



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 26.11.2001
SEC(2001) 1922

COMMISSION STAFF WORKING PAPER

ANNEXES TO THE

Seventh report on the implementation of the telecommunications regulatory package

{COM(2001)706}

TABLE OF CONTENTS

ANNEX 1 TELECOMMUNICATIONS MARKET DATA.....	1
1.1 SIZE AND GROWTH OF EU TELECOMMUNICATIONS MARKET	1
1.2 VOICE TELEPHONY SERVICES	7
1.3 TARIFFS.....	17
1.4 LEASED LINES.....	37
1.5 MOBILE SERVICES.....	53
1.6 INTERNET.....	63
ANNEX 2 REGULATORY DATA, INCLUDING IMPLEMENTATION OF THE TV SIGNALS DIRECTIVE.....	71
2.1 LOCAL ACCESS	71
2.2 INTERCONNECTION.....	79
2.3 IMPLEMENTATION OF DIRECTIVE 95/47/EC (THE TV SIGNALS DIRECTIVE)	85
2.4 REGULATORY ISSUES: SUPPLEMENTARY DATA.....	105
2.5 APPENDIX: EURO EXCHANGE RATES	119
ANNEX 3 OVERVIEW OF IMPLEMENTATION IN THE MEMBERS STATES.....	123
3.1 BELGIUM.....	123
3.2 DENMARK.....	132
3.3 GERMANY.....	146
3.4 GREECE.....	161
3.5 SPAIN.....	170
3.6 FRANCE.....	187
3.7 IRELAND	200
3.8 ITALY.....	212
3.9 LUXEMBOURG	226
3.10 THE NETHERLANDS	235
3.11 AUSTRIA	247
3.12 PORTUGAL.....	260
3.13 FINLAND	271
3.14 SWEDEN.....	285
3.15 UNITED KINGDOM	299
ANNEX 4 LIST OF OPERATORS, ASSOCIATIONS AND ORGANISATIONS INVOLVED IN THE PREPARATION AND HEARINGS FOR THE SEVENTH REPORT	317

Annex 1

Telecommunications market data

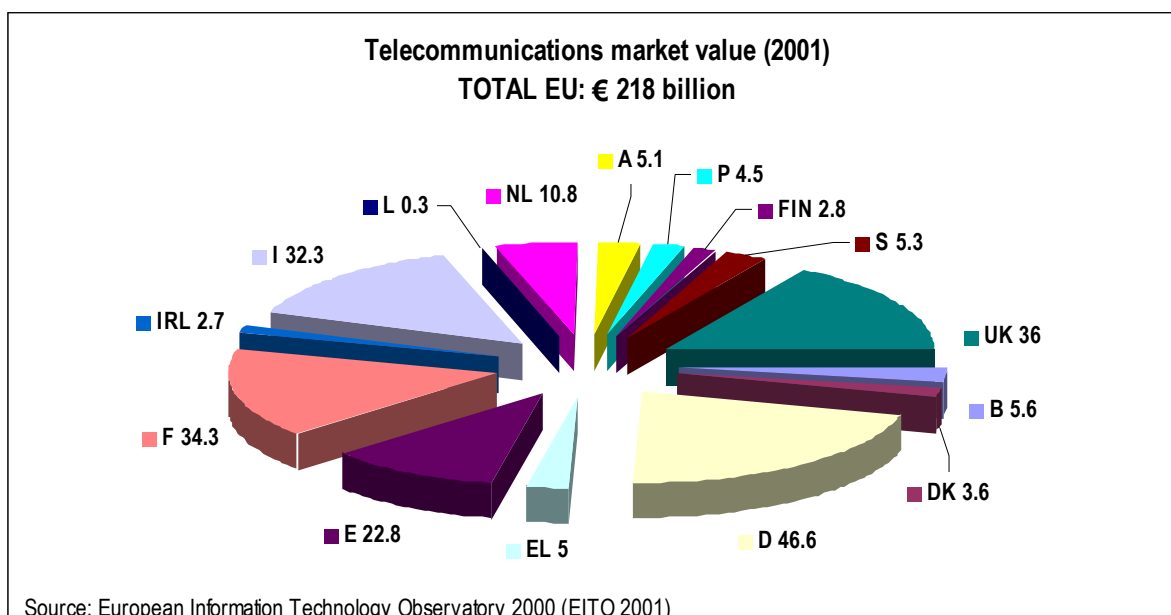
1.1 SIZE AND GROWTH OF EU TELECOMMUNICATIONS MARKET

This section provides estimates of the value of the EU telecommunications market and its breakdown into main segments (voice telephony, mobile services, switched data and leased line services).

Figures referring to 2001 are generally forecasts. Actual values calculated *ex post* might differ from those provided here.

Estimates of growth and penetration rates of mobile services and internet are provided in the sections on “Mobile services” and “Internet” respectively.

Chart 1

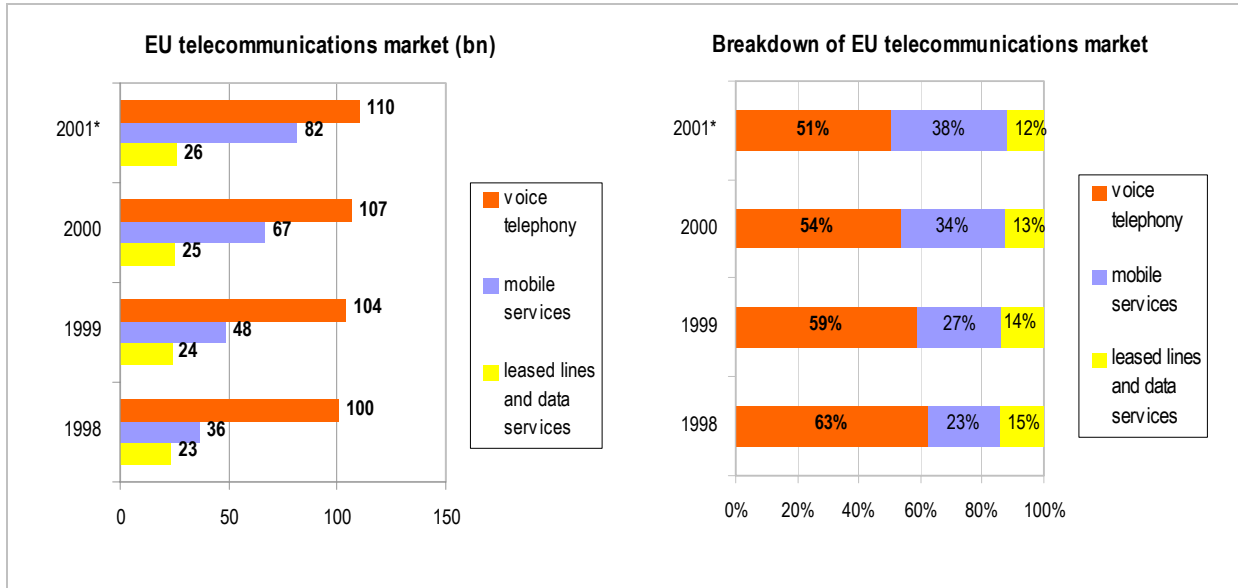


Estimates of 2001 revenues for public voice telephony (including home and business internet dial-up access), network (switched data and leased lines) and mobile telephone services.

EITO provides a combined estimate for Belgium and Luxembourg. The figures given in this and the following charts are estimates based on the relative numbers of fixed lines and mobile subscribers in each of the two countries.

Chart 2

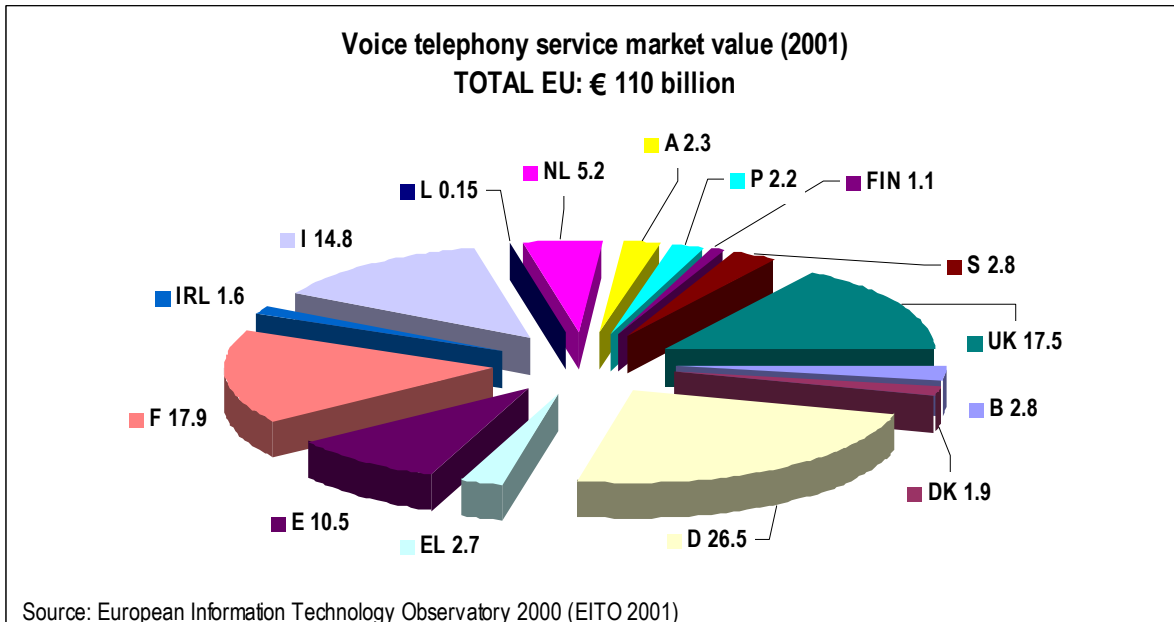
Chart 3



* Estimates

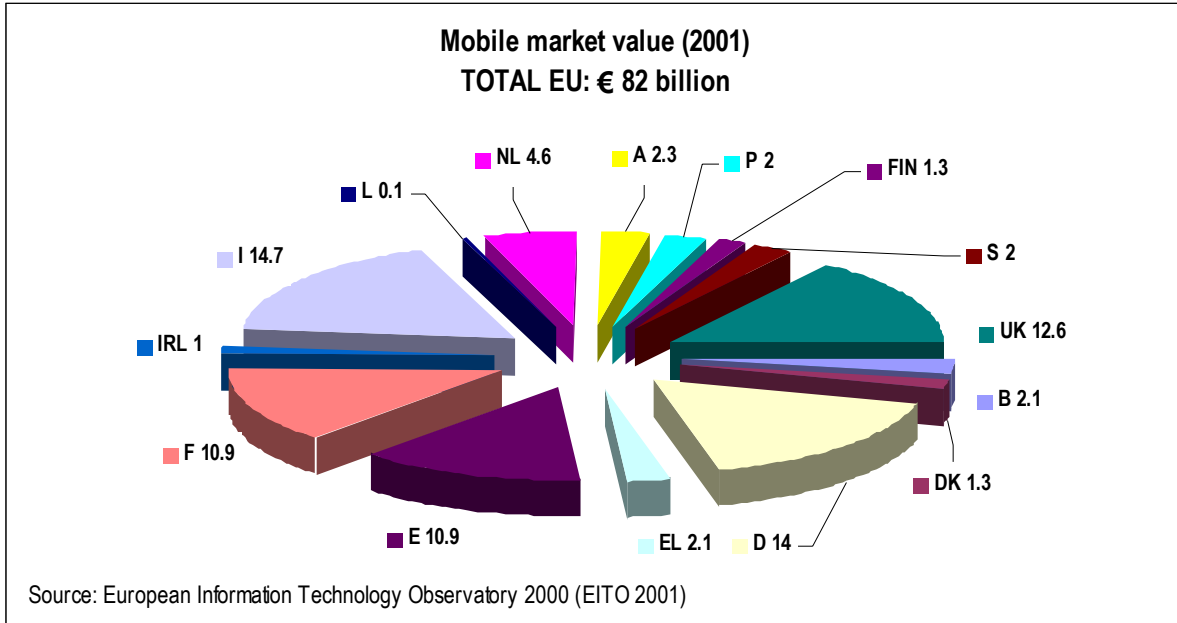
Evolution of EU telecommunications market and breakdown of estimated 2001 revenues for telecommunications services into main market segments.

Chart 4



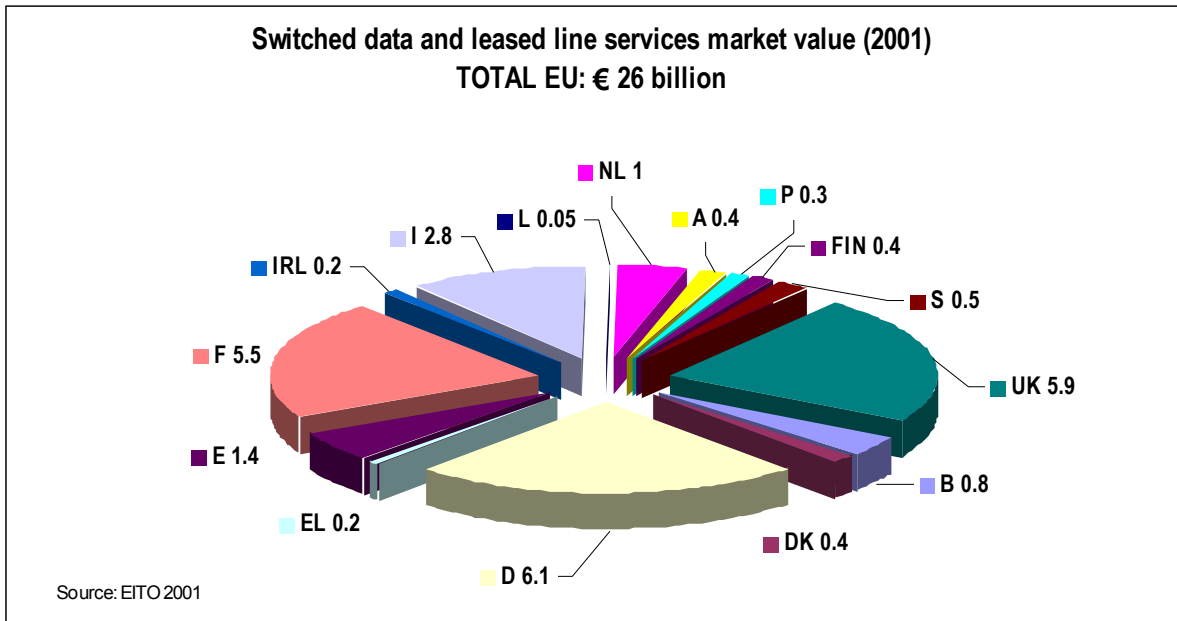
Estimates of 2001 revenues for public voice telephony.

Chart 5



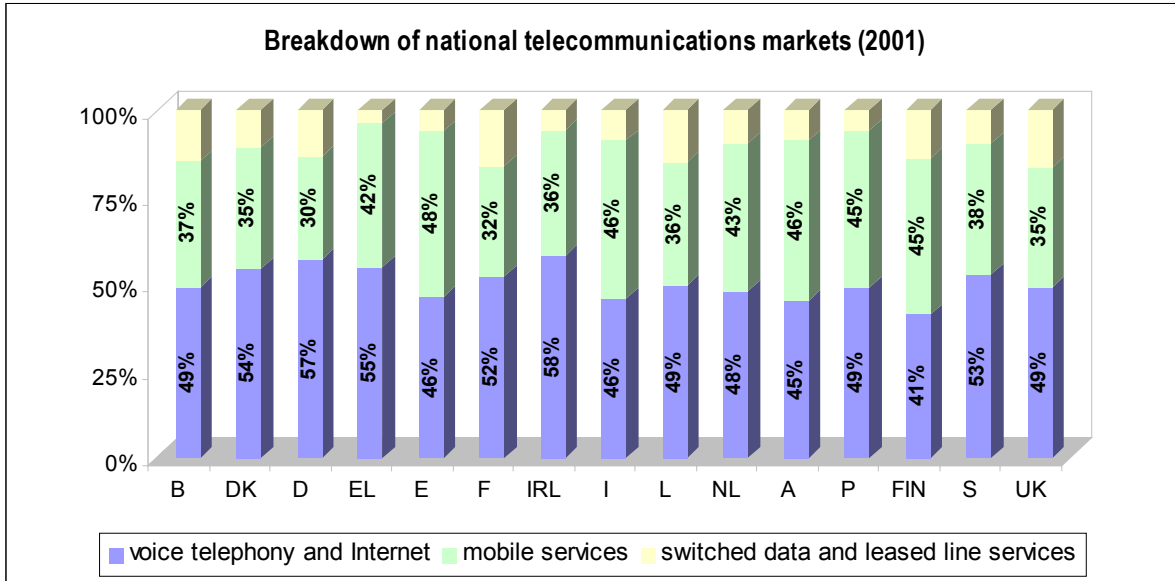
Estimates of 2001 revenues for mobile services.

Chart 6



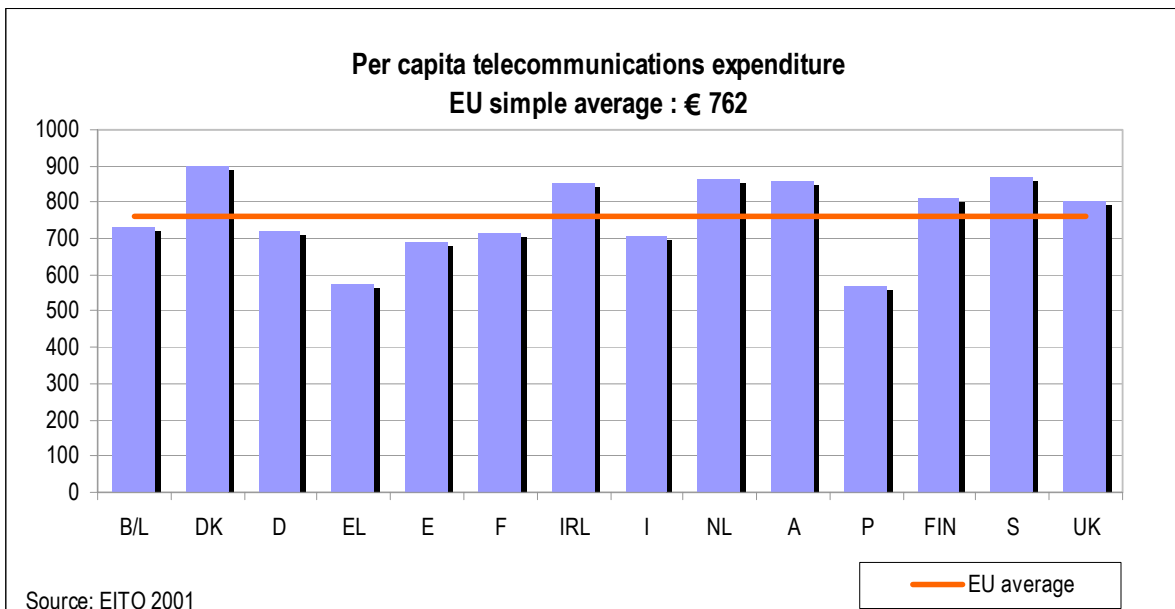
Estimates of 2001 revenues for switched data and leased line services.

Chart 7



Breakdown of estimated 2001 revenues for telecommunications services into main market segments for each Member State.

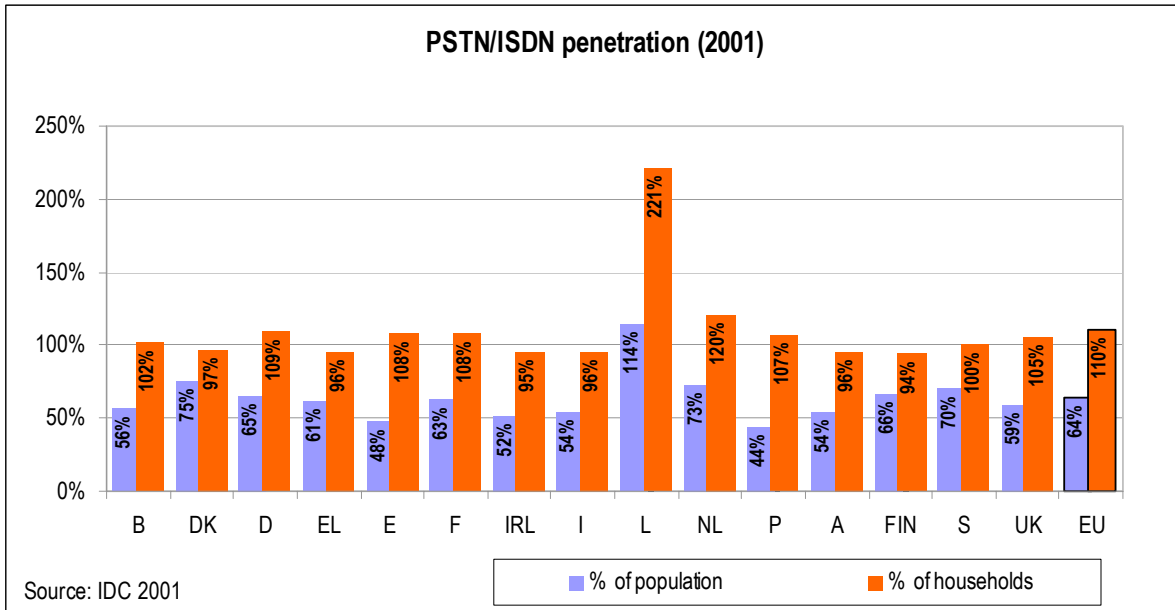
Chart 8



Per capita telecommunications expenditure in the EU in 2000.

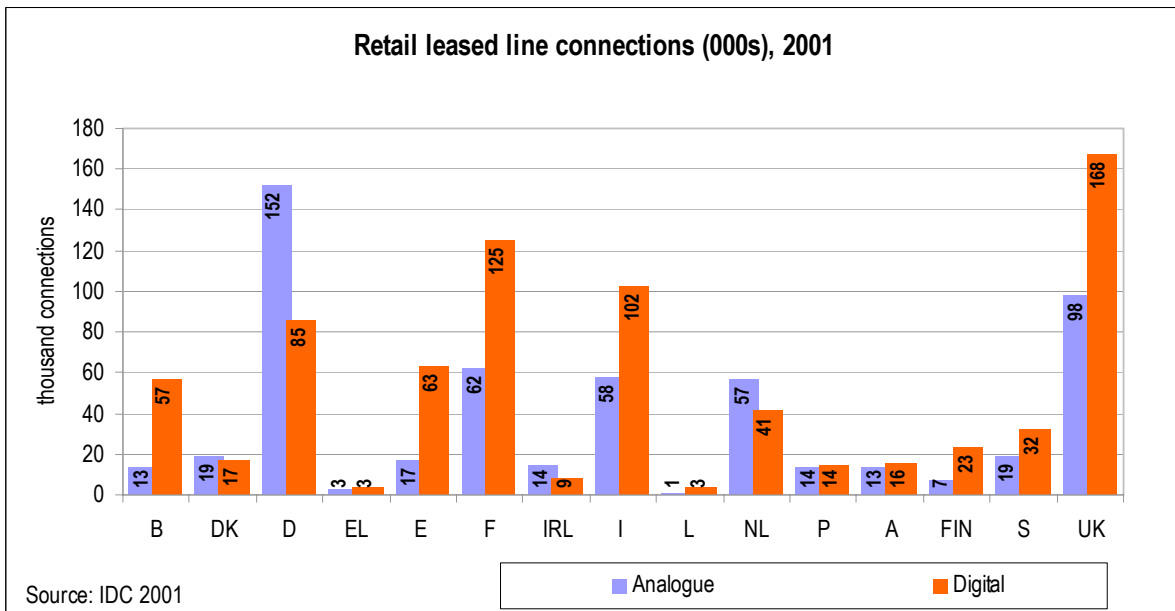
The figures refer to expenditure on telecommunications network equipment, telecommunications terminals and telecommunications services (voice, mobile, data, leased lines and cable TV), according to definitions provided by EITO 2001.

Chart 9



PSTN/ISDN population and household penetration in Member States. It is important to note that a significant proportion of Member State fixed penetration rates are due to ISDN channels. The household penetration rates exceed 100% for countries with high ISDN usage as well as use of more than one line per household.

