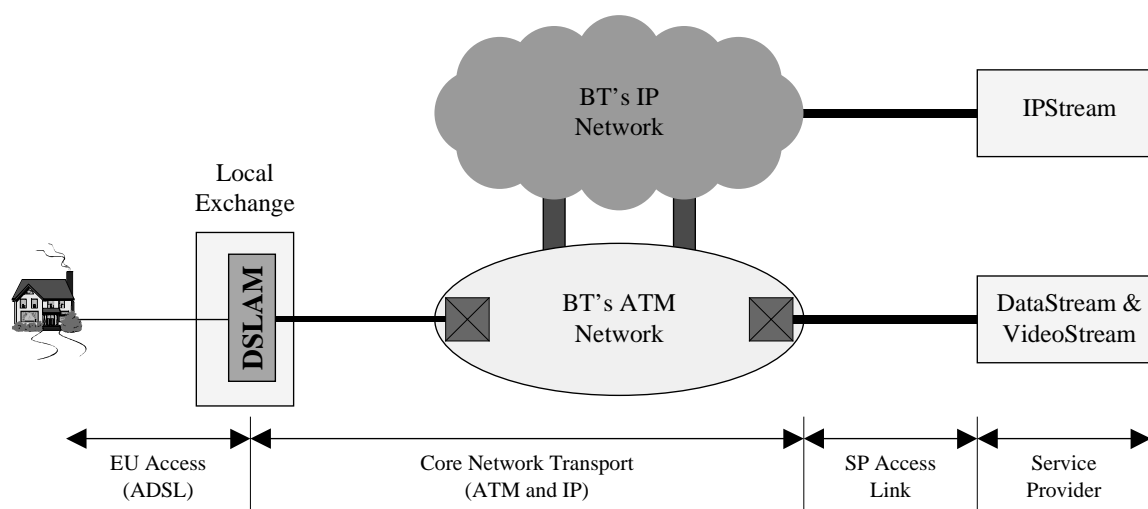
4.10 The UK market is more competitive both in terms of infrastructure competition (from cable modems) and service provider competition (BT Openworld's market share of the ADSL market is lower than Wanadoo's or T-Online's).

4.11 While Germany has a significantly higher number of broadband subscribers, not all of these have unmetered access (approximately 40% use a metered package or a package with a limited number of included hours).

## Incumbent wholesale and retail DSL products

4.12 In order to describe the types of wholesale products available, it is necessary to have some understanding of the network components used to deliver the services. A simplified network diagram illustrating BT's wholesale products is shown in figure 4.3. Figures E.1 – E.3 in Annex E illustrate the IP based products available in each of the three countries.

**Figure 4.3 :BT's wholesale ADSL products**



4.13 Table 4.2 summarises the main wholesale and retail products offered by the incumbent telcos in each country, excluding offers by the incumbent SP. Further details are given in Annex D.

**Table 4.2 – Summary of ADSL products available from incumbent telco, providing Internet access\***

	France	Germany	UK	Comments
Wholesale end user access at DSLAM	IP/ADSL 1 and 2		Datastream end user access	These products cannot be bought in isolation – they require purchase of wholesale transport from DSLAM to ATM/IP level
Retail end user access at DSLAM	Ma Ligne ADSL and Ma Ligne ADSL Pro**			IP/ADSL is the resale (wholesale) version of the 'Ma Ligne ADSL' retail products. A SP service needs to be purchased by the end user as well
Wholesale access at ATM (access to DSLAM plus transport to ATM)	ADSL connect ATM		Datastream (end user access + virtual path)	A link to the SP PoP is also required
Wholesale access at IP (access to DSLAM plus transport to IP)	Collecte IP/ADSL (needs to be added to end user access to DSLAM)		IPStream (includes end user access to DSLAM)	A link to the SP PoP is also required ('BT Central' in the UK)
Wholesale access directly to the Internet			IPStream + BT Central Plus	
Retail access directly to the Internet			BT Broadband***	Provides Internet connectivity without the usual SP features (such as e-mail and web-space) – based on IPStream + BT Central Plus
Retail access at IP		T-DSL		A SP service needs to be purchased by the end user as well. A resale version of this has been proposed.
Backhaul from IP to SP Point of Presence (PoP) or directly to the Internet		Variety of products		Little detail available. 'TICOC', the most widely used, is charged on a per Gbyte basis and provides a connection directly to the Internet.

\*BT also offers a wholesale product called Videostream which allows provision of video on demand services

\*\*Previously called 'Netissimo 1 and 2'

\*\*\* Will be available later in the year

4.14 In the UK, end users purchase their Internet access over DSL as a complete service from a SP (who in turn will be using a BT wholesale product to provide the service). In Germany end users need to purchase two products – an ADSL access product from the incumbent and a SP service to provide an Internet service over DSL. The access products available from the incumbent cannot be used in isolation.

In France both options are available. This is illustrated in Table 4.3 and the box below.

**Table 4.3 – End user purchase options**

	Retail products purchased by end user		Wholesale inputs*
	From Incumbent telco**	From SP	
<b>France – option 1</b>	Ma Ligne ADSL or Ma Ligne ADSL Pro***	SP contract required as well	Collecte IP/ADSL
<b>France – option 2</b>	None	End to end service	IP/ADSL 1 or 2 + Collecte IP/ADSL
<b>Germany</b>	T-DSL	SP contract required as well	Range of wholesale options available
<b>UK</b>	None	End to end service	IPStream + BT Central

\* most commonly used inputs

\*\* not including incumbent SP

\*\*\* previously called 'Netissimo 1 and 2'

### End user purchase options

#### France – option 1

- End user buys DSL access as a retail product ('Ma Ligne ADSL') from France Telecom plus a SP service (two stop shopping – France Telecom product cannot be used on its own)
- the SP will use the France Telecom wholesale transport (Collecte IP/ADSL) to provide the service

#### France – option 2

- End user buys the entire DSL service, including internet access, from the SP (one stop shopping)
- the SP will use two France Telecom wholesale products to provide the service – an access service (IP/ADSL which is the resale version of Ma Ligne ADSL) and wholesale transport (Collecte IP/ADSL)

#### Germany

- End user buys DSL access ('T-DSL') as a retail product from Deutsche Telekom plus a SP service (two stop shopping – Deutsche Telekom product cannot be used on its own)
- the SP will typically use a Deutsche Telekom wholesale product to provide the service

#### UK

- End user buys the entire DSL service, including internet access, from the SP (one stop shopping)
- the SP will use one of BT's wholesale products (eg IPStream) to provide service



4.15 Some regulatory principles regarding the availability and pricing of the wholesale DSL products are summarised in table 4.4. This shows that:

- in the UK:
  - BT offers some products on a wholesale basis only; where a retail product is offered it has a wholesale equivalent; and
  - prices are transparent and non-discriminatory;
- in France wholesale versions of France Telecom's retail DSL products are available;
- in Germany, there is still no wholesale version of T-DSL;
- in both France and Germany the existence of volume discounts may makes it difficult to assess whether prices can be considered transparent and non-discriminatory; and
- in Germany there is very little price transparency.

4.16 A list of some of the issues encountered in each country is given in the individual country overviews in Annex D.

**Table 4.4: Regulatory principles for wholesale DSL**

Issue	France	Germany	UK
Availability of wholesale versions of retail products	Wholesale version of Ma Ligne ADSL (access to DSLAM) is available	There is still no wholesale version of T-DSL (Deutsche Telekom has been ordered to provide this)	Wholesale only products are available. BT Broadband has a wholesale equivalent
Wholesale prices are transparent	Prices are published. However, volume discounts mean that prices actually paid by individual SPs are not known	Prices are not published. Volume discounts also mean prices paid by individual SPs are not known.	Yes – prices are published
Wholesale prices are non-discriminatory	Volume discounts mean that in practice Wanadoo pays less than its competitors*	Volume discounts mean that in practice T-online pays less than its competitors*	Yes

*\*Volume discounts may be discriminatory if they are not justified by cost savings.*

### Price comparisons

4.17 As table 4.2 shows, comparing prices for wholesale products is difficult as products are not directly comparable. Comparisons between the UK and France are possible given some modelling assumptions. Comparisons with Germany are more difficult as the products available are very different and full details of Deutsche Telekom's prices are not available.

4.18 The figures that follow provide some illustrative comparisons of prices of wholesale products and the relationship between wholesale and retail products. Further detail is provided in the table in annex E. Comparisons have been based on monthly charges only. Including one off charges (spread over three years) has very little effect on the comparisons.

4.19 In both France and Germany the wholesale price is dependent on the 'volume' purchased, ie there are volume discounts depending on the number of end users supplied by the SP. The price paid will differ for SPs with high numbers of end users ('high volume SPs', ie those paying the minimum wholesale price available) compared to those with only a low number of end users ('low volume SPs', ie those paying the maximum wholesale price). The results are presented as follows:

- for residential products in France, the prices presented are based on ART's estimate, which is assumed to represent a 'typical' SP (see below);
- for business products in France, ART has not published an estimate and results are presented for both high and low volume SPs; and
- for Germany, estimates are based on a price thought to be appropriate for a high volume SP such as T-Online (see below).

4.20 Prices for wholesale products in France are currently undergoing changes. Further details are given in Annex D (see also [www.art-telecom.fr/eng/index.htm](http://www.art-telecom.fr/eng/index.htm), 'High speed Internet: 14 May 2002'). For the purposes of the comparisons, French prices are modelled both on the basis of existing prices and on France Telecom's new proposals. It is noted that the ART's view is that the price cuts for IP/ADSL are anti-competitive and France Telecom has been asked to modify its proposals. Hence, the actual price reduction is likely to be somewhat less than that presented here: France Telecom have proposed a 30% decrease, while ART have proposed that the decrease should be 25%. Final prices are, therefore, likely to lie between the existing and the proposed prices.

4.21 The ART has published estimates of the wholesale price per end user based on the residential DSL product. Oftel has used these estimates to compare the wholesale price in France with the wholesale price in the UK. It is noted that the contention ratio for the UK residential product is 50:1 while the ART have used a contention ratio of 23:1. It is possible to adjust the ART estimate to account for this factor. However, it is uncertain whether this adjustment is meaningful, and hence the adjustment has not been done. The ART has not published an estimate of the wholesale price per end user for business services, and for these services Oftel has estimated costs based on a contention ratio of 20:1, ie the contention ratio for UK business services.

4.22 The additional price for subscribing to T-DSL in Germany differs according to whether the end user has:

- a PSTN subscription (highest additional cost);
- a standard ISDN subscription; or
- a subscription to an ISDN package (lowest additional cost).

4.23 The comparisons are based on both extremes (ie T-DSL taken over PSTN and taken with an ISDN package). Prices for T-DSL were changed in February 2002 in response to RegTP's concerns that some prices were below cost. The comparisons

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take account of these changes. The changes involved an increase to the price of T-DSL taken over ISDN and a decrease to the price of T-DSL taken over PSTN.

4.24 The price of wholesale transport from IP directly to the Internet (known as 'TICOC') in Germany depends on the number of Gigabytes used by an end user. In modelling these costs Oftel has assumed an average usage of 1.2 Gbyte/ month, consistent with the assumptions in chapter 3. A report by Enders Analysis<sup>19</sup>, however, suggests that average usage is 3Gbyte a month, and this higher level would have a significant impact on the results. The prices for TICOC are not published. Oftel has relied on an estimate of the price per GByte (also published by Enders Analysis) expected to be relevant for T-Online (a high volume SP).

### ***Wholesale price comparisons for residential products***

4.25 Figures 4.4a and 4.4b compare prices in the UK with prices in France and Germany respectively. The figures look at products used to provide the most basic ADSL service, commonly used for residential consumers. While the comparison with France is broadly 'like with like', this is not true for Germany where like for like comparisons are not possible. The closest to a like for like comparison is to compare:

- an end to end wholesale product<sup>20</sup> in the UK (IPStream + BT Central Plus); with
- retail access to the one of 74 points at the IP level in Germany (T-DSL) plus wholesale transport to the Internet (TICOC).

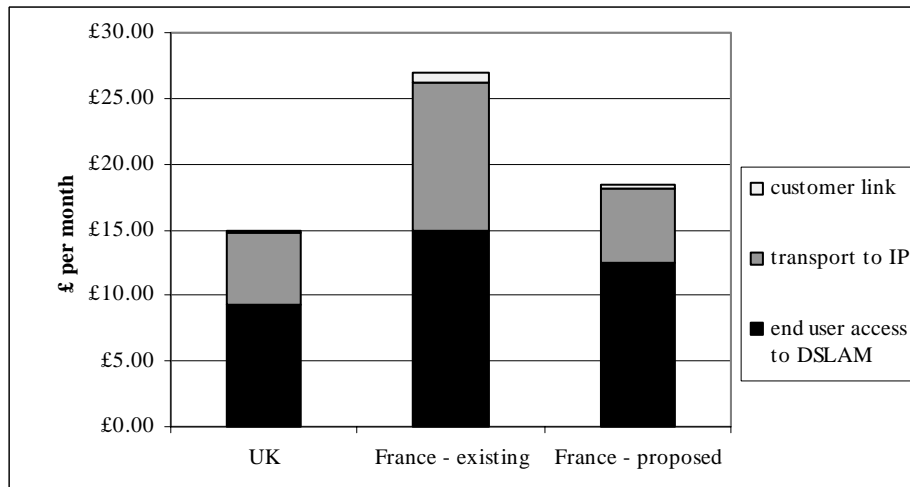
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<sup>19</sup> *Broadband Europe*, published January 2002 by Enders Analysis.

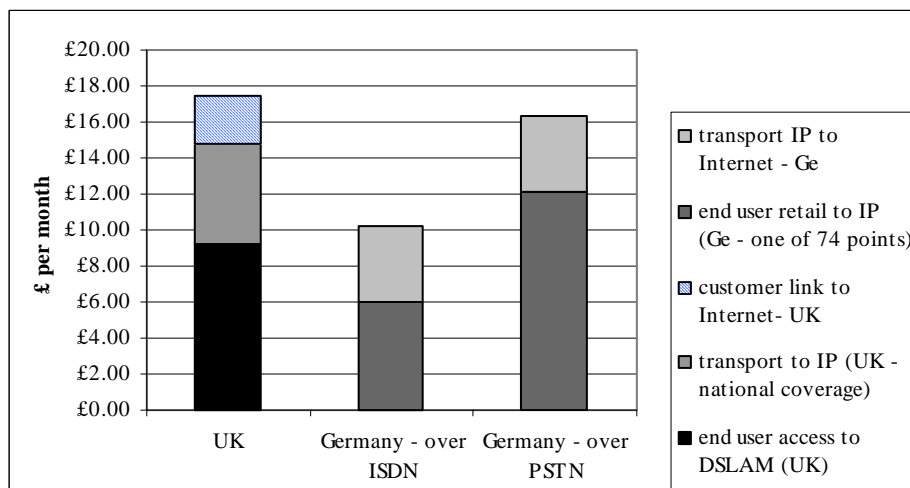
<sup>20</sup> "End to end wholesale products" are defined as products offered by the incumbent allowing provision of a DSL service from an end user, across the incumbent network, right up to the service provider's point of presence.

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**Figure 4.4a – Comparison of wholesale ADSL product prices – IPStream Home + BT Central ‘equivalent’, UK vs France**



**Figure 4.4b – Comparison of wholesale\* ADSL product prices – IPStream Home + BT Central Plus ‘equivalent’, UK vs Germany**



*\*for Germany some retail price elements have been included, where no equivalent wholesale version exists*

4.26 Figure 4.4a shows that:

- overall, the price for end to end wholesale DSL in the UK is cheaper than the current French price; even with the proposed price cuts in France, the UK price remains cheaper;
- the price of end-user access to the DSLAM is currently cheaper in the UK than in France and is still cheaper when compared to the new prices proposed by France Telecom; and
- the price of transport from the DSLAM to the SP PoP is currently cheaper in the UK than in France, but becomes comparable with the proposed French price cuts.

4.27 Figure 4.4a is based on the ART's estimate of the price faced by SPs. The price in fact depends on the number of end users served by the SP and would be

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higher for a 'low volume' SP and higher for a 'low volume' SP. France Telecom's new proposals reduce the impact of volume discounts.

4.28 Adjusting the prices shown in Figure 4.4a to account for the lower contention ratio used by the ART, would decrease the prices in France. The current prices would remain higher than in the UK, and the proposed prices would be about the same as in the UK.

4.29 While products in the UK and Germany are not directly comparable, Figure 4.4b shows that:

- overall, end to end wholesale DSL in the UK is more expensive than the closest equivalent combined end to end products over ISDN in Germany for a high volume SP. Taking out an element of cost to account for the 'retail margin' for the T-DSL product would make Germany look even cheaper;
- comparing end to end prices over PSTN, however, it is seen that prices (for a SP with a high volume of end-users) are fairly close to those in the UK;
- the price for *retail access to IP* (T-DSL) in combination with an ISDN package in Germany is cheaper than *wholesale access to DSLAM* in the UK – this Deutsche Telekom product is, therefore, much cheaper than an 'equivalent' in the UK;
- for DSL provided over a PSTN line the results are more ambiguous – T-DSL is more expensive than the UK end user access charge to the DSLAM, as would be expected given the different nature of the products; and
- the prices in Germany for transport from the IP level allowing national access to the Internet are based on estimates. The approximate figures suggest transport for a high volume SP is cheaper than transport from DSLAM to SP PoP in the UK (as would be expected, given the different nature of the products).

4.30 Assuming a higher usage volume of 3 Gbyte/month for end users in Germany would, however, make German prices significantly higher, and UK prices would compare favourably with German prices over PSTN.

4.31 Company information also suggests that transport from the IP level to the Internet is significantly more expensive for a low volume SP. UK prices would compare favourably with German prices over PSTN for a SP with few end users.

### ***Comparisons of wholesale and retail prices for residential products***

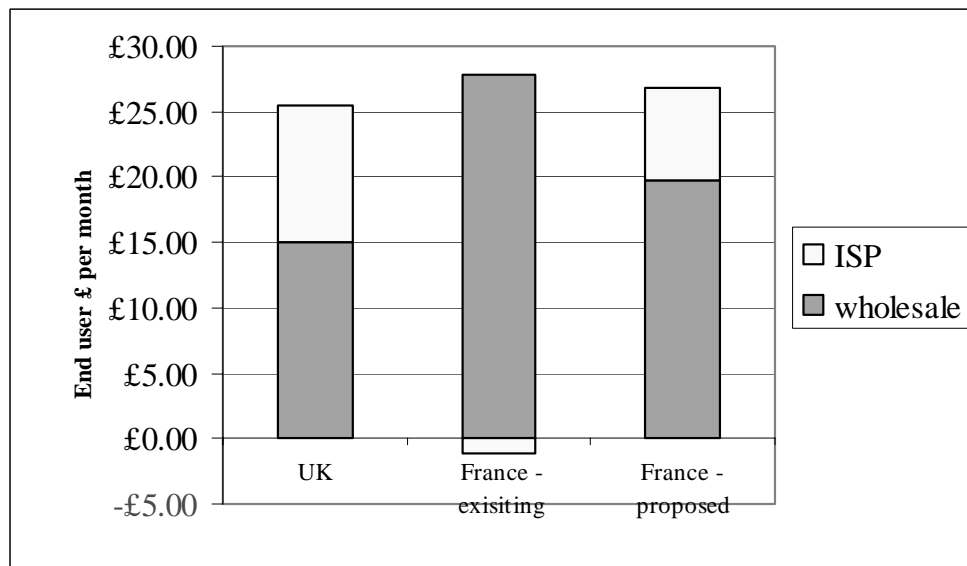
4.32 Figures 4.5a and 4.5b present the wholesale prices in the context of the retail prices (both in UK£ per month). This is done for the incumbent SP's retail offer. The figures show the SP 'margin', ie the difference between the retail price received by the SP and the price of any wholesale inputs required. This does not take account of any indirect sources of revenue (eg from advertising).

4.33 In France the comparison is based on: existing retail prices with existing wholesale prices; and existing retail prices with proposed wholesale prices. It is unclear to what extent the wholesale price reduction would be passed on to end users. The comparison has been based on the ART estimate of wholesale prices.

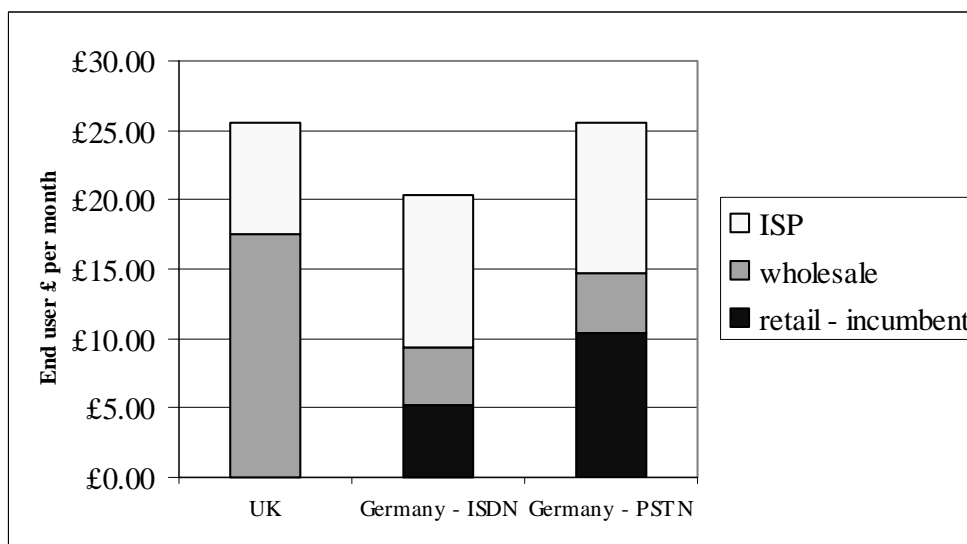
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4.34 In Germany the comparisons are shown for an end user with a PSTN subscription and with an ISDN package.

**Figure 4.5a – Comparison of end user prices and SP margin (UK£, excl VAT) – UK vs France**



**Figure 4.5b – Comparison of end user prices and SP margin (UK£, excl VAT) – UK vs Germany**



*To make UK wholesale prices comparable to those in Germany, the price of BT Central Plus has been included in this chart.*

4.35 Figure 4.5a shows that:

- currently, the SP margin, based on direct revenues, is negative in France (though for a SP with a high volume of end users, ie paying the lowest wholesale prices, a small margin seems possible); and
- the proposed new prices would still only allow a margin lower than that in the UK, even if none of the price reduction is passed on to end users.

4.36 Figure 4.5b shows that: the 'SP margin' in Germany (for a high volume SP) is higher than that in the UK. However, assuming a higher usage volume of 3 Gbyte/month for end users in Germany would decrease the SP margin below that in the UK. The margin for a low volume SP could also be significantly lower than that shown (and lower than that in the UK) according to company information.

4.37 The above comparisons are all based on incumbent SP retail prices. For the SPs researched in the retail section of this benchmarking report (chapter 3) it is seen that:

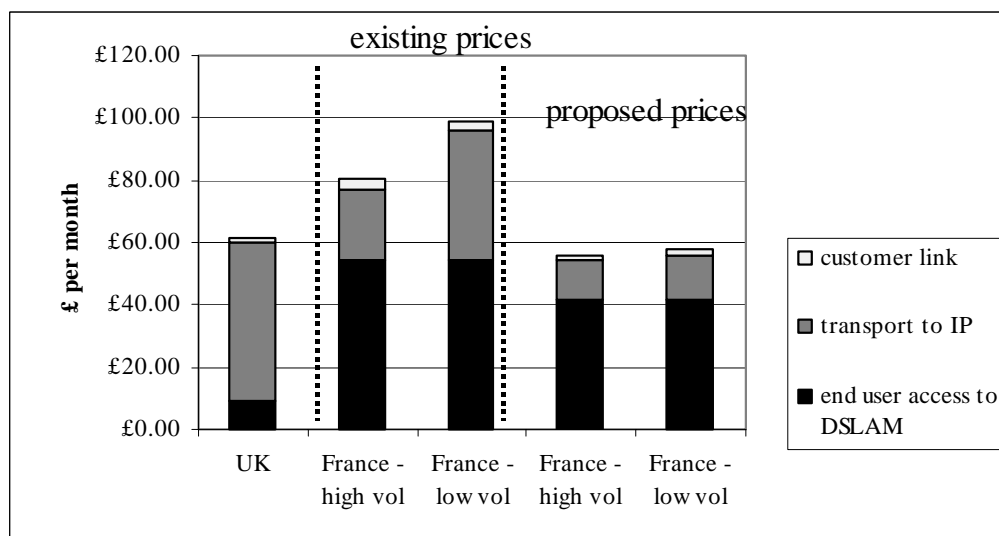
- some UK SPs are offering retail prices substantially below BT Openworld's price (ie up to £5.50 a month cheaper, excluding VAT);
- French SPs do not seem to be undercutting Wanadoo; and
- Germany SPs are undercutting T-Online but by a smaller amount than that in the UK (up to £3, excluding VAT).

### ***Wholesale price comparisons for business products***

4.38 The analysis has been repeated for business consumers. In this case comparisons between France and the UK only have been made. Figure 4.6 compares the cost for an end to end wholesale product. As the ART have not published an estimate of the SP cost per end user, Oftel has modelled these on the basis of the highest and lowest prices available and assuming a contention ratio of 20:1.

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**Figure 4.6 – Comparison of wholesale ADSL product prices – IPStream Office 1000 + BT Central ‘equivalent’, UK vs France**



4.39 Figure 4.6 compares the wholesale products used most widely to provide ADSL services to business customers. It illustrates that:

- overall, an end to end wholesale service in the UK is currently cheaper than in France; with the proposed price reductions the French price would fall to a level slightly below that in the UK; and
- the split of the end to end price between end user access charges to the DSLAM and transport from the DSLAM to the IP is very different in the UK and France (the former is relatively cheap in the UK and the latter relatively cheap in France). However, as these service elements need to be purchased jointly, the split is somewhat artificial and it is the overall end to end price that is important.

4.40 The comparison of SP margin has not been presented, as ART have not published estimates of wholesale prices actually paid in France. Based on the estimates shown in Figure 4.6, the SP margin in France appears lower than in the UK. It is unclear how much of the proposed wholesale price reduction would be passed onto end users.

## Conclusions

The main conclusions that can be drawn are as follows:

- *Size and shape of the market:*
  - penetration of broadband services in the UK is behind that in France and Germany; however
  - the UK market is more competitive both in terms of infrastructure competition and service provider competition;
- *Prices for end to end wholesale DSL products:*
  - UK prices are below both current French prices and the new prices proposed by France Telecom for residential DSL products; and



- there are no end to end wholesale DSL products in Germany. Prices for the wholesale products that are available are not published. Prices in Germany depend on a number of factors (the end user's existing PSTN/ISDN subscription, the volume of end users served by the SP, the usage volume in Gbyte per month per end user). All of these factors make drawing comparisons difficult;
  - *Relationship between wholesale and retail services:*
    - BT's wholesale prices allow a margin on BTOpenworld's retail price. Other SP's are undercutting BTOpenworld while retaining some margin;
    - France Telecom's current wholesale prices do not allow a SP margin (based on ART's assumptions). However, given the volume discounts a large SP such as Wanadoo may be making some margin. Other SP's do not seem to be undercutting Wanadoo's price;
    - detailed information on Deutsche Telekom's wholesale products is not available. The information Oftel has, however, suggests that T-Online is able to make a margin, while the margin available for smaller SP's may be much smaller. Some SP's are undercutting T-Online's price;
  - *Other:*
    - wholesale DSL products in the UK are clearly transparent and non-discriminatory, while this is more difficult to assess in France and Germany; and
    - there is a more straightforward 'one-stop shop' for consumers in the UK compared to Germany, and to some extent France.
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## Annex A

### Exchange rates and VAT rates

A.1 The exchange rates and VAT rates used in this study are shown in table A1.

**Table A1 Exchange rates and VAT rates**

Country	Current exchange rate <sup>1</sup>	PPP factor <sup>1</sup>	PPP exchange rate	VAT rate (%)
France	0.62	1.14	0.70	19.6
Germany	0.62	1.14	0.70	16
Sweden	0.07	1.01	0.07	25
UK	1.00	1.00	1.00	17.5
US – CA	0.70	0.97	0.68	5
US – Ohio	0.70	0.97	0.68	6

<sup>1</sup> OECD figures

A.2 All results are presented using Purchasing Power Parity (PPP) exchange rates. This means that the exchange rate is offset by the PPP factor given in Table A1.

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## **Annex B**

### **Detailed results for Internet access baskets (basic)**

B.1 The following tables show the detailed results for packages included in the study for each basket. Results for the top 70 packages only are displayed. Costs are shown per annum.

## 1 Residential basket 1, 2.8 hours usage per month (20% peak, 80% off-peak)

Country	ISP	Package	Connect- ion	Annual subscrip- tion	usage for 2.8 hours	total ISP	Annual fixed	usage for 2.8 hours	total PSTN	ISP+ PSTN charges
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	15	15	0	0	0	15
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	15	15	0	0	0	15
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	16	16	0	0	0	16
Germany	NGI	NGI Plus	0	0	18	18	0	0	0	18
Sweden	Utfors	Internet Bassurf	0	0	19	19	0	0	0	19
Germany	NGI	NGI By Call	0	0	19	19	0	0	0	19
Germany	Tiscali – de	Tiscali Online Plus	0	0	20	20	0	0	0	20
Sweden	Tiscali – Se	Cash n'Surf	0	0	20	20	0	0	0	20
Germany	Claranet	Dial'n'surf	0	0	21	21	0	0	0	21
Germany	QSC	Q-Dial	0	0	21	21	0	0	0	21
Germany	Tiscali – de	Tiscali Online	0	0	21	21	0	0	0	21
Sweden	Tele2	Free2Connect	0	0	21	21	0	0	0	21
Sweden	Spray	Spray Gratis Internetabonnemang	0	0	21	21	0	0	0	21
Sweden	Telia	Telia Internet Basic	0	0	22	22	0	0	0	22
Sweden	Telenordia	Telenordia Internet Surf	0	0	22	22	0	0	0	22
Germany	NGI	NGI Easy	0	0	22	22	0	0	0	22
US – CA	AT&T	Prepaid – 20 hours	0	0	23	24	0	0	0	24
US – Ohio	AT&T	Prepaid – 20 hours	0	0	24	24	0	0	0	24
France	Oreka	Oreka Acces Détente	0	0	24	24	0	0	0	24
US – CA	AT&T	Prepaid – 8 hours	0	0	23	24	0	0	0	24
Germany	Arcor	Arcor ISDN Internet by Call	0	0	24	24	0	0	0	24
US – Ohio	AT&T	Prepaid – 8 hours	0	0	24	24	0	0	0	24
UK	NTL	NTL pay as you go	0	0	25	25	0	0	0	25
Germany	Arcor	Arcor Internet by call	0	0	26	26	0	0	0	26
UK	BT	BTopenworld Pay-as-you-go	0	0	0	0	0	29	29	29
UK	Freeserve	Freeserve No Ties	0	0	0	0	0	29	29	29
UK	Virgin	Virgin.Net- Pay as you go	0	0	0	0	0	29	29	29
UK	Tiscali – UK	Tiscali Pay As You Go	0	0	0	0	0	29	29	29
Germany	T-Online	T-Online By Call	0	0	32	32	0	0	0	32
France	Oreka	Oreka Forfait 5 heures	0	34	0	34	0	0	0	34
Germany	Debitel	start.net	0	0	34	34	0	0	0	34
UK	Telewest	Blueyonder Pay-as-you-go	0	0	35	35	0	0	0	35
Germany	Arcor	Arcor ISDN Internet by call local	0	0	0	0	0	36	36	36
UK	MSN – UK	MSN FreeWeb Pay-as-you-go	0	0	36	36	0	0	0	36
Sweden	Tele2	Tele2Internet med Surfrabatt 15%	0	19	17	37	0	0	0	37
France	Liberty Surf	Totale Liberte	0	0	0	0	0	37	37	37
France	Club Internet	Access Direct	0	0	0	0	0	37	37	37
France	Free	Free Access	0	0	0	0	0	37	37	37
France	Wanadoo	Acces Libre	0	0	38	38	0	0	0	38
Sweden	Telenordia	Uppringt Abonnemang	0	20	0	20	0	20	20	41
Sweden	Telenordia	Telenordia Algonet	0	20	0	20	0	20	20	41
Sweden	Telia	Telia Internet 020	0	19	22	41	0	0	0	41
US – CA	AOL.us	Light Usage Plan	0	42	0	42	0	0	0	42
US – Ohio	AOL.us	Light Usage Plan	0	43	0	43	0	0	0	43
Germany	Arcor	Arcor ISDN Speed	0	30	13	43	0	0	0	43
France	Liberty Surf	Forfait 5H	0	46	0	46	0	0	0	46
Germany	Debitel	privat.net	0	28	22	49	0	0	0	49
France	Club Internet	Forfait Zen 5H	0	51	0	51	0	0	0	51
France	Oreka	Oreka Forfait 10 heures	0	51	0	51	0	0	0	51
Germany	T-Online	T-Online Eco	0	34	21	55	0	0	0	55
Germany	NGI	NGI Premium	0	43	13	56	0	0	0	56
Germany	Arcor	Arcor Speed	0	43	13	56	0	0	0	56
Germany	T-Online	T-Online by night	0	42	17	59	0	0	0	59
UK	MSN – UK	MSN FreeWeb -10	0	60	0	60	0	0	0	60
France	Club Internet	Forfait Zen 5H	0	60	0	60	0	0	0	60
France	AOL.fr	AOL Tout Compris 2h	0	45	20	65	0	0	0	65
Germany	Tiscali – de	Tiscali Online 10	0	67	0	67	0	0	0	67
France	Wanadoo	Integrale 5	0	67	0	67	0	0	0	67
France	Wanadoo	Integrale Option Fidelite' 6	0	67	0	67	0	0	0	67
US – CA	XO	Consumer Dial – 5 hours	0	68	0	68	0	0	0	68
US – Ohio	XO	Consumer Dial – 5 hours	0	68	0	68	0	0	0	68
Germany	AOL.de	AOL-Start	0	76	0	76	0	0	0	76
France	Liberty Surf	Forfait 10H	0	80	0	80	0	0	0	80
US – Ohio	Ohio Ameritech	Prodigy Internet Low Usage Plan	0	81	0	81	0	0	0	81
Sweden	Telenordia	Telenordia Internet ISDN	0	65	0	65	0	17	17	82
Germany	T-Online	T-Online by day	0	63	19	82	0	0	0	82
US – CA	AOL.us	Limited Usage Plan	0	85	0	85	0	0	0	85
US – CA	MSN	Hourly Plan	0	85	0	85	0	0	0	85
US – CA	Pacbell	Prodigy Internet Low Usage Plan	0	85	0	85	0	0	0	85
US – Ohio	AOL.us	Limited Usage Plan	0	86	0	86	0	0	0	86

All prices are in UK£ based on tariffs valid at February 2002

## 2 Residential basket 2, 10 hours off-peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip tion	usage for 10 hours	total ISP	Annual fixed	usage for 10 hours	total PSTN	ISP+ PSTN charges
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	44	44	0	0	0	44
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	49	49	0	0	0	49
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	49	49	0	0	0	49
France	Oreka	Oreka Forfait 10 heures	0	51	0	51	0	0	0	51
Sweden	Utfors	Internet Bassurf	0	0	52	52	0	0	0	52
Sweden	Tiscali – Se	Cash n'Surf	0	0	57	57	0	0	0	57
Sweden	Tele2	Free2Connect	0	0	59	59	0	0	0	59
Sweden	Spray	Spray Gratis Internetabonnemang	0	0	59	59	0	0	0	59
Sweden	Telia	Telia Internet Basic	0	0	59	59	0	0	0	59
Sweden	Telenordia	Telenordia Internet Surf	0	0	59	59	0	0	0	59
UK	MSN – UK	MSN FreeWeb -10	0	60	0	60	0	0	0	60
Germany	NGI	NGI Plus	0	0	62	62	0	0	0	62
Germany	Claranet	Dial'n'surf	0	0	64	64	0	0	0	64
Germany	Tiscali – de	Tiscali Online 10	0	67	0	67	0	0	0	67
Sweden	Tele2	Tele2Internet med Surfrabatt 15%	0	19	48	67	0	0	0	67
Germany	NGI	NGI By Call	0	0	70	70	0	0	0	70
Germany	Arcor	Arcor ISDN Speed	0	30	41	71	0	0	0	71
UK	BT	BTopenworld Pay-as-you-go	0	0	0	0	0	71	71	71
UK	Freeserve	Freeserve No Ties	0	0	0	0	0	71	71	71
UK	Virgin	Virgin.Net- Pay as you go	0	0	0	0	0	71	71	71
UK	Tiscali – UK	Tiscali Pay As You Go	0	0	0	0	0	71	71	71
Germany	Tiscali – de	Tiscali Online Plus	0	0	72	72	0	0	0	72
Germany	NGI	NGI Easy	0	0	74	74	0	0	0	74
Germany	AOL.de	AOL-Start	0	76	0	76	0	0	0	76
Germany	QSC	Q-Dial	0	0	76	76	0	0	0	76
Germany	Tiscali – de	Tiscali Online	0	0	76	76	0	0	0	76
Sweden	Telenordia	Uppringt Abonnemang	0	20	0	20	0	57	57	77
Sweden	Telenordia	Telenordia Algonet	0	20	0	20	0	57	57	77
UK	NTL	NTL pay as you go	0	0	78	78	0	0	0	78
Sweden	Telia	Telia Internet 020	0	19	59	79	0	0	0	79
France	Liberty Surf	Forfait 10H	0	80	0	80	0	0	0	80
US – Ohio	Ohio Ameritech	Prodigy Internet Low Usage Plan	0	81	0	81	0	0	0	81
Germany	Arcor	Arcor Speed	0	43	41	84	0	0	0	84
US – CA	AT&T	Prepaid – 20 hours	0	0	84	85	0	0	0	85
US – CA	MSN	Hourly Plan	0	85	0	85	0	0	0	85
US – CA	Pacbell	Prodigy Internet Low Usage Plan	0	85	0	85	0	0	0	85
US – CA	AT&T	Prepaid – 8 hours	0	0	84	85	0	0	0	85
US – Ohio	AT&T	Prepaid – 20 hours	0	0	85	85	0	0	0	85
US – Ohio	MSN	Hourly Plan	0	86	0	86	0	0	0	86
US – Ohio	AT&T	Prepaid – 8 hours	0	0	85	86	0	0	0	86
Germany	Arcor	Arcor ISDN Internet by Call	0	0	86	86	0	0	0	86
France	Oreka	Oreka Acces Détente	0	0	86	86	0	0	0	86
France	Club Internet	Forfait Zen 10H	0	86	0	86	0	0	0	86
France	Wanadoo	Integrale 10	0	87	0	87	0	0	0	87
France	Wanadoo	Integrale Option Fidelite' 12	0	87	0	87	0	0	0	87
Germany	Arcor	Arcor Internet by call	0	0	89	89	0	0	0	89
Germany	NGI	NGI Premium	0	43	47	89	0	0	0	89
UK	MSN – UK	MSN FreeWeb Pay-as-you-go	0	0	90	90	0	0	0	90
US – CA	EarthLink	EarthLink Limited	6	85	0	91	0	0	0	91
US – Ohio	EarthLink	EarthLink Limited	6	86	0	92	0	0	0	92
France	Oreka	Oreka Forfait 20 heures	0	93	0	93	0	0	0	93
Germany	T-Online	T-Online by night	0	42	58	100	0	0	0	100
Germany	Arcor	Arcor ISDN Internet by call local	0	0	0	0	0	104	104	104
UK	MSN – UK	MSN FreeWeb – 25	0	108	0	108	0	0	0	108
France	Oreka	Oreka Forfait 5 heures	0	34	76	110	0	0	0	110
Germany	T-Online	T-Online Eco	0	34	75	110	0	0	0	110
Sweden	Telenordia	Telenordia Internet ISDN	0	65	0	65	0	48	48	112
UK	Telewest	Blueyonder Pay-as-you-go	0	0	114	114	0	0	0	114
Germany	T-Online	T-Online By Call	0	0	117	117	0	0	0	117
Sweden	Spray	Spray Fastpris 20 timmar	0	117	0	117	0	0	0	117
France	Liberty Surf	Totale Liberte	0	0	0	0	0	118	118	118
France	Club Internet	Access Direct	0	0	0	0	0	118	118	118
France	Free	Free Access	0	0	0	0	0	118	118	118
UK	Tiscali – UK	Tiscali Offpeak	0	120	0	120	0	0	0	120
UK	NTL	NTL:home internet service unlimited	0	120	0	120	0	0	0	120
France	Wanadoo	Acces Libre	0	0	120	120	0	0	0	120
Germany	Debitel	Start.net	0	0	121	121	0	0	0	121
France	Liberty Surf	Forfait 20H	0	122	0	122	0	0	0	122
France	Club Internet	Forfait Zen 20H	0	125	0	125	0	0	0	125
Germany	T-Online	T-online surftime 30	0	125	0	125	0	0	0	125