Chart 10



Retail leased line connections by analogue and digital type. These are leased lines used by businesses either to carry voice or data traffic. Total leased lines are hitting a plateau or declining in more advanced countries, as analogue leased lines are decommissioned and users move to higher-bandwidth digital leased lines.

|

|

1.2 VOICE TELEPHONY SERVICES

1. PUBLIC FIXED VOICE TELEPHONY

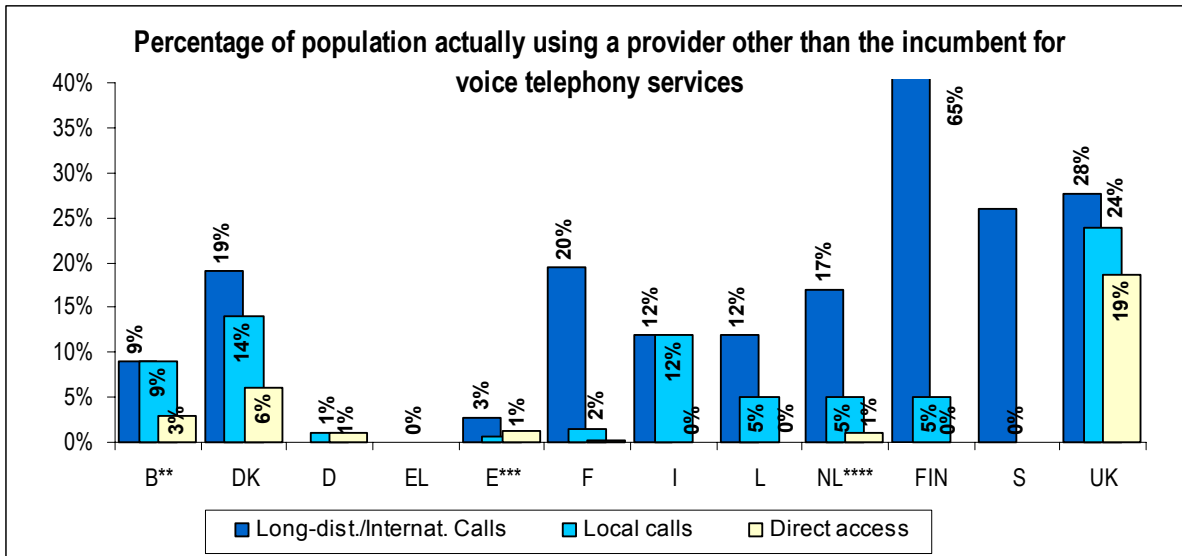
This section analyses the fixed voice telephony market, in terms of the percentage of the population with a choice of operators, the incumbent's market share, and the facilities used by the operators to provide public voice telephony services.

The data presented below has been provided by the national regulatory authorities and, unless otherwise indicated, reports the position in July 2001.

The following Chart provides NRAs' estimates of the percentage of population actually using a provider other than the incumbent for voice telephony services. Austria reports that call services are provided by alternative operators for 30% of total lines. Furthermore, in Austria 8% of the households in Vienna are directly connected by a provider other than the incumbent operator. Italy indicates that call services are provided by alternative operators for 21.5% of total lines.

No information is available for Ireland. No data is available for Germany, on long-distance and international calls, for Finland on direct access and for Portugal on local, long-distance and international calls. For the latter, the percentage of population actually using an alternative provider for direct access is zero.

Chart 1



* Not to scale.

** Percentage of residential customers.

*** Based on subscribers at the end of 2000.

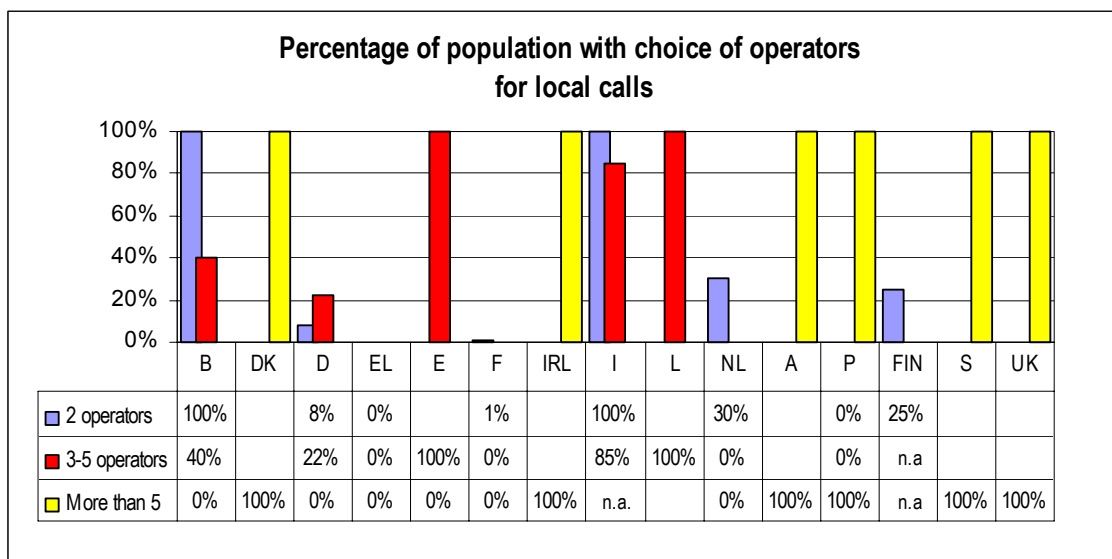
**** Figure for local calls and direct access should be regarded as maximum values.

It should be noted that in the case of Finland, the reference is to the percentage of population using providers other than Sonera for long-distance and international calls. However, other operators (notably Kaukoverkko Ysi Oy for long-distance calls and Oy Finnet International Ab for international calls) have been notified as operators with significant market power.

1.1. LOCAL CALL MARKETS

Chart 2 shows the estimated percentage of the population with a choice between 2 operators, 3 to 5 operators and more than 5 operators for local calls.

Chart 2



* The figure for the United Kingdom refers to the overall call market (local, long-distance and international).

The following charts show the incumbent operators' share of the local call market estimated respectively on the basis of retail revenues and outgoing minutes of communications at the end of year 2000. For the Netherlands, the figures are those of the SMP investigation carried out in September 2000.

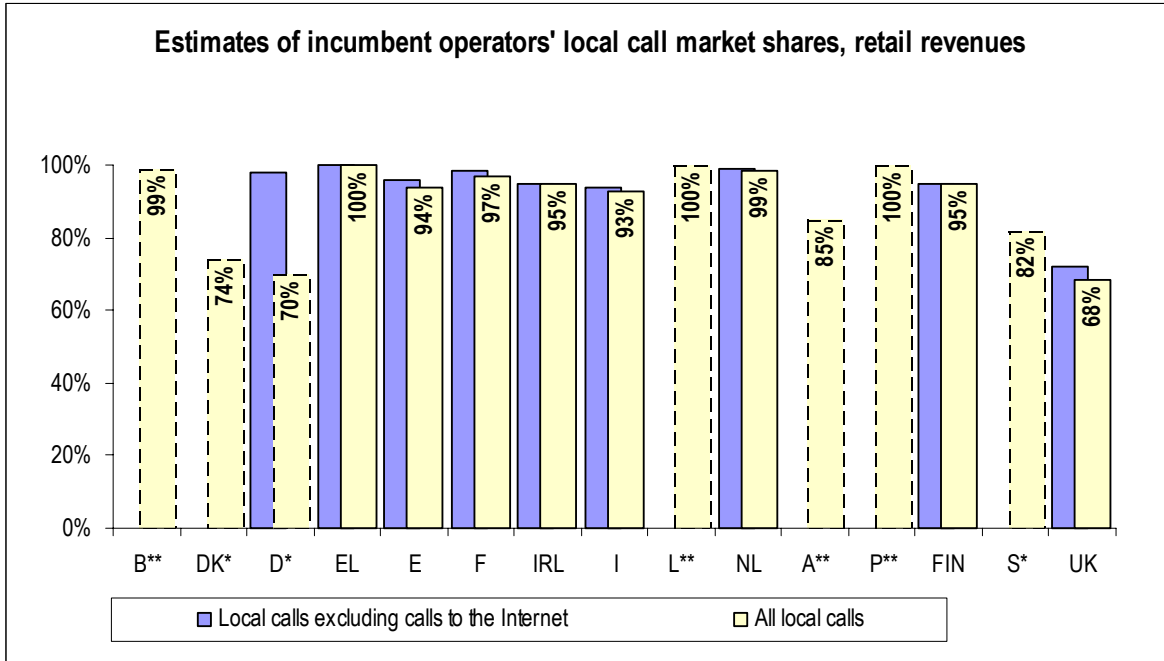
For Finland, the figures refer to the combined market share of the incumbents (Sonera, Elisa and Finnet group).

These figures are estimates provided by the NRAs, except for Belgium and Austria (in the case of market shares based on retail revenues only), that considers this information as confidential. The information on market shares on revenues is not available for Luxembourg and Portugal. In all these cases, estimates as of 1999 are indicated. These estimates are therefore expected to overestimate actual market shares of incumbent operators at the end of 2000. In addition, the Austrian figure for 1999 does not distinguish between local, long-distance and international calls.

The figures provided for Denmark, Germany and Sweden in Chart and Chart refer to both local and long-distance calls. Because of its small size, no distinction is made in Luxembourg between the local and long-distance call markets.

Estimates on the basis of outgoing minutes of communications of the incumbent operators share of local calls are not available for Belgium, Italy, Portugal and Sweden.

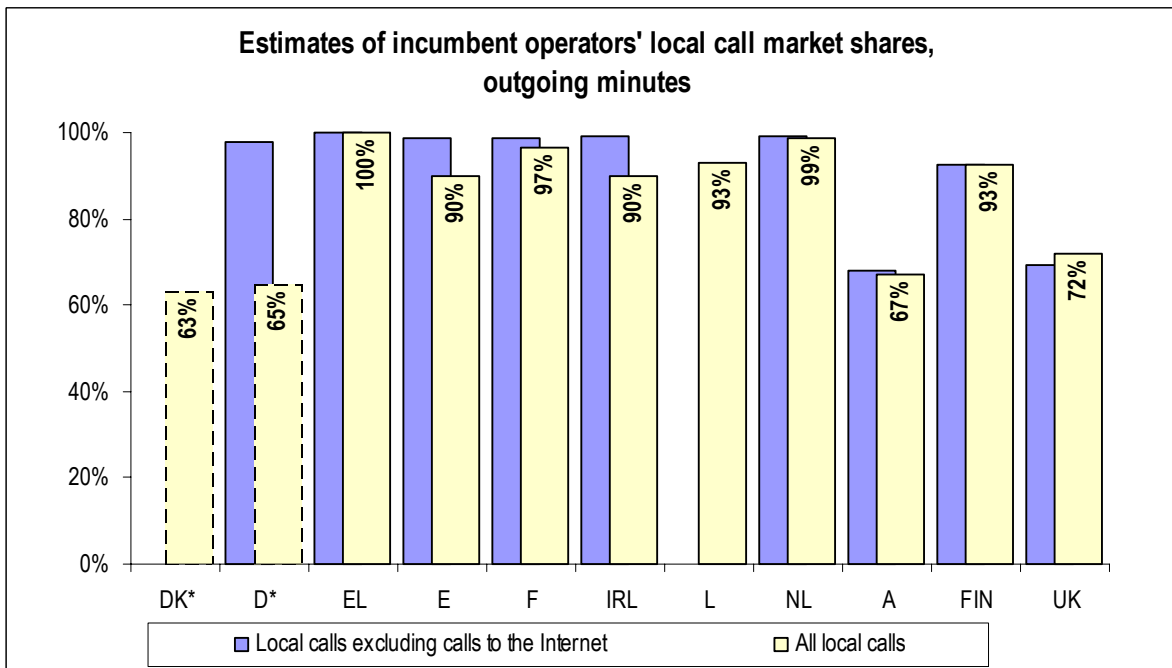
Chart 3



* Figures refer to local and long-distance calls.

** Estimates at the end of year 1999. In the case of Austria, the figure does not distinguish between local, long-distance and international calls.

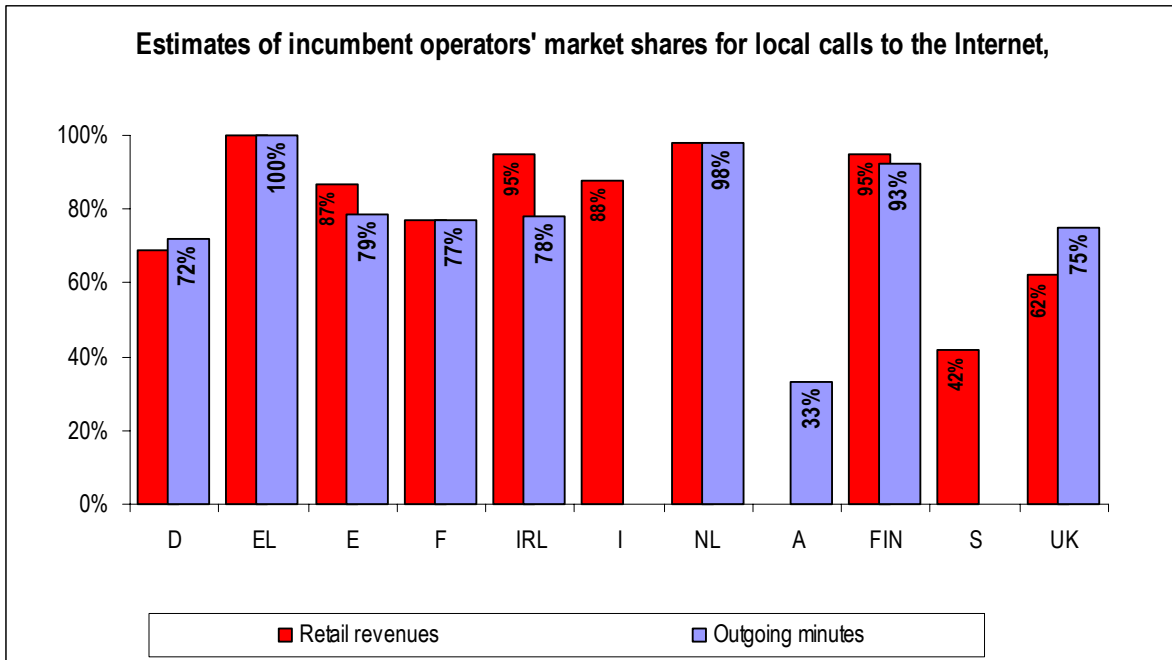
Chart 4



* Figures refer to local and long-distance calls.

No estimate of the incumbent operator's share of calls to the internet is available for Denmark, Luxembourg and Portugal. In the case of Belgium, the figure is regarded as confidential.

Chart 5



1.2. LONG-DISTANCE AND INTERNATIONAL CALLS MARKETS

Chart indicates the estimated percentage of the population with a choice between 2 operators, 3 to 5 operators and more than 5 operators for long-distance and international calls.

Chart 6

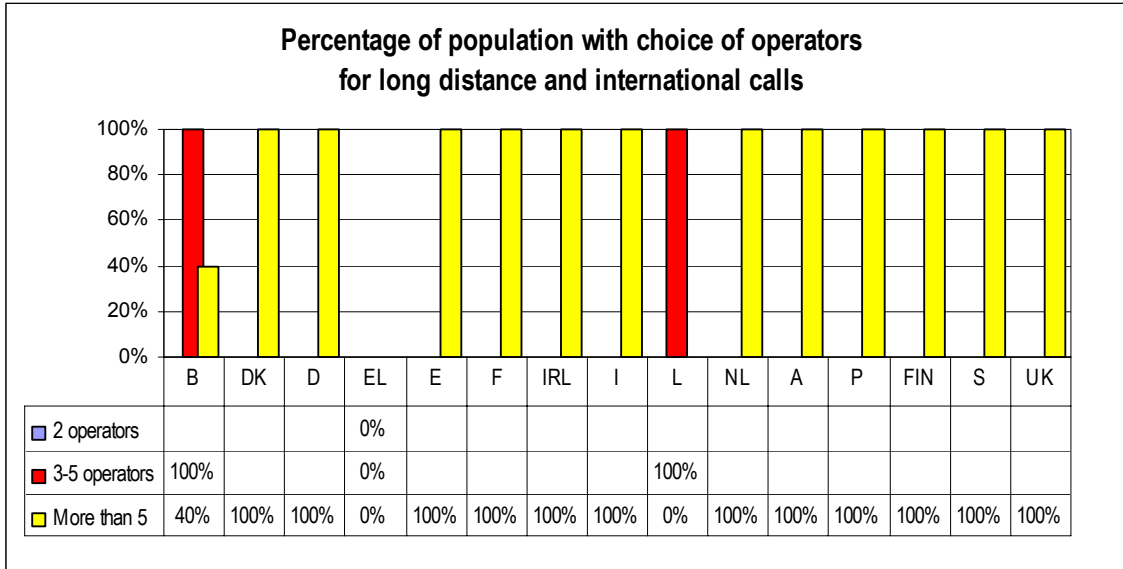
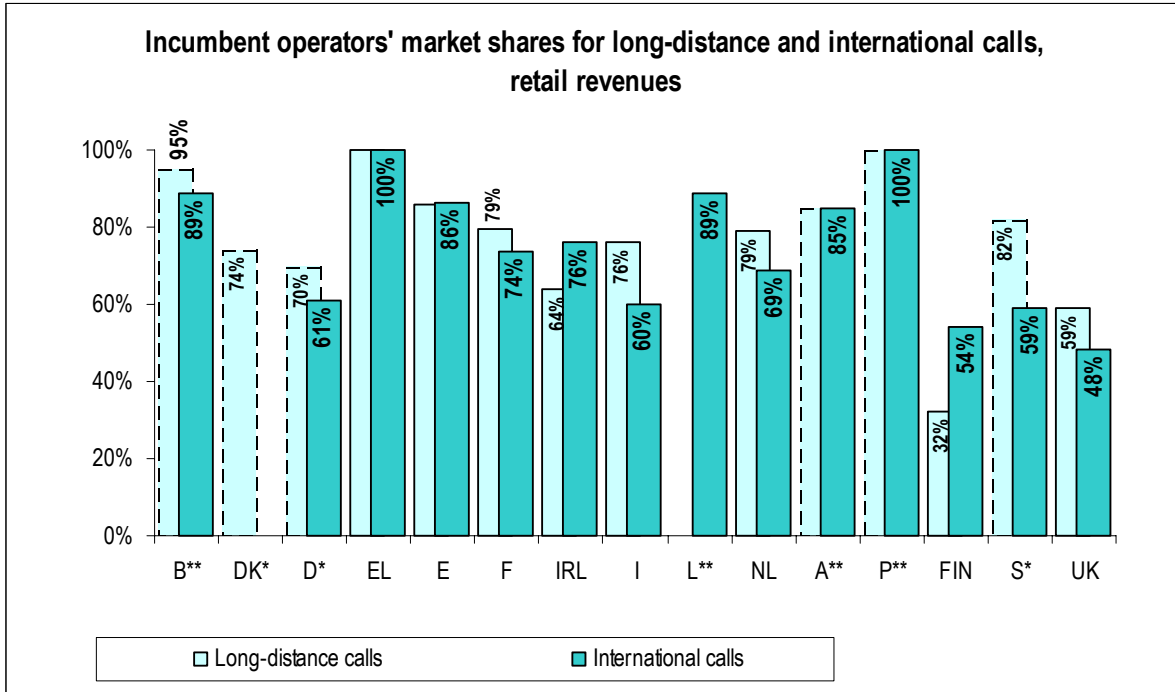


Chart 7, Chart 8 and Chart 9 show the incumbent operators' shares of the market for long-distance calls, international calls and calls to mobile networks estimated respectively on the basis of retail revenues and outgoing minutes of communications at the end of year 2000.

Belgium regards market share figures as confidential. The figures provided for Denmark and Germany in Chart 7 and Chart 8 refer to both local and long-distance calls.

For Finland, the figures on market shares for long-distance and international calls refer to the market share of Sonera only.

Chart 7

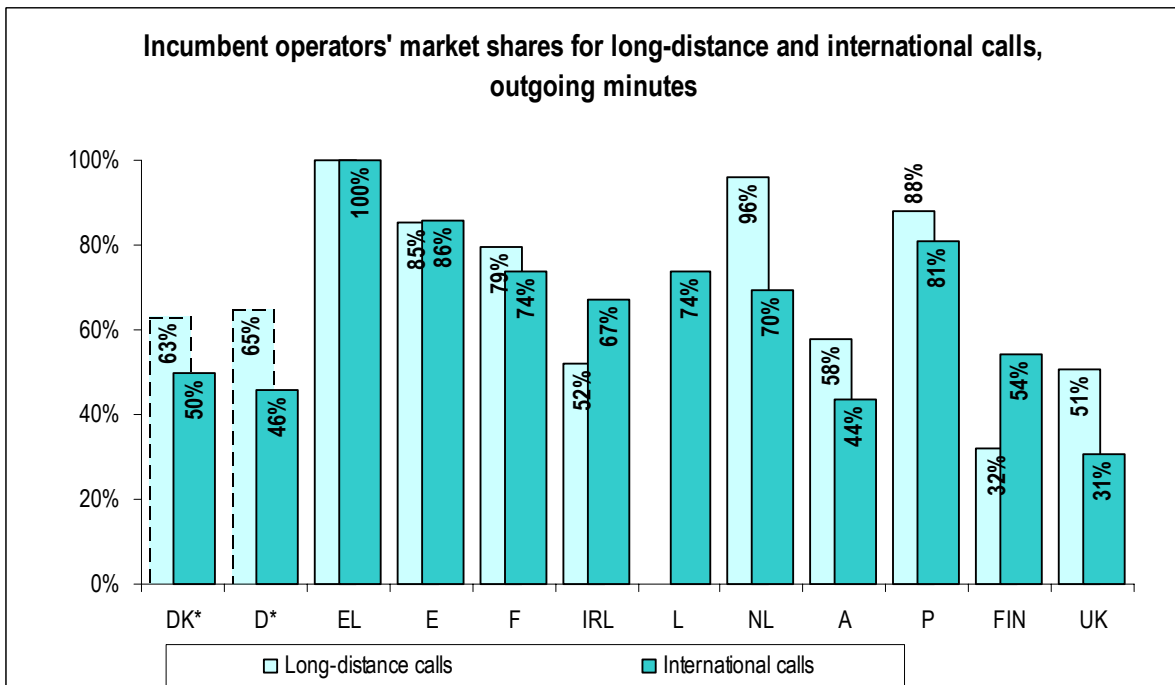


* Figures refer to local and long-distance calls.

** Estimates at the end of year 1999. In addition, in the case of Austria, the figure does not distinguish between local, long-distance and international.

The figure for Finland in Chart 7 and Chart 8 refer to Sonera only and do not include the market shares of Kaukoverkko Ysi Oy and Oy Finnet International Ab, that have recently been notified as operators with significant market power respectively for long-distance and international calls.

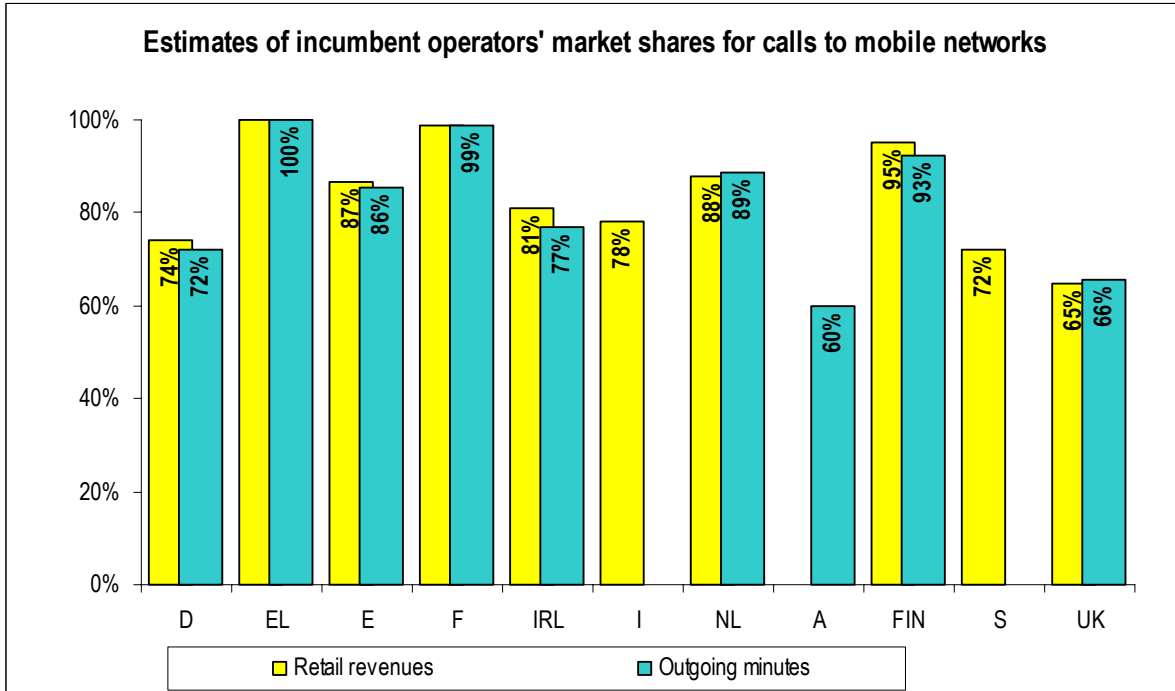
Chart 8



* Estimates refer to local and long-distance calls.