All prices are in UK£ based on tariffs valid at February 2002

### 3 Residential basket 3, 20 hours off-peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip -tion	usage for 20 hours	total ISP	Annual fixed	usage for 20 hours	total PSTN	ISP+ PSTN charges
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	98	98	70	0	70	168
Germany	Arcor	Arcor ISDN Speed	0	30	83	113	70	0	70	183
US – CA	MSN	Hourly Plan	0	85	0	85	99	0	99	184
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	89	89	114	0	114	203
UK	NTL	128k package	25	180	0	205	0	0	0	205
France	Oreka	Oreka Forfait 20 heures	0	93	0	93	114	0	114	206
Sweden	Telenordia	Telenordia Internet ISDN	0	65	0	65	50	95	145	209
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	98	98	114	0	114	212
US – Ohio	MSN	Hourly Plan	0	86	0	86	128	0	128	214
Sweden	Utfors	Internet Bassurf	0	0	104	104	114	0	114	218
UK	MSN – UK	MSN FreeWeb – 25	0	108	0	108	119	0	119	227
Sweden	Tiscali – Se	Cash n'Surf	0	0	113	113	114	0	114	228
Sweden	Tele2	Tele2Internet med Surfrabatt 15%	0	19	96	115	114	0	114	230
Sweden	Spray	Spray Fastpris 20 timmar	0	117	0	117	114	0	114	232
Sweden	Tele2	Free2Connect	0	0	118	118	114	0	114	233
Sweden	Spray	Spray Gratis Internetabonnemang	0	0	118	118	114	0	114	233
Sweden	Telia	Telia Internet Basic	0	0	119	119	114	0	114	233
Sweden	Telenordia	Telenordia Internet Surf	0	0	119	119	114	0	114	233
France	Liberty Surf	Forfait 20H	0	122	0	122	114	0	114	236
UK	BT	BTopenworld Pay-as-you-go	0	0	0	0	119	117	236	236
UK	Freeserve	Freeserve No Ties	0	0	0	0	119	117	236	236
UK	Virgin	Virgin.Net- Pay as you go	0	0	0	0	119	117	236	236
UK	Tiscali – UK	Tiscali Pay As You Go	0	0	0	0	119	117	236	236
Germany	NGI	NGI Plus	0	0	123	123	114	0	114	237
France	Club Internet	Forfait Zen 20H	0	125	0	125	114	0	114	238
Germany	T-Online	T-online surftime 30	0	125	0	125	114	0	114	239
UK	Tiscali – UK	Tiscali Offpeak	0	120	0	120	119	0	119	239
France	Wanadoo	Integrale 20	0	126	0	126	114	0	114	240
France	Wanadoo	Integrale Option Fidelite' 24	0	126	0	126	114	0	114	240
France	Free	Forfait Internet – 50 Heures	0	126	0	126	114	0	114	240
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	114	0	114	240
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
Germany	Arcor	Arcor Speed (was Arcor-Nexgo Speed)	0	43	83	126	114	0	114	240
Germany	Arcor	Arcor ISDN Internet by Call	0	0	172	172	70	0	70	241
UK	NTL	NTL:home internet service unlimited	0	120	0	120	122	0	122	242
Germany	Claranet	Dial'n'surf	0	0	128	128	114	0	114	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Telenordia	Uppringt Abonnemang	0	20	0	20	114	113	228	248
Sweden	Telenordia	Telenordia Algonet	0	20	0	20	114	113	228	248
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
Germany	NGI	NGI Premium	0	43	93	136	114	0	114	250
UK	BT	BT openworld for Surf Time Packages	0	72	0	72	179	0	179	251
UK	Freeserve	Freeserve HomeTime (with BT Surf Together packages)	0	72	0	72	179	0	179	251
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	Telia	Telia Internet 020	0	19	119	138	114	0	114	253
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
Germany	NGI	NGI By Call	0	0	140	140	114	0	114	254
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
Sweden	Telia	Telia Internet ISDN	0	101	112	213	50	0	50	262
Germany	NGI	NGI Easy	0	0	149	149	114	0	114	263
France	Club Internet	Forfait Full is Beautiful 20H	0	152	0	152	114	0	114	265
Germany	AOL.de	AOL-Start	0	76	76	152	114	0	114	266
Germany	QSC	Q-Dial	0	0	152	152	114	0	114	266
Germany	Arcor	Arcor ISDN Power	0	98	98	196	70	0	70	266
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
US – CA	AT&T	Prepaid – 20 hours	0	0	169	169	99	0	99	268
Sweden	Utfors	Internet Storsurf for PSTN	0	154	0	154	114	0	114	268
US – CA	AT&T	Prepaid – 8 hours	0	0	169	169	99	0	99	268
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
Germany	Tiscali – de	Tiscali Online 20	0	126	0	126	143	0	143	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noos	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
US – CA	EarthLink	EarthLink Limited	6	85	82	173	99	0	99	272
Germany	T-Online	T-Online by night	0	42	116	158	114	0	114	272

All prices are in UK£ based on tariffs valid at February 2002

#### 4 Residential basket 4, 30 hours off-peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 30 hours	total ISP	Annual fixed	Usage for 30 hours	total PSTN	ISP+ PSTN charges
UK	NTL	128k package	25	180	0	205	0	0	0	205
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	147	147	70	0	70	217
Germany	Arcor	Arcor ISDN Speed	0	30	124	154	70	0	70	224
Germany	T-Online	T-online surftime 30	0	125	0	125	114	0	114	239
UK	Tiscali – UK	Tiscali Offpeak	0	120	0	120	119	0	119	239
France	Free	Forfait Internet – 50 Heures	0	126	0	126	114	0	114	240
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	114	0	114	240
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
UK	NTL	NTL:home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	133	133	114	0	114	248
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
UK	BT	BT openworld for Surf Time Packages	0	72	0	72	179	0	179	251
UK	Freeserve	Freeserve HomeTime (with BT Surf Together packages)	0	72	0	72	179	0	179	251
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
Sweden	Telenordia	Telenordia Internet ISDN	0	65	0	65	50	143	192	257
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	147	147	114	0	114	261
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
UK	Televest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
Sweden	Utfors	Internet Bassurf	0	0	155	155	114	0	114	270
France	Noos	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
Sweden	Spray	Spray Fastpris 30 timmar	0	158	0	158	114	0	114	272
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
France	AOL.fr	Forfait Decouverte	25	252	0	277	0	0	0	277
Sweden	Tele2	Tele2Internet med Surfrabatt 15%	0	19	144	164	114	0	114	278
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
Germany	Arcor	Arcor Speed (was Arcor-Nexgo Speed)	0	43	124	167	114	0	114	281
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	155	0	155	128	0	128	282
Sweden	Tiscali – Se	Cash n'Surf	0	0	170	170	114	0	114	284
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
Sweden	Spray	Spray Fastpris 20 timmar	0	117	59	176	114	0	114	291
Sweden	Tele2	Free2Connect	0	0	177	177	114	0	114	292
Sweden	Spray	Spray Gratis Internetabonnemang	0	0	177	177	114	0	114	292
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Sweden	Utfors	Internet Storsurf for PSTN	0	154	24	178	114	0	114	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293
Sweden	Telia	Telia Internet Basic	0	0	178	178	114	0	114	293
Sweden	Telenordia	Telenordia Internet Surf	0	0	178	178	114	0	114	293
Sweden	Telia	Telia ADSL Broadband	33	263	0	296	0	0	0	296
Sweden	Telenordia	Telenordia ADSL Bredband	33	263	0	296	0	0	0	296
Germany	AOL.de	AOL-Top	0	182	0	182	114	0	114	296
Germany	NGI	NGI Premium	0	43	140	182	114	0	114	297
UK	AOL.uk	AOL Flat Rate	0	180	0	180	119	0	119	299
UK	BT	BT openworld Anytime	0	180	0	180	119	0	119	299
UK	Tiscali – UK	Tiscali Anytime	0	180	0	180	119	0	119	299
UK	MSN – UK	MSN FreeWeb – 25	0	108	72	180	119	0	119	299
Germany	NGI	NGI Plus	0	0	185	185	114	0	114	299
UK	Virgin	Virgin.Net- 24seven	0	180	0	180	119	0	119	299
US – Ohio	Qwest	Internet Access	0	172	0	172	128	0	128	300
US – Ohio	Speak Easy	56K Dial Up	0	172	0	172	128	0	128	300
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	172	0	172	128	0	128	300
US – CA	AOL.us	Standard Plan	0	204	0	204	99	0	99	303
France	Liberty Surf	Forfait 30 H	0	190	0	190	114	0	114	303
France	Wanadoo	Integrale 30	0	190	0	190	114	0	114	304
France	Wanadoo	Integrale Option Fidelite' 36	0	190	0	190	114	0	114	304

All prices are in UK£ based on tariffs valid at February 2002

## 5 Residential basket 5, 40 hours off-peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip -tion	usage for 40 hours	total ISP	Annual fixed	Usage for 40 hours	total PSTN	ISP+ PSTN charges
UK	NTL	128k package	25	180	0	205	0	0	0	205
UK	Tiscali – UK	Tiscali Offpeak	0	120	0	120	119	0	119	239
France	Free	Forfait Internet – 50 Heures	0	126	0	126	114	0	114	240
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	114	0	114	240
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
UK	NTL	NTL:home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
UK	BT	BT openworld for Surf Time Packages	0	72	0	72	179	0	179	251
UK	Freeserve	Freeserve HomeTime (with BT Surf Together packages)	0	72	0	72	179	0	179	251
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
Germany	Arcor	Arcor ISDN Speed	0	30	166	196	70	0	70	265
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	196	196	70	0	70	266
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noos	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
France	AOL.fr	Forfait Decouverte	25	252	0	277	0	0	0	277
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	155	0	155	128	0	128	282
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	178	178	114	0	114	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293
Sweden	Telia	Telia ADSL Broadband	33	263	0	296	0	0	0	296
Sweden	Telenordia	Telenordia ADSL Bredband	33	263	0	296	0	0	0	296
UK	AOL.uk	AOL Flat Rate	0	180	0	180	119	0	119	299
UK	BT	BT openworld Anytime	0	180	0	180	119	0	119	299
UK	Tiscali – UK	Tiscali Anytime	0	180	0	180	119	0	119	299
UK	Virgin	Virgin.Net- 24seven	0	180	0	180	119	0	119	299
US – Ohio	Qwest	Internet Access	0	172	0	172	128	0	128	300
US – Ohio	Speak Easy	56K Dial Up	0	172	0	172	128	0	128	300
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	172	0	172	128	0	128	300
US – CA	AOL.us	Standard Plan	0	204	0	204	99	0	99	303
Sweden	Telenordia	Telenordia Internet ISDN	0	65	0	65	50	190	240	305
US – Ohio	Ohio Ameritech	Prodigy Internet Deluxe Unlimited Monthly Plan	0	178	0	178	128	0	128	306
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	196	196	114	0	114	310
Germany	T-Online	T-online surftime 30	0	125	75	200	114	0	114	314
UK	Telewest	Blueyonder Broadband Internet	17	300	0	317	0	0	0	317
Sweden	Spray	Spray Fastpris 50 timmar	0	202	0	202	114	0	114	317
US – Ohio	AT&T	WorldNet Service Unlimited	0	189	0	189	128	0	128	317
US – Ohio	MSN	Dial-up Access	0	189	0	189	128	0	128	317
US – Ohio	Qwest	MSN Internet Access/Qwest	0	189	0	189	128	0	128	317
UK	Demon	Premier Connect – + SurfTime Eve/we	0	141	0	141	179	0	179	320
Sweden	Utfors	Internet Bassurf	0	0	207	207	114	0	114	322
Germany	Arcor	Arcor Speed (was Arcor-Nexgo Speed)	0	43	166	209	114	0	114	323
US – Ohio	EarthLink	EarthLink Unlimited	6	189	0	195	128	0	128	323
UK	NTL	Hi-speed Option 1 (Up to 512 Kbps)	25	300	0	325	0	0	0	325
Germany	Arcor	Arcor DSL – Flatrate 128	6	319	0	325	0	0	0	325
France	Wanadoo	CableWanadoo – Prime @cces	65	261	0	326	0	0	0	326
Sweden	Tele2	Tele2Internet med Surfrabatt 15%	0	19	193	212	114	0	114	326
US – CA	EarthLink	EarthLink The Works	0	230	0	230	99	0	99	329
Sweden	Spray	Spray Fastpris 30 timmar	0	158	59	217	114	0	114	331

All prices are in UK£ based on tariffs valid at February 2002



## 6 Residential basket A/o, 150 hours off-peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 150 hours	total ISP	Annual fixed	Usage for 150 hours	total PSTN	ISP+ PSTN charges
UK	NTL	128k package	25	180	0	205	0	0	0	205
UK	Tiscali – UK	Tiscali Offpeak	0	120	0	120	119	0	119	239
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
UK	NTL	NTL:home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
UK	BT	BT openworld for Surf Time Packages	0	72	0	72	179	0	179	251
UK	Freeserve	Freeserve HomeTime (with BT Surf Together packages)	0	72	0	72	179	0	179	251
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noos	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	155	0	155	128	0	128	282
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293
Sweden	Telia	Telia ADSL Broadband	33	263	0	296	0	0	0	296
Sweden	Telenordia	Telenordia ADSL Bredband	33	263	0	296	0	0	0	296
UK	AOL.uk	AOL Flat Rate	0	180	0	180	119	0	119	299
UK	BT	BT openworld Anytime	0	180	0	180	119	0	119	299
UK	Tiscali – UK	Tiscali Anytime	0	180	0	180	119	0	119	299
UK	Virgin	Virgin.Net- 24seven	0	180	0	180	119	0	119	299
US – Ohio	Qwest	Internet Access	0	172	0	172	128	0	128	300
US – Ohio	Speak Easy	56K Dial Up	0	172	0	172	128	0	128	300
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	172	0	172	128	0	128	300
US – CA	AOL.us	Standard Plan	0	204	0	204	99	0	99	303
US – Ohio	Ohio Ameritech	Prodigy Internet Deluxe Unlimited Monthly Plan	0	178	0	178	128	0	128	306
UK	Telewest	Blueyonder Broadband Internet	17	300	0	317	0	0	0	317
US – Ohio	AT&T	WorldNet Service Unlimited	0	189	0	189	128	0	128	317
US – Ohio	MSN	Dial-up Access	0	189	0	189	128	0	128	317
US – Ohio	Qwest	MSN Internet Access/Qwest	0	189	0	189	128	0	128	317
UK	Demon	Premier Connect – + SurfTime Eve/we	0	141	0	141	179	0	179	320
US – Ohio	EarthLink	EarthLink Unlimited	6	189	0	195	128	0	128	323
UK	NTL	Hi-speed Option 1 (Up to 512 Kbps)	25	300	0	325	0	0	0	325
Germany	Arcor	Arcor DSL – Flatrate 128	6	319	0	325	0	0	0	325
France	Wanadoo	CableWanadoo – Prime @cces	65	261	0	326	0	0	0	326
US – CA	EarthLink	EarthLink The Works	0	230	0	230	99	0	99	329
US – Ohio	AOL.us	Standard Plan	0	206	0	206	128	0	128	334
US – CA	Qwest	DSL Deluxe	71	273	0	343	0	0	0	343
US – Ohio	Qwest	DSL Deluxe	71	275	0	346	0	0	0	346
Sweden	Telia	(Comhem) High speed internet IC 1000	30	319	0	350	0	0	0	350
US – Ohio	EarthLink	EarthLink The Works	0	232	0	232	128	0	128	360
US – CA	MSN	DSL	23	341	0	364	0	0	0	364
US – Ohio	MSN	DSL	24	344	0	368	0	0	0	368
Germany	Arcor	Arcor DSL – Flatrate 768	6	363	0	369	0	0	0	369
Germany	Arcor	Arcor ISDN Flat Rate	0	301	0	301	70	0	70	371
Germany	AOL.de	AOL High Speed DSL Flat (12months)	40	336	0	376	0	0	0	376
US – CA	Comcast	High Speed Internet Service	0	383	0	383	0	0	0	383
US – Ohio	Comcast	High Speed Internet Service	0	387	0	387	0	0	0	387
Germany	PrimaCom	_pro	18	370	0	389	0	0	0	389
UK	Pipex	Pipex Xtreme Solo	39	352	0	391	0	0	0	391
US – CA	Qwest	Office Works -Residential	0	298	0	298	99	0	99	397

All prices are in UK£ based on tariffs valid at February 2002

## 7 Residential basket 2p, 10 hours peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip -tion	usage for 10 hours	total ISP	Annual fixed	usage for 10 hours	total PSTN	ISP+ PSTN charges
France	Oreka	Oreka Forfait 10 heures	0	51	0	51	0	0	0	51
UK	MSN – UK	MSN FreeWeb -10	0	60	0	60	0	0	0	60
Germany	Tiscali – de	Tiscali Online 10	0	67	0	67	0	0	0	67
Germany	NGI	NGI By Call	0	0	70	70	0	0	0	70
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	71	71	0	0	0	71
Germany	Tiscali – de	Tiscali Online Plus	0	0	72	72	0	0	0	72
Germany	NGI	NGI Easy	0	0	74	74	0	0	0	74
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	75	75	0	0	0	75
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	75	75	0	0	0	75
Germany	AOL.de	AOL-Start	0	76	0	76	0	0	0	76
Germany	QSC	Q-Dial	0	0	76	76	0	0	0	76
Germany	Tiscali – de	Tiscali Online	0	0	76	76	0	0	0	76
UK	NTL	NTL pay as you go	0	0	78	78	0	0	0	78
France	Liberty Surf	Forfait 10H	0	80	0	80	0	0	0	80
US – Ohio	Ohio Ameritech	Prodigy Internet Low Usage Plan	0	81	0	81	0	0	0	81
US – CA	AT&T	Prepaid – 20 hours	0	0	84	85	0	0	0	85
US – CA	MSN	Hourly Plan	0	85	0	85	0	0	0	85
US – CA	Pacbell	Prodigy Internet Low Usage Plan	0	85	0	85	0	0	0	85
Germany	NGI	NGI Plus	0	0	85	85	0	0	0	85
US – CA	AT&T	Prepaid – 8 hours	0	0	84	85	0	0	0	85
US – Ohio	AT&T	Prepaid – 20 hours	0	0	85	85	0	0	0	85
US – Ohio	MSN	Hourly Plan	0	86	0	86	0	0	0	86
US – Ohio	AT&T	Prepaid – 8 hours	0	0	85	86	0	0	0	86
Germany	Arcor	Arcor ISDN Internet by Call	0	0	86	86	0	0	0	86
France	Oreka	Oreka Acces Détente	0	0	86	86	0	0	0	86
France	Club Internet	Forfait Zen 10H	0	86	0	86	0	0	0	86
France	Wanadoo	Integrale 10	0	87	0	87	0	0	0	87
France	Wanadoo	Integrale Option Fidelite' 12	0	87	0	87	0	0	0	87
Germany	Arcor	Arcor Internet by call (was-Nexgo Internet by Call)	0	0	89	89	0	0	0	89
Germany	NGI	NGI Premium	0	43	47	89	0	0	0	89
US – CA	EarthLink	EarthLink Limited	6	85	0	91	0	0	0	91
US – Ohio	EarthLink	EarthLink Limited	6	86	0	92	0	0	0	92
France	Oreka	Oreka Forfait 20 heures	0	93	0	93	0	0	0	93
Germany	Claranet	Dial'n'surf	0	0	100	100	0	0	0	100
Sweden	Utfors	Internet Bassurf	0	0	100	100	0	0	0	100
Germany	T-Online	T-Online by day	0	63	40	104	0	0	0	104
Germany	Arcor	Arcor ISDN Speed	0	30	75	105	0	0	0	105
UK	MSN – UK	MSN FreeWeb – 25	0	108	0	108	0	0	0	108
France	Oreka	Oreka Forfait 5 heures	0	34	76	110	0	0	0	110
Germany	T-Online	T-Online Eco	0	34	75	110	0	0	0	110
Sweden	Tiscali – Se	Cash n'Surf	0	0	110	110	0	0	0	110
Sweden	Tele2	Tele2Internet med Surfrabatt 15%	0	19	94	113	0	0	0	113
UK	Telewest	Blueyonder Pay-as-you-go	0	0	114	114	0	0	0	114
Sweden	Tele2	Free2Connect	0	0	115	115	0	0	0	115
Sweden	Spray	Spray Gratis Internetabonnemang	0	0	115	115	0	0	0	115
Sweden	Telia	Telia Internet Basic	0	0	115	115	0	0	0	115
Sweden	Telenordia	Telenordia Internet Surf	0	0	115	115	0	0	0	115
Germany	T-Online	T-Online By Call	0	0	117	117	0	0	0	117
Sweden	Spray	Spray Fastpris 20 timmar	0	117	0	117	0	0	0	117
Germany	T-Online	T-Online by night	0	42	75	117	0	0	0	117
Germany	Arcor	Arcor Speed (was Arcor-Nexgo Speed)	0	43	75	118	0	0	0	118
France	Liberty Surf	Totale Liberte	0	0	0	0	0	118	118	118
France	Club Internet	Access Direct	0	0	0	0	0	118	118	118
France	Free	Free Access	0	0	0	0	0	118	118	118
UK	Tiscali – UK	Tiscali Daytime	0	120	0	120	0	0	0	120
UK	MSN – UK	MSN FreeWeb Daytime	0	120	0	120	0	0	0	120
UK	NTL	NTL.home internet service unlimited	0	120	0	120	0	0	0	120
France	Wanadoo	Acces Libre	0	0	120	120	0	0	0	120
Germany	Debitel	Start.net	0	0	121	121	0	0	0	121
France	Liberty Surf	Forfait 20H	0	122	0	122	0	0	0	122
France	Club Internet	Forfait Zen 20H	0	125	0	125	0	0	0	125
Germany	T-Online	T-online surftime 30	0	125	0	125	0	0	0	125
France	Wanadoo	Integrale 20	0	126	0	126	0	0	0	126
France	Wanadoo	Integrale Option Fidelite' 24	0	126	0	126	0	0	0	126
France	Free	Forfait Internet – 50 Heures	0	126	0	126	0	0	0	126
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	0	0	0	126
Germany	Tiscali – de	Tiscali Online 20	0	126	0	126	0	0	0	126
Sweden	Telenordia	Uppringt Abonnemang	0	20	0	20	0	110	110	130
Sweden	Telenordia	Telenordia Algonet	0	20	0	20	0	110	110	130
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	0	0	0	134

All prices are in UK£ based on tariffs valid at February 2002

## 8 Residential basket 3p, 20 hours peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 20 hours	total ISP	Annual fixed	usage for 20 hours	total PSTN	ISP+ PSTN charges
US – CA	MSN	Hourly Plan	0	85	0	85	99	0	99	184
UK	NTL	128k package	25	180	0	205	0	0	0	205
France	Oreka	Oreka Forfait 20 heures	0	93	0	93	114	0	114	206
US – Ohio	MSN	Hourly Plan	0	86	0	86	128	0	128	214
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	150	150	70	0	70	219
UK	MSN – UK	MSN FreeWeb – 25	0	108	0	108	119	0	119	227
Sweden	Spray	Spray Fastpris 20 timmar	0	117	0	117	114	0	114	232
France	Liberty Surf	Forfait 20H	0	122	0	122	114	0	114	236
France	Club Internet	Forfait Zen 20H	0	125	0	125	114	0	114	238
Germany	T-Online	T-online surftime 30	0	125	0	125	114	0	114	239
UK	Tiscali – UK	Tiscali Daytime	0	120	0	120	119	0	119	239
UK	MSN – UK	MSN FreeWeb Daytime	0	120	0	120	119	0	119	239
France	Wanadoo	Integrale 20	0	126	0	126	114	0	114	240
France	Wanadoo	Integrale Option Fidelite' 24	0	126	0	126	114	0	114	240
France	Free	Forfait Internet – 50 Heures	0	126	0	126	114	0	114	240
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	114	0	114	240
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
Germany	Arcor	Arcor ISDN Internet by Call	0	0	172	172	70	0	70	241
UK	NTL	NTL:home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
Germany	Arcor	Arcor ISDN Speed	0	30	150	180	70	0	70	249
Germany	NGI	NGI Premium	0	43	93	136	114	0	114	250
US – CA	XO	Consumer Dial – Unlimited Access	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
Germany	NGI	NGI By Call	0	0	140	140	114	0	114	254
Sweden	Tiscali – Se	Gratis Internetabonnemang	0	0	142	142	114	0	114	257
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
Germany	T-Online	T-Online by day	0	63	81	144	114	0	114	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
Germany	NGI	NGI Easy	0	0	149	149	114	0	114	263
Germany	Arcor	Arcor-Nexgo Internet by Call Easy	0	0	150	150	114	0	114	264
France	Club Internet	Forfait Full is Beautiful 20H	0	152	0	152	114	0	114	265
Germany	AOL.de	AOL-Start	0	76	76	152	114	0	114	266
Germany	QSC	Q-Dial	0	0	152	152	114	0	114	266
Germany	Arcor	Arcor ISDN Power	0	98	98	196	70	0	70	266
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
US – CA	AT&T	Prepaid – 20 hours	0	0	169	169	99	0	99	268
Sweden	Utfors	Internet Storsurf for PSTN	0	154	0	154	114	0	114	268
US – CA	AT&T	Prepaid – 8 hours	0	0	169	169	99	0	99	268
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
Germany	Tiscali – de	Tiscali Online 20	0	126	0	126	143	0	143	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noos	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
US – CA	EarthLink	EarthLink Limited	6	85	82	173	99	0	99	272
Sweden	Spray	Spray Fastpris 30 timmar	0	158	0	158	114	0	114	272
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
France	AOL.fr	Forfait Decouverte	25	252	0	277	0	0	0	277
UK	NTL	NTL pay as you go	0	0	156	156	122	0	122	277
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
US – Ohio	XO	Consumer Dial – Unlimited Access	0	155	0	155	128	0	128	282
Germany	Tiscali – de	Tiscali Online 10	0	67	72	139	143	0	143	282
Germany	NGI	NGI Plus	0	0	170	170	114	0	114	284
France	Oreka	Oreka Acces Détente	0	0	172	172	114	0	114	286
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
Germany	Tiscali – de	Tiscali Online Plus	0	0	145	145	143	0	143	288
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
Germany	Arcor	Arcor Internet by call	0	0	177	177	114	0	114	291
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293

All prices are in UK£ based on tariffs valid at February 2002

## 9 Residential basket 4p, 30 hours peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip -tion	usage for 30 hours	total ISP	Annual fixed	usage for 30 hours	total PSTN	ISP+ PSTN charges
UK	NTL	128k package	25	180	0	205	0	0	0	205
Germany	T-Online	T-online surftime 30	0	125	0	125	114	0	114	239
UK	Tiscali – UK	Tiscali Daytime	0	120	0	120	119	0	119	239
UK	MSN – UK	MSN FreeWeb Daytime	0	120	0	120	119	0	119	239
France	Free	Forfait Internet – 50 Heures	0	126	0	126	114	0	114	240
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	114	0	114	240
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
UK	NTL	NTL.home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noosnet	Forfait Primo	26	244	0	270	0	0	0	270
Sweden	Spray	Spray Fastpris 30 timmar	0	158	0	158	114	0	114	272
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
France	AOL.fr	Forfait Decouverte	25	252	0	277	0	0	0	277
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	155	0	155	128	0	128	282
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Sweden	Utfors	Internet Storsurf for PSTN	0	154	24	178	114	0	114	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293
Germany	Arcor	Arcor ISDN Internet by Call Easy	0	0	225	225	70	0	70	294
Sweden	Telia	Telia ADSL Broadband	33	263	0	296	0	0	0	296
Sweden	Telenordia	Telenordia ADSL Bredband	33	263	0	296	0	0	0	296
Germany	AOL.de	AOL-Top	0	182	0	182	114	0	114	296
Germany	NGI	NGI Premium	0	43	140	182	114	0	114	297
Germany	T-Online	T-Online by day	0	63	121	185	114	0	114	299
UK	AOL.uk	AOL Flat Rate	0	180	0	180	119	0	119	299
UK	BT	BT openworld Anytime	0	180	0	180	119	0	119	299
UK	Tiscali – UK	Tiscali Anytime	0	180	0	180	119	0	119	299
UK	MSN – UK	MSN FreeWeb – 25	0	108	72	180	119	0	119	299
UK	Virgin	Virgin.Net- 24seven	0	180	0	180	119	0	119	299
US – Ohio	Qwest	Internet Access	0	172	0	172	128	0	128	300
US – Ohio	Speak Easy	56K Dial Up	0	172	0	172	128	0	128	300
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	172	0	172	128	0	128	300
US – CA	AOL.us	Standard Plan	0	204	0	204	99	0	99	303
France	Liberty Surf	Forfait 30 H	0	190	0	190	114	0	114	303
France	Wanadoo	Integrale 30	0	190	0	190	114	0	114	304
France	Wanadoo	Integrale Option Fidelite' 36	0	190	0	190	114	0	114	304
US – Ohio	Ohio Ameritech	Prodigy Internet Deluxe Unlimited Monthly Plan	0	178	0	178	128	0	128	306
US – CA	MSN	Hourly Plan	0	85	128	213	99	0	99	312
France	AOL.fr	AOL Tout Compris 30h	0	199	0	199	114	0	114	313
Germany	Arcor	Arcor ISDN Power	0	98	147	245	70	0	70	315
UK	Telewest	Blueyonder Broadband Internet	17	300	0	317	0	0	0	317
Sweden	Spray	Spray Fastpris 50 timmar	0	202	0	202	114	0	114	317
US – Ohio	AT&T	WorldNet Service Unlimited	0	189	0	189	128	0	128	317
US – Ohio	MSN	Dial-up Access	0	189	0	189	128	0	128	317
US – Ohio	Qwest	MSN Internet Access/Qwest	0	189	0	189	128	0	128	317
US – Ohio	EarthLink	EarthLink Unlimited	6	189	0	195	128	0	128	323
Germany	NGI	NGI By Call	0	0	209	209	114	0	114	323
Germany	Arcor	Arcor ISDN Speed	0	30	225	254	70	0	70	324
UK	NTL	Hi-speed Option 1 (Up to 512 Kbps)	25	300	0	325	0	0	0	325
Germany	Arcor	Arcor DSL – Flatrate 128	6	319	0	325	0	0	0	325

All prices are in UK£ based on tariffs valid at February 2002

## 10 Residential basket 5p, 40 hours peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 40 hours	total ISP	Annual fixed	usage for 40 hours	total PSTN	ISP+ PSTN charges
UK	NTL	128k package	25	180	0	205	0	0	0	205
UK	Tiscali – UK	Tiscali Daytime	0	120	0	120	119	0	119	239
UK	MSN – UK	MSN FreeWeb Daytime	0	120	0	120	119	0	119	239
France	Free	Forfait Internet – 50 Heures	0	126	0	126	114	0	114	240
France	AOL.fr	AOL Tout Compris 50h	0	126	0	126	114	0	114	240
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
UK	NTL	NTL:home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noos	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
France	AOL.fr	Forfait Decouverte	25	252	0	277	0	0	0	277
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	155	0	155	128	0	128	282
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293
Sweden	Telia	Telia ADSL Broadband	33	263	0	296	0	0	0	296
Sweden	Telenordia	Telenordia ADSL Bredband	33	263	0	296	0	0	0	296
UK	AOL.uk	AOL Flat Rate	0	180	0	180	119	0	119	299
UK	BT	BT openworld Anytime	0	180	0	180	119	0	119	299
UK	Tiscali – UK	Tiscali Anytime	0	180	0	180	119	0	119	299
UK	Virgin	Virgin.Net- 24seven	0	180	0	180	119	0	119	299
US – Ohio	Qwest	Internet Access	0	172	0	172	128	0	128	300
US – Ohio	Speak Easy	56K Dial Up	0	172	0	172	128	0	128	300
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	172	0	172	128	0	128	300
US – CA	AOL.us	Standard Plan	0	204	0	204	99	0	99	303
US – Ohio	Ohio Ameritech	Prodigy Internet Deluxe Unlimited Monthly Plan	0	178	0	178	128	0	128	306
Germany	T-Online	T-online surftime 30	0	125	75	200	114	0	114	314
UK	Telewest	Blueyonder Broadband Internet	17	300	0	317	0	0	0	317
Sweden	Spray	Spray Fastpris 50 timmar	0	202	0	202	114	0	114	317
US – Ohio	AT&T	WorldNet Service Unlimited	0	189	0	189	128	0	128	317
US – Ohio	MSN	Dial-up Access	0	189	0	189	128	0	128	317
US – Ohio	Qwest	MSN Internet Access/Qwest	0	189	0	189	128	0	128	317
US – Ohio	EarthLink	EarthLink Unlimited	6	189	0	195	128	0	128	323
UK	NTL	Hi-speed Option 1 (Up to 512 Kbps)	25	300	0	325	0	0	0	325
Germany	Arcor	Arcor DSL – Flatrate 128	6	319	0	325	0	0	0	325
France	Wanadoo	CableWanadoo – Prime @cces	65	261	0	326	0	0	0	326
US – CA	EarthLink	EarthLink The Works	0	230	0	230	99	0	99	329
US – Ohio	AOL.us	Standard Plan	0	206	0	206	128	0	128	334
Germany	Tiscali – de	Tiscali DSL time100	40	295	0	335	0	0	0	335
Germany	T-Online	T-Online by day	0	63	162	225	114	0	114	339
Sweden	Utfors	Internet Storsurf for PSTN	0	154	73	226	114	0	114	341
Germany	NGI	NGI Premium	0	43	186	229	114	0	114	343
US – CA	Qwest	DSL Deluxe	71	273	0	343	0	0	0	343
US – Ohio	Qwest	DSL Deluxe	71	275	0	346	0	0	0	346
Sweden	Telia	(Comhem) High speed internet IC 1000	30	319	0	350	0	0	0	350
Germany	T-Online	T-online surftime 60	0	237	0	237	114	0	114	351
Sweden	Spray	Spray Fastpris 70 timmar	0	242	0	242	114	0	114	356
Germany	AOL.de	AOL-Top	0	182	61	243	114	0	114	357
US – Ohio	EarthLink	EarthLink The Works	0	232	0	232	128	0	128	360
Germany	Arcor	Arcor ISDN Power	0	98	196	294	70	0	70	364

All prices are in UK£ based on tariffs valid at February 2002

## 11 Residential basket A/o p, 150 hours peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 150 hours	total ISP	Annual fixed	usage for 150 hours	total PSTN	ISP+ PSTN charges
UK	NTL	128k package	25	180	0	205	0	0	0	205
UK	Tiscali – UK	Tiscali Daytime	0	120	0	120	119	0	119	239
UK	MSN – UK	MSN FreeWeb Daytime	0	120	0	120	119	0	119	239
US – CA	Pacbell	Prodigy Internet Annual Unlimited Plan	0	141	0	141	99	0	99	240
UK	NTL	NTL.home internet service unlimited	0	120	0	120	122	0	122	242
US – CA	AT&T	Worldnet Service Plus	0	145	0	145	99	0	99	244
Sweden	Tele2	Tele2Internet Kabel	47	201	0	248	0	0	0	248
US – CA	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	153	0	153	99	0	99	252
Sweden	UPC	Chello	11	242	0	253	0	0	0	253
US – CA	Qwest	DSL 256	71	187	0	258	0	0	0	258
US – Ohio	Qwest	DSL 256	71	189	0	260	0	0	0	260
US – Ohio	Ohio Ameritech	Prodigy Internet Annual Unlimited Plan	0	134	0	134	128	0	128	262
UK	Telewest	Blueyonder Surf unlimited	0	144	0	144	122	0	122	266
Germany	PrimaCom	_easy	18	248	0	267	0	0	0	267
Sweden	Telia	(Comhem) High speed internet IC 500	30	239	0	269	0	0	0	269
US – CA	Qwest	Internet Access	0	170	0	170	99	0	99	269
US – CA	Speak Easy	56K Dial Up	0	170	0	170	99	0	99	269
US – CA	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	170	0	170	99	0	99	269
US – CA	Pacbell	Prodigy Internet Monthly Unlimited Plan	0	170	0	170	99	0	99	269
France	Noosnet	Noosnet Forfait Primo	26	244	0	270	0	0	0	270
US – Ohio	AT&T	Worldnet Service Plus	0	146	0	146	128	0	128	274
UK	Freeserve	Freeserve AnyTime	0	156	0	156	119	0	119	275
Sweden	Spray	ADSL Broadband	38	242	0	280	0	0	0	280
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Pre-pay	0	155	0	155	128	0	128	282
US – CA	AT&T	WorldNet Service Unlimited	0	187	0	187	99	0	99	286
US – CA	MSN	Dial-up Access	0	187	0	187	99	0	99	286
US – CA	Qwest	MSN Internet Access/Qwest	0	187	0	187	99	0	99	286
US – CA	Pacbell	Prodigy Internet Deluxe Monthly Plan	0	187	0	187	99	0	99	286
US – Ohio	Ohio Ameritech	Prodigy Internet Monthly Unlimited Plan	0	162	0	162	128	0	128	290
Sweden	UPC	Chello Plus	8	282	0	290	0	0	0	290
US – CA	EarthLink	EarthLink Unlimited	6	187	0	193	99	0	99	292
Germany	Tiscali – de	Tiscali DSL 500	40	252	0	293	0	0	0	293
Sweden	Telia	Telia ADSL Broadband	33	263	0	296	0	0	0	296
Sweden	Telenordia	Telenordia ADSL Bredband	33	263	0	296	0	0	0	296
UK	AOL.uk	AOL Flat Rate	0	180	0	180	119	0	119	299
UK	BT	BT openworld Anytime	0	180	0	180	119	0	119	299
UK	Tiscali – UK	Tiscali Anytime	0	180	0	180	119	0	119	299
UK	Virgin	Virgin.Net- 24seven	0	180	0	180	119	0	119	299
US – Ohio	Qwest	Internet Access	0	172	0	172	128	0	128	300
US – Ohio	Speak Easy	56K Dial Up	0	172	0	172	128	0	128	300
US – Ohio	XO	Consumer Dial – Unlimited Access Plan Month to Month	0	172	0	172	128	0	128	300
US – CA	AOL.us	Standard Plan	0	204	0	204	99	0	99	303
US – Ohio	Ohio Ameritech	Prodigy Internet Deluxe Unlimited Monthly Plan	0	178	0	178	128	0	128	306
UK	Telewest	Blueyonder Broadband Internet	17	300	0	317	0	0	0	317
US – Ohio	AT&T	WorldNet Service Unlimited	0	189	0	189	128	0	128	317
US – Ohio	MSN	Dial-up Access	0	189	0	189	128	0	128	317
US – Ohio	Qwest	MSN Internet Access/Qwest	0	189	0	189	128	0	128	317
US – Ohio	EarthLink	EarthLink Unlimited	6	189	0	195	128	0	128	323
UK	NTL	Hi-speed Option 1 (Up to 512 Kbps)	25	300	0	325	0	0	0	325
Germany	Arcor	Arcor DSL – Flatrate 128	6	319	0	325	0	0	0	325
France	Wanadoo	CableWanadoo – Prime @cces	65	261	0	326	0	0	0	326
US – CA	EarthLink	EarthLink The Works	0	230	0	230	99	0	99	329
US – Ohio	AOL.us	Standard Plan	0	206	0	206	128	0	128	334
US – CA	Qwest	DSL Deluxe	71	273	0	343	0	0	0	343
US – Ohio	Qwest	DSL Deluxe	71	275	0	346	0	0	0	346
Sweden	Telia	(Comhem) High speed internet IC 1000	30	319	0	350	0	0	0	350
US – Ohio	EarthLink	EarthLink The Works	0	232	0	232	128	0	128	360
US – CA	MSN	DSL	23	341	0	364	0	0	0	364
US – Ohio	MSN	DSL	24	344	0	368	0	0	0	368
Germany	Arcor	Arcor DSL – Flatrate 768	6	363	0	369	0	0	0	369
Germany	Arcor	Arcor ISDN Flat Rate	0	301	0	301	70	0	70	371
Germany	AOL.de	AOL High Speed DSL Flat (12months)	40	336	0	376	0	0	0	376
US – CA	Comcast	High Speed Internet Service	0	383	0	383	0	0	0	383
US – Ohio	Comcast	High Speed Internet Service	0	387	0	387	0	0	0	387
Germany	PrimaCom	_pro	18	370	0	389	0	0	0	389
UK	Pipex	Pipex Xtreme Solo	39	352	0	391	0	0	0	391
US – CA	Qwest	Office Works -Residential	0	298	0	298	99	0	99	397
US – CA	Road Runner (Time Warner)	Residential Service	24	383	0	407	0	0	0	407