No estimate of the incumbent operator's share of calls to a mobile network is available for Denmark and Portugal. In the case of Luxembourg, the minutes of calls to mobile networks are included in the minutes for local calls (see previous Chart 4). In Belgium, the figures are regarded as confidential.

Chart 9



1.3. FACILITIES USED BY NEW OPERATORS TO PROVIDE VOICE TELEPHONY TO RESIDENTIAL USERS

This section provides information on the facilities used by new operators to offer voice telephony, particularly to residential users.

Chart 10 show the number of new entrants that have been allocated an access code at 1 August 2001. The figure for Luxembourg also covers reserved codes.

Chart 11, Chart 12 and Chart 13 show the estimated number of alternative operators using carrier selection, carrier pre-selection or direct access to provide voice telephony services to residential users. These figures are estimates provided by the national regulatory authorities and refer to July 2001. The latter three charts should be read separately and not summed up as country totals, since most operators use more than one means of providing call services.

As indicated in the section on numbering, at the reference date used for these charts, carrier selection and pre-selection was not yet available for local calls in Germany, France and Finland. Furthermore, carrier pre-selection was not yet available in Greece. In the United Kingdom, carrier pre-selection for local calls is only available via “autodiallers”.

Because of its small size, no distinction is made in Luxembourg between local and long-distance calls.

In the following charts, the figures for Austria should be regarded as minimum values.

The information is not available for Portugal.

Chart 10

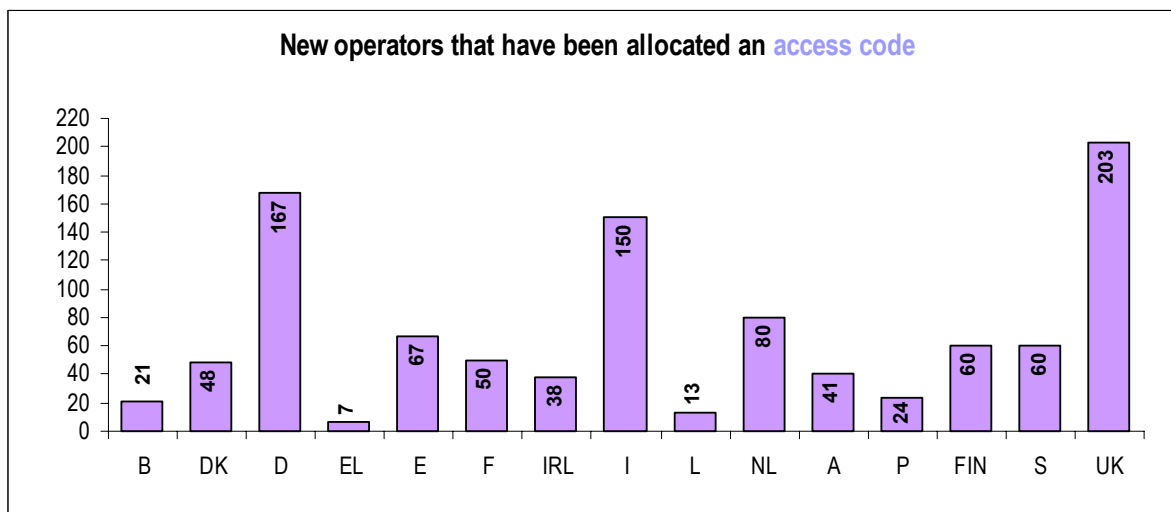
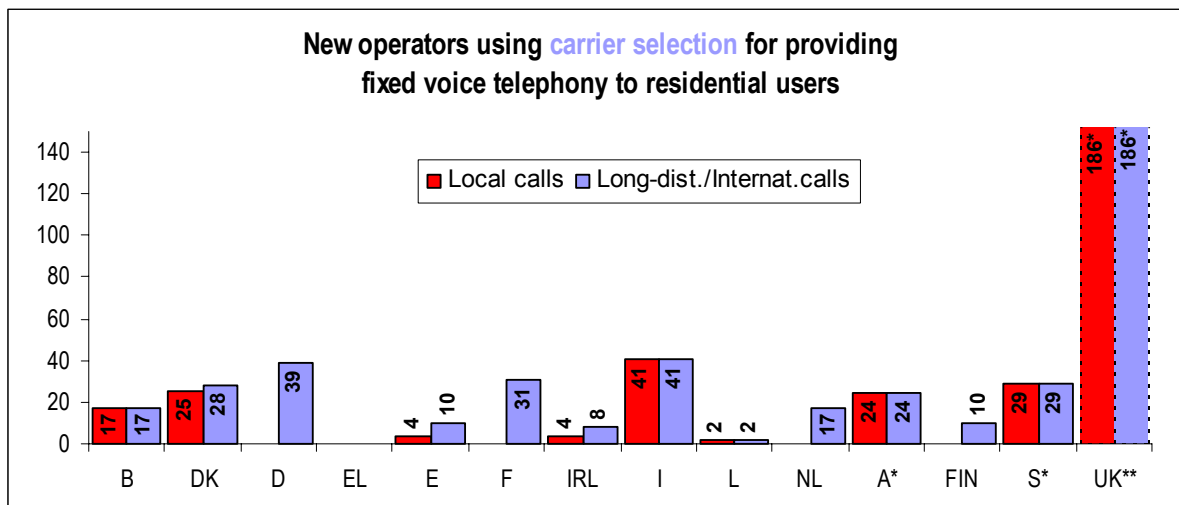


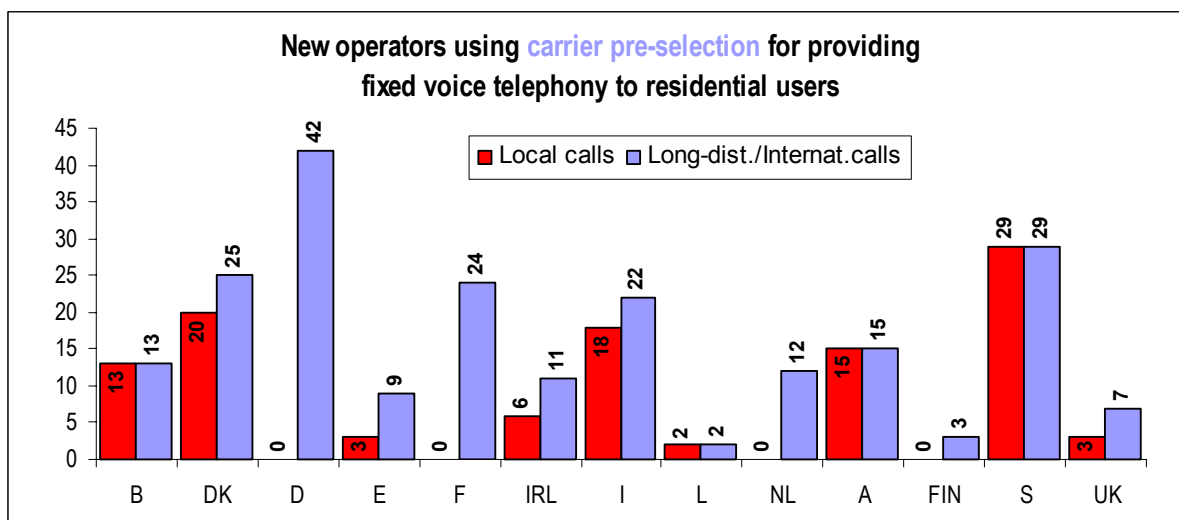
Chart 11



* The figures for Austria and Sweden do not distinguish between the type of call.

** The figures for the United Kingdom refer to the total number of PTOs providing services to both residential and business users and are not comparable to the figures in the Sixth Report. In addition, no distinction is made between actual provision of local and long-distance calls. The actual number of operators using carrier selection for providing services to residential users is likely to be lower.

Chart 12



* The figures for Austria and Sweden do not distinguish between the type of call.

Chart 13

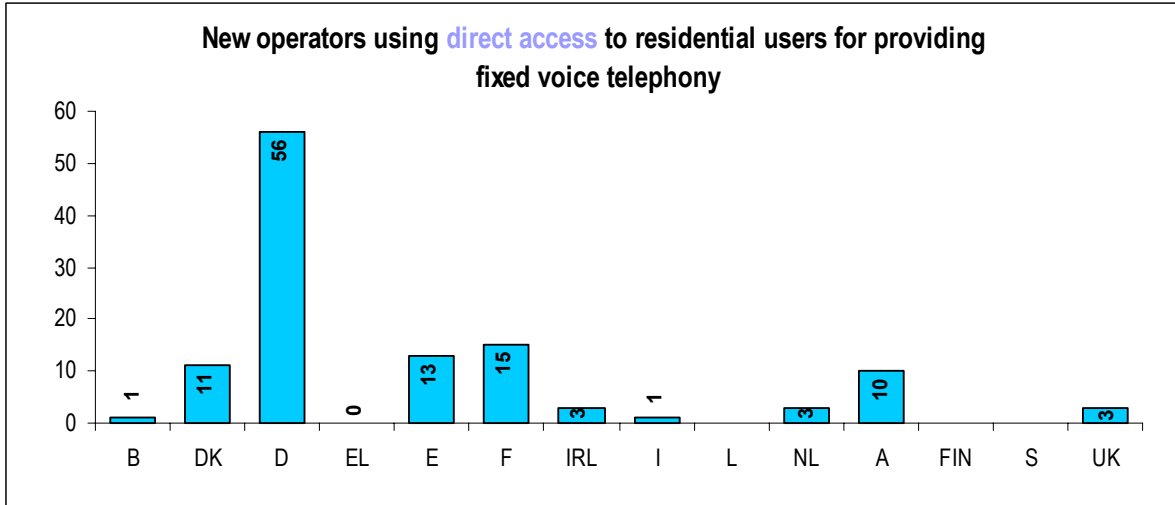
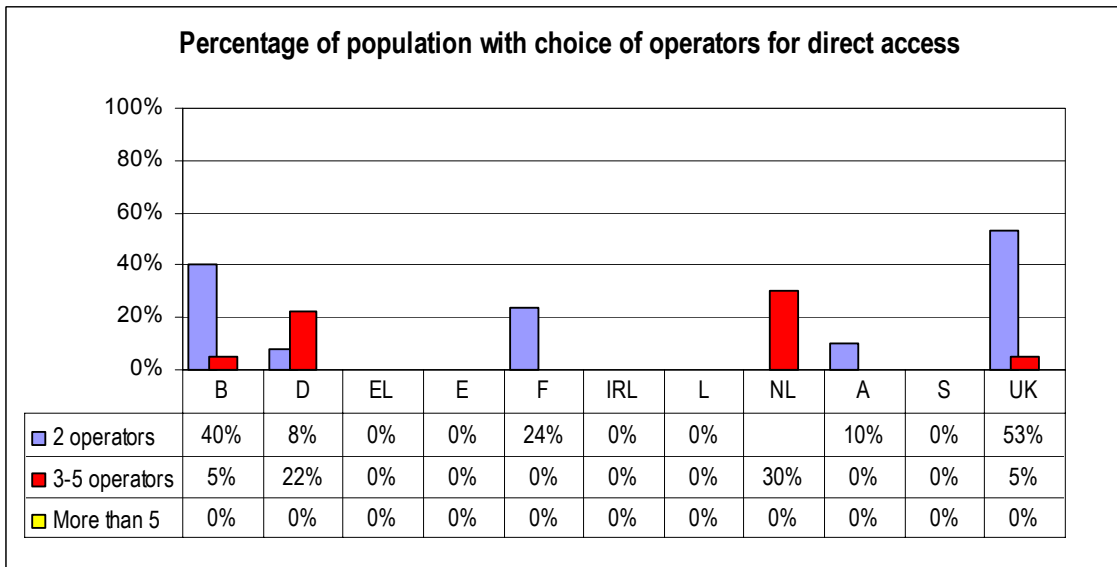


Chart 14 shows the estimated percentage of the population with a choice between 2 operators, 3 to 5 operators and more than 5 operators for direct access.

Data is not available for Denmark, Italy, Portugal and Finland.

Chart 14



1.3 TARIFFS

INCUMBENTS' RETAIL TARIFFS FOR PUBLIC FIXED VOICE TELEPHONY

This section examines the charging system, the line rental charges and the main tariffs for public fixed voice telephony charged by the incumbent operators in each Member State¹ in August 2001. The price trend over the past three years is also analysed.

The incumbent operators still retain a large market share, but new entrants are increasingly gaining market shares by offering cheaper prices for certain types of call (usually long-distance or international) or destination. The prices charged by incumbents do not necessarily, therefore, represent the lowest prices available. A comparison between the rates charged by incumbents and alternative operators for a sample of countries is shown at the end of this section.

The figures and information are taken from a study carried out for the Commission by Total Research-Teligen. The data are collected from primary sources (i.e. directly from the incumbent operators).

Different sets of charges for fixed national voice telephony services are shown in the following sections:

- the minimum costs for different types of calls (local, long-distance, international calls and calls towards mobile networks), depending on the charging system adopted;
- the monthly rentals charged by incumbent operators;
- the charges for a composite basket of calls (local, long-distance, international fixed calls and calls to mobile), that gives an estimate of the average monthly spending by a typical "European business/residential user" for the whole range (national and international) of calls;
- the charges for a basket of national calls, that gives an estimate of the average monthly spending by a typical "European business/residential user" for fixed national calls;
- the price of some individual calls (3- and 10-minute local, long-distance and international calls) at peak time, inclusive of any initial charge. Furthermore, for incumbents which apply unit-based charging, the price of a whole unit is calculated.
- the basket of international calls for each country that indicates the average price of a single call from the originating country to all other OECD destinations. In addition, the price of individual calls to specific destinations are also shown.

For the various types of calls, a benchmark based on a comparison with US and Japan is also included. For the USA, the prices for national calls are those charged by Nynex/Bell Atlantic/Verizon (in New York city)² and the prices for international calls are those charged by AT&T. For Japan, the national call prices are those charged by NTT and the international call prices are those charged by KDD.

¹ The incumbent operators considered are the following: Belgacom for Belgium, Tele Denmark for Denmark, Deutsche Telekom for Germany, OTE for Greece, Telefonica for Spain, France Telecom for France, Eircom for Ireland, Telecom Italia for Italy, P&T Luxembourg for Luxembourg, KPN for the Netherlands, Telekom Austria for Austria, Portugal Telecom for Portugal, Sonera for Finland, Telia for Sweden, British Telecom for the United Kingdom.

² The operator has changed name twice during the past five years. Prices for the same operator may vary depending on the specific user location in the area covered by the local operator. We have taken the prices for New York city.

The euro exchange rate expressed in terms of purchasing power parities (€-PPP) has been applied, in order to compare the retail price level between Member States in real terms, rather than nominal terms (see appendix for more details on € and €-PPP exchange rates). € and €-PPP exchange rates are used, referring to 2001, even for past years, in order to avoid showing changes in exchange rates. Price increases/decreases over time are in nominal rather than real terms (i.e. the effects of inflation are not excluded).

The EU average tariffs shown in the charts are weighted (by population of the Member States in 1999) average rather than simple averages.

1. CHARGING SYSTEM

The billing system for public voice telephony services usually comprises two components: an initial charge applied at the beginning of a call and a charge for the remainder of the call (that may not depend on the type of initial charge used).

1.1 INITIAL CHARGES

The initial charge can take the following two forms.

- **Call set-up charge** which applies as soon as the call is answered. This charge may include a number of seconds of call time before normal time-based charging starts (in this case it is also called *initial charge*). In some cases the call set-up charge applies only if the time-based charge for the call is less than the call set-up charge, to ensure that operators receive a minimum revenue per call (in this case it is also called *minimum charge*).
- **Unit charge**, which has the same effect as the initial charge. A full unit is charged at the beginning of the call, and includes a number of seconds of call time until the next unit is charged. Depending on the principle used by the operator (synchronous/asynchronous), the number of seconds of call time in the first unit may be less than the specified unit duration.

1.2 CHARGING SYSTEM DURING THE CALL

Operators currently use two main ways of charging calls: real time charging or unit-based charging. Both are used in conjunction with an initial charge (call set-up or minimum charge). Most operators publish duration charges on a per-minute basis, irrespective of the system used.

The two systems are:

- **Real time charging** (also known as per-second billing): the duration charge is directly proportionate to the exact duration of the call (normally to the nearest second). A call set-up charge may also apply.
- **Unit-based charging** uses a fixed price unit³. The duration of this unit varies according to the destination of the call and time of day. Call duration is always rounded up to a multiple of whole units, so the user will nearly always pay for more time than the time used. A call set-up charge may apply, but is relatively rare.

The real time charging method can be perceived as being more convenient for users, as it is the most transparent method (users only pay for what is actually used). However, there is no guarantee that this method will result in the lowest call charge: most incumbent operators have switched from

³ A variation of this method, used in the US, is **fixed period charging**, which uses a variable price, but fixed duration unit. The call is normally charged on a per-minute or per 6-seconds basis. The price for the period will vary according to destination and time of day. The charged duration of the call is rounded up to a multiple of whole periods. A call set-up or initial charge is often applied in the form of a higher charge for the first period. This initial charge may vary according to destination and time of day.

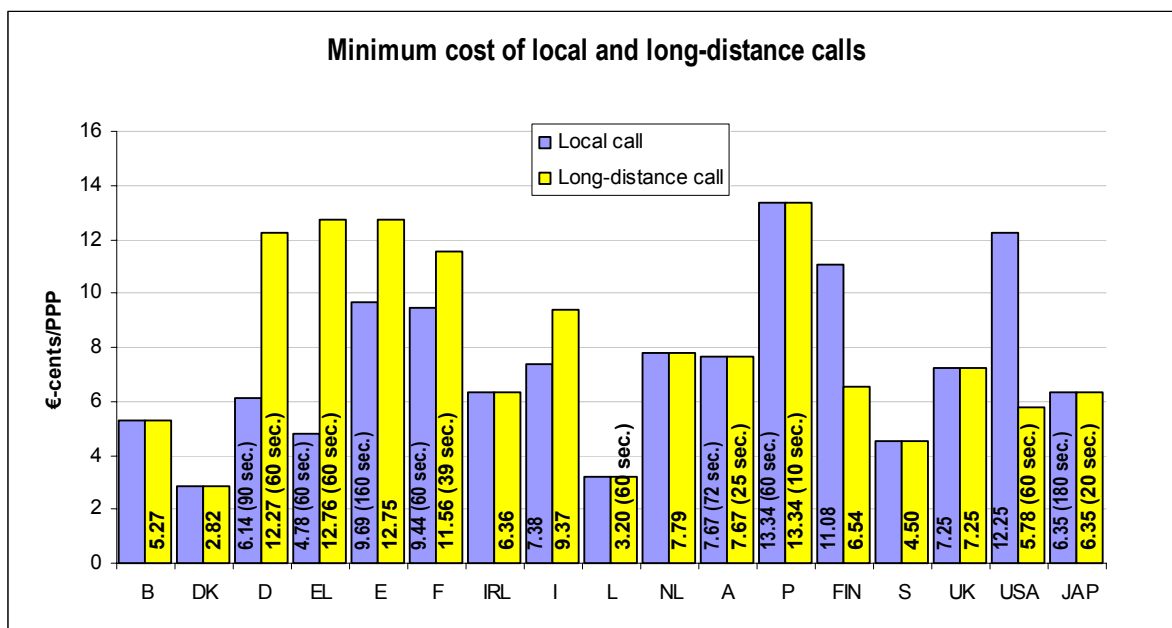
a unit-based system to real time charging, keeping the same average duration charge, but adding a (new) call set-up charge, resulting in a higher overall cost per call. This especially affects medium-length calls, depending on the price structure before and after the change.

In August 2001 only the incumbents in Greece, Luxembourg, Austria and Germany (for local and international calls⁴) still use a unit-based charging system. No changes are reported since the situation in August 2000.

Call set-up charges may vary according to the type of call (local, long-distance, international, calls to mobile), and for international calls according to destination. In the case of international calls (see Chart 3), the minimum cost of a call may change according to the destination.

The following charts show the minimum cost, due to initial charges, for local, long-distance and international calls and calls to mobile charged by the incumbent operators. The free call time (i.e. the number of seconds of call time before normal time-based charging starts) is shown in brackets. Values are expressed in €-PPP, including VAT. It should be noted that while some operators apply identical set-up charges to local and long-distance calls, the free call times can vary, as is the case in Austria and Portugal.

Chart 1



⁴ National calls and calls to mobile are charged per minute rather than the normal unit.

Chart 2

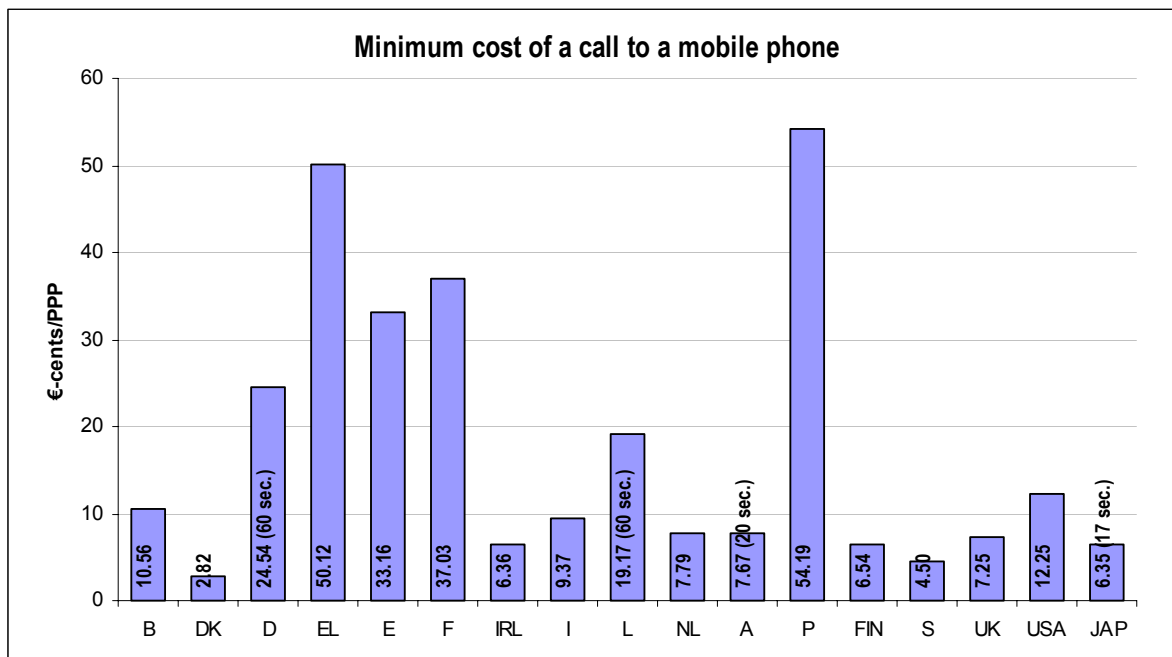
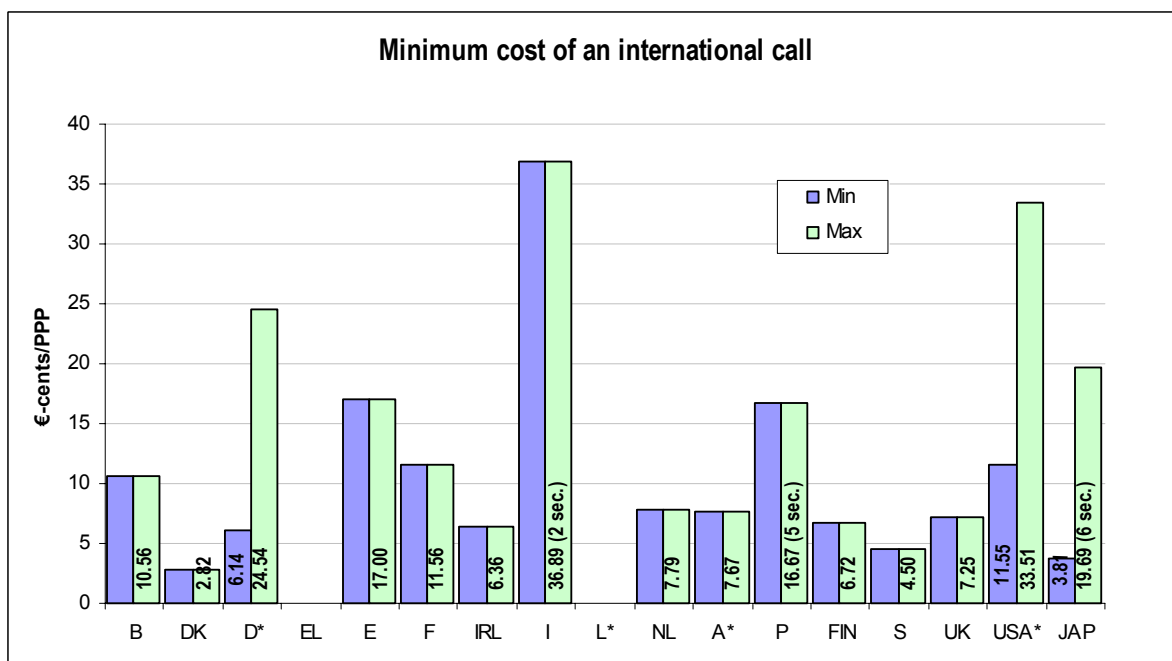


Chart 3



* In Germany, Luxembourg, Austria and USA, where unit based charging is used, the initial period covered by the first unit may change with the destination.