All prices are in UK£ based on tariffs valid at February 2002

## 12 Business basket 6, 9.6 hours usage per month (80% peak, 20% off-peak)

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 9.6 hours	total ISP	Annual fixed	usage for 9.6 hours	total PSTN	ISP+ PSTN charges
France	Wanadoo	Integrale 10	0	73	0	73	0	0	0	73
France	Wanadoo	Integrale Option Fidelite' 12	0	73	0	73	0	0	0	73
Germany	Arcor	Arcor Online Power	0	85	0	85	0	0	0	85
Sweden	Utfors	ISDN Surf	0	32	55	88	0	0	0	88
Sweden	Telia	Telia Internet 020	0	16	83	98	0	0	0	98
US – Ohio	AT&T	Basic Business Plan	0	48	56	104	0	0	0	104
US – CA	AT&T	Basic Business Plan	0	48	56	104	0	0	0	104
France	Wanadoo	Integrale 20	0	105	0	105	0	0	0	105
France	Wanadoo	Integrale Option Fidelite' 24	0	105	0	105	0	0	0	105
Germany	WorldCom	WorldCom Internet Dial	4	56	60	119	0	0	0	119
France	Wanadoo	Integrale Option Fidelite' 6	0	56	68	125	0	0	0	125
Sweden	Telenordia	Telenordia Internet ISDN	0	52	0	52	0	83	83	134
France	Wanadoo	Integrale 5	0	56	87	144	0	0	0	144
US – Ohio	AT&T	Easy Invoice Billing – Hourly	3	0	152	155	0	0	0	155
US – CA	AT&T	Easy Invoice Billing – Hourly	3	0	152	155	0	0	0	155
Sweden	Telia	Telia Internet ISDN	0	81	77	158	0	0	0	158
France	Wanadoo	Integrale 30	0	159	0	159	0	0	0	159
France	Wanadoo	Integrale Option Fidelite' 36	0	159	0	159	0	0	0	159
US – Ohio	AT&T	Comprehensive Business Plan	0	162	0	162	0	0	0	162
US – Ohio	Qwest	Internet Access	0	162	0	162	0	0	0	162
US – CA	AT&T	Comprehensive Business Plan	0	162	0	162	0	0	0	162
US – CA	Qwest	Internet Access	0	162	0	162	0	0	0	162
US – Ohio	EarthLink	Professional Dialup	6	162	0	168	0	0	0	168
US – CA	EarthLink	Professional Dialup	6	162	0	168	0	0	0	168
UK	BT	BT Connect Lite from openworld – Pay as you go	0	0	0	0	0	170	170	170
Sweden	Telenordia	Telenordia Internetthotel Start	11	80	0	91	0	83	83	174
UK	BT	BT Connect Lite from openworld – Unmetered access	0	180	0	180	0	0	0	180
US – Ohio	EarthLink	EarthLink Unlimited	6	178	0	184	0	0	0	184
US – CA	EarthLink	EarthLink Unlimited	6	178	0	184	0	0	0	184
US – Ohio	AT&T	Premium Business Plan	0	203	0	203	0	0	0	203
US – Ohio	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	0	0	0	203
US – CA	AT&T	Premium Business Plan	0	203	0	203	0	0	0	203
US – CA	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	0	0	0	203
Germany	Arcor	Arcor Web Presence	0	129	80	209	0	0	0	209
Germany	Arcor	Arcor Web Presence	0	129	80	209	0	0	0	209
US – Ohio	EarthLink	EarthLink The Works	0	219	0	219	0	0	0	219
US – CA	EarthLink	EarthLink The Works	0	219	0	219	0	0	0	219
UK	Demon	Premier Connect	0	120	100	220	0	0	0	220
US – Ohio	Qwest	Office Works- Small Business	0	227	0	227	0	0	0	227
US – CA	Qwest	Office Works- Small Business	0	227	0	227	0	0	0	227
Germany	KKF	Einzelplaz Dial-up	12	126	99	237	0	0	0	237
Sweden	Tele2	Tele2Internet ISDN med Surfrabatt 15%	0	178	67	245	0	0	0	245
France	Wanadoo	Integrales 100 H fidelite'	0	245	0	245	0	0	0	245
UK	Demon	Premier Connect Plus	0	204	53	258	0	0	0	258
UK	Demon	Premier Connect – + SurfTime Eve/we	0	120	94	214	61	0	61	275
Germany	Arcor	Arcor DSL – Flatrate 128	5	275	0	281	0	0	0	281
UK	Easynet	Dial Up Account	0	120	0	120	0	170	170	290
UK	BT	BT Connect Pay as You Go	0	120	0	120	0	170	170	290
Sweden	Telenordia	Telenordia Internetthotel Standard	11	201	0	213	0	83	83	295
France	Wanadoo	Integrales 100 H	0	299	0	299	0	0	0	299
Germany	Arcor	Arcor DSL – Flatrate 768	5	313	0	318	0	0	0	318
Germany	T-Online	Business online	35	290	0	324	0	0	0	324
UK	BT	BT Connect Anytime	0	336	0	336	0	0	0	336
UK	Demon	Premier Connect Plus+SurfTime A/T	0	204	0	204	204	0	204	408
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	27	404	0	431	0	0	0	431
France	Wanadoo	Wanado Aces Pro	0	0	436	436	0	0	0	436
US – Ohio	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Pacbell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
Sweden	Telenordia	Telenordia Internetthotel Advanced	11	363	0	374	0	83	83	457
Germany	KKF	Professional DSL Volume 192K	93	413	0	506	0	0	0	506
UK	Freemove	FreemovePlus Home 512K (Single Pc)	50	459	0	509	0	0	0	509
US – Ohio	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – CA	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
UK	BT	Business 500	50	480	0	530	0	0	0	530
UK	Pipex	Pipex Xtreme Home Office – Self Install	53	479	0	533	0	0	0	533
US – Ohio	Ohio Ameritech	SpeedPath 768 Office	142	406	0	548	0	0	0	548
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	50	540	0	590	0	0	0	590
UK	Pipex	Pipex Xtreme Home Office – Managed	53	540	0	593	0	0	0	593
Germany	NGI	NGI SDSL 192 Volume Rate	156	438	0	594	0	0	0	594

All prices are in UK£ based on tariffs valid at February 2002

### 13 Business basket 7, 10 hours peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip -tion	usage for 10 hours	total ISP	Annual fixed	usage for 10 hours	total PSTN	ISP+ PSTN charges
France	Wanadoo	Integrale 10	0	73	0	73	0	0	0	73
France	Wanadoo	Integrale Option Fidelite' 12	0	73	0	73	0	0	0	73
Germany	Arcor	Arcor Online Power	0	85	0	85	0	0	0	85
Sweden	Utfors	ISDN Surf	0	32	63	95	0	0	0	95
France	Wanadoo	Integrale 20	0	105	0	105	0	0	0	105
France	Wanadoo	Integrale Option Fidelite' 24	0	105	0	105	0	0	0	105
Sweden	Telia	Telia Internet O20	0	16	92	108	0	0	0	108
US – Ohio	AT&T	Basic Business Plan	0	48	61	109	0	0	0	109
US – CA	AT&T	Basic Business Plan	0	48	61	109	0	0	0	109
Germany	WorldCom	WorldCom Internet Dial Solo	4	56	63	122	0	0	0	122
France	Wanadoo	Integrale Option Fidelite' 6	0	56	76	132	0	0	0	132
Sweden	Telenordia	Telenordia Internet ISDN	0	52	0	52	0	92	92	144
France	Wanadoo	Integrale 5	0	56	95	152	0	0	0	152
France	Wanadoo	Integrale 30	0	159	0	159	0	0	0	159
France	Wanadoo	Integrale Option Fidelite' 36	0	159	0	159	0	0	0	159
US – Ohio	AT&T	Easy Invoice Billing – Hourly	3	0	158	162	0	0	0	162
US – CA	AT&T	Easy Invoice Billing – Hourly	3	0	158	162	0	0	0	162
US – Ohio	AT&T	Comprehensive Business Plan	0	162	0	162	0	0	0	162
US – Ohio	Qwest	Internet Access	0	162	0	162	0	0	0	162
US – CA	AT&T	Comprehensive Business Plan	0	162	0	162	0	0	0	162
US – CA	Qwest	Internet Access	0	162	0	162	0	0	0	162
US – Ohio	EarthLink	Professional Dialup	6	162	0	168	0	0	0	168
US – CA	EarthLink	Professional Dialup	6	162	0	168	0	0	0	168
Sweden	Telia	Telia Internet ISDN	0	81	89	170	0	0	0	170
UK	BT	BT Connect Lite from openworld – Unmetered access	0	180	0	180	0	0	0	180
Sweden	Telenordia	Telenordia Internetthotel Start	11	80	0	91	0	92	92	184
US – Ohio	EarthLink	EarthLink Unlimited	6	178	0	184	0	0	0	184
US – CA	EarthLink	EarthLink Unlimited	6	178	0	184	0	0	0	184
US – Ohio	AT&T	Premium Business Plan	0	203	0	203	0	0	0	203
US – Ohio	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	0	0	0	203
US – CA	AT&T	Premium Business Plan	0	203	0	203	0	0	0	203
US – CA	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	0	0	0	203
UK	BT	BT Connect Lite from openworld – Pay as you go	0	0	0	0	0	206	206	206
Germany	Arcor	Arcor Web Presence	0	129	88	217	0	0	0	217
Germany	Arcor	Arcor Web Presence	0	129	88	217	0	0	0	217
US – Ohio	EarthLink	EarthLink The Works	0	219	0	219	0	0	0	219
US – CA	EarthLink	EarthLink The Works	0	219	0	219	0	0	0	219
US – Ohio	Qwest	Office Works- Small Business	0	227	0	227	0	0	0	227
US – CA	Qwest	Office Works- Small Business	0	227	0	227	0	0	0	227
UK	Demon	Premier Connect	0	120	123	243	0	0	0	243
France	Wanadoo	Integrales 100 H fidelite'	0	245	0	245	0	0	0	245
Germany	KKF	Einzelplaz Dial-up	12	126	111	249	0	0	0	249
Sweden	Tele2	Tele2Internet ISDN med Surfrabatt 15%	0	178	75	253	0	0	0	253
UK	Demon	Premier Connect Plus	0	204	61	265	0	0	0	265
Germany	Arcor	Arcor DSL – Flatrate 128	5	275	0	281	0	0	0	281
France	Wanadoo	Integrales 100 H	0	299	0	299	0	0	0	299
UK	Demon	Premier Connect – + SurfTime Eve/we	0	120	123	243	61	0	61	304
Sweden	Telenordia	Telenordia Internetthotel Standard	11	201	0	213	0	92	92	305
Germany	Arcor	Arcor DSL – Flatrate 768	5	313	0	318	0	0	0	318
Germany	T-Online	Business online	35	290	0	324	0	0	0	324
UK	Easynet	Dial Up Account	0	120	0	120	0	206	206	326
UK	BT	BT Connect Pay as You Go	0	120	0	120	0	206	206	326
UK	BT	BT Connect Anytime	0	336	0	336	0	0	0	336
UK	Demon	Premier Connect Plus+SurfTime A/T	0	204	0	204	204	0	204	408
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	27	404	0	431	0	0	0	431
US – Ohio	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Pacbell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
France	Wanadoo	Wanadoo Aces Pro	0	0	455	455	0	0	0	455
Sweden	Telenordia	Telenordia Internetthotel Advanced	11	363	0	374	0	92	92	467
Germany	KKF	Professional DSL Volume 192K	93	413	0	506	0	0	0	506
UK	Freemove	FreemovePlus Home 512K (Single Pc)	50	459	0	509	0	0	0	509
US – Ohio	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – CA	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
UK	BT	Business 500	50	480	0	530	0	0	0	530
UK	Pipex	Pipex Xtreme Home Office – Self Install	53	479	0	533	0	0	0	533
US – Ohio	Ohio Ameritech	SpeedPath 768 Office	142	406	0	548	0	0	0	548
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	50	540	0	590	0	0	0	590
UK	Pipex	Pipex Xtreme Home Office – Managed	53	540	0	593	0	0	0	593
Germany	NGI	NGI SDSL 192 Volume Rate	156	438	0	594	0	0	0	594

All prices are in UK£ based on tariffs valid at February 2002



## 14 Business basket 8, 20 hours peak usage per month

Country	ISP	Package	Connect -ion	Annual subscrip -tion	usage for 20 hours	total ISP	Annual fixed	usage for 20 hours	total PSTN	ISP+ PSTN charges
Germany	Arcor	Arcor Online Power	0	85	0	85	98	0	98	183
France	Wanadoo	Integrale 20	0	105	0	105	113	0	113	219
France	Wanadoo	Integrale Option Fidelite' 24	0	105	0	105	113	0	113	219
Sweden	Utfors	ISDN Surf	0	32	126	159	84	0	84	243
US – CA	AT&T	Comprehensive Business Plan	0	162	0	162	95	0	95	257
US – CA	Qwest	Internet Access	0	162	0	162	95	0	95	257
US – CA	EarthLink	Professional Dialup	6	162	0	168	95	0	95	263
France	Wanadoo	Integrale 30	0	159	0	159	113	0	113	272
France	Wanadoo	Integrale Option Fidelite' 36	0	159	0	159	113	0	113	272
US – CA	EarthLink	EarthLink Unlimited	6	178	0	184	95	0	95	279
Germany	Arcor	Arcor DSL – Flatrate 128	5	275	0	281	0	0	0	281
US – CA	AT&T	Premium Business Plan	0	203	0	203	95	0	95	298
US – CA	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	95	0	95	298
Germany	WorldCom	WorldCom Internet Dial Solo	4	56	153	212	98	0	98	310
US – CA	EarthLink	EarthLink The Works	0	219	0	219	95	0	95	314
Germany	Arcor	Arcor DSL – Flatrate 768	5	313	0	318	0	0	0	318
Sweden	Telenordia	Telenordia Internet ISDN	0	52	0	52	84	184	268	320
Sweden	Telia	Telia Internet 020	0	16	184	200	121	0	121	321
US – CA	Qwest	Office Works- Small Business	0	227	0	227	95	0	95	322
Germany	T-Online	Business online	35	290	0	324	0	0	0	324
US – CA	AT&T	Basic Business Plan	0	48	183	231	95	0	95	326
France	Wanadoo	Integrale Option Fidelite' 12	0	73	152	225	113	0	113	339
Sweden	Telia	Telia Internet ISDN	0	81	179	259	84	0	84	344
UK	BT	BT Connect Lite from openworld – Unmetered access	0	180	0	180	170	0	170	350
France	Wanadoo	Integrales 100 H fidelite'	0	245	0	245	113	0	113	358
Sweden	Telenordia	Telenordia Internetthotel Start	11	80	0	91	84	184	268	360
Germany	Arcor	Arcor Web Presence	0	129	176	305	60	0	60	365
Germany	Arcor	Arcor Web Presence	0	129	176	305	60	0	60	365
US – Ohio	AT&T	Comprehensive Business Plan	0	162	0	162	206	0	206	368
US – Ohio	Qwest	Internet Access	0	162	0	162	206	0	206	368
US – Ohio	EarthLink	Professional Dialup	6	162	0	168	206	0	206	373
France	Wanadoo	Integrale 10	0	73	190	263	113	0	113	377
US – Ohio	EarthLink	EarthLink Unlimited	6	178	0	184	206	0	206	390
US – Ohio	AT&T	Premium Business Plan	0	203	0	203	206	0	206	408
US – Ohio	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	206	0	206	408
Sweden	Tele2	Tele2Internet ISDN med Surfrabatt 15%	0	178	150	328	84	0	84	412
France	Wanadoo	Integrales 100 H	0	299	0	299	113	0	113	412
US – CA	AT&T	Easy Invoice Billing – Hourly	3	0	317	320	95	0	95	415
US – Ohio	EarthLink	EarthLink The Works	0	219	0	219	206	0	206	425
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	27	404	0	431	0	0	0	431
US – Ohio	Qwest	Office Works- Small Business	0	227	0	227	206	0	206	433
France	Wanadoo	Integrale Option Fidelite' 6	0	56	266	323	113	0	113	436
US – Ohio	AT&T	Basic Business Plan	0	48	183	231	206	0	206	437
US – Ohio	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Pacbell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
France	Wanadoo	Integrale 5	0	56	285	342	113	0	113	455
Sweden	Telenordia	Telenordia Internetthotel Standard	11	201	0	213	84	184	268	481
Germany	KKF	Einzelplatz Dial-up	12	126	222	361	123	0	123	484
UK	Demon	Premier Connect Plus	0	204	123	327	170	0	170	496
UK	BT	BT Connect Anytime	0	336	0	336	170	0	170	505
Germany	KKF	Professional DSL Volume 192K	93	413	0	506	0	0	0	506
UK	Freeserve	FreeservePlus Home 512K (Single Pc)	50	459	0	509	0	0	0	509
US – Ohio	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – CA	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – Ohio	AT&T	Easy Invoice Billing – Hourly	3	0	317	320	206	0	206	526
UK	BT	Business 500	50	480	0	530	0	0	0	530
UK	Pipex	Pipex Xtreme Home Office – Self Install	53	479	0	533	0	0	0	533
UK	Demon	Premier Connect	0	120	245	365	170	0	170	535
US – Ohio	Ohio Ameritech	SpeedPath 768 Office	142	406	0	548	0	0	0	548
UK	Demon	Premier Connect Plus+SurfTime A/T	0	204	0	204	374	0	374	578
UK	BT	BT Connect Lite from openworld – Pay as you go	0	0	0	0	170	411	581	581
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	50	540	0	590	0	0	0	590
UK	Pipex	Pipex Xtreme Home Office – Managed	53	540	0	593	0	0	0	593
Germany	NGI	NGI SDSL 192 Volume Rate	156	438	0	594	0	0	0	594
UK	Demon	Premier Connect – + SurfTime Eve/we	0	120	245	365	231	0	231	596
US – Ohio	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Verizon	Up to 768/128	36	568	0	604	0	0	0	604
UK	Iomart	CopperBurst 500 Lite	91	540	0	631	0	0	0	631

All prices are in UK£ based on tariffs valid at February 2002

## 15 Business basket 9, 30 hours peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 30 hours	total ISP	Annual fixed	usage for 30 hours	total PSTN	ISP+ PSTN charges
Germany	Arcor	Arcor Online Power	0	85	42	127	98	0	98	225
US – CA	AT&T	Comprehensive Business Plan	0	162	0	162	95	0	95	257
US – CA	Qwest	Internet Access	0	162	0	162	95	0	95	257
US – CA	EarthLink	Professional Dialup	6	162	0	168	95	0	95	263
France	Wanadoo	Integrale 30	0	159	0	159	113	0	113	272
France	Wanadoo	Integrale Option Fidelite' 36	0	159	0	159	113	0	113	272
US – CA	EarthLink	EarthLink Unlimited	6	178	0	184	95	0	95	279
Germany	Arcor	Arcor DSL – Flatrate 128	5	275	0	281	0	0	0	281
US – CA	AT&T	Premium Business Plan	0	203	0	203	95	0	95	298
US – CA	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	95	0	95	298
Sweden	Utfors	ISDN Surf	0	32	189	222	84	0	84	306
US – CA	EarthLink	EarthLink The Works	0	219	0	219	95	0	95	314
Germany	Arcor	Arcor DSL – Flatrate 768	5	313	0	318	0	0	0	318
US – CA	Qwest	Office Works- Small Business	0	227	0	227	95	0	95	322
Germany	T-Online	Business online	35	290	0	324	0	0	0	324
France	Wanadoo	Integrale Option Fidelite' 24	0	105	114	219	113	0	113	333
UK	BT	BT Connect Lite from openworld – Unmetered access	0	180	0	180	170	0	170	350
France	Wanadoo	Integrales 100 H fidelite'	0	245	0	245	113	0	113	358
US – Ohio	AT&T	Comprehensive Business Plan	0	162	0	162	206	0	206	368
US – Ohio	Qwest	Internet Access	0	162	0	162	206	0	206	368
US – Ohio	EarthLink	Professional Dialup	6	162	0	168	206	0	206	373
US – Ohio	EarthLink	EarthLink Unlimited	6	178	0	184	206	0	206	390
Germany	WorldCom	WorldCom Internet Dial Solo	4	56	242	301	98	0	98	400
US – Ohio	AT&T	Premium Business Plan	0	203	0	203	206	0	206	408
US – Ohio	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	206	0	206	408
France	Wanadoo	Integrale 20	0	105	190	296	113	0	113	409
France	Wanadoo	Integrales 100 H	0	299	0	299	113	0	113	412
Sweden	Telenordia	Telenordia Internet ISDN	0	52	0	52	84	277	361	412
Sweden	Telia	Telia Internet 020	0	16	277	292	121	0	121	413
US – Ohio	EarthLink	EarthLink The Works	0	219	0	219	206	0	206	425
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	27	404	0	431	0	0	0	431
US – Ohio	Qwest	Office Works- Small Business	0	227	0	227	206	0	206	433
Sweden	Telia	Telia Internet ISDN	0	81	268	349	84	0	84	433
US – Ohio	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Pacbell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	AT&T	Basic Business Plan	0	48	305	353	95	0	95	448
Sweden	Telenordia	Telenordia Internetthotel Start	11	80	0	91	84	277	361	452
Germany	Arcor	Arcor Web Presence	0	129	264	393	60	0	60	453
Germany	Arcor	Arcor Web Presence	0	129	264	393	60	0	60	453
Sweden	Tele2	Tele2Internet ISDN med Surfrabatt 15%	0	178	224	402	84	0	84	486
UK	BT	BT Connect Anytime	0	336	0	336	170	0	170	505
Germany	KKF	Professional DSL Volume 192K	93	413	0	506	0	0	0	506
UK	Freeserve	FreeservePlus Home 512K (Single Pc)	50	459	0	509	0	0	0	509
US – Ohio	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – CA	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
France	Wanadoo	Integrale Option Fidelite' 12	0	73	342	416	113	0	113	529
UK	BT	Business 500	50	480	0	530	0	0	0	530
UK	Pipex	Pipex Xtreme Home Office – Self Install	53	479	0	533	0	0	0	533
US – Ohio	Ohio Ameritech	SpeedPath 768 Office	142	406	0	548	0	0	0	548
UK	Demon	Premier Connect Plus	0	204	184	388	170	0	170	558
US – Ohio	AT&T	Basic Business Plan	0	48	305	353	206	0	206	559
France	Wanadoo	Integrale 10	0	73	381	454	113	0	113	567
Sweden	Telenordia	Telenordia Internetthotel Standard	11	201	0	213	84	277	361	573
US – CA	AT&T	Easy Invoice Billing – Hourly	3	0	475	479	95	0	95	573
UK	Demon	Premier Connect Plus+SurfTime A/T	0	204	0	204	374	0	374	578
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	50	540	0	590	0	0	0	590
UK	Pipex	Pipex Xtreme Home Office – Managed	53	540	0	593	0	0	0	593
Germany	NGI	NGI SDSL 192 Volume Rate	156	438	0	594	0	0	0	594
Germany	KKF	Einzelplatz Dial-up	12	126	334	472	123	0	123	595
US – Ohio	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Verizon	Up to 768/128	36	568	0	604	0	0	0	604
France	Wanadoo	Integrale Option Fidelite' 6	0	56	457	513	113	0	113	626
UK	Iomart	CopperBurst 500 Lite	91	540	0	631	0	0	0	631
US – Ohio	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	113	528	0	640	0	0	0	640
US – CA	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	113	528	0	640	0	0	0	640
US – CA	Pacbell	Enhanced DSL Internet Access 384-1500/128	113	528	0	640	0	0	0	640
France	Wanadoo	Integrale 5	0	56	476	532	113	0	113	645

All prices are in UK£ based on tariffs valid at February 2002

## 16 Business basket 10, 40 hours peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 40 hours	total ISP	Annual fixed	usage for 40 hours	total PSTN	ISP+ PSTN charges
US – CA	AT&T	Comprehensive Business Plan	0	162	0	162	95	0	95	257
US – CA	Qwest	Internet Access	0	162	0	162	95	0	95	257
US – CA	EarthLink	Professional Dialup	6	162	0	168	95	0	95	263
Germany	Arcor	Arcor Online Power	0	85	85	169	98	0	98	268
US – CA	EarthLink	EarthLink Unlimited	6	178	0	184	95	0	95	279
Germany	Arcor	Arcor DSL – Flatrate 128	5	275	0	281	0	0	0	281
US – CA	AT&T	Premium Business Plan	0	203	0	203	95	0	95	298
US – CA	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	95	0	95	298
US – CA	EarthLink	EarthLink The Works	0	219	0	219	95	0	95	314
Germany	Arcor	Arcor DSL – Flatrate 768	5	313	0	318	0	0	0	318
US – CA	Qwest	Office Works- Small Business	0	227	0	227	95	0	95	322
Germany	T-Online	Business online	35	290	0	324	0	0	0	324
France	Wanadoo	Integrale Option Fidelite' 36	0	159	76	235	113	0	113	348
UK	BT	BT Connect Lite from openworld – Unmetered access	0	180	0	180	170	0	170	350
France	Wanadoo	Integrales 100 H fidelite'	0	245	0	245	113	0	113	358
US – Ohio	AT&T	Comprehensive Business Plan	0	162	0	162	206	0	206	368
US – Ohio	Qwest	Internet Access	0	162	0	162	206	0	206	368
Sweden	Utfors	ISDN Surf	0	32	252	285	84	0	84	369
US – Ohio	EarthLink	Professional Dialup	6	162	0	168	206	0	206	373
US – Ohio	EarthLink	EarthLink Unlimited	6	178	0	184	206	0	206	390
US – Ohio	AT&T	Premium Business Plan	0	203	0	203	206	0	206	408
US – Ohio	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	206	0	206	408
France	Wanadoo	Integrales 100 H	0	299	0	299	113	0	113	412
US – Ohio	EarthLink	EarthLink The Works	0	219	0	219	206	0	206	425
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	27	404	0	431	0	0	0	431
US – Ohio	Qwest	Office Works- Small Business	0	227	0	227	206	0	206	433
US – Ohio	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Pacbell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
France	Wanadoo	Integrale 30	0	159	190	349	113	0	113	462
Germany	WorldCom	WorldCom Internet Dial Solo	4	56	332	391	98	0	98	490
Sweden	Telenordia	Telenordia Internet ISDN	0	52	0	52	84	369	453	505
Sweden	Telia	Telia Internet 020	0	16	369	384	121	0	121	505
UK	BT	BT Connect Anytime	0	336	0	336	170	0	170	505
Germany	KKF	Professional DSL Volume 192K	93	413	0	506	0	0	0	506
UK	Freeserve	FreeservePlus Home 512K (Single Pc)	50	459	0	509	0	0	0	509
US – Ohio	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – CA	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
Sweden	Telia	Telia Internet ISDN	0	81	357	438	84	0	84	522
France	Wanadoo	Integrale Option Fidelite' 24	0	105	304	410	113	0	113	523
UK	BT	Business 500	50	480	0	530	0	0	0	530
UK	Pipex	Pipex Xtreme Home Office – Self Install	53	479	0	533	0	0	0	533
Germany	Arcor	Arcor Web Presence	0	129	352	481	60	0	60	541
Germany	Arcor	Arcor Web Presence	0	129	352	481	60	0	60	541
Sweden	Telenordia	Telenordia Internetthotel Start	11	80	0	91	84	369	453	544
US – Ohio	Ohio Ameritech	SpeedPath 768 Office	142	406	0	548	0	0	0	548
Sweden	Tele2	Tele2Internet ISDN med Surfrabatt 15%	0	178	299	477	84	0	84	561
US – CA	AT&T	Basic Business Plan	0	48	427	475	95	0	95	570
UK	Demon	Premier Connect Plus+SurfTime A/T	0	204	0	204	374	0	374	578
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	50	540	0	590	0	0	0	590
UK	Pipex	Pipex Xtreme Home Office – Managed	53	540	0	593	0	0	0	593
Germany	NGI	NGI SDSL 192 Volume Rate	156	438	0	594	0	0	0	594
France	Wanadoo	Integrale 20	0	105	381	486	113	0	113	599
US – Ohio	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Verizon	Up to 768/128	36	568	0	604	0	0	0	604
UK	Demon	Premier Connect Plus	0	204	245	449	170	0	170	619
UK	Iomart	CopperBurst 500 Lite	91	540	0	631	0	0	0	631
US – Ohio	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	113	528	0	640	0	0	0	640
US – CA	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	113	528	0	640	0	0	0	640
US – CA	Pacbell	Enhanced DSL Internet Access 384-1500/128	113	528	0	640	0	0	0	640
Sweden	Telenordia	Telenordia Internetthotel Standard	11	201	0	213	84	369	453	666
US – Ohio	Ohio Ameritech	SpeedPath 768 OfficePlus	142	528	0	669	0	0	0	669
US – Ohio	AT&T	Basic Business Plan	0	48	427	475	206	0	206	681
US – CA	Pacbell	Enhanced DSL Internet Access – Special Router Promotion	79	609	0	688	0	0	0	688
Germany	KKF	Einzelplaz Dial-up	12	126	445	583	123	0	123	706
France	Wanadoo	Integrale Option Fidelite' 12	0	73	533	606	113	0	113	719
US – CA	AT&T	Easy Invoice Billing – Hourly	3	0	634	637	95	0	95	732

All prices are in UK£ based on tariffs valid at February 2002

## 17 Business basket A/o, 150 hours peak usage per month

Country	ISP	Package	Connect-ion	Annual subscrip-tion	usage for 150 hours	total ISP	Annual fixed	usage for 150 hours	total PSTN	ISP+ PSTN charges
US – CA	AT&T	Comprehensive Business Plan	0	162	0	162	95	0	95	257
US – CA	Qwest	Internet Access	0	162	0	162	95	0	95	257
US – CA	EarthLink	Professional Dialup	6	162	0	168	95	0	95	263
US – CA	EarthLink	EarthLink Unlimited	6	178	0	184	95	0	95	279
Germany	Arcor	Arcor DSL – Flatrate 128	5	275	0	281	0	0	0	281
US – CA	AT&T	Premium Business Plan	0	203	0	203	95	0	95	298
US – CA	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	95	0	95	298
US – CA	EarthLink	EarthLink The Works	0	219	0	219	95	0	95	314
Germany	Arcor	Arcor DSL – Flatrate 768	5	313	0	318	0	0	0	318
US – CA	Qwest	Office Works- Small Business	0	227	0	227	95	0	95	322
Germany	T-Online	Business online	35	290	0	324	0	0	0	324
UK	BT	BT Connect Lite from openworld – Unmetered access	0	180	0	180	170	0	170	350
US – Ohio	AT&T	Comprehensive Business Plan	0	162	0	162	206	0	206	368
US – Ohio	Qwest	Internet Access	0	162	0	162	206	0	206	368
US – Ohio	EarthLink	Professional Dialup	6	162	0	168	206	0	206	373
US – Ohio	EarthLink	EarthLink Unlimited	6	178	0	184	206	0	206	390
US – Ohio	AT&T	Premium Business Plan	0	203	0	203	206	0	206	408
US – Ohio	AT&T	Easy Invoice Billing – 5-24 users	0	203	0	203	206	0	206	408
US – Ohio	EarthLink	EarthLink The Works	0	219	0	219	206	0	206	425
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	27	404	0	431	0	0	0	431
US – Ohio	Qwest	Office Works- Small Business	0	227	0	227	206	0	206	433
US – Ohio	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Southwestern Bell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
US – CA	Pacbell	Basic DSL Internet Service	34	406	0	439	0	0	0	439
UK	BT	BT Connect Anytime	0	336	0	336	170	0	170	505
Germany	KKF	Professional DSL Volume 192K	93	413	0	506	0	0	0	506
UK	Freeserve	FreeservePlus Home 512K (Single Pc)	50	459	0	509	0	0	0	509
US – Ohio	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
US – CA	Qwest	DSL Pro Deluxe	67	447	0	514	0	0	0	514
UK	BT	Business 500	50	480	0	530	0	0	0	530
UK	Pipex	Pipex Xtreme Home Office – Self Install	53	479	0	533	0	0	0	533
US – Ohio	Ohio Ameritech	SpeedPath 768 Office	142	406	0	548	0	0	0	548
UK	Demon	Premier Connect Plus+SurfTime A/T	0	204	0	204	374	0	374	578
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	50	540	0	590	0	0	0	590
UK	Pipex	Pipex Xtreme Home Office – Managed	53	540	0	593	0	0	0	593
Germany	NGI	NGI SDSL 192 Volume Rate	156	438	0	594	0	0	0	594
US – Ohio	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Qwest	DSL Pro, 640	67	536	0	603	0	0	0	603
US – CA	Verizon	Up to 768/128	36	568	0	604	0	0	0	604
UK	Iomart	CopperBurst 500 Lite	91	540	0	631	0	0	0	631
US – Ohio	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	113	528	0	640	0	0	0	640
US – CA	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	113	528	0	640	0	0	0	640
US – CA	Pacbell	Enhanced DSL Internet Access 384-1500/128	113	528	0	640	0	0	0	640
US – Ohio	Ohio Ameritech	SpeedPath 768 OfficePlus	142	528	0	669	0	0	0	669
US – CA	Pacbell	Enhanced DSL Internet Access – Special Router Promotion	79	609	0	688	0	0	0	688
Germany	Arcor	Arcor Online Power	0	85	550	634	98	0	98	733
US – Ohio	Covad	Telesoho 1500/384	59	682	0	741	0	0	0	741
US – CA	Covad	Telesoho 1500/384	59	689	0	748	0	0	0	748
Germany	QSC	Q-DSL Office	40	719	0	759	0	0	0	759
US – CA	Verizon	Up to 1.5/128	36	731	0	767	0	0	0	767
US – Ohio	Qwest	DSL Pro, 1M	67	715	0	782	0	0	0	782
US – CA	Qwest	DSL Pro, 1M	67	715	0	782	0	0	0	782
Sweden	Telia	Telia Bredband Foretag -1.0 Mbits	27	809	0	835	0	0	0	835
US – Ohio	Qwest	Business Class DSL 256	56	804	0	861	0	0	0	861
US – CA	Qwest	Business Class DSL 256	56	804	0	861	0	0	0	861
Germany	Claranet	sDSL 144	35	834	0	869	0	0	0	869
Germany	PrimaCom	Easy_Business	12	876	0	888	0	0	0	888
Germany	QSC	DSL Business 1	70	834	0	904	0	0	0	904
Germany	QSC	DSL Business 2	70	834	0	904	0	0	0	904
US – Ohio	AT&T	Single User DSL – 144/144	102	812	0	914	0	0	0	914
US – CA	AT&T	Single User DSL – 144/144	102	812	0	914	0	0	0	914
Germany	KKF	Professional DSL Volume 384K	93	834	0	928	0	0	0	928
Germany	KKF	Professional DSL Flatrate 192K	93	834	0	928	0	0	0	928
US – Ohio	Speak Easy	NetCommuter 144K	132	812	0	944	0	0	0	944
US – Ohio	Speak Easy	NetCommuter 192K	132	812	0	944	0	0	0	944
US – CA	Speak Easy	NetCommuter 144K	132	812	0	944	0	0	0	944
US – CA	Speak Easy	NetCommuter 192K	132	812	0	944	0	0	0	944
US – Ohio	Southwestern Bell	Symmetric DSL Internet 144K	131	853	0	983	0	0	0	983

All prices are in UK£ based on tariffs valid at February 2002

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## Annex C

### Detailed results for DSL and cable modem services

C.1 The following tables show the detailed results for packages included in the study for each basket. Results for the top 70 packages only are displayed. Costs are shown per month.

## Broadband, Residential

Country	ISP	Package	DSL/ cable modem	fixed monthly charge	monthly usage charge	total monthly charges	downstream capacity	upstream capacity	GM capacity
Sweden	Tele2	Tele2Internet Kabel	CM	21	0	21	512	64	181
Sweden	UPC	Chello	CM	21	0	21	512	128	256
US	Qwest	DSL 256	DSL	22	0	22	256	256	256
Germany	PrimaCom	_easy	CM	22	0	22	256	128	181
Sweden	Telia	(Comhem) High speed internet IC 500	CM	22	0	22	512	128	256
Sweden	Spray	ADSL Broadband	DSL	23	0	23	512	512	512
Sweden	UPC	Chello Plus	CM	24	0	24	768	128	314
Sweden	Telia	Telia ADSL Broadband	DSL	25	0	25	512	512	512
Sweden	Telenordia	Telenordia ADSL Bredband	DSL	25	0	25	512	512	512
UK	Telewest	Blueyonder Broadband Internet	CM	26	0	26	512	128	256
UK	NTL	Hi-speed Option 1	CM	27	0	27	512	128	256
Sweden	Telia	(Comhem) High speed internet IC 1000	CM	29	0	29	1000	200	447
US	Qwest	DSL Deluxe	DSL	29	0	29	640	256	405
US	MSN	DSL	DSL	31	0	31	256	256	256
Germany	AOL.de	AOL High Speed DSL Flat	DSL	31	0	31	768	128	314
Germany	PrimaCom	_pro	CM	32	0	32	1024	256	512
UK	Pipex	Pipex Xtreme Solo	DSL	33	0	33	512	256	362
US	Comcast	High Speed Internet Service	CM	33	0	33	1500	128	438
Germany	Arcor	Arcor DSL – Flatrate 768	DSL	33	0	33	768	128	314
France	Club Internet	Pack Modem Haut Debit	DSL	35	0	35	512	128	256
US	Road Runner	Residential Service	CM	35	0	35	1750	768	1159
Germany	AOL.de	AOL High Speed DSL Flat	DSL	35	0	35	1500	192	537
France	Liberty Surf	Pack ADSL Tiscali Liberty Surf	DSL	35	0	35	512	128	256
France	Wanadoo	Wanadoo ADSL (Xtense500)	DSL	35	0	35	512	128	256
Germany	T-Online	T-Online DSL Flat	DSL	35	0	35	768	128	314
US	Qwest	MSN Broadband Powered by Qwest 256	DSL	35	0	35	256	256	256
Germany	Tiscali – de	Tiscali DSL 500	DSL	24	13	37	768	128	314
Germany	Tiscali – de	Tiscali DSL time100	DSL	28	10	38	768	128	314
France	AOL.fr	AOL ADSL	DSL	38	0	38	512	128	256
France	Noos	Noosnet Forfait Rapido	CM	38	0	38	512	128	256
US	Covad	TeleSurfer	DSL	38	0	38	608	128	279
US	MSN	DSL Gold	DSL	38	0	38	640	256	405
US	EarthLink	EarthLink High Speed Internet	CM	38	0	38	2000	384	876
US	Southwestern	Basic DSL Internet Service	DSL	39	0	39	942	128	347
US	Pacbell	Basic DSL Internet Service	DSL	39	0	39	942	128	347
US	AOL.us	High Speed DSL	DSL	40	0	40	1400	1400	1400
US	Speak Easy	Standard EssentialEdge Basic	DSL	41	0	41	608	128	279
US	Verizon	Online DSL Bronze Plus	DSL	41	0	41	768	128	314
France	Club Internet	Forfait Haut Debit ( Net 1)	DSL	42	0	42	512	128	256
Germany	NGI	NGI DSL Flat	DSL	42	0	42	1024	256	512
US	Qwest	MSN Broadband Powered by Qwest	DSL	42	0	42	640	256	405
US	EarthLink	EarthLink DSL	DSL	42	0	42	1500	128	438
Germany	QSC	Q-DSL Home	DSL	43	0	43	1024	256	512
US	Ohio	SpeedPath 768	DSL	43	0	43	768	128	314
Germany	Tiscali – de	Tiscali DSL Flat Plus	DSL	44	0	44	1024	256	512
UK	BT	Home 500	DSL	44	0	44	500	250	354
UK	Tiscali – UK	Tiscali ADSL USB 500	DSL	44	0	44	500	250	354
US	AT&T	Single User ADSL – 608/128	DSL	45	0	45	608	128	279
US	Covad	TeleSurfer Plus	DSL	45	0	45	1500	384	759
UK	Freeserve	Freeserve Broadband	DSL	46	0	46	512	256	362
France	Nerim	Nerim Base	DSL	46	0	46	512	128	256
US	Qwest	DSL Pro Deluxe	DSL	46	0	46	640	256	405
US	Speak Easy	Gamer Rail	DSL	48	0	48	608	128	279
US	Speak Easy	Sys Admin /radsl/usr	DSL	48	0	48	608	128	279
US	Speak Easy	Insider TraderNovice	DSL	48	0	48	608	128	279
US	Speak Easy	Standard NetExpert Basic	DSL	48	0	48	1500	128	438
US	Verizon	Online DSL Enhanced Bronze	DSL	49	0	49	1500	128	438
US	Speak Easy	Standard EssentialEdge Plus	DSL	49	0	49	608	128	279
UK	Freeserve	FreeservePlus Home 512K	DSL	50	0	50	512	256	362
UK	Zen Internet	ZenADSL Home	DSL	52	0	52	512	256	362
UK	NTL	Hi-speed Option 2	CM	52	0	52	512	128	256
UK	Pipex	Pipex Xtreme Home Office – Self Install	DSL	52	0	52	512	256	362
US	EarthLink	EarthLink Home Office DSL	DSL	53	0	53	1500	128	438
US	Qwest	DSL Pro, 640	DSL	54	0	54	640	640	640
UK	Demon	Express	DSL	54	0	54	512	256	362
US	Speak Easy	Gamer Rail 133+	DSL	56	0	56	1500	128	438
US	Speak Easy	Sys Admin /radsl/usr/pro	DSL	56	0	56	1500	128	438
US	Speak Easy	Insider TraderPlus	DSL	56	0	56	1500	128	438
US	Speak Easy	Standard NetExpert Plus	DSL	56	0	56	1500	128	438
Germany	NGI	NGI DSL Pro	DSL	56	0	56	1024	256	512