2. MONTHLY RENTAL CHARGED BY THE INCUMBENT OPERATORS

The following charts show the incumbent's monthly line rental charges for residential and business users in August 2001 and the variation in nominal terms in each country since August 1998. In order to reflect the real charges actually paid by users, values are expressed in €-PPP, including VAT for residential users and excluding VAT for business users.

The incumbent operators in Italy, Sweden and the United Kingdom apply different monthly line rental charges for residential and business users. In the Netherlands and Austria two different packages have been chosen for residential and business users. In the other countries the differences between the types of users are due only to the exclusion of VAT for business users.

Chart 4

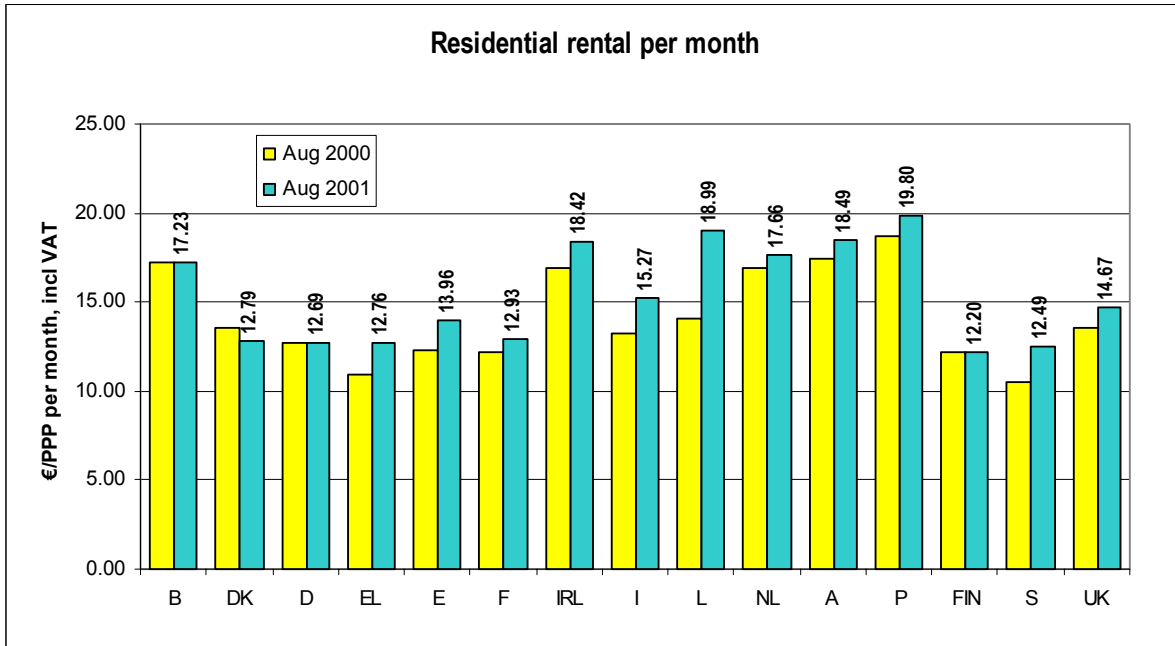
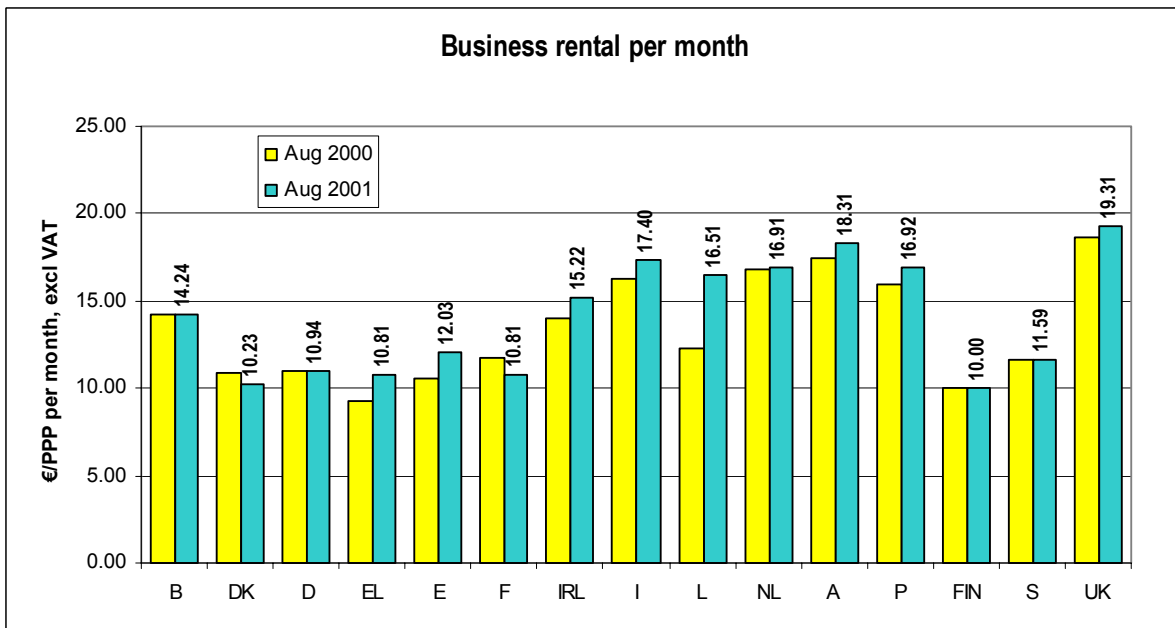


Chart 5



The following charts show the EU weighted average variation in nominal terms of the residential and business monthly line rental charge.

Chart 6

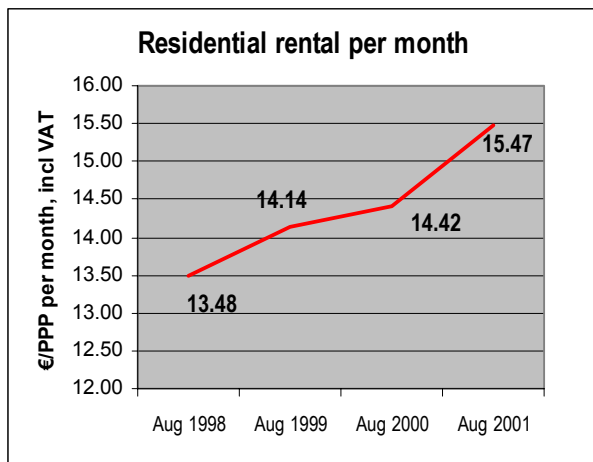
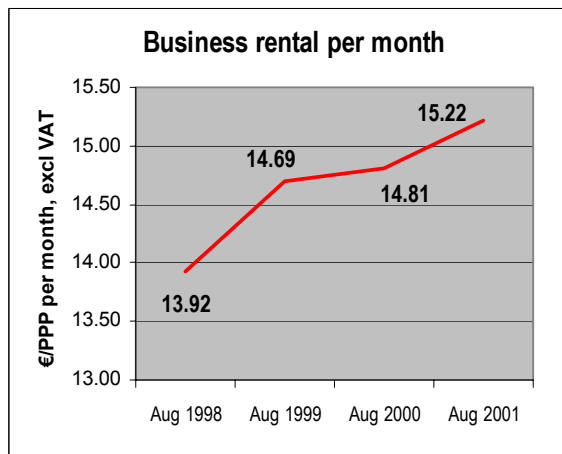


Chart 7



3. AVERAGE MONTHLY EXPENDITURE (composite call basket)

The figures presented in this section are intended to provide an estimate of the average monthly expenditure of a “standard” European consumer (business and residential). The Basket Methodology for Telecommunications Cost Comparison has been devised by the OECD and accepted in most countries as the most stable and neutral method of comparison⁵.

The user is assumed to have a contract for the provision of voice telephony services with the incumbent operator, and to use only this operator for all types of calls (local, long-distance, international, calls to mobile). Since consumers are making increasing use of call-by-call carrier selection, in particular for specific highly discounted types of calls (i.e. international and long-distance), the figures given below are purely indicative, and do not necessarily reflect the cheapest solution available.

The charts below show the average monthly expenditure for standard residential and business users as of August 2001, expressed in €-PPP, based on the standard tariffs charged by the incumbent operators (i.e. excluding any discount packages). This means that lower costs can be achieved if the user subscribes to one or more discounted packages.

The basket of calls used to estimate average monthly expenditure is the new “composite OECD basket”⁶, which includes not only fixed national calls (as did the old basket), but also fixed international calls and calls to mobile networks.

The OECD residential/business baskets are defined as follows (on an annual basis):

The fixed (i.e. non-recurring) charges include the annual line rental charge plus the charge for the installation of a new line (depreciated over 5 years). Fixed charges for residential users include VAT, while for business users VAT is excluded.

The usage charge for residential users refers to a basket of 1 200 national calls to fixed lines, plus 120 calls (with an average duration of 2 minutes) to mobile networks⁷, plus 72 international calls⁸.

⁵ A full description of the methodology can be found in “Performance indicators for public telecommunications operators”, ICCP Series No.2.2, OECD 1990.

⁶ The revised OECD baskets were adopted in May 2000.

⁷ Representing 10% of the number of calls to fixed lines.

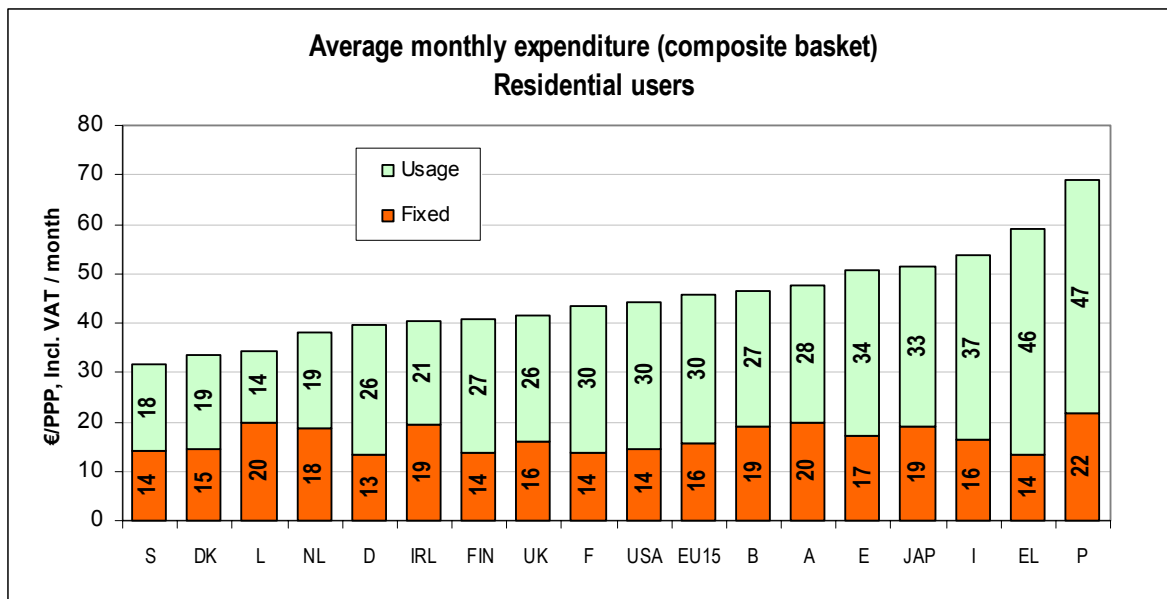
The usage charges for national calls to fixed lines are calculated with a weighted distribution over 14 distances from 3 to 490 km, at representative times of day (4 calls during the week and 2 during the weekend). The call duration varies from 2.5 to 7 minutes, depending on time and distance. The usage for residential users is weighted towards off-peak hours, and with typically long calls. Only 36% of the calls are within normal business hours; 64% are for distances below 10 km; 9% are for distances above 100 km.

The usage charge for business users refers to a basket of 3 600 national calls to fixed lines plus 360 calls (with an average call duration of 2 minutes) to mobile networks⁷, plus 216 international calls⁸. The usage charges for national calls to fixed lines are calculated with a weighted distribution over 14 distances from 3 to 490 km, at representative times of day (4 calls during the week and 2 during the weekend), and with a call duration of 3.5 minutes regardless of time of day and distance. The usage for business users is weighted towards business hours, and with typically short calls. Over 85% of the calls are within normal business hours; 64% are for distances below 10km; 12.5% are for distances above 100 km.

In the case of Luxembourg, local calls cover the entire country.

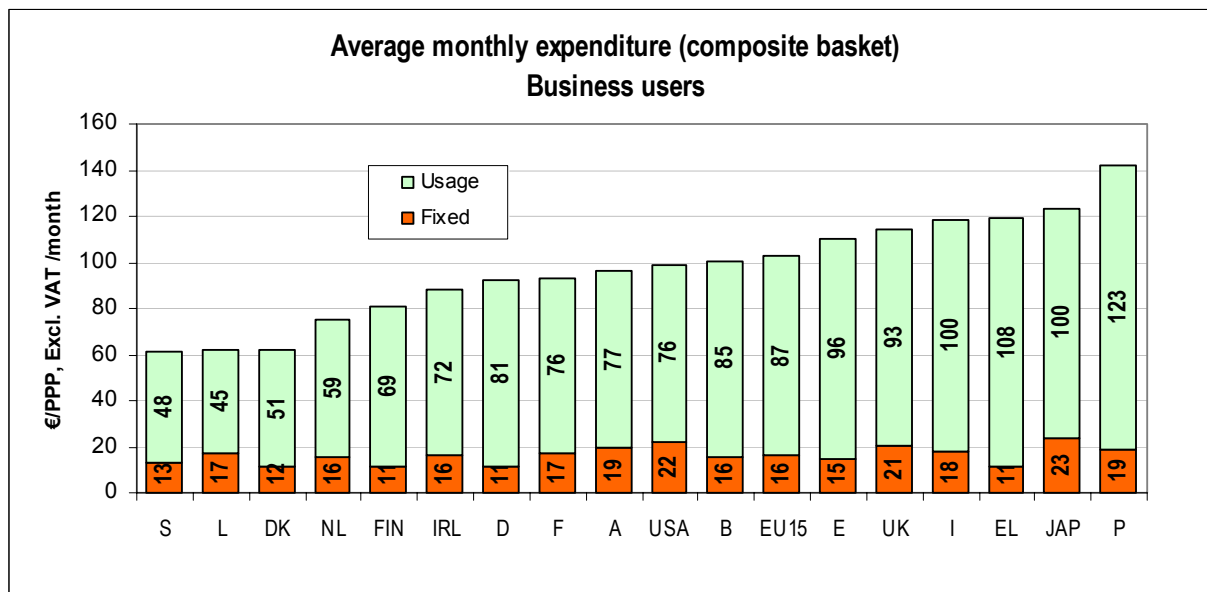
It is important to note that the exact figures are not directly comparable with those published in the Sixth report, due to differences in PPP values. The value of the baskets in August 2000, according to 2001 PPP, are those shown in the following charts.

Chart 8



⁸ Representing 6% of the number of calls to fixed lines.

Chart 9



4. FIXED NATIONAL CALLS

4.1. PRICES CHARGED BY THE INCUMBENT OPERATORS FOR INDIVIDUAL FIXED NATIONAL CALLS

This section shows the prices charged by the incumbent operators for individual fixed calls (the same call prices apply to business and residential users). Where the incumbent operator uses a unit-based charging system, the price of calls of different duration and/or distances may in some cases be identical, where both calls are charged the same number of units.

Prices refer to peak hours (weekdays 11.00) and are expressed in €-PPP including VAT. Except where otherwise specified, the figures refer to August 2001.

Prices are indicated for three-minute and 10-minute calls over two distances: 3 km (equivalent to a local call) and 200 km (equivalent to a long-distance call). In several countries the tariff changes at exactly one of these distances: in these cases, the rates for the lower distance band are used.

The price of a three-minute call is more affected by the magnitude of the call set-up charge than the price of a 10-minute call.

Where two or more tariff packages are available (i.e. Austria and the Netherlands), the prices refer to the basic residential package. In all other cases the prices refer to the standard tariff (cheaper tariffs may be available under discounted packages).

The EU average value is the average of the EU countries weighted according to population in 1999. The EU percentage variations 1998-2001 are calculated as a weighted average of the variations in the individual Member States, rather than as the variation in EU weighted average values.

Chart 10

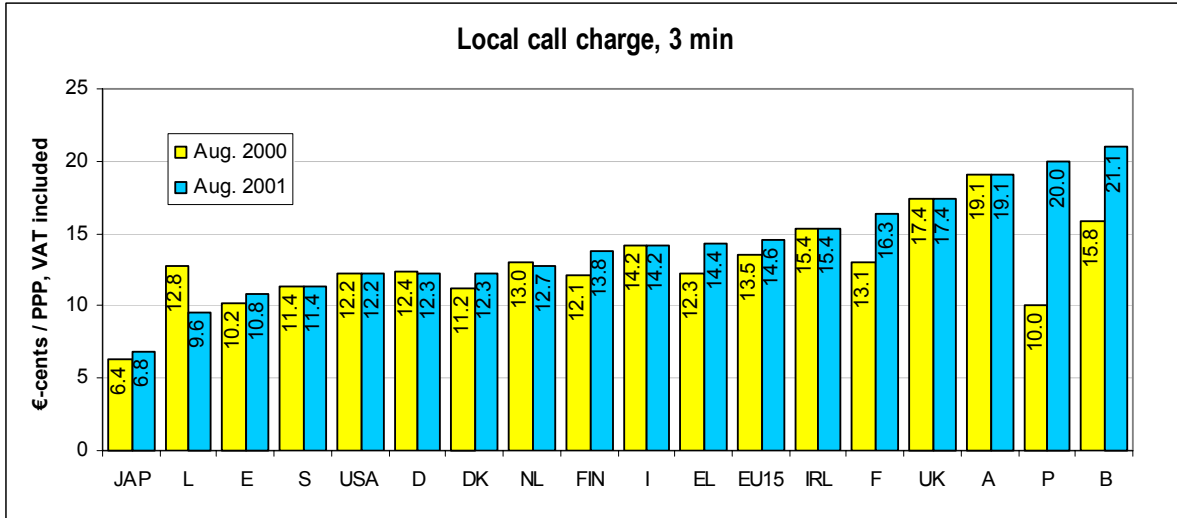


Chart 11

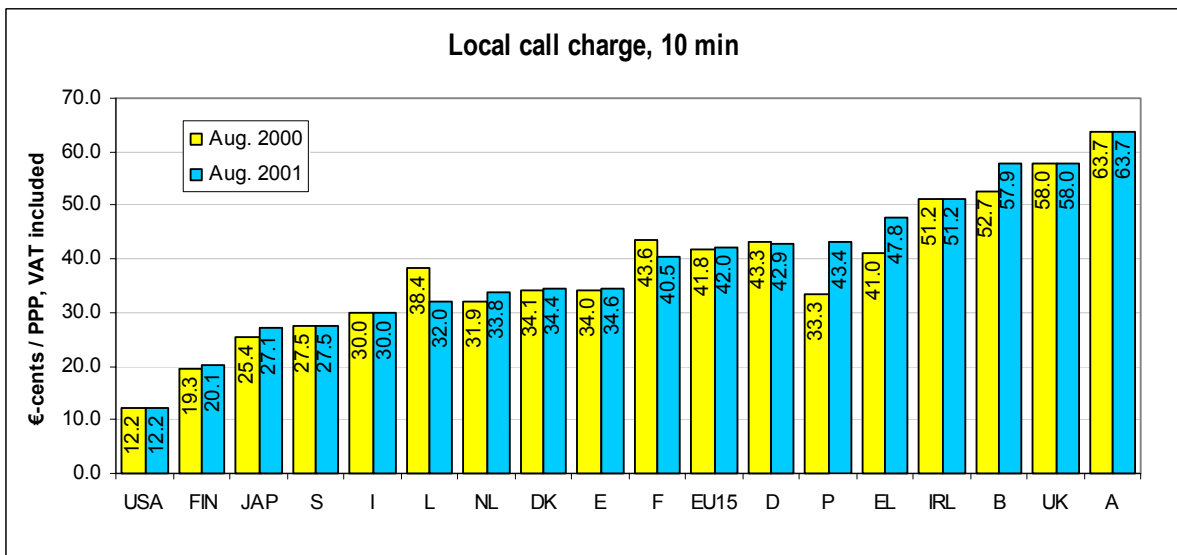


Chart 12

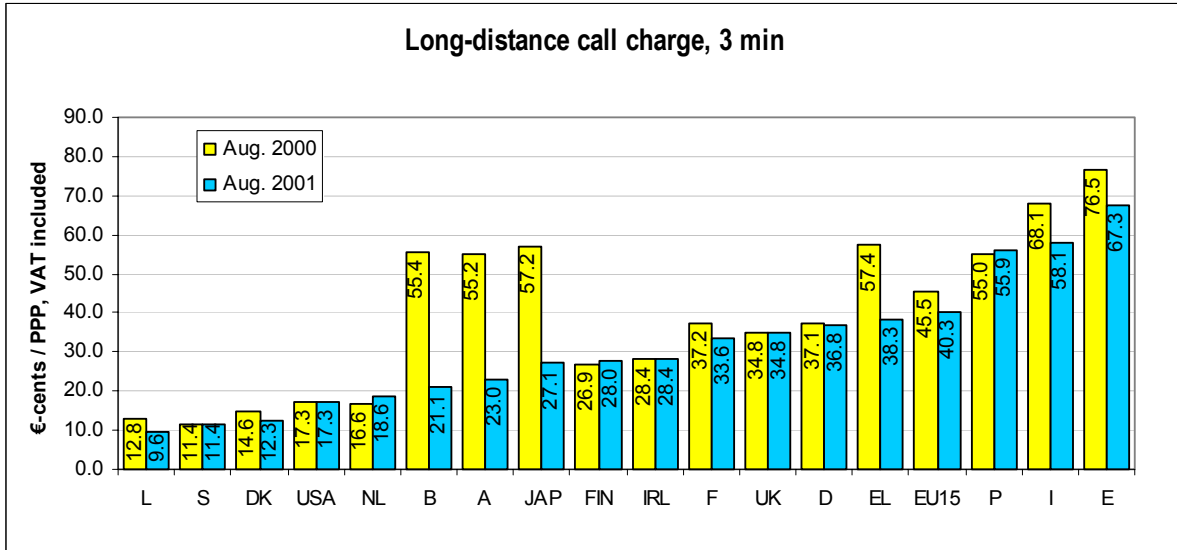


Chart 13

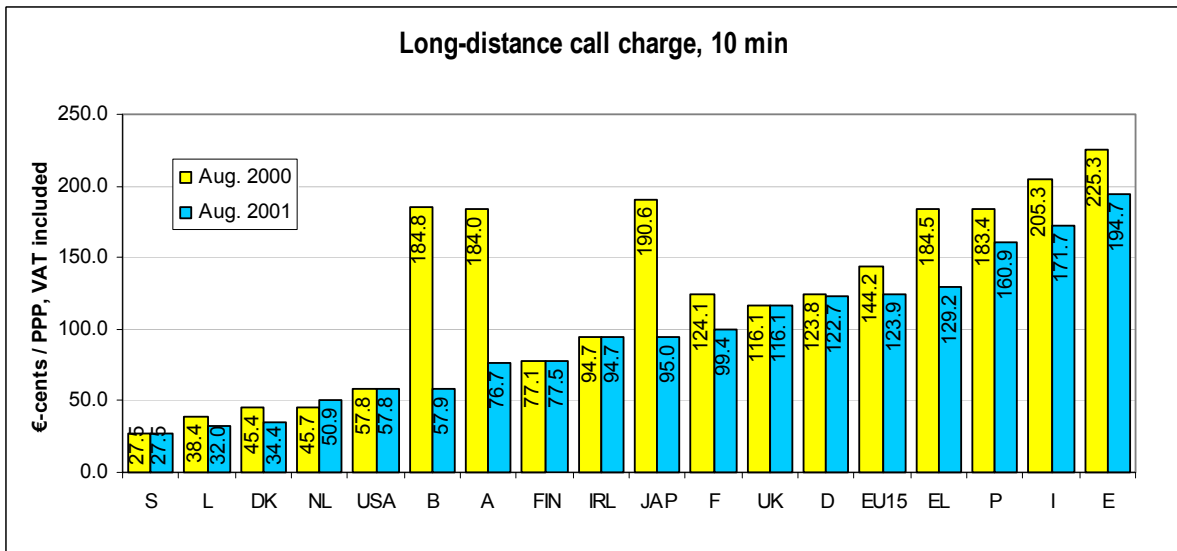


Chart 14

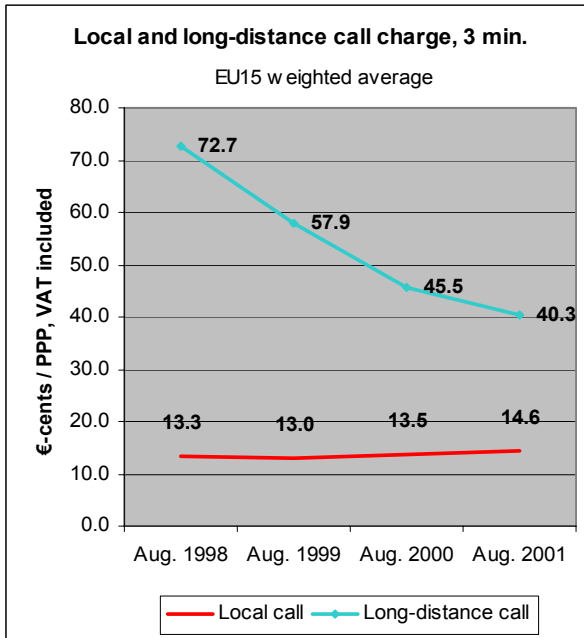
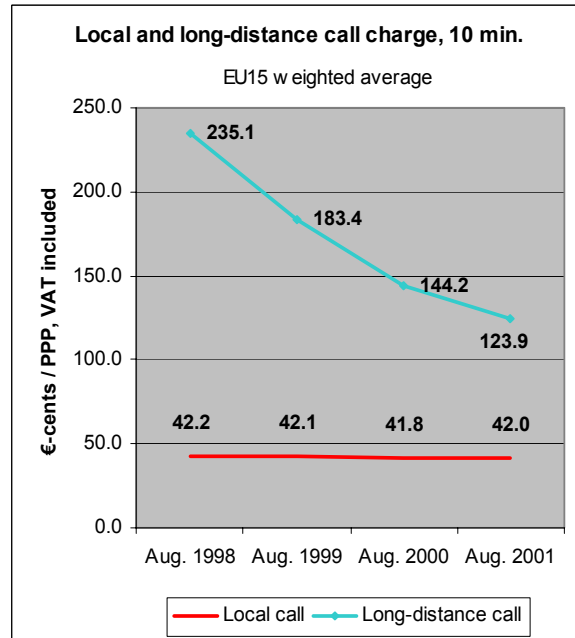


Chart 15



4.2. TREND OF THE BASKET FOR FIXED NATIONAL CALLS (national basket)

The following charts show the variation of the monthly expenditure of residential and business users on fixed national calls with respect to August 2001, last year (August 2000) and August 1998 (in order to maintain consistency over time, the “old” OECD basket is used, which, unlike the “composite”, does not include international calls).

The variation in the international basket is shown in section 5.

Chart 16

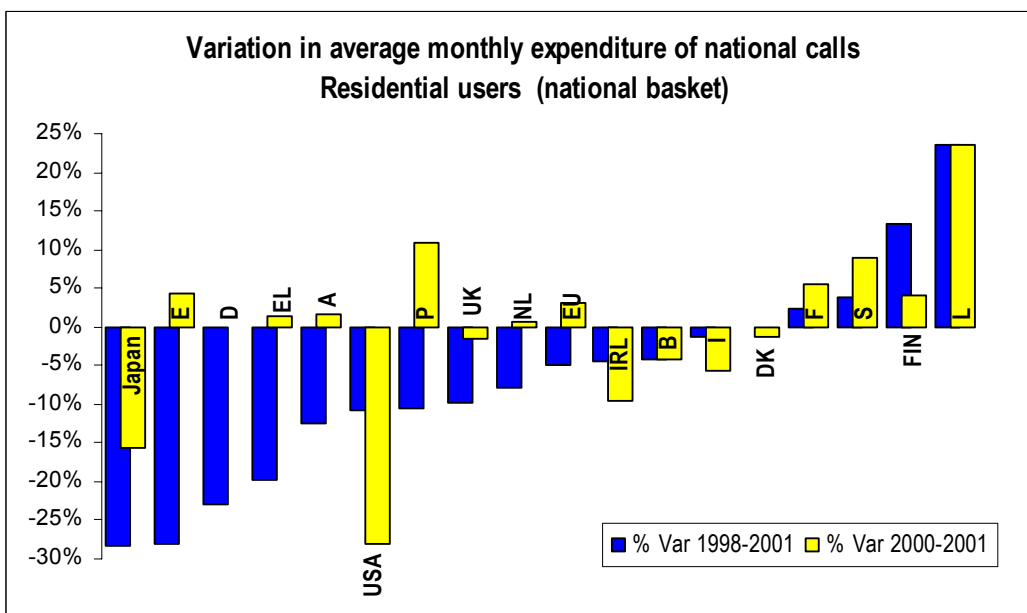


Chart 17

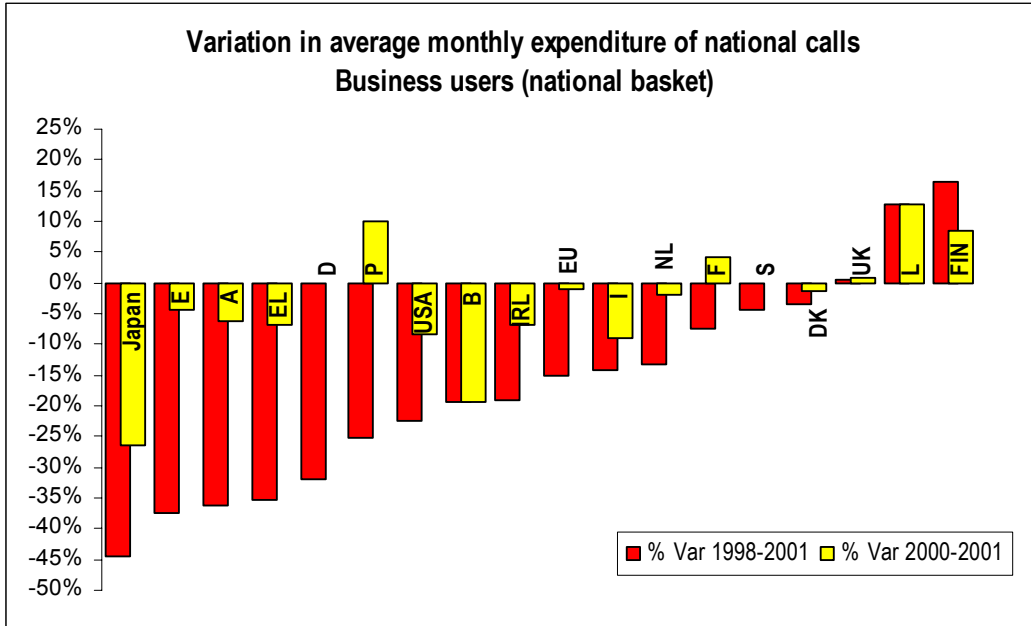
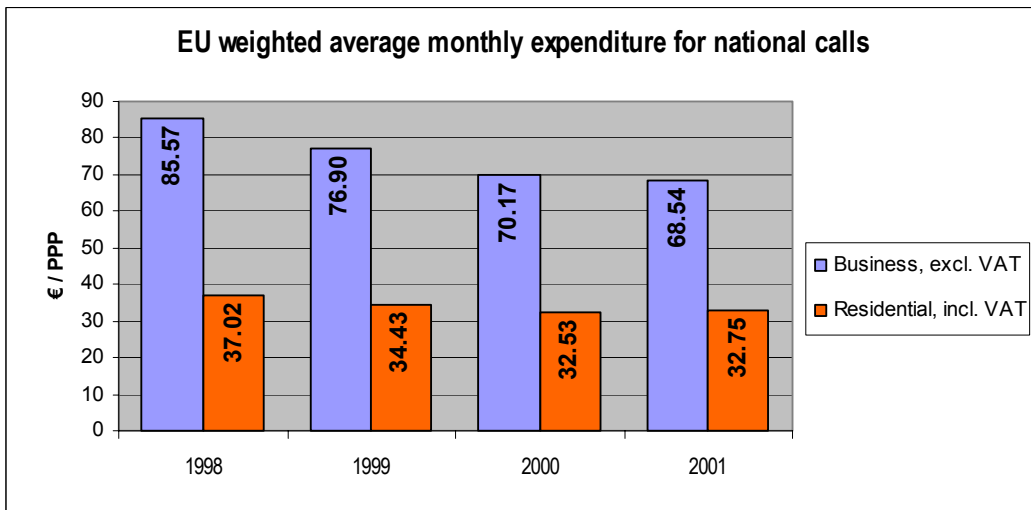


Chart 18



5. FIXED INTERNATIONAL CALLS

The following charts show the prices of the international call basket (an estimate of the average cost of an international call in each country) and the price of a 10-minute call to specified destinations (within Europe, to Japan and to the USA).

5.1.PRICE OF AN AVERAGE FIXED INTERNATIONAL CALL (international call basket)

The basket of international calls for each country indicates the weighted average price of a three-minute call during peak hours and a five-minute call during off-peak hours from the originating country to the other OECD countries. Traffic weighting is used, as defined by the OECD for the destination weighting, as per the revision in 2000. This method applies a weight to each destination based on the traffic volumes reported on that route (ITU statistics). Therefore, prices indicated in this section are not comparable to those in the Sixth report, which was constructed on the basis of the OECD zone weighting methodology.

The prices refer to the standard tariff packages, and not to any cheaper tariffs which may be available under discounted packages. In Austria and the Netherlands specific packages have been chosen, as no “standard” tariffs exist.

The residential basket includes VAT. Call charges are weighted between peak and off-peak hours: 25% for peak hours and 75% for off-peak hours. The business basket excludes VAT. Call charges are weighted 75% for peak hours and 25% for off-peak hours. The average price of an international call is lower for business users than for residential users because of the heavier weighting given to three-minute peak-hour calls, which are on average cheaper than five-minute off-peak calls, and because VAT is excluded for business users but included for residential users.

Values are expressed in €-PPP and give the position in August 2001.

The variations in nominal terms since August 1998 are also shown.

Chart 19

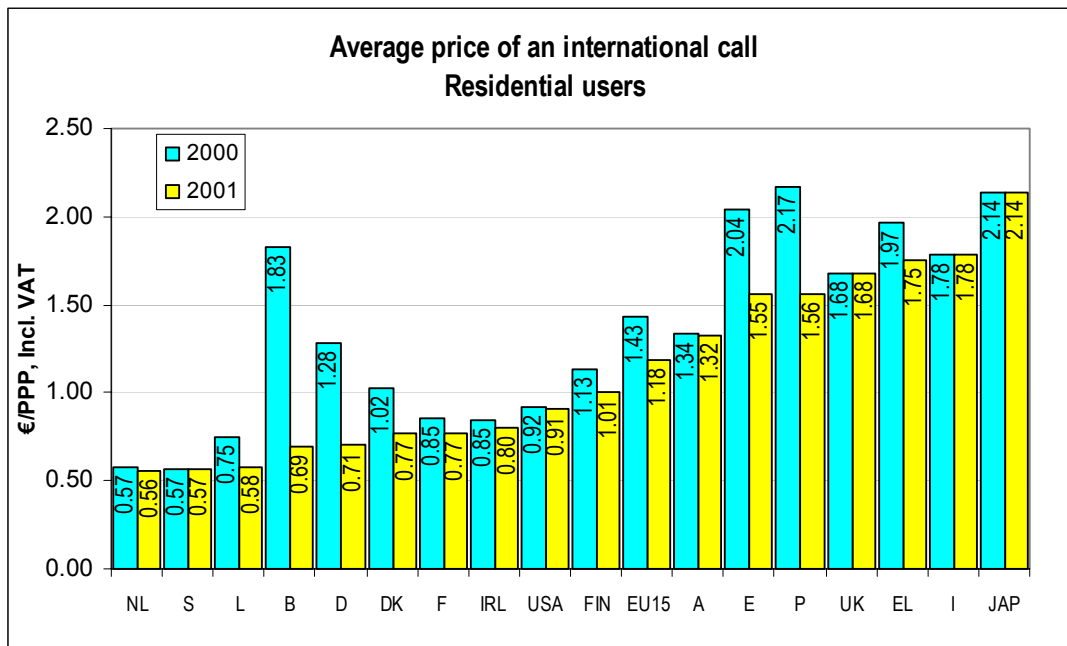


Chart 20

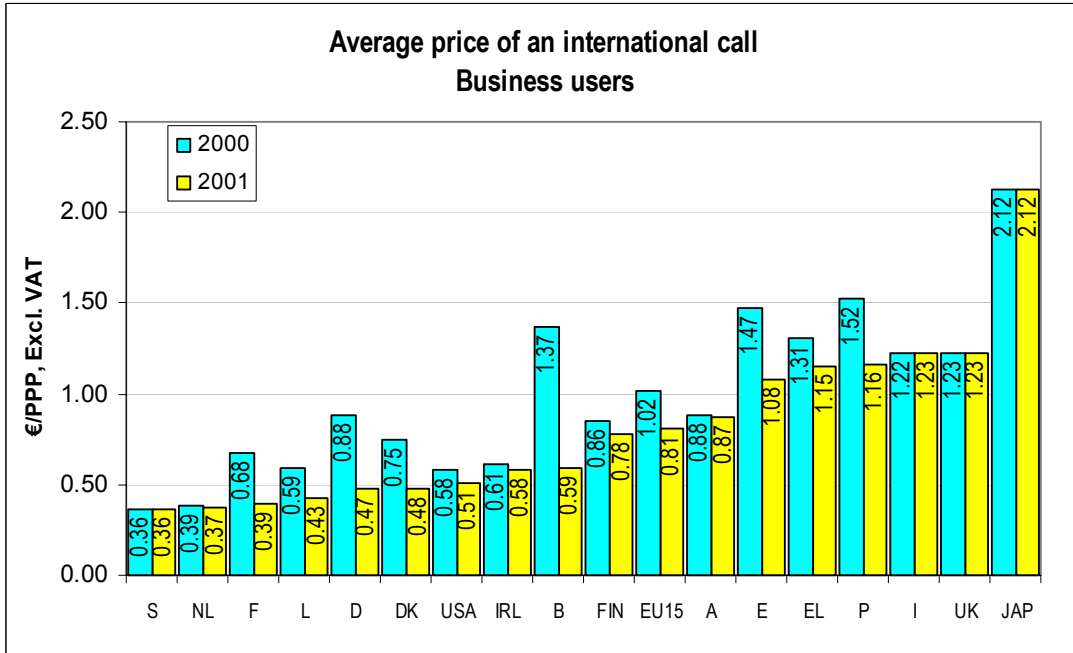
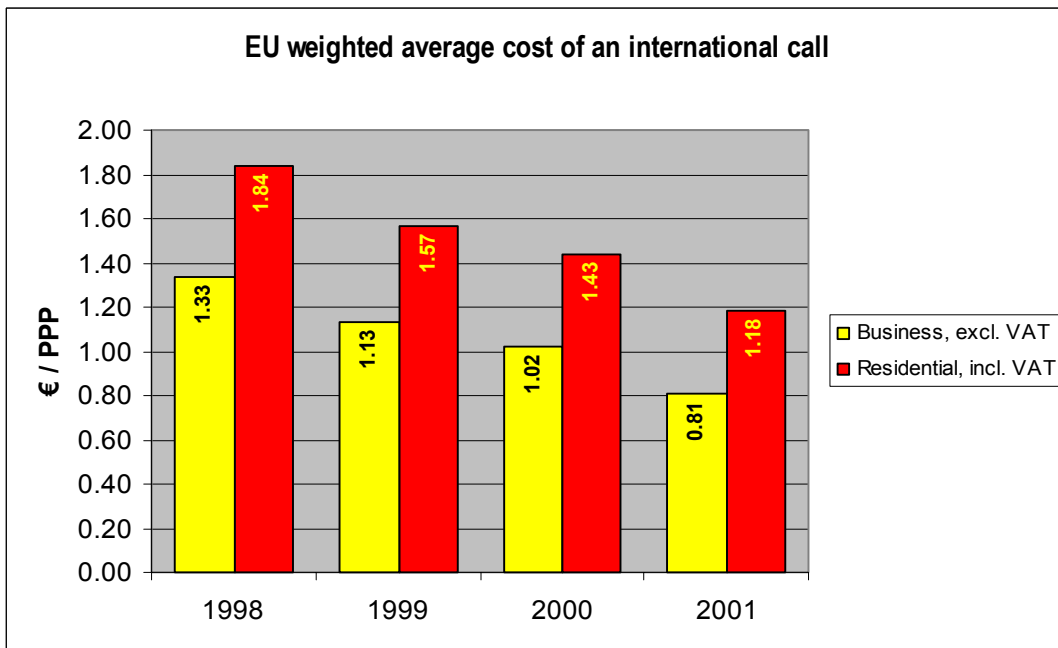


Chart 21



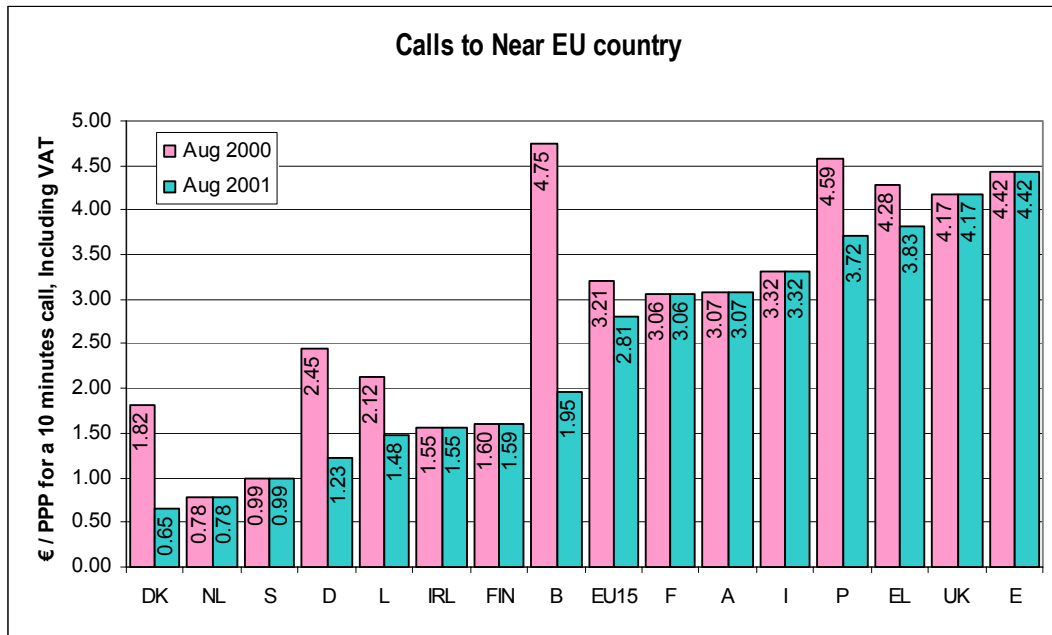
5.2. PRICES OF INDIVIDUAL INTERNATIONAL CALLS TO EUROPE, JAPAN AND THE USA

The following two charts show the prices of a 10-minute international call (including VAT) during peak hours (weekday 11.00) to four different destinations: neighbouring country⁹ (near EU), more distance country¹⁰ (far EU), Japan and the USA.

Figures are expressed in €-PPP at August 2001 values, including VAT; they refer to the European incumbent operators, the EU weighted average, KDD for Japan and AT&T for the USA.

Price variations since August 2000 are also indicated.

Chart 22



⁹ The neighbouring countries are defined as: France for Belgium, Germany and the United Kingdom; Sweden for Denmark and Finland; Italy for Greece (and *viceversa*); Portugal for Spain (and *viceversa*); the United Kingdom for Ireland, the USA and Japan; Germany for Luxembourg, the Netherlands and Austria; Belgium for France.

¹⁰ The more distant countries are defined as: Greece for Belgium, Denmark, Germany, France, Ireland, Luxembourg, the Netherlands, Austria, Finland, Sweden, the United Kingdom, the USA and Japan; Denmark for Greece, Spain, Italy and Portugal.

Chart 23

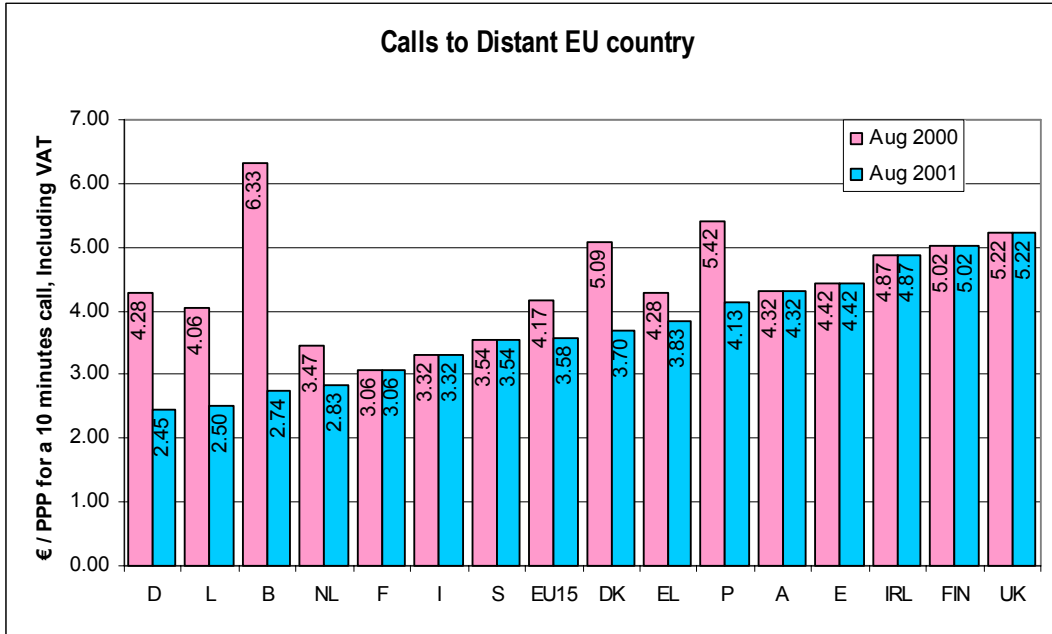
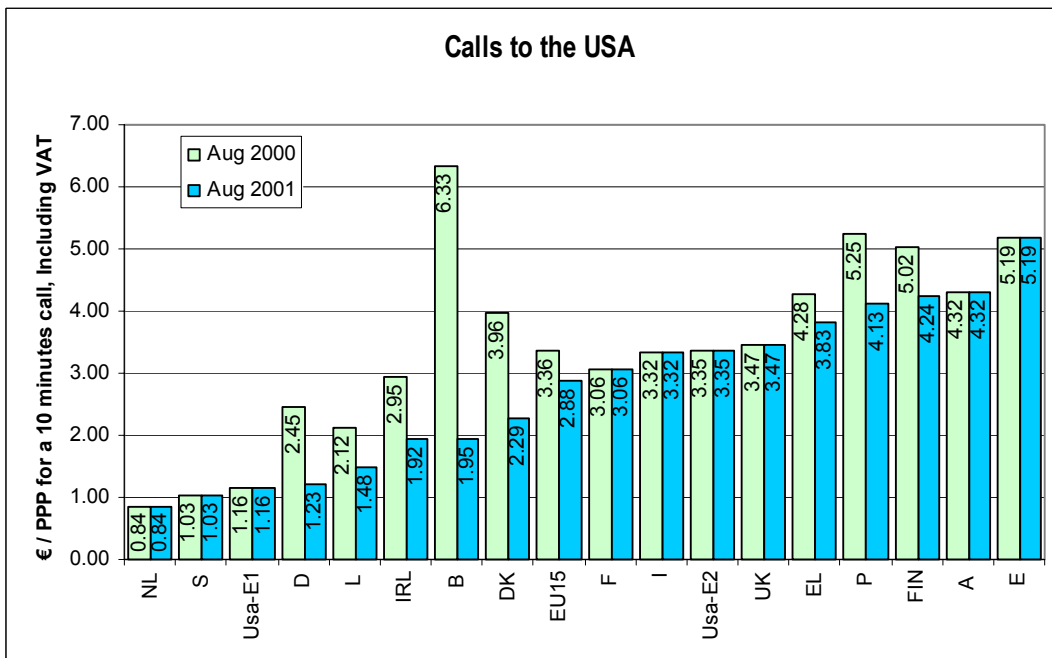
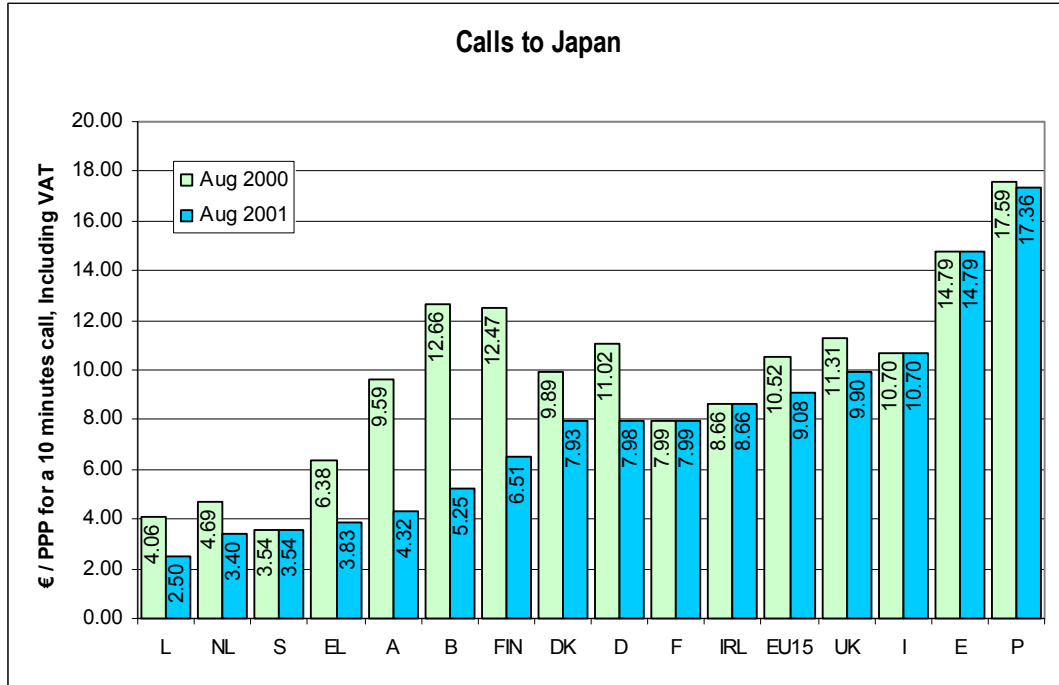


Chart 24



For comparative purposes, the chart also recalls the cost of a call from the USA respectively to a near (see “Usa-E1” in the chart) and a distant (see “Usa-2” in the chart) EU country.