All prices are in UK£ based on tariffs valid at February 2002

## Broadband, Business – low

Country	ISP	Package	DSL/cable modem	fixed monthly charge	monthly usage charge	total monthly charges	downstream capacity	upstream capacity	GM capacity
Germany	Arcor	Arcor DSL – Flatrate 768	DSL	28	0	28	768	128	314
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	DSL	36	0	36	512	512	512
USA	Southwestern Bell	Basic DSL Internet Service	DSL	37	0	37	942	128	347
USA	Pacbell	Basic DSL Internet Service	DSL	37	0	37	942	128	347
UK	Freeserve	FreeservePlus Home 512K (Single Pc)	DSL	42	0	42	512	256	362
USA	Qwest	DSL Pro Deluxe	DSL	43	0	43	640	256	405
UK	BT	Business 500	DSL	44	0	44	500	250	354
UK	Pipex	Pipex Xtreme Home Office – Self Install	DSL	44	0	44	512	256	362
USA	Ohio Ameritech	SpeedPath 768 Office	DSL	46	0	46	768	128	314
UK	Zen Internet	ZenADSL Single-User USB 512Kbps	DSL	49	0	49	512	256	362
USA	Qwest	DSL Pro, 640	DSL	50	0	50	640	640	640
USA	Verizon	Up to 768/128	DSL	50	0	50	768	128	314
UK	lomart	CopperBurst 500 Lite	DSL	53	0	53	512	250	358
USA	Southwestern Bell	Enhanced DSL Internet Access – 1.5-0.384/0.128	DSL	53	0	53	942	128	347
USA	Pacbell	Enhanced DSL Internet Access 384-1500/128	DSL	53	0	53	942	128	347
USA	Ohio Ameritech	SpeedPath 768 OfficePlus	DSL	56	0	56	768	128	314
USA	Pacbell	Enhanced DSL Internet Access – Special Router Promotion	DSL	57	0	57	942	128	347
USA	Covad	Telesoho 1500/384	DSL	61	0	61	1500	384	759
USA	Verizon	Up to 1.5/128	DSL	64	0	64	1500	128	438
USA	Qwest	DSL Pro, 1M	DSL	65	0	65	1000	1000	1000
Sweden	Telia	Telia Bredband Foretag -1.0 Mbits	DSL	70	0	70	1000	512	716
USA	Qwest	Business Class DSL 256	DSL	72	0	72	256	256	256
Germany	Claranet	sDSL 144 (was Speedway 144)	DSL	72	0	72	144	144	144
Germany	PrimaCom	Easy_Business	CM	74	0	74	512	256	362
Germany	QSC	DSL Business 1	DSL	75	0	75	144	144	144
USA	AT&T	Single User DSL – 144/144	DSL	76	0	76	144	144	144
Germany	KKF	Professional DSL Flatrate 192K	DSL	77	0	77	192	192	192
USA	Speak Easy	NetCommuter 144K	DSL	79	0	79	144	144	144
USA	Speak Easy	NetCommuter 192K	DSL	79	0	79	192	192	192
USA	Southwestern Bell	Symmetric DSL Internet 144K	DSL	82	0	82	144	144	144
USA	Pacbell	Symmetric DSL Internet 144K	DSL	82	0	82	144	144	144
USA	Verizon	Up to 384/384	DSL	84	0	84	384	384	384
Germany	NGI	NGI SDSL 192 Flat Rate	DSL	87	0	87	192	192	192
UK	EasyNet	DSL500	DSL	87	0	87	500	250	354
USA	Southwestern Bell	Symmetric DSL Internet 192K	DSL	89	0	89	192	192	192
USA	Pacbell	Symmetric DSL Internet 192K	DSL	89	0	89	192	192	192
USA	Speak Easy	Multi-Office144K	DSL	92	0	92	144	144	144
USA	Speak Easy	Multi-Office 192K	DSL	92	0	92	192	192	192
UK	Pipex	Pipex Xtreme Business 500 – self install	DSL	93	0	93	512	256	362
USA	Speak Easy	Net Advantage 144K	DSL	96	0	96	144	144	144
USA	Speak Easy	Net Advantage 192K	DSL	96	0	96	192	192	192
USA	EarthLink	Earthlink Biz DSL 144 Kbps	DSL	96	0	96	144	144	144
UK	NTL	500k	DSL	97	0	97	500	256	358
USA	Verizon	Up to 1.5/384	DSL	98	0	98	1500	384	759
USA	Qwest	Business Class DSL 512	DSL	99	0	99	512	512	512
UK	Demon	Express Plus	DSL	102	0	102	512	256	362
UK	Freeserve	FreeservePlus Business 512K (Multiple Pc's)	DSL	102	0	102	512	256	362
USA	EarthLink	Earthlink Biz DSL 192 Kbps	DSL	103	0	103	192	192	192
USA	Covad	Telespeed 144	DSL	104	0	104	144	144	144
USA	Covad	Telespeed 192	DSL	104	0	104	192	192	192
UK	Zen Internet	ZenADSL Office 500	DSL	104	0	104	512	256	362
Germany	PrimaCom	Pro_Business	CM	106	0	106	1024	512	724
USA	Southwestern Bell	Symmetric DSL Internet 384K	DSL	106	0	106	384	384	384
USA	Pacbell	Symmetric DSL Internet 384K	DSL	106	0	106	384	384	384
UK	EasyNet	DSL1000	DSL	107	0	107	1000	250	500
UK	BT	Business 500PLUS	DSL	107	0	107	500	250	354
USA	XO	Business DSL 144K	DSL	108	0	108	144	144	144
USA	AT&T	Multi User SDSL – 144/144	DSL	110	0	110	144	144	144
USA	AT&T	Multi User SDSL – 192/192	DSL	110	0	110	192	192	192
UK	Zen Internet	ZenADSL Multi-user 512 Kbps	DSL	112	0	112	512	256	362
USA	Speak Easy	Net Advantage Plus 144K	DSL	113	0	113	144	144	144
USA	Speak Easy	Net Advantage Plus 192K	DSL	113	0	113	192	192	192
USA	Speak Easy	NetCommuter 384K	DSL	113	0	113	384	384	384
USA	Speak Easy	Multi-Office 384K	DSL	113	0	113	384	384	384
Sweden	Telia	Telia Bredband Foretag -2.0 Mbits	DSL	117	0	117	2000	512	1012
France	Nerim	Nerim Pro	DSL	117	0	117	1000	256	506
UK	Telewest	Blueyonder Workwise 500 pro	CM	117	0	117	512	256	362
USA	Qwest	DSL Pro, 4M	DSL	117	0	117	4000	1000	2000
USA	Verizon	Up to 768/768	DSL	118	0	118	768	768	768
USA	Qwest	Business Class DSL 768	DSL	119	0	119	768	768	768

All prices are in UK£ based on tariffs valid at February 2002

## Broadband, Business – medium

Country	ISP	Package	DSL/cable modem	fixed monthly charge	monthly usage charge	total monthly charges	downstream capacity	upstream capacity	GM capacity
Sweden	Telia	Telia Bredband Foretag -0.5 Mbits	DSL	36	0	36	512	512	512
US	Qwest	DSL Pro, 640	DSL	50	0	50	640	640	640
US	Covad	Telesoho 1500/384	DSL	61	0	61	1500	384	759
US	Qwest	DSL Pro, 1M	DSL	65	0	65	1000	1000	1000
Sweden	Telia	Telia Bredband Foretag -1.0 Mbits	DSL	70	0	70	1000	512	716
US	Verizon	Up to 1.5/384	DSL	98	0	98	1500	384	759
US	Qwest	Business Class DSL 512	DSL	99	0	99	512	512	512
Germany	PrimaCom	Pro_Business	CM	106	0	106	1024	512	724
UK	Easynet	DSL1000	DSL	107	0	107	1000	250	500
Sweden	Telia	Telia Bredband Foretag -2.0 Mbits	DSL	117	0	117	2000	512	1012
France	Nerim	Nerim Pro	DSL	117	0	117	1000	256	506
US	Qwest	DSL Pro, 4M	DSL	117	0	117	4000	1000	2000
US	Verizon	Up to 768/768	DSL	118	0	118	768	768	768
US	Qwest	Business Class DSL 768	DSL	119	0	119	768	768	768
France	Wanadoo	Wanadoo ADSL Pro	DSL	123	0	123	1000	256	506
UK	Easynet	DSL2000	DSL	127	0	127	2000	250	707
US	Speak Easy	NetCommuter 768K	DSL	129	0	129	768	768	768
US	Southwestern Bell	Enhanced DSL Internet Access – 1.5-6/0.384	DSL	131	0	131	3750	384	1200
US	Pacbell	Enhanced DSL Internet Access – 1.5-6/384	DSL	131	0	131	3750	384	1200
UK	NTL	1 MB	DSL	132	0	132	1000	256	506
US	Ohio Ameritech	SpeedPath 1500 OfficePlus	DSL	134	0	134	1500	256	620
UK	BT	Business 1000PLUS	DSL	137	0	137	1000	250	500
Germany	NGI	NGI DSL Flat for Business	DSL	137	0	137	1024	256	512
UK	Freemove	FreemovePlus Business 1000K	DSL	142	0	142	1000	256	506
US	XO	Business DSL 528K	DSL	142	0	142	528	528	528
UK	Zen Internet	ZenADSL Office 1000	DSL	144	0	144	1000	256	506
US	Qwest	Business Class DSL 1000/864	DSL	146	0	146	1000	864	930
UK	Telewest	Blueyonder Workwise 1000 pro	CM	147	0	147	1000	256	506
Germany	QSC	Q-DSL Office	DSL	148	0	148	1500	256	620
UK	Zen Internet	ZenADSL Multi-user 1 Mbps	DSL	152	0	152	1000	256	506
US	Southwestern Bell	Symmetric DSL Internet 768K	DSL	160	0	160	768	768	768
UK	lomart	CopperBurst 1000	DSL	160	0	160	1000	250	500
US	Speak Easy	NetCommuter 1100K	DSL	163	0	163	1100	1100	1100
US	Speak Easy	Multi-Office 768K	DSL	167	0	167	768	768	768
UK	BT	Business 2000PLUS	DSL	167	0	167	2000	250	707
UK	Pipex	Pipex Xtreme Business 2000 – self install	DSL	173	0	173	2000	256	716
US	XO	Business DSL 784K	DSL	176	0	176	784	784	784
US	Southwestern Bell	Symmetric DSL Internet 1100K	DSL	177	0	177	1100	1100	1100
UK	Telewest	Blueyonder Workwise 2000 pro	CM	177	0	177	2000	256	716
US	Speak Easy	Net Advantage 768K	DSL	180	0	180	768	768	768
US	Speak Easy	NetCommuter 1500K	DSL	180	0	180	1500	1500	1500
UK	Demon	Express Pro	DSL	182	0	182	2000	256	716
UK	Zen Internet	ZenADSL Office 2000	DSL	184	0	184	2000	256	716
US	AT&T	Multi User SDSL – 768/768	DSL	191	0	191	768	768	768
US	Qwest	DSL Pro, 7M	DSL	192	0	192	7000	1000	2646
UK	Freemove	FreemovePlus Business 2000K	DSL	192	0	192	2000	256	716
UK	Zen Internet	ZenADSL Multi-user 2 Mbps	DSL	192	0	192	2000	256	716
US	Speak Easy	Net Advantage Plus 768K	DSL	197	0	197	768	768	768
US	Speak Easy	Multi-Office 1100K	DSL	197	0	197	1100	1100	1100
UK	lomart	CopperBurst 2000	DSL	201	0	201	2000	250	707
US	EarthLink	Earthlink Biz DSL 768 Kbps	DSL	205	0	205	768	768	768
US	Southwestern Bell	Symmetric DSL Internet 1500K	DSL	207	0	207	1500	1500	1500
US	XO	Business DSL 1.1Mbps	DSL	210	0	210	1100	1100	1100
US	Speak Easy	Net Advantage 1100K	DSL	214	0	214	1100	1100	1100
Germany	T-Online	Business online	DSL	27	189	216	1500	192	537
US	Covad	Telespeed 768	DSL	217	0	217	768	768	768
US	Speak Easy	Net Advantage Plus 1100K	DSL	228	0	228	1100	1100	1100
Germany	KKF	Professional DSL Volume 768K	DSL	115	126	242	768	768	768
US	EarthLink	Earthlink Biz DSL 1.1 Mbps	DSL	245	0	245	1100	1100	1100
US	AT&T	Multi User SDSL – 1100/1100	DSL	245	0	245	1100	1100	1100
US	Speak Easy	Multi-Office 1500K	DSL	248	0	248	1500	1500	1500
US	Covad	Telespeed 1.1	DSL	249	0	249	1100	1100	1100
UK	lomart	CopperSurf 1000	DSL	256	0	256	1000	250	500
Germany	KKF	Professional DSL Volume 1000K	DSL	133	126	259	1000	1000	1000
Germany	NGI	NGI SDSL 768 Volume Rate	DSL	122	138	259	768	768	768
US	XO	Business DSL 1.5Mbps	DSL	264	0	264	1500	1500	1500
US	Covad	Telespeed 1.5	DSL	274	0	274	1500	1500	1500
US	XO	Business DSL 2.3Mbps	DSL	278	0	278	2300	2300	2300
US	EarthLink	Earthlink Biz DSL 1.5 Mbps	DSL	279	0	279	1500	1500	1500
US	AT&T	Multi User SDSL – 1500/1500	DSL	279	0	279	1500	1500	1500

All prices are in UK£ based on tariffs valid at February 2002



## Broadband, Business – high

Country	ISP	Package	DSL/cable modem	fixed monthly charge	monthly usage charge	total monthly charges	downstream capacity	upstream capacity	GM capacity
USA	Qwest	DSL Pro, 1M	DSL	65	0	65	1000	1000	1000
Sweden	Telia	Telia Bredband Foretag -2.0 Mbits	DSL	117	0	117	2000	512	1012
USA	Qwest	DSL Pro, 4M	DSL	117	0	117	4000	1000	2000
USA	Southwestern Bell	Enhanced DSL Internet Access – 1.5-6/0.384	DSL	131	0	131	3750	384	1200
USA	Pacbell	Enhanced DSL Internet Access – 1.5-6/384	DSL	131	0	131	3750	384	1200
USA	Speak Easy	NetCommuter 1100K	DSL	163	0	163	1100	1100	1100
USA	Southwestern Bell	Symmetric DSL Internet 1100K	DSL	177	0	177	1100	1100	1100
USA	Speak Easy	NetCommuter 1500K	DSL	180	0	180	1500	1500	1500
USA	Qwest	DSL Pro, 7M	DSL	192	0	192	7000	1000	2646
USA	Speak Easy	Multi-Office 1100K	DSL	197	0	197	1100	1100	1100
USA	Southwestern Bell	Symmetric DSL Internet 1500K	DSL	207	0	207	1500	1500	1500
USA	XO	Business DSL 1.1Mbps	DSL	210	0	210	1100	1100	1100
USA	Speak Easy	Net Advantage 1100K	DSL	214	0	214	1100	1100	1100
USA	Speak Easy	Net Advantage Plus 1100K	DSL	228	0	228	1100	1100	1100
USA	EarthLink	Earthlink Biz DSL 1.1 Mbps	DSL	245	0	245	1100	1100	1100
USA	AT&T	Multi User SDSL – 1100/1100	DSL	245	0	245	1100	1100	1100
USA	Speak Easy	Multi-Office 1500K	DSL	248	0	248	1500	1500	1500
USA	Covad	Telespeed 1.1	DSL	249	0	249	1100	1100	1100
USA	XO	Business DSL 1.5Mbps	DSL	264	0	264	1500	1500	1500
USA	Covad	Telespeed 1.5	DSL	274	0	274	1500	1500	1500
USA	XO	Business DSL 2.3Mbps	DSL	278	0	278	2300	2300	2300
USA	EarthLink	Earthlink Biz DSL 1.5 Mbps	DSL	279	0	279	1500	1500	1500
USA	AT&T	Multi User SDSL – 1500/1500	DSL	279	0	279	1500	1500	1500
USA	Speak Easy	Net Advantage 1500K	DSL	282	0	282	1500	1500	1500
USA	Speak Easy	Net Advantage Plus 1500K	DSL	282	0	282	1500	1500	1500
Germany	KKF	Professional DSL Volume 1000K	DSL	133	225	358	1000	1000	1000
Germany	KKF	Professional DSL Volume 1500K	DSL	157	225	382	1500	1500	1500
Germany	NGI	NGI SDSL 1000 Volume Rate	DSL	143	258	401	1000	1000	1000
Germany	KKF	Professional DSL Volume 2000K	DSL	193	225	417	2000	2000	2000
Germany	NGI	NGI SDSL 1500 Volume Rate	DSL	162	258	420	1500	1500	1500
Germany	KKF	Professional DSL Flatrate 1000K	DSL	428	0	428	1000	1000	1000
Germany	NGI	NGI SDSL 1000 Flat Rate	DSL	440	0	440	1000	1000	1000
Germany	NGI	NGI SDSL 2000 Volume Rate	DSL	198	258	456	2000	2000	2000
Germany	WorldCom	Worldcom Internet DSL Office 1024	DSL	490	0	490	1024	1024	1024
Germany	Claranet	sDSL 2300 small business	DSL	356	155	511	2300	2300	2300
USA	Covad	TeleXtend 1500	DSL	516	0	516	1500	1500	1500
Germany	KKF	Professional DSL Flatrate 1500K	DSL	526	0	526	1500	1500	1500
Germany	QSC	DSL Business 10	DSL	222	306	527	1024	1024	1024
Germany	NGI	NGI SDSL 1500 Flat Rate	DSL	531	0	531	1500	1500	1500
Germany	KKF	Professional DSL Flatrate 2000K	DSL	561	0	561	2000	2000	2000
Germany	NGI	NGI SDSL 2000 Flat Rate	DSL	566	0	566	2000	2000	2000
Germany	QSC	DSL Business 20	DSL	292	306	597	2300	2300	2300
Germany	Claranet	sDSL2300	DSL	707	0	707	2300	2300	2300
Germany	WorldCom	Worldcom Internet DSL Office 2300	DSL	764	0	764	2300	2300	2300
Germany	T-Online	T-Interconnect Basic 1.92Mbit/s	DSL	594	258	852	1920	1920	1920
Germany	T-Online	Interconnect 3 – volume rate	DSL	609	252	861	4096	384	1254
Germany	T-Online	Interconnect 4 – volume rate	DSL	715	252	966	6016	576	1862
Germany	T-Online	Interconnect 3 – flat rate	DSL	1066	0	1066	4096	384	1254
Germany	KKF	Professional DSL Flatrate 4000K	DSL	1081	0	1081	4000	4000	4000
Germany	NGI	NGI SDSL 4000 Flat Rate	DSL	1088	0	1088	4000	4000	4000
Germany	T-Online	Interconnect 4 – flat rate	DSL	2049	0	2049	6016	576	1862

All prices are in UK£ based on tariffs valid at February 2002

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## Annex D

### Overview of Wholesale ADSL in France, Germany and the UK

#### France

##### *End user options*

D.1 End users currently have the following range of broadband options available to them:

- ADSL services based on France Telecom's products in combination with a Service Provider (SP) service – there are around 550,000 connections (Q1 2002);
- SDSL services are beginning to be offered to business based on unbundled local loops. The number of connections is still tiny (ART estimate around 650 as at end of May 2002); and
- cable modem services provide around 200,000 connections (end 2001).

D.2 For services based on France Telecom's products, end users have a choice of service providers. However, Wanadoo (France Telecom's Service Provider) has a very large proportion of the market (around 90% of subscriptions).

##### *France Telecom's ADSL products*

D.3 ADSL accounts for the highest number of subscribers having overtaken cable modem mid-2001. France Telecom offers a range of ADSL products as listed below:

- **Ma Ligne ADSL and Ma Ligne ADSL Pro**<sup>21</sup> – these are *retail* services (purchased directly by the end user), installed by France Telecom, which provide access at the DSLAM.
  - Ma Ligne ADSL offers speeds of 512 kbit/s downstream and 128 kbit/s upstream and is aimed at residential users;
  - Ma Ligne ADSL Pro offers 1024 kbit/s downstream and 256 kbit/s upstream and is aimed at business users;

The end user also needs to subscribe to a SP to obtain internet access over DSL, and the SP will need to purchase a transport service ('Collecte IP/ADSL') in order to provide service.
- **IP/ADSL 1 and IP/ADSL 2** – these are self-install, 'resale' (ie *wholesale*) variants of Ma Ligne ADSL and Ma Ligne ADSL Pro respectively. The SP needs to subscribe to Collecte IP/ADSL to provide a service to end users;
- **Collecte IP/ADSL** – this provides *wholesale* transport from the DSLAM to the IP level (and is used by the SP in conjunction with either Ma Ligne ADSL or IP/ADSL). There are two variants:
  - 'regional transport' takes the traffic from the DSLAM to a point within the same region (there are a total of 17 regions). To provide national coverage using this option the SP would need to build out to all 17 regions;

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<sup>21</sup> Previously called 'Netissimo 1 and 2'.

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- ‘national transport’ takes the traffic from the DSLAM to any point in France, allowing national coverage from a single point of presence (PoP). The pricing of both variants includes a volume discount (ie the price per Mbit/s decreases as the total number of Mbit/s purchased increases);
  - Link to PoP – a wholesale link from the IP level to the SP's PoP is offered in conjunction with Collecte IP/ADSL;
  - **ADSL Connect ATM** – this is a *wholesale* product providing end user access to the DSLAM plus transport to the ATM level. Traffic is delivered at one of 41 points (or ‘plaques’). To provide national coverage using this product the SP would need to build out to all 41 plaques.
  - Link to PoP – a wholesale link from the ATM level to the SP's PoP is offered in conjunction with ADSL Connect ATM;
  - **Turbo DSL** – this is a *retail* product providing a leased line equivalent for corporate customers and SP. This is not considered further here.

D.4 ADSL Connect ATM is not yet widely used and nearly all ADSL connections are currently based on the Ma Ligne ADSL plus Collecte IP/ADSL service or the IP/ADSL plus Collecte IP/ADSL service. The second of these options (which is self install) currently accounts for around 85% of new sales.

D.5 For the Collecte IP/ADSL service, France Telecom controls the contention ratio. France Telecom does not publish the contention ratio, but all SPs (including Wanadoo, France Telecom's SP) are treated in the same way regarding this. The ART has assumed a contention ratio of 23:1 for the residential product in its recent comments on France Telecom's new pricing proposals. ADSL Connect ATM allows the SP some flexibility in setting the contention ratio, although there are restrictions on the ratio of end users to capacity in the virtual path through the ATM, which restrict the range of services SPs can provide. The pricing of ADSL Connecte ATM is currently at a level which means it is not competitive with IP/ADSL 1, and hence is unlikely to be an attractive option for providing residential service.