Chart 25



6. COMPARISON BETWEEN THE PRICES CHARGED BY INCUMBENT AND ALTERNATIVE OPERATORS

This section compares the prices charged for public voice telephony services by the incumbent operators in a sample of EU Member States and by some of their main competitors. The information collected by Total Research-Teligen concerns exclusively Belgium, Germany, Spain, France, Sweden and the United Kingdom.

Since prices vary substantially across the countries, these tariffs are merely examples and are not necessarily typical (for example, many operators offer “free” local calls, depending on the tariff package chosen by the subscribers).

Prices include VAT and are applicable for August 2001.

Chart 26

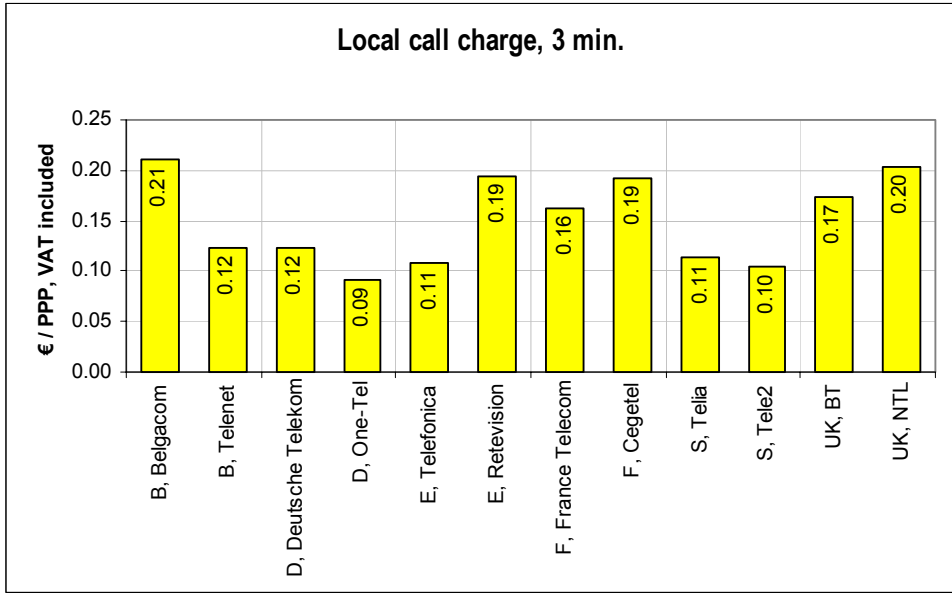


Chart 27

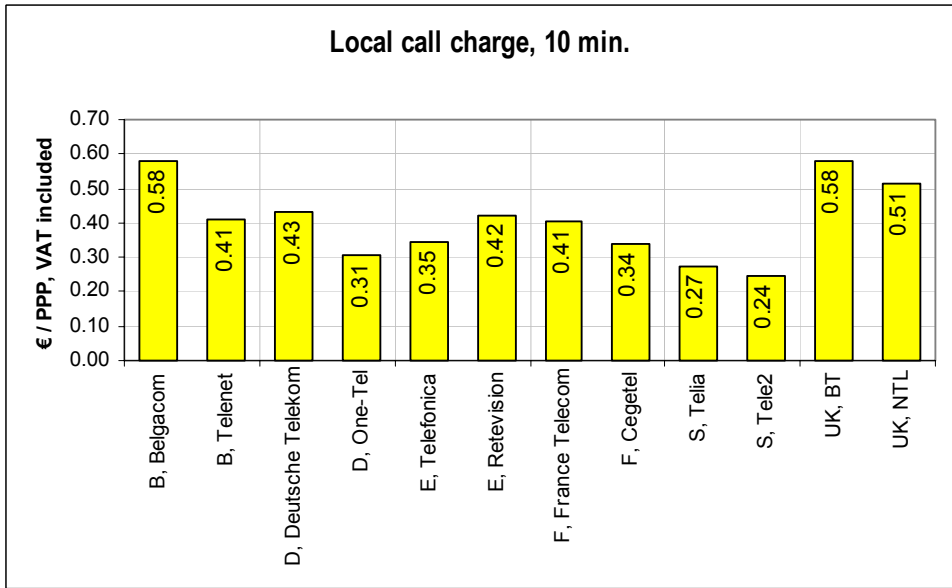


Chart 28

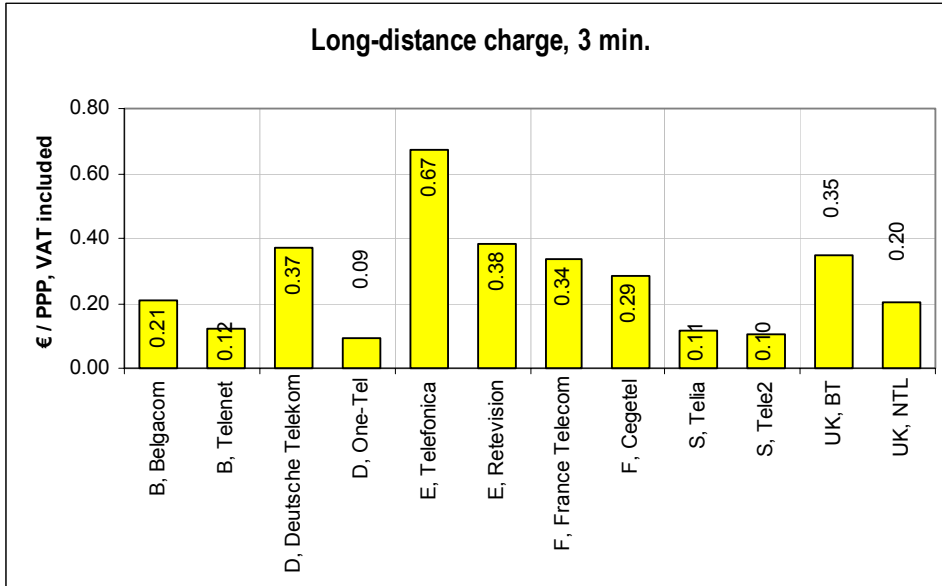
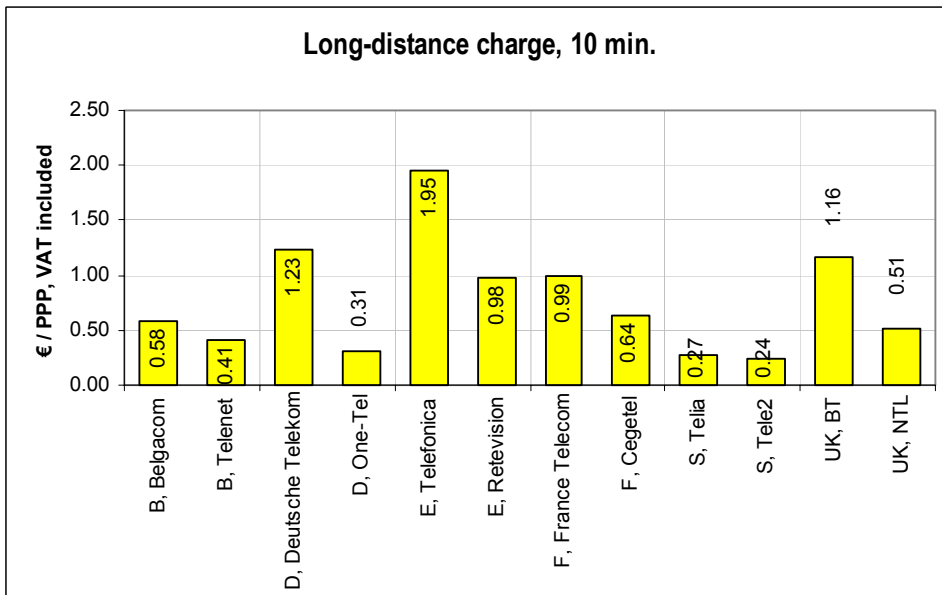


Chart 29



|

|

1.4 LEASED LINES

This section contains an overview of prices charged by incumbent operators in each Member State for national and international leased line services as of 1 August 2001. Price developments are also analysed over the period August 1998-2001.

The figures and the information are taken from a study carried out by Total Research-Teligen for the Commission. Data on standard retail prices charged by incumbent operators have been collected in each country.

1. INCUMBENTS' NATIONAL LEASED LINES

In the case of national leased line services, three distances are covered: 2 km (local circuits), 50 km and 200 km. 50 km and 200 km lines include a 2 km circuit tail at both ends. This means that the long distance part of the circuit will be 46 km and 196 km respectively, when local tail and main circuit prices are specified separately. When a single price, including local tails, is specified for the end to end circuit, tariffs for main circuits of respectively 2 km, 50 km and 200 km are considered.

The following types of digital circuit are considered: digital 64 Kbit/s, 2 Mbit/s, 34 Mbit/s and 155 Mbit/s. As not all carriers publish prices for all bitrates, information on all countries is not always available. This is especially the case for higher bitrates.

The following charts show the price levels and developments for various categories.

Where possible, comparisons are made between standard rates in the EU Member States, the USA and Japan.

The following should be noted:

- All charges are in euro per year, VAT excluded. See the “Appendix on exchange rates” for details on euro exchange rates used herein.
- When different prices apply according to geographical location of the leased line, standard prices chosen for this analysis are those for 2 km circuits wholly within a major city and for 50-200 km circuits connecting a major city to a “minor” city. In particular, the following tariffs are considered: for Belgium, “Level 1” tariffs; for Austria, the “City-Tariff”, starting from 2001; for Sweden and Finland, the Green tariffs; for the United Kingdom, the tariffs for 2 km circuits within the Central London Zone and for long distance circuits with one or both ends outside the Central London Zone; for France, in the case of 34 and 155 Mbit/s, the tariffs for circuits with one end in zone A, as defined by France Telecom.
- Finland is not included in the analysis of 64 Kbit/s circuits, because since 1998 Sonera does not publish the prices for full 64 Kbit/s services. Furthermore, since that year the company no longer published prices for 2 Mbit/s circuits.
- Prices refer to basic services and only unstructured circuits are considered for 2 Mbit/s services.
- Prices used are standard prices, excluding any discounts.
- The expression “EU average” refers to the simple, non-weighted average across EU countries.
- The EU average variation represents the simple, non-weighted average of national variations.

- For the USA, the prices of Nynex/Verizon (New York) and Pacific Bell (California) have been used. The prices refer to intra-LATA intra-State circuits. It should be noted that the bitrates of those services in the USA are different, so that 56 Kbit/s are taken instead of 64 Kbit/s, 1.5 Mbit/s instead of 2 Mbit/s and 43 Mbit/s instead of 34 Mbit/s. Prices have been adjusted according to the difference in capacity.

The tariffs are deemed to be in force as of 1 August 2001. The last changes in tariffs taken into account for operators in each of the Member States are the following:

Austria	01.06.00 ¹¹	Luxembourg	01.04.01
Belgium	01.07.01	Netherlands	01.04.01
Denmark	01.01.01	Portugal	01.07.99
Finland	00.01.00	Spain	31.05.01
France	01.03.01	Sweden	01.04.00
Germany	09.04.01	UK	01.12.00
Greece	12.08.00	USA, Verizon	01.06.00
Ireland	01.07.00	USA, PacBell	14.11.00
Italy	01.11.00	Japan	01.10.00

¹¹ It should be noted that new tariffs will be applicable from 1 September 2001.

1.1. NATIONAL LEASED LINE PRICES AS OF 1 AUGUST 2001

1.1.1. 64 Kbit/s

Chart 1

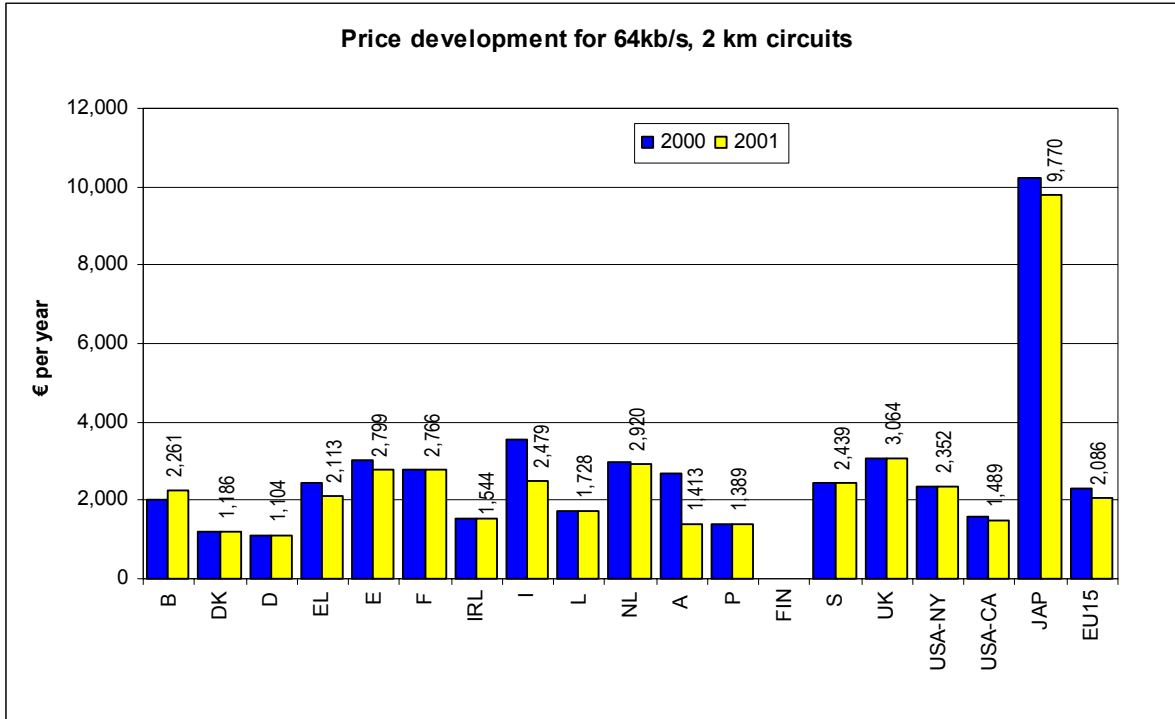


Chart 2

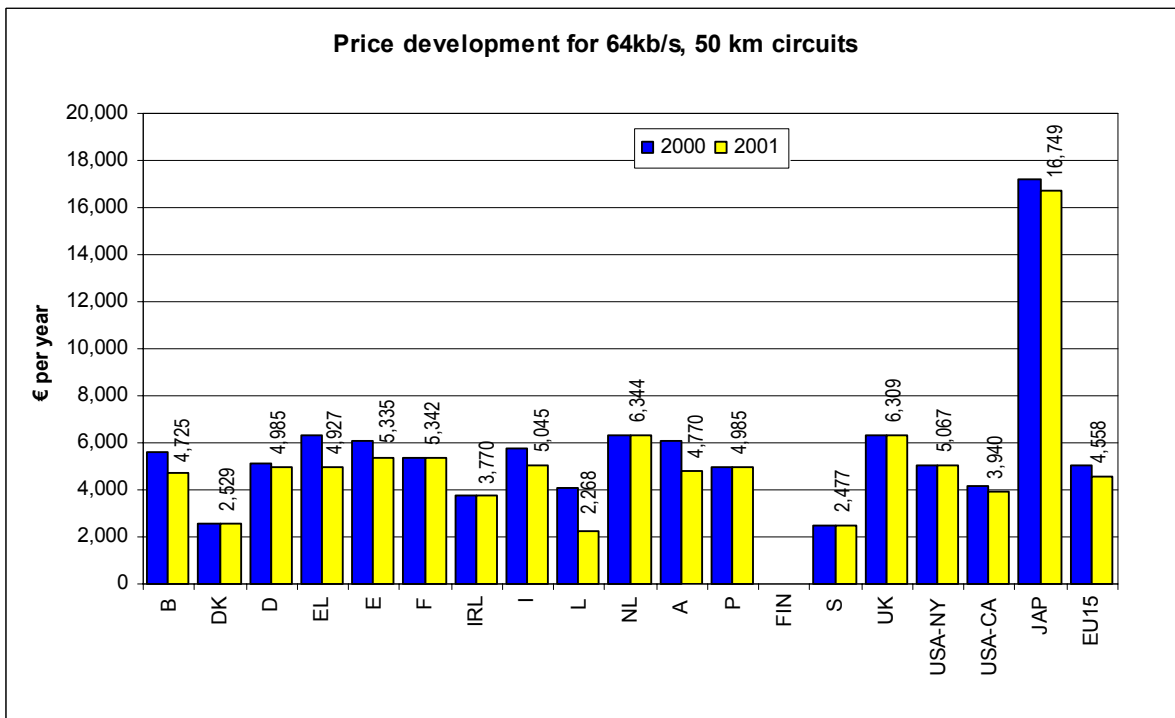
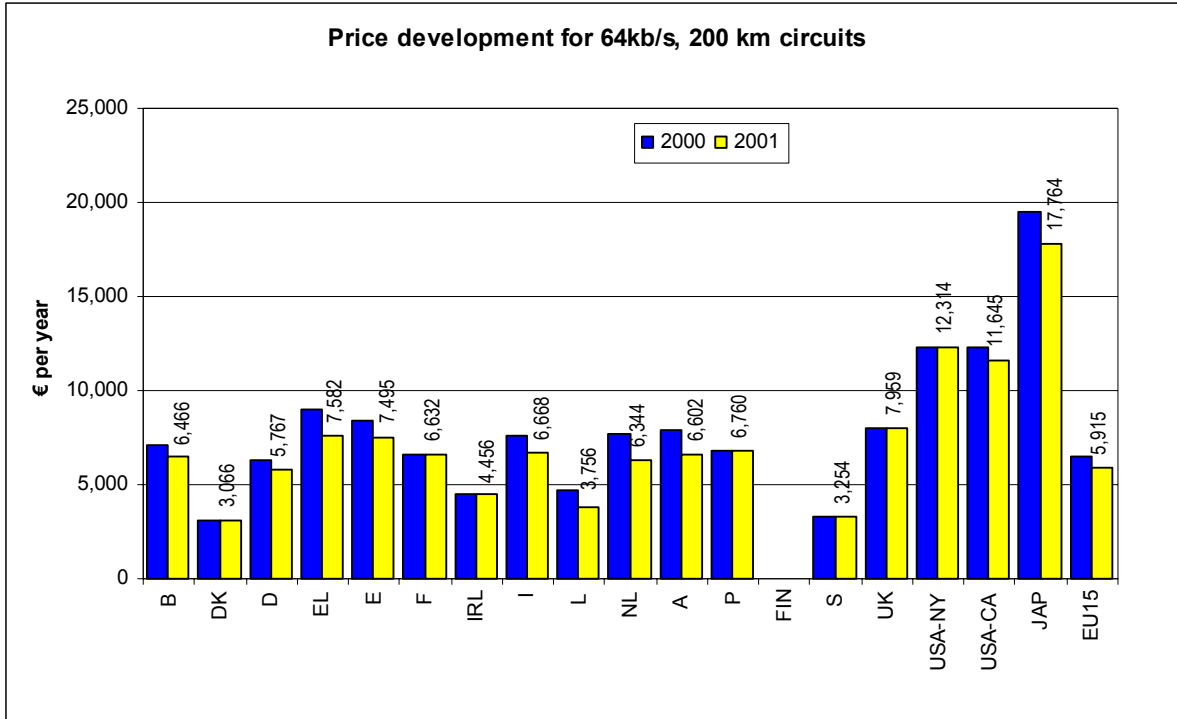