D.6 The IP/ADSL (or Ma Ligne ADSL) plus collecte IP/ADSL service is analogous to BT's IPStream products. To compare costs, assumptions are needed regarding:

- the contention ratio;
- the volume of traffic – as there are volume discounts for Collecte IP/ADSL, assumptions about the number of end users are needed; and
- the mix of regional and national transport for Collecte IP/ADSL – IPStream provides national coverage: to reproduce this in France a SP will buy national transport from 16 regions plus regional transport within the region where the PoP is located (a total of 17 regions). Given the concentration of customers in Paris, the percentage of regional transport may be reasonably substantial. The ART assume 50% of end users are in Paris.

### ***Proposed price changes***

D.7 France Telecom proposed price reductions early in April 2002. Reductions are proposed both for IP/ADSL products and for ADSL Connect ATM. The ART has reviewed these prices and has proposed some changes (see [www.art-telecom.fr/eng/index.htm](http://www.art-telecom.fr/eng/index.htm), ‘High speed Internet: 14 May 2002’ for further information):

- the price fall for IP/ADSL products should not be as great; and
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- the price fall for ADSL Connect ATM should be greater.

D.8 These changes are proposed to ensure that operators using the ADSL Connect ATM products, or using unbundled local loops, can compete against SPs using the IP/ADSL products.

D.9 France Telecom has been asked to respond by the end of May.

D.10 In this report Ofcom has concentrated on the IP/ADSL products as these are the products most widely used. Price comparisons are presented both on the basis of current prices and on the basis of France Telecom's proposals. At the time of writing the report France Telecom's response to ART is not known. The actual price reduction is likely to be somewhat less than that presented here: France Telecom have proposed a 30% decrease, while ART have proposed that the decrease should be 25%.

D.11 As well as price changes, there have been changes proposed to the structure and new products have been introduced. Collecte IP/ADSL previously had 2 variants: regional transport and national transport. This has now largely been replaced by an offer allowing transport from any point in the mainland to the SP's PoP (similar to the previous national transport, except that overseas departments are no longer included in the offer). There is a separate offer for overseas departments that is not considered here.

D.12 France Telecom has also proposed a new offer which allows access directly to the Internet. This appears to be analogous to the BT Central Plus product.

### ***Issues***

D.13 The following issues have arisen in France:

- IP/ADSL Collecte has volume discounts. As Wanadoo is by far the largest provider of ADSL this means that France Telecom's subsidiary is paying less than other SPs. The impact of volume discounts is, however, reduced under the new price proposals;
- the relative pricing of ADSL Connect ATM is such that it does not allow an operator to compete against the IP/ADSL products. The proposed new prices do not address this issue; and
- the European Commission is currently investigating whether Wanadoo is pricing below cost.

### **Germany**

#### ***End user options***

D.14 End users currently have the following range of broadband options available to them:

- ADSL services based on Deutsche Telekom's products in combination with a Service Provider (SP) service – there are around 2,300,000 connections (Q1 2002);
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- SDSL and ADSL services are offered mainly to business based on unbundled local loops or own build. The number of connections is around 70,000 (Q1 2002); and
- cable modem services provide around 30,000 connections (end 2001). There is limited coverage.

D.15 For ADSL services based on Deutsche Telekom's products, end users have a choice of SP. However, T-Online (Deutsche Telekom's SP) has around 87% of these subscriptions.

### ***Deutsche Telekom's ADSL products***

D.16 ADSL services based on Deutsche Telekom's products provide the vast majority of broadband connections. Deutsche Telekom offers the following products:

- **T-DSL** – this is a *retail* ADSL service (purchased directly by the end user), which provides access at the IP level with bandwidth 768 kbit/s downstream and 128 kbit/s upstream. The end user also needs to subscribe to a SP to obtain internet access over DSL. Traffic is delivered to one of 74 points in the country and the SP can purchase a transport service from Deutsche Telekom in order to provide national coverage.
- A *resale* (ie wholesale) version of T-DSL has been proposed but has not yet been agreed; and
- **TIC, TICOC DSL, ISP-Gate, T-ZISP** – Deutsche Telekom offers a range of *wholesale* products which offer backhaul from the IP level (one of 74 points) to the SPs PoP combining use of Deutsche Telekom's Internet platform. It has not been possible to obtain full details or pricing information for these products. TICOC DSL is currently the most utilised variant of these. This is a broadband variant of an existing narrowband product. There is a charge per Gigabyte of traffic and volume discounts apply. A report by Enders Analysis<sup>22</sup> suggests that the charge is around €5 per Gigabyte and that the average data volume is 3Gbyte per month. Company information suggests the range of charges is relatively wide.

D.17 Full details of the wholesale services and prices are not available. The services appear to provide the following functionality:

- T-ZISP and ISP-Gate provide access from one of 74 IP points to the SP PoP. They differ in that the latter includes use of Deutsche Telekom's IP platform. To construct something analogous to BT's IPStream plus BT Central product, would involve including an ISP-Gate product; and
- TICOC DSL provides access from one of 74 IP points directly to the Internet. To construct something analogous to BT's IPStream plus BT Central Plus product, would involve including a TICOC product.

D.18 An end user needs to purchase a SP service in conjunction with T-DSL. This can be purchased from a number of SP's including T-Online. T-Online offers a range of products including:

- flat rate DSL access;
- pay per minute; and

<sup>22</sup> *Broadband Europe*, published January 2002 by Enders Analysis.

- bundled packages offering a fixed number of hours use with per minute charges applying outside the included time.

D.19 This differs from the DSL products available in most countries which tend to be flat rate only. The flat rate package accounts for approximately 50% of T-Online's subscriptions. The flat rate product is more closely comparable to UK and French products and is the product considered in the retail price comparisons.

D.20 An end user also has a choice of taking DSL over a PSTN or ISDN line. The prices for this vary, with DSL over PSTN substantially more expensive than DSL over ISDN. Further reductions are available if the end user subscribes to an ISDN package (rather than the standard tariff). This appears to be a pricing strategy for Deutsche Telekom, rather than being justified by any cost differences. In practice, the majority of end users are taking DSL over ISDN (eg as reported by Enders).

D.21 The very different structure of DSL products in Germany makes price comparisons difficult:

- T-DSL is a retail, not a wholesale product;
- T-DSL provides access at one of 74 IP points, compared to IPStream which provides national coverage at the IP level or Datastream which provides local, regional or national coverage but at the ATM level; and
- Deutsche Telekom does not provide information on the contention ratio – any comparisons presented are based on the assumption that the contention ratio is not dissimilar to the 50:1 provided by IPStream. If this is not the case this could significantly impact the comparisons.

### ***Issues***

D.22 The following issues have arisen in Germany:

- there is no wholesale version of T-DSL – Deutsche Telekom was told in March 2001 to provide this, but there is still no agreed product;
- there have been concerns that T-DSL is priced below cost, particularly when combined with an ISDN package. Deutsche Telekom has implemented some price changes to address this concern, however, the price in conjunction with an ISDN package remains low;
- Deutsche Telekom's wholesale products include volume discounts. As T-Online is by far the largest provider of ADSL this means that Deutsche Telekom's subsidiary is paying less than other SPs;
- prices for wholesale products are not publicly available; and
- a request for interconnection at the ATM level has been refused on technical grounds.

## **UK**

### ***End user options***

D.23 End users currently have the following range of broadband options available to them:

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- ADSL services based on BT's products in combination with a Service Provider (SP) service – there are around 200,000 connections (Apr 2002);
- services based on unbundled local loops are just starting to be offered commercially (there are services provided over around 300 loops);
- cable modem services provide around 328,000 connections (beginning of May 2002); and
- ADSL is also offered by Kingston in the Hull area (around 10,000 connections – not considered further here).

D.24 For services based on BT's products, end users have a choice of service providers. Oftel estimates that BT Openworld has around 50% of subscribers.

### ***BT's ADSL products***

D.25 BT offers a range of ADSL products as listed below:

- **IPStream** – this is a *wholesale* product. IPStream provides a service per end user which includes: customer access to DSLAM, use of BT's ATM network and use of BT's IP network. The service provides national coverage. A link between BT's IP network and the operator/SPs point of presence also needs to be purchased ('**BT Central**'). The service is available in a number of variants:
  - IPStream Home – downstream capacity 500, upstream capacity 250, contention ratio 50:1
  - IPStream Office 500 – downstream capacity 500 kbit/s, upstream capacity 250 kbit/s, contention ratio 20:1
  - IPStream Office 1000 – downstream capacity 1000 kbit/s, upstream capacity 250 kbit/s, contention ratio 20:1
  - IPStream Office 2000 – downstream capacity 2000, upstream capacity 250, contention ratio 20:1.
- **Datastream** – this is a *wholesale* product. There are 3 key elements to Datastream:
  - a service per end user which includes customer access to the DSLAM (this has a number of variants with capacities as for IPStream);
  - a virtual path through BT's ATM network – the cost of this varies with the distance; and
  - a link between BT's ATM network and the operator/SPs point of presence. The operator must buy some combination of the first 2 elements (ie customer access cannot be provided without at least one virtual path being bought from that DSLAM). However the relationship between the number of end users at a DSLAM and the amount of capacity (in 4M chunks) from that DSLAM is a choice for the operator – ie the operator can control the contention ratio.
- **Videostream** – this is a *wholesale* product. It allows the SP to provide video on demand services;
- **BT Central Plus** – this is a *wholesale* product. It differs from BT Central in that the final connection is to the Internet rather than to the SP PoP; and
- **BT Broadband** – this is a *retail* product based on the wholesale IPStream + BT Central Plus products, which are available to all SPs on the same terms and conditions. This will be offered later in the year (this is the only retail

product offered directly by BT – other retail products are offered by BT's ISP, BT Openworld).

D.26 Currently the vast majority of ADSL connections are based on the IPStream products and this is used as the basis for the main comparisons.

### ***Issues***

D.27 The following issues have arisen in the UK:

- there have been concerns from LLU operators that BT wholesale products are priced below cost – Oftel has stated that it believes the prices to be above cost;
  - there have been concerns regarding a margin squeeze by BT Openworld – Oftel has stated that (based on the new BT prices) there is no margin squeeze; and
  - there has been a request for ATM interconnection – Oftel has still to make a determination in this case.
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## **Annex E**

### **Further details of comparisons made for wholesale ADSL**

E.1 Table E.1 provides further details on the comparisons and the assumptions made. This is followed by a network diagrams illustrating the products available in the different countries. Note, the table looks at the price comparisons for IPStream products. While in principle a comparison can be made between Datastream and ADSL Connect ATM (in France), given the current issues regarding the pricing and structure of the latter product, this is not useful at this stage.

E.2 Exchange rate from Euro to £ of 0.62 has been used with adjustments for PPP (factor 1.14 for both France and Germany).

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**Table E.1 Price comparisons for IP handover – based on existing prices in France**

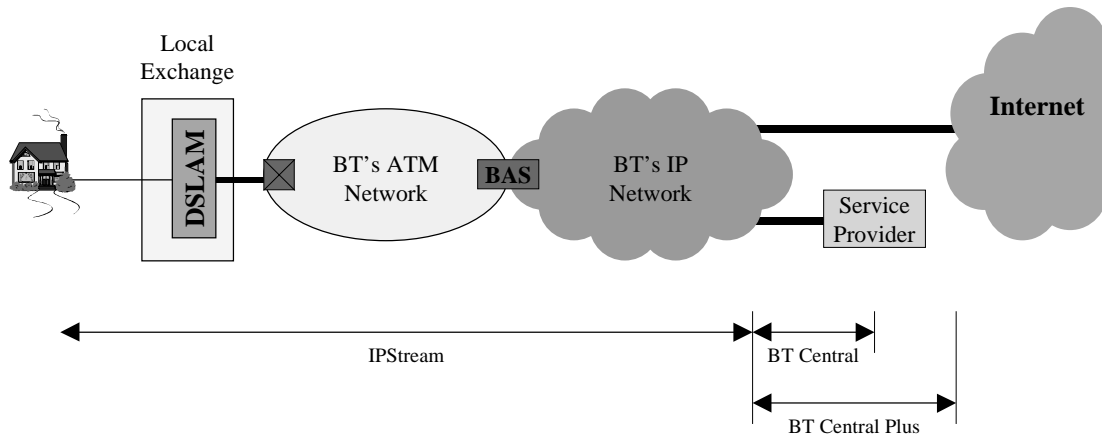
Description of product	UK	France	Germany	Comments
End user access to DSLAM	Datastream end user access	IP/ADSL (resale version of Ma Ligne ADSL) 2 versions: 1: 512/128 kbit/s 2: 1024/256 kbit/s	No equivalent	Product needs to be bought in conjunction with a virtual path from DSLAM to ATM/IP.
Cost	£9.25	€21.34 = £15 for IP/ADSL 1 €77.75 = £55 for IP/ADSL 2		UK price cheaper. French prices are much higher for the higher bandwidth variant.
Transport from DSLAM to IP layer	IPStream (home) with datastream end user access subtracted	Collecte IP/ADSL. There are regional and national charges both of which have volume discounts	No equivalent	IPStream is nationwide. Collecte IP/ADSL has regional/national elements
Cost	Res = £5.5 (ie £14.75 – £9.25) Bus (IPStream office 1000) = £50.75 (ie £60-£9.25)	See below for assumptions. For res customer = £11 Range for bus = £22-£41		For the res product, French prices are higher (based on ART estimate). For the bus product UK prices seem higher (based on OfTel estimate).
End user to IP layer	IPStream (home)	IP/ADSL+ Collecte IP/ADSL	Nearest equivalent is T-DSL	T-DSL is not really comparable: It is a retail product (implies higher price than resale). Traffic is presented at the IP layer, but there is no national coverage
Cost	Res – £14.75 Bus – £60	Res-£26. Bus – £77 – £96	T-DSL costs €8.6 excl VAT = £6.0 with an	UK cheaper than France. Taking T-DSL over a PSTN line is

Description of product	UK	France	Germany	Comments
IP to SP	BT Central	SP link	TICOC (note product not comparable to in UK/France)	a bit cheaper than IPStream (to compare costs requires adjustment for resale against additional transport required). Taking T-DSL over ISDN is cheaper than UK – and majority of people do this.
Cost	Approx £0.22 for res, £1.08 for bus	Approx £0.70 for res, £3.4 for bus	Approx £4.2 for a high volume SP	German product not comparable (provides much greater transport).
Total cost for end to end product	Res – £14.97 Bus – £61.08	Res – £27 Bus – £80 – £99	Over PSTN – £16 With ISDN package £10	UK cheaper than France. German products with ISDN package cheaper than elsewhere, over PSTN lower end of range comparable to UK – but results depend on assumptions used.

Modelling assumptions used for French pricing:

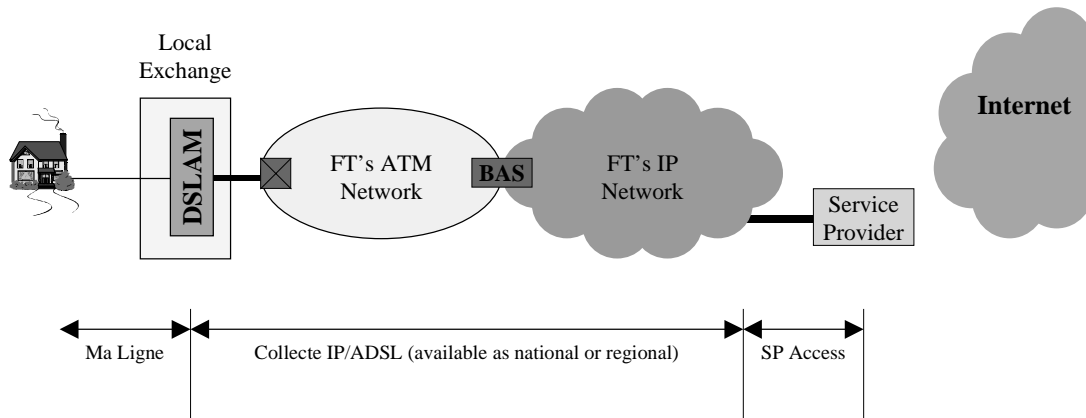
- ART estimates used for residential product (contention ratio 23:1; SP with 20,000 end users, 50% of end user in Paris);
- Contention ratio 20:1 for business is used
- 50% of customers are assumed to be in Paris where the SP PoP is located (so 50% of transport is assumed to be regional with the rest national, consistent with ART assumption). Under the new proposals the structure has changed. OfTel has assumed 100% of consumers in mainland France and 0 % in overseas departments.
- A 300Mbit/s link to the SP is assumed. The length has been taken to be 30km. It is further assumed that this is fully utilised.
- Connection charges have not been taken into account .

**Figure E.1 BT's IP Based DSL Products**



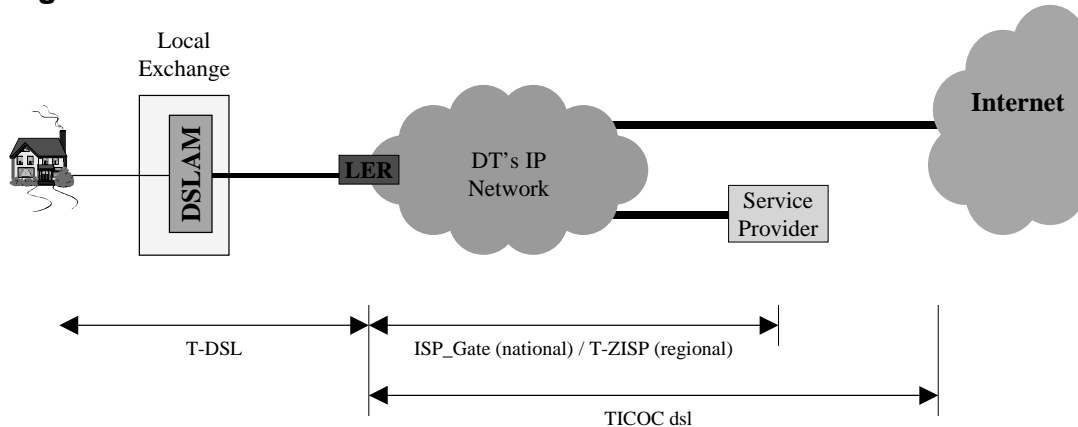
BAS = Broadband Access Server  
 IPStream includes national conveyance, i.e. only one 'Central' link is required to achieve national coverage

**Figure E.2: France Telecom's IP Based DSL Products**



BAS = Broadband Access Server  
 The regional version of Collecte IP/ADSL consists of 17 areas, i.e. 17 connections are required to achieve national coverage

**Figure E.3: Deutsche Telecom's IP Based DSL Products**



LER = Label Edge Router  
 There are 74 LERs and a separate T-ZISP is required at each one to achieve national coverage

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## Glossary

**ADSL:** Asymmetric Digital Subscriber Line (ADSL) technology transforms a normal telephone line into a high-speed digital line that enables access to telephony services and the Internet at the same time. ADSL provides always-on, always-available access to the Internet at speeds that are 10 to 40 times faster than a standard 56k modem.

**ATM network:** network using Asynchronous Transfer Mode technology.

**Bandwidth:** the physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz) and in digital systems in binary bits per second. (bit/s).

**Broadband:** Most people connect to the Internet over a phone line, typically using a modem with a maximum speed of 28.8 or 56 kilobits per second. This 'narrowband' communication requires users to wait while a dial up connection is made before they can access the Internet. Broadband services offer significantly faster data rates, enabling the delivery of services such as high speed Internet access and video on demand.

**Contention ratio:** The ratio of the potential maximum demand to the actual bandwidth. The higher the contention ratio, the greater the number of users that may be trying to use the actual bandwidth at any one time and, therefore, the lower the effective bandwidth offered, especially at peak times.

**DSLAM:** Digital Subscriber Line Access Multiplexer. Located in the co-location space of an Operator at an exchange site. It is composed of a multiplex and the DSL modems necessary to operate DSL services over the loops served by the Operator from the exchange.

**DSL technology:** Digital subscriber line technology. A family of technologies generically referred to as DSL, or xDSL, capable of transforming ordinary phone lines (twisted copper pairs) into high speed digital lines, capable of supporting advanced services such as fast internet access and video on demand. ADSL (Asymmetrical Digital Subscriber Line), HDSL (High data rate Digital Subscriber line) and VDSL (Very high data rate Digital Subscriber Line) are all variants of xDSL.

**IP – Internet Protocol:** packet data protocol used for routing and carriage of messages across the internet.

**ISP – Internet Service Provider:** A company that provides individuals and other companies with access to the Internet and other related services.

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**Local loop:** the access network connection between the customer's premises and the local PSTN exchange, usually a loop comprised by two copper wires.

**Local loop unbundling (LLU):** The process where the incumbent operator makes its local network (the connection between the customer's premises and the local exchange) available to other companies. The customer is then able to choose another supplier other than the incumbent to provide services.

**Mbit/s:** Mega (million) bits per second. A measure of speed of transfer of digital information.

**Point of Presence (PoP):** Point on SP network

**Service provider:** Provider of telecommunication services, or services with a telecommunication service component, to third parties.

**Virtual Paths (VPs):** an established path from the DSLAM through the network to the point of connection.

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