Chart 3



1.1.2. 2 Mbit/s

Chart 4

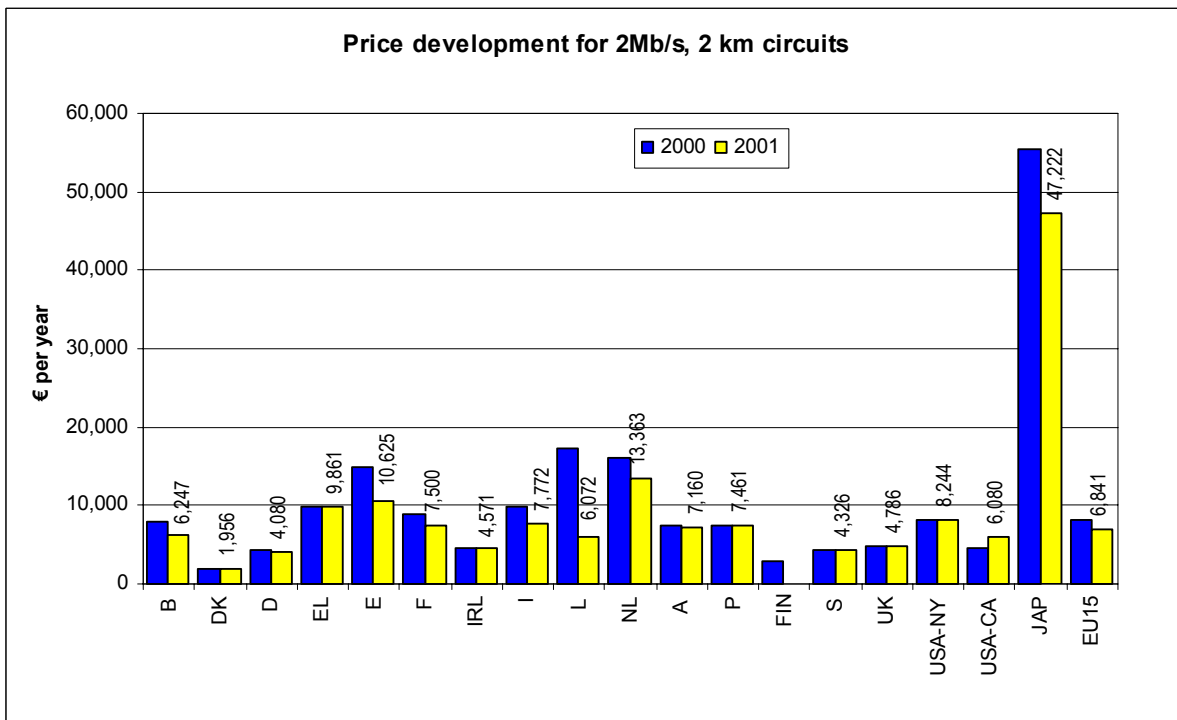


Chart 5

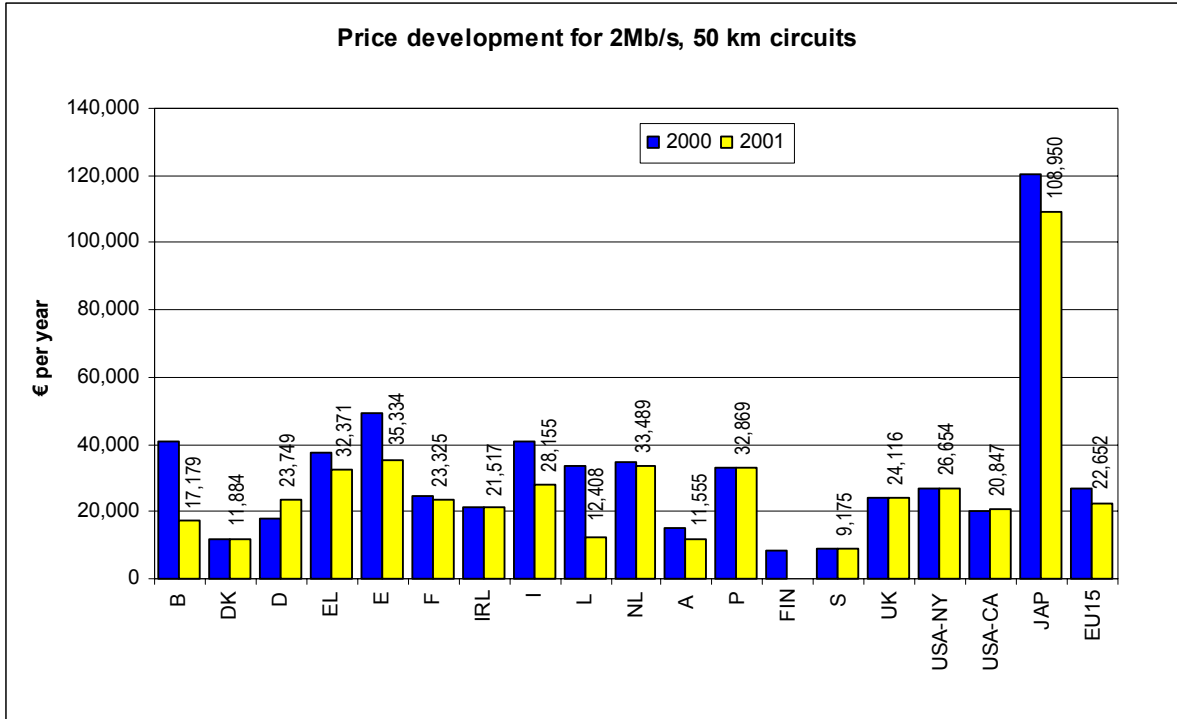
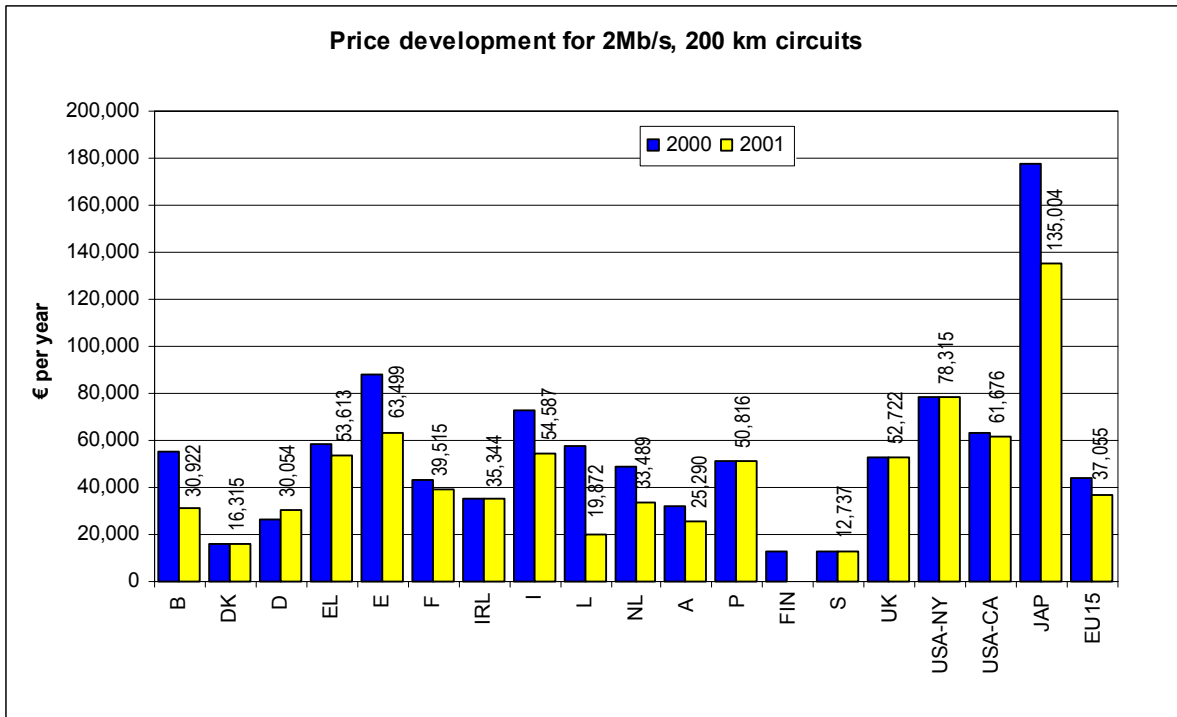


Chart 6



1.1.3. 34 Mbit/s

Chart 7

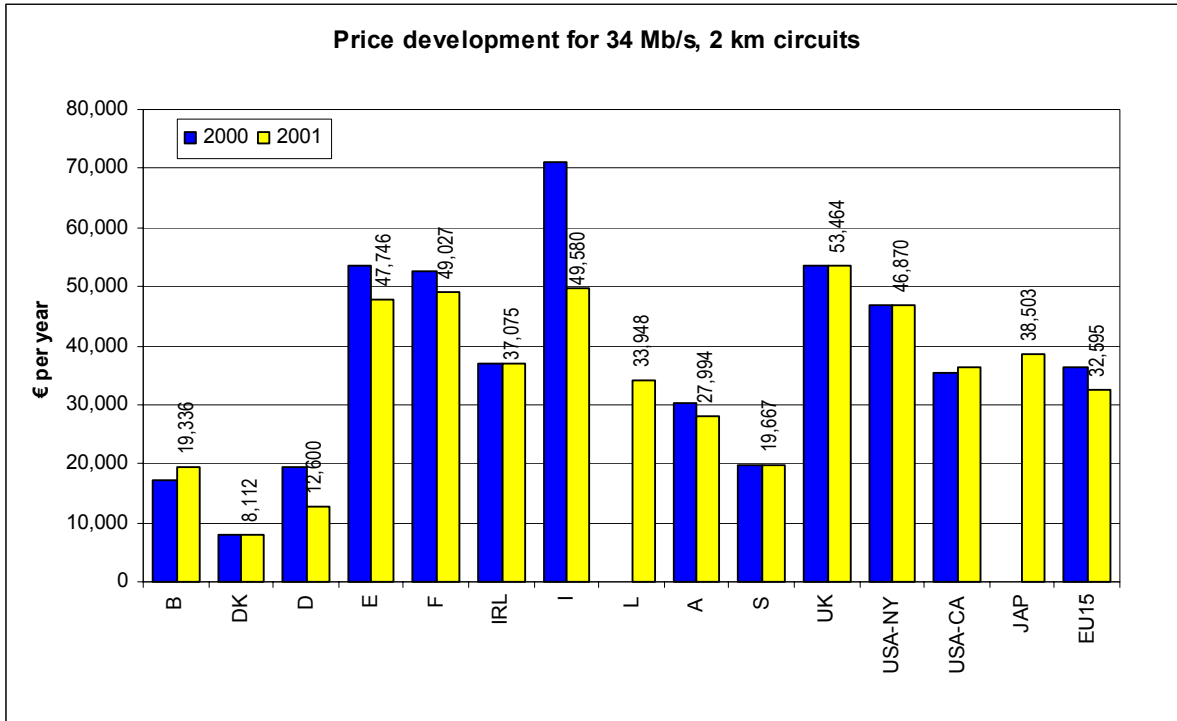
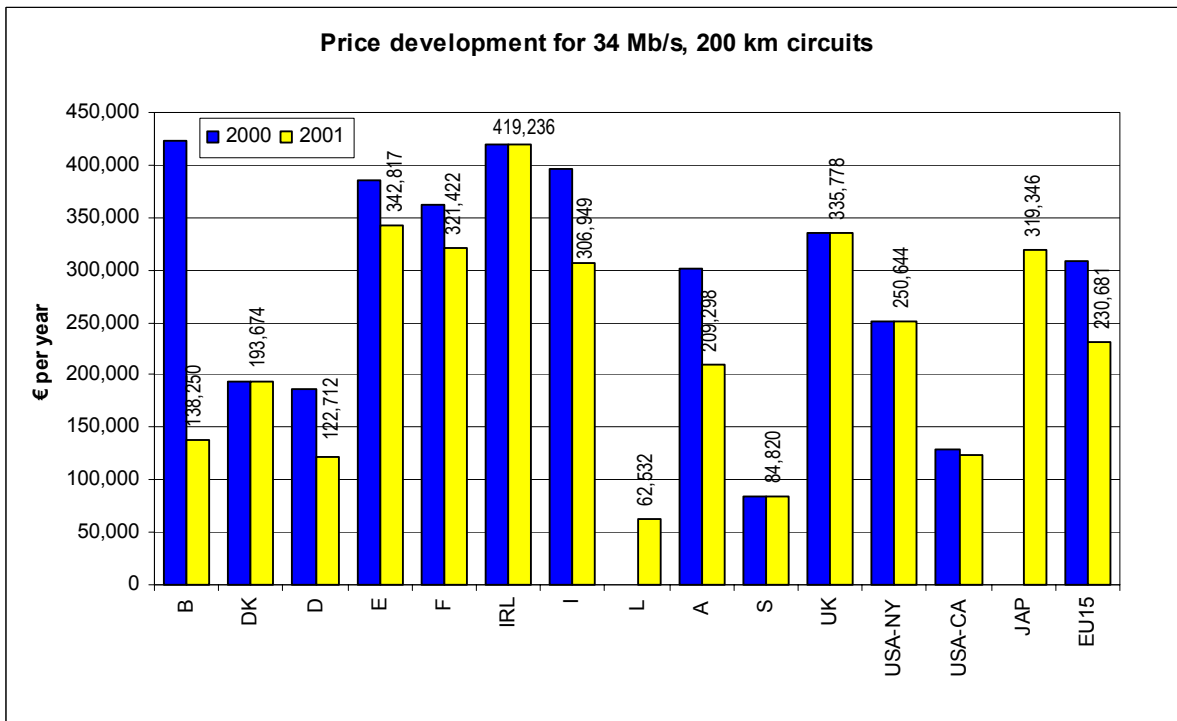


Chart 8



1.1.4. 155 Mbit/s

Chart 9

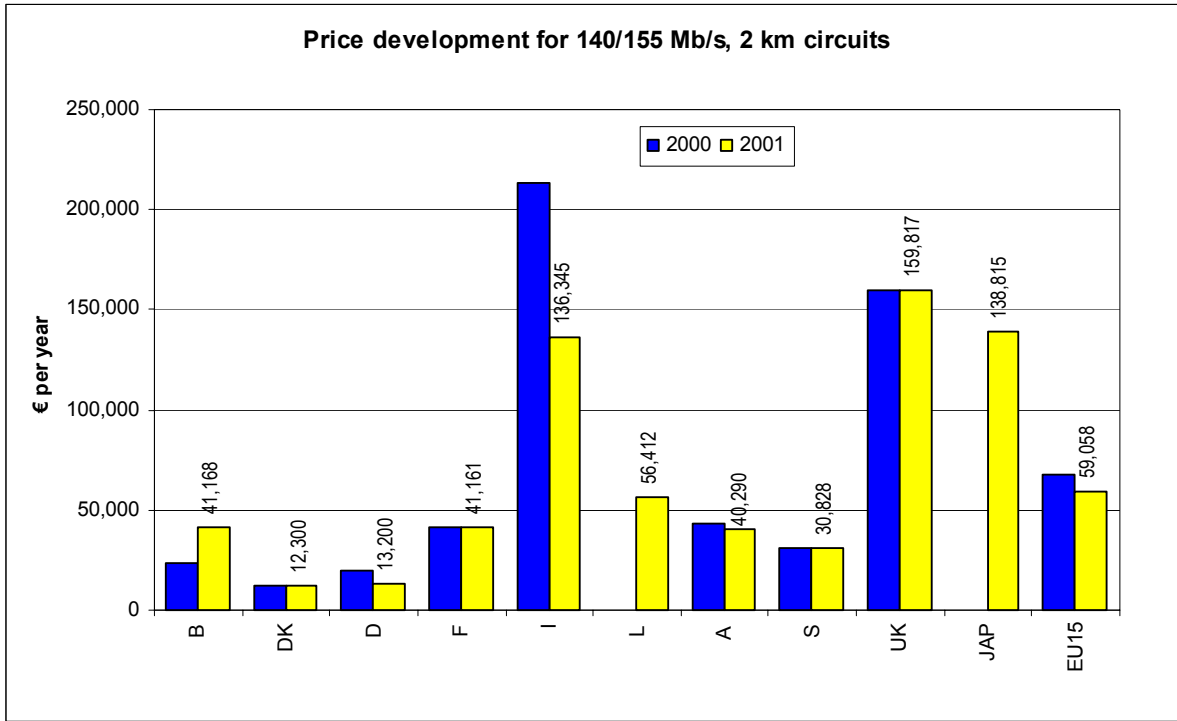
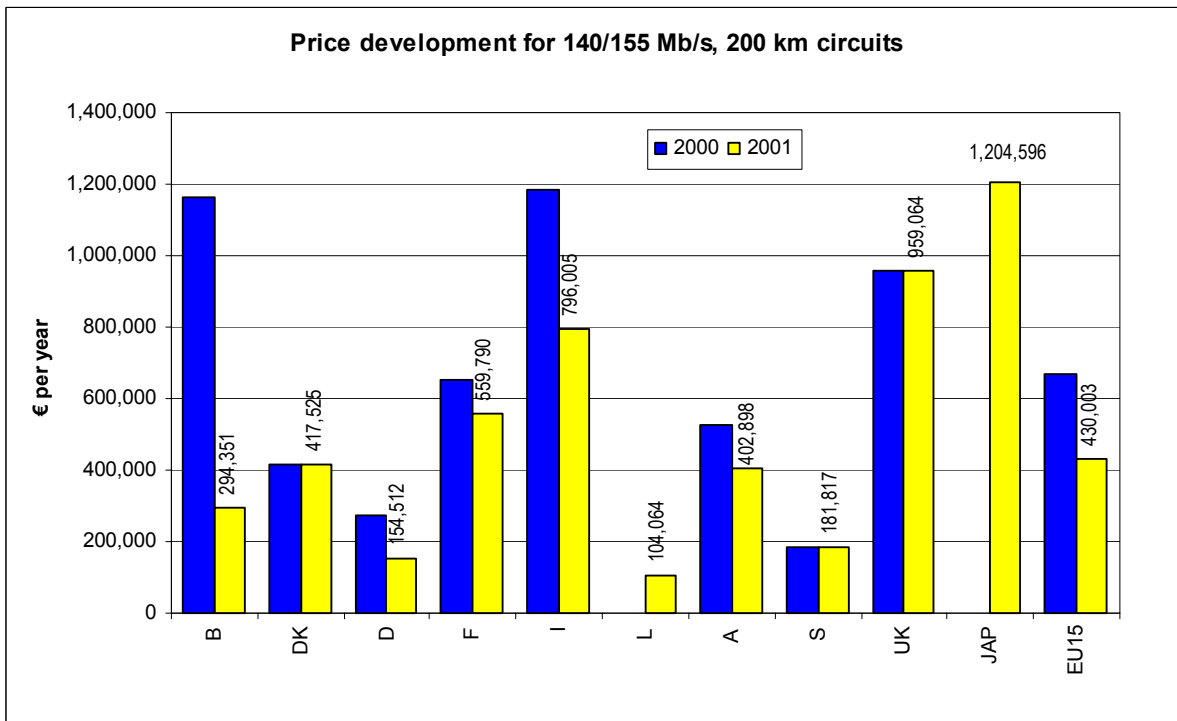


Chart 10



1.2. NATIONAL LEASED LINE PRICE TRENDS (1 AUGUST 1998- 1 AUGUST 2001)

Chart 11

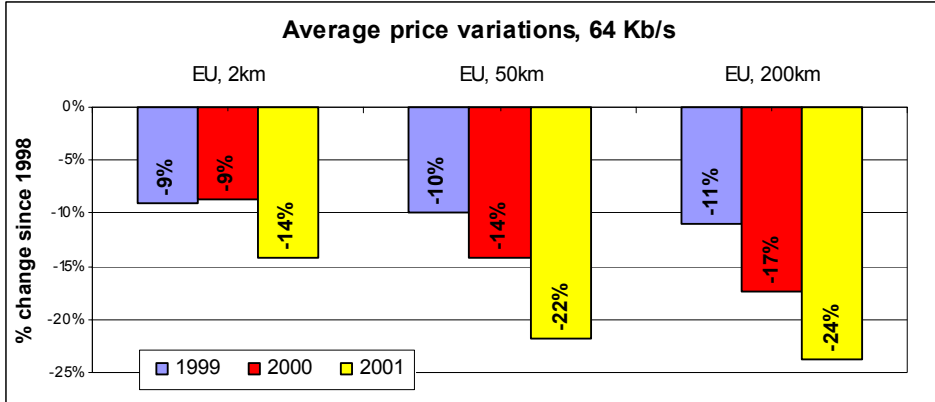


Chart 12

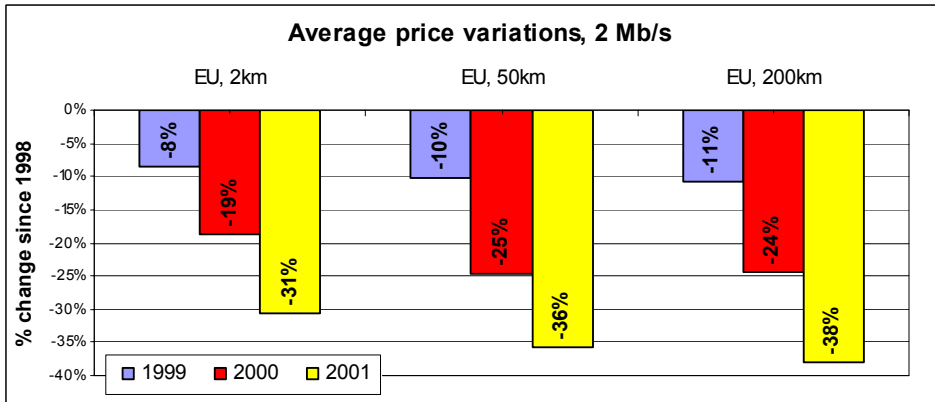
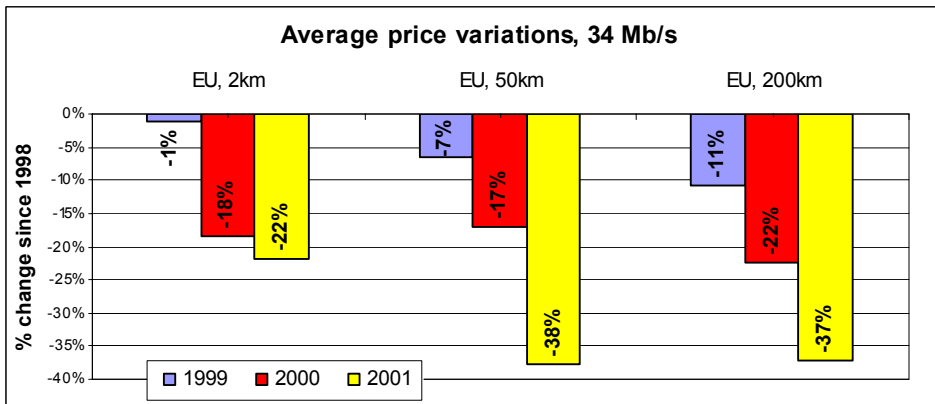


Chart 13



2. INCUMBENTS' INTERNATIONAL LEASED LINES

This section examines the standard retail prices (annual rental) for international leased line services (half-circuits in each country) charged by the incumbent operators in each Member State as of 1 August 2001. An analysis of the price development over the period from August 1998 to August 2001 is also included.

Three destinations are covered: international half circuits to the nearest EU country (hereafter “near EU”), to the most distant EU country (“far EU”) and to the USA. Near and far EU countries are defined in Table 1.

Furthermore, three (3) types of circuits are considered: digital 64 Kbit/s, 2 Mbit/s and 34 Mbit/s. Given that price information on 155 Mbit/s international lines is only available for a few member States, the analysis of these circuits is omitted.

Table 1: Definition of destination countries.

From:	Near EU	Far EU
B	F	EL
DK	S	EL
D	F	EL
EL	I	DK
E	P	DK
F	B	EL
IRL	UK	EL
I	EL	DK
L	D	EL
NL	D	EL
A	D	EL
P	E	DK
FIN	S	EL
S	DK	EL
UK	F	EL
USA	UK	EL
Japan	UK	EL

The following should be noted:

- All charges are in euro per year, VAT excluded. See the “Appendix on exchange rates” for details on euro exchange rates used in this section.
- Germany is not included in the analysis because Deutsche Telekom does not publish prices for international half circuits.
- The expression “EU average” refers to the simple, non-weighted average across EU countries.

- The EU average variation represents variations of the non-weighted EU average.

The tariffs are those deemed to be in force as of 1 August 2001. The last changes in tariffs taken into account for operators in each Member States are indicated in Table 2.

Table 2

	Last update	Confirmed
Belgium	01.03.99	18.10.01
Denmark	15.08.00	18.10.01
Germany	01.01.00	-
Greece	01.03.99	01.01.01
Spain	15.12.99	01.06.01
France	01.01.00	18.10.01
Ireland	21.04.00	24.07.00
Italy	01.09.00	01.01.01
Luxembourg	01.04.01	01.05.01
Netherlands	01.01.01	01.01.01
Austria	01.07.99	18.10.01
Portugal	01.07.99	01.07.01
Finland	01.01.01	01.09.01
Sweden	01.01.99	01.02.01
UK	01.11.99	18.10.01
USA	Basic prices have not changed for a long time	
Japan	01.10.00	01.11.00

2.1. INTERNATIONAL LEASED LINE PRICES AS OF 1 AUGUST 2001

2.1.1. 64 Kbit/s

Chart 19

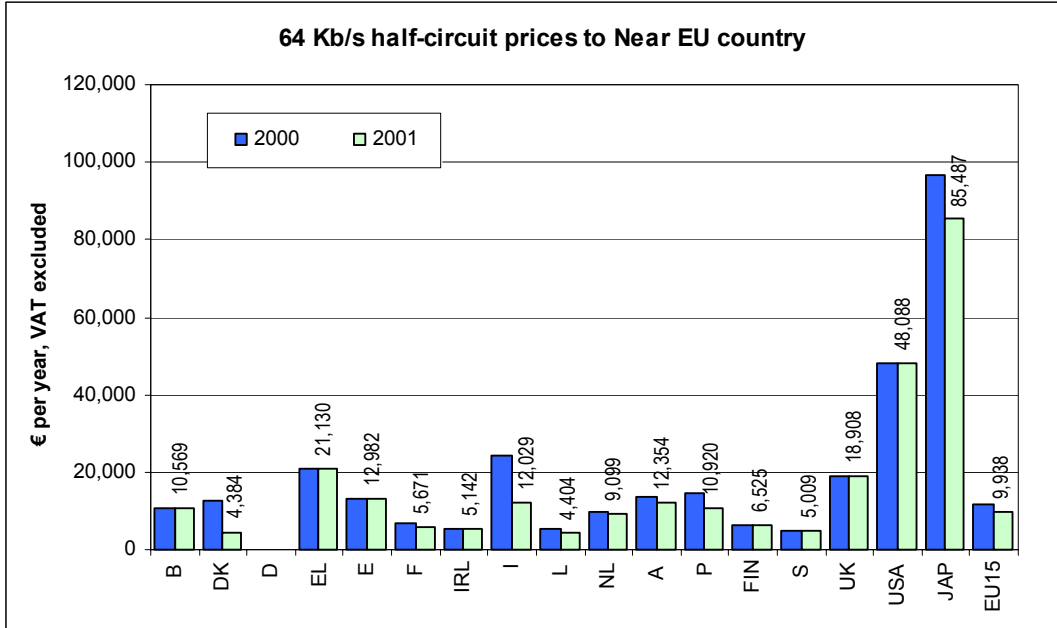


Chart 20

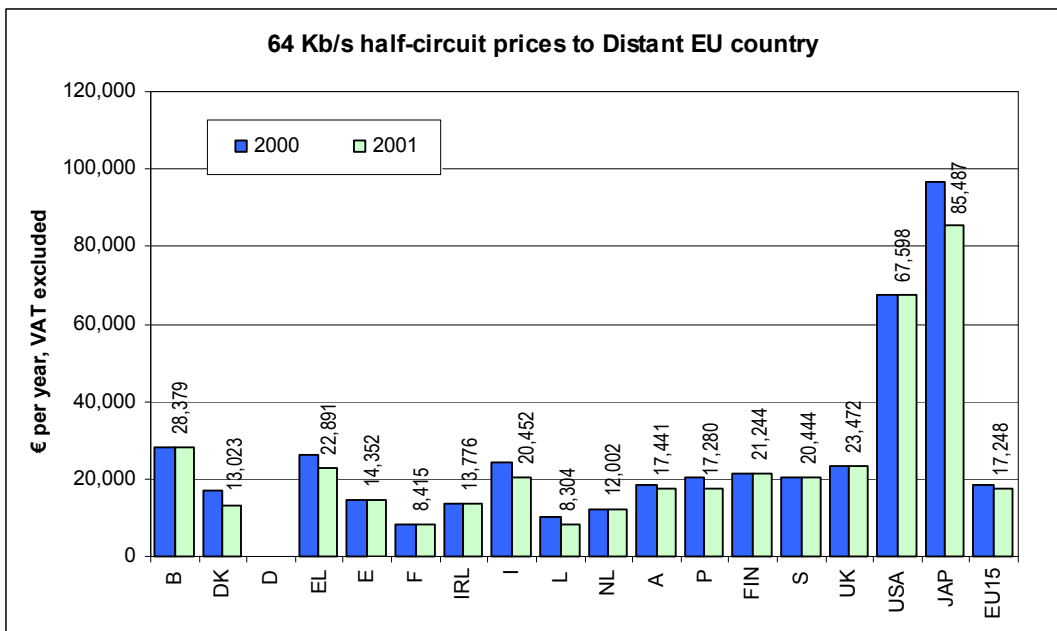
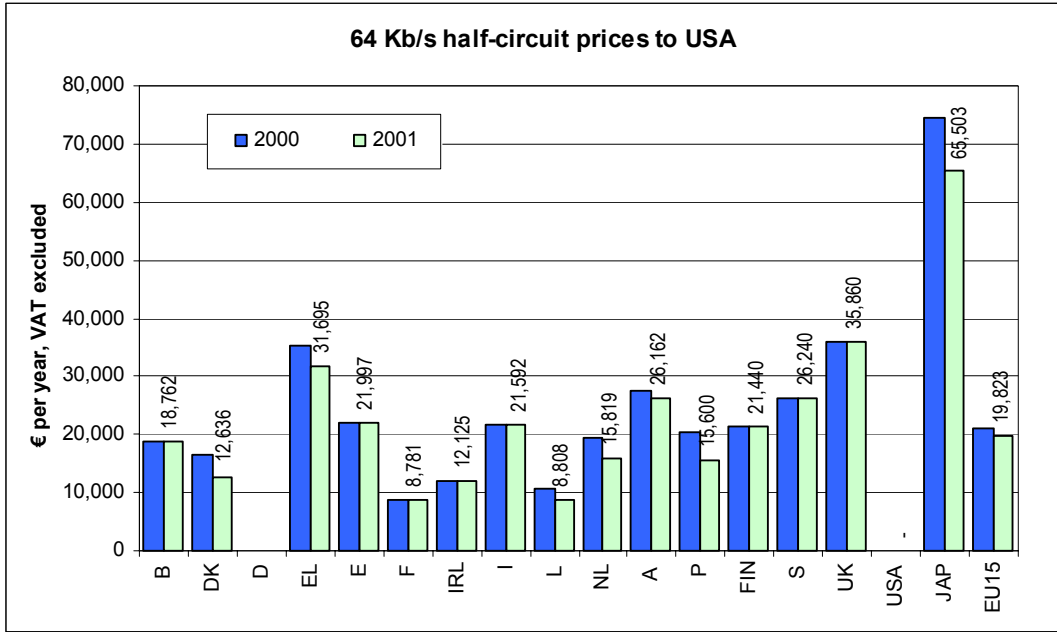


Chart 21



2.1.2. 2 Mbit/s

Chart 22

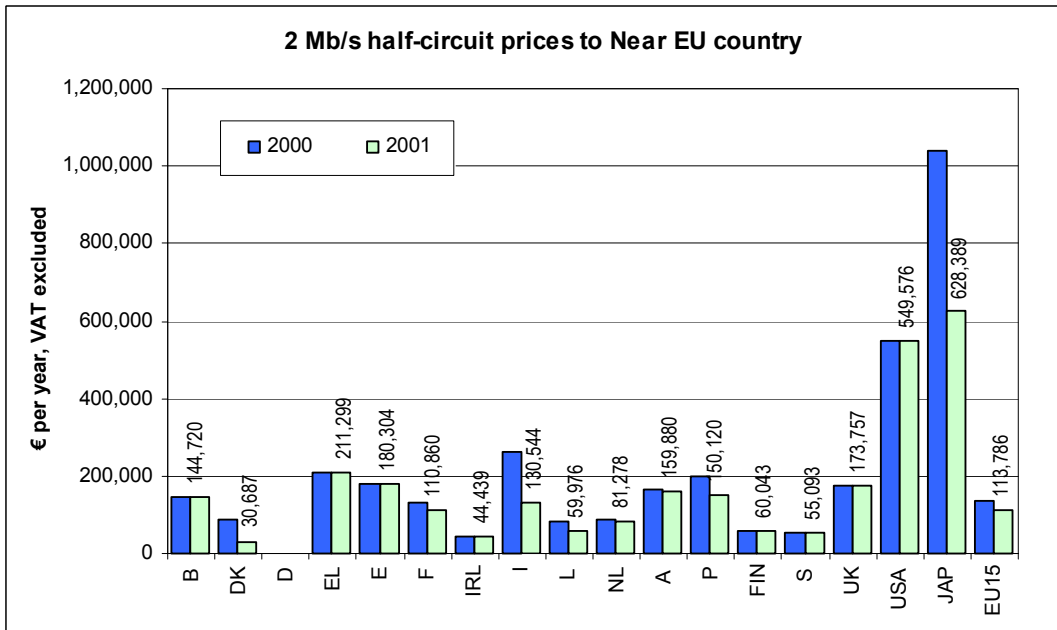


Chart 23

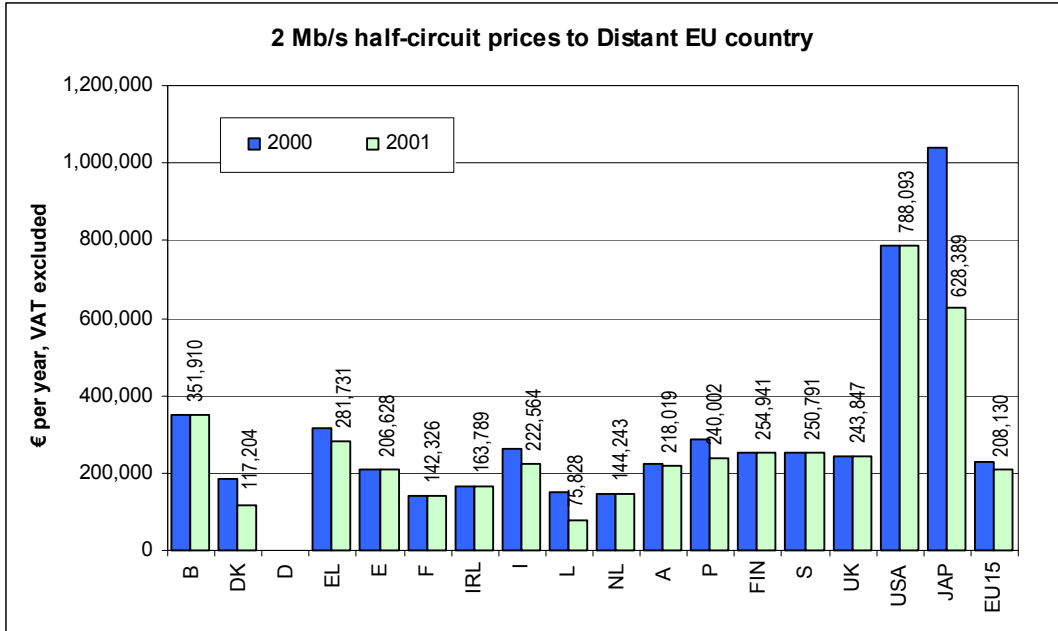
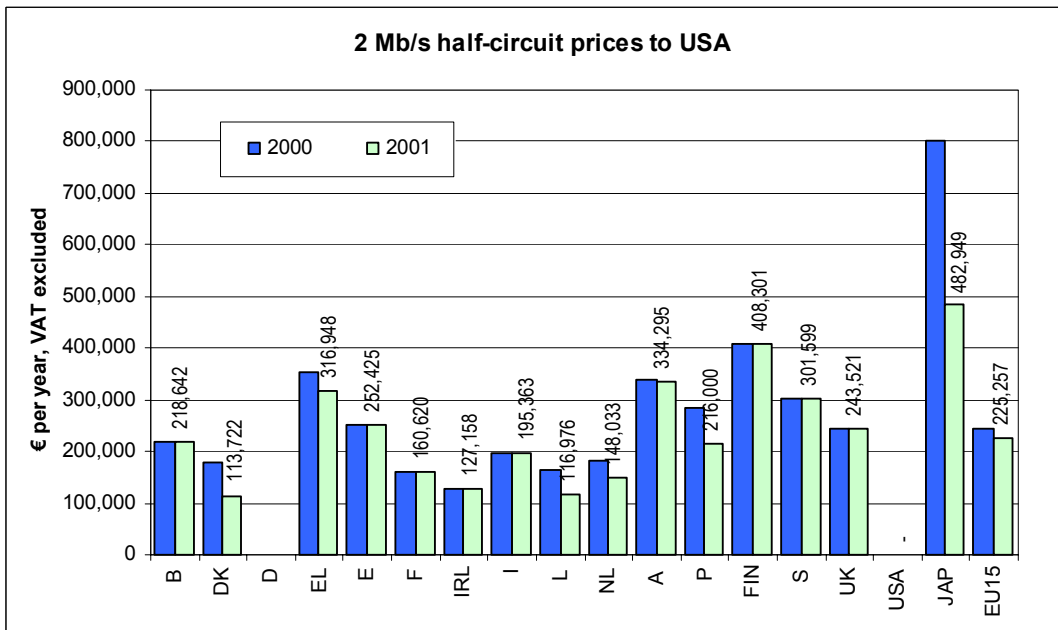


Chart 24



2.1.3. 34 Mbit/s

Chart 25

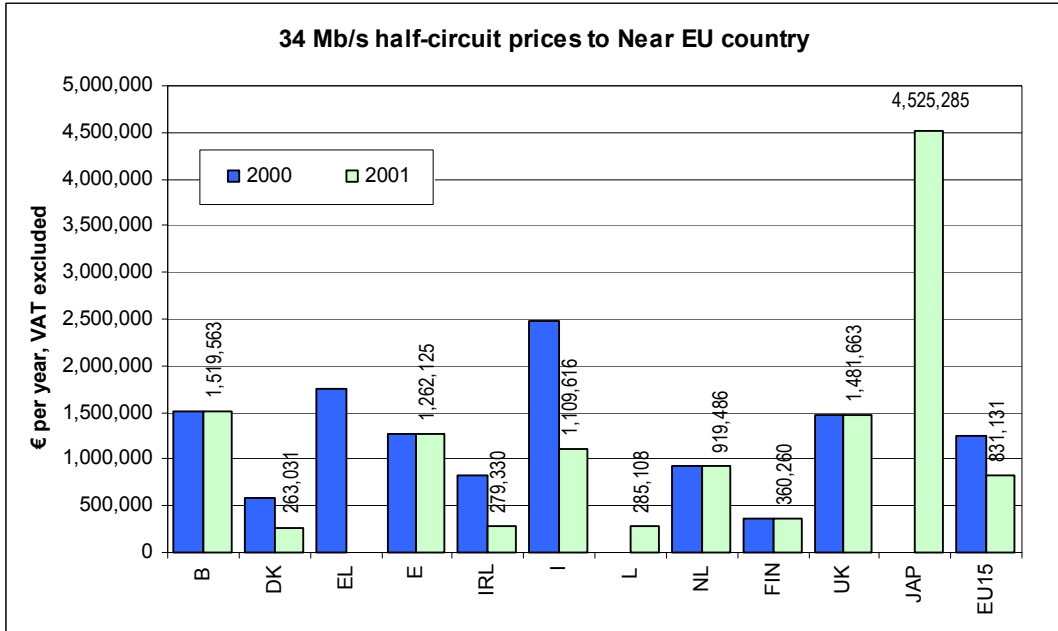
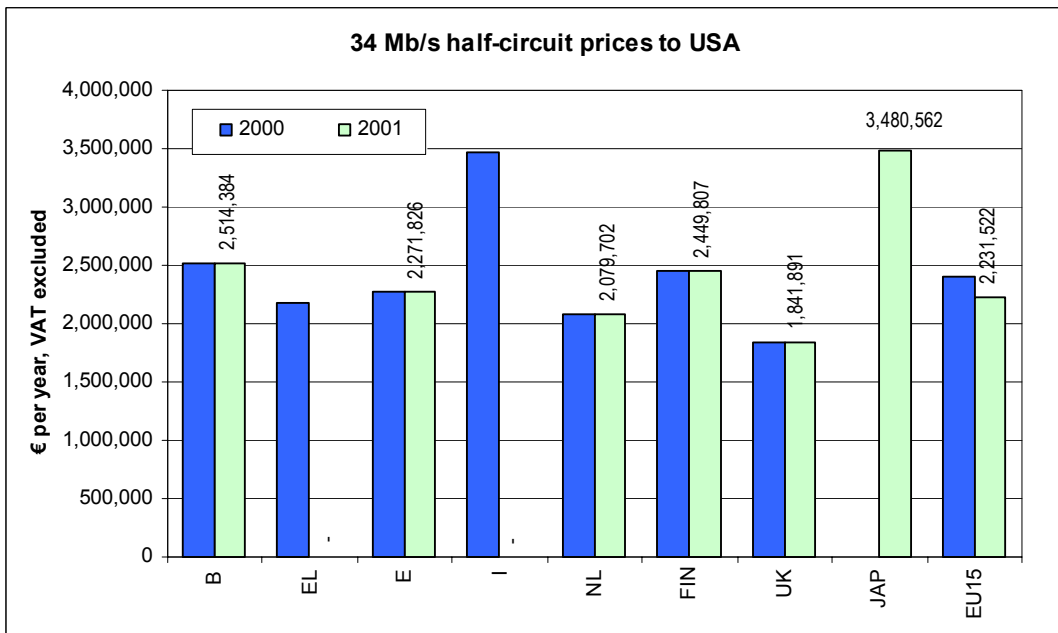


Chart 26



2.2. INTERNATIONAL LEASED LINE PRICE TRENDS (1 AUGUST 1998 - 1 AUGUST 2001)

Unlike section 1.2, the EU average variations below represent percentage changes of EU average.

Chart 27

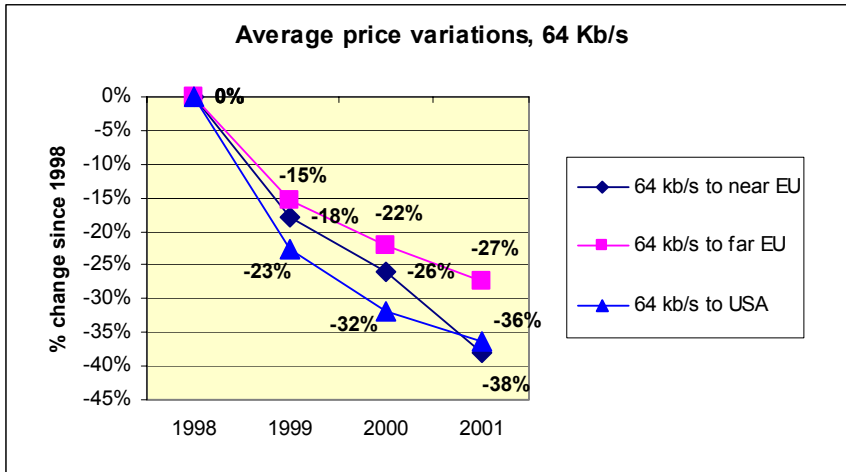


Chart 28

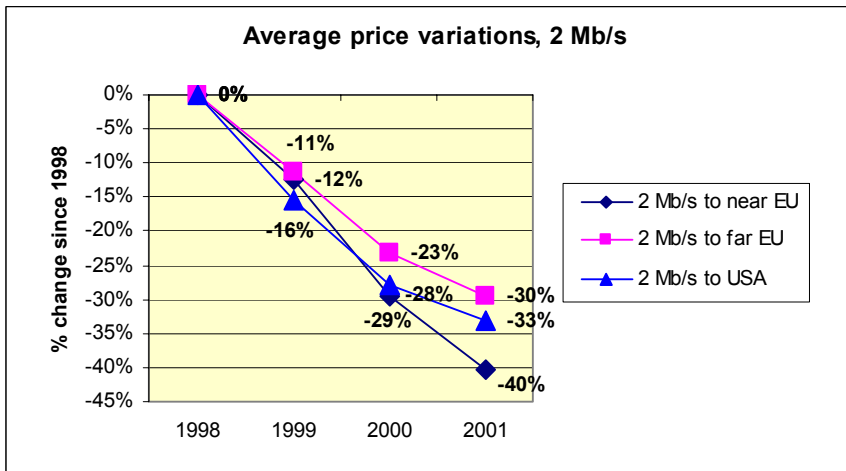
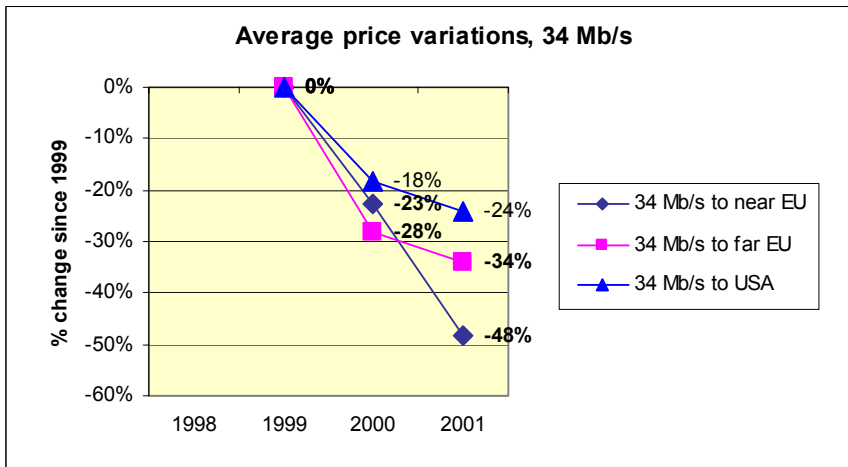


Chart 29



1.5 MOBILE SERVICES

1 MOBILE MARKET DATA

The following charts estimate for each Member State the number of mobile subscribers and the penetration rate in 2001, and the growth in the penetration rate since August 2000.

Subscribers figures are taken from FT Mobile Communications (August 2001) and include both analogue and digital (second-generation) mobile subscribers.

EU average is a simple, rather than a weighted, average.

The following chart shows the absolute number of mobile subscribers in each Member State (columns) and their penetration rate (dots).

Chart 1

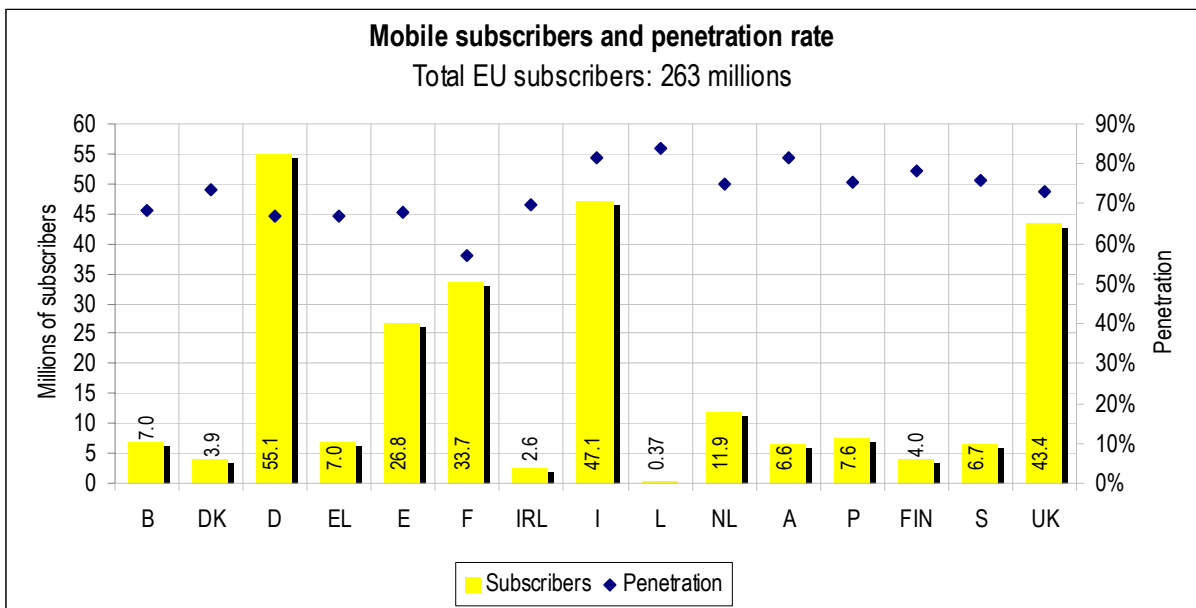
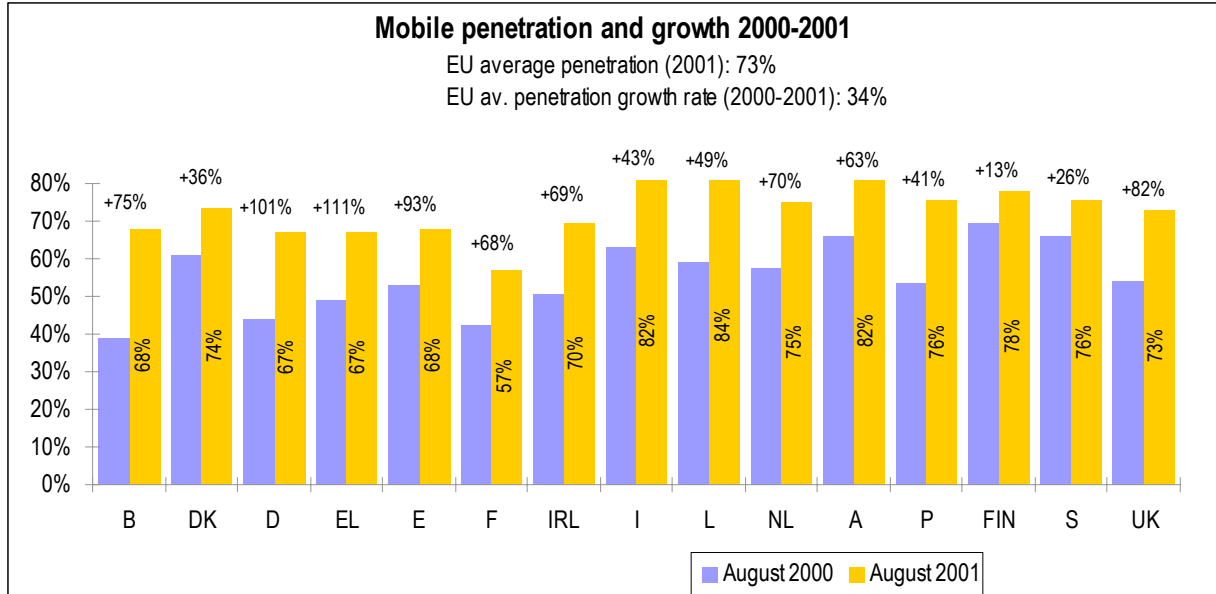


Chart 2



2 Operators' market shares

The following charts show the market shares, in terms of subscribers, of the main competitors in the mobile market.

Since in six - countries the incumbent's subsidiary is still providing the analogue service on the basis of a de jure or de facto monopoly, the operators' market shares have been calculated on two different relevant markets: the overall mobile market (including analogue, DCS 1800 and GSM 900 subscribers) and the digital market only (DCS 1800 and GSM 900).

The data concerning shares of the mobile market are based on estimates of the number of mobile subscribers, taken from FT Mobile Communications, and refer to August 2001. They have been compiled on the same basis in each country, and are therefore comparable. However, different figures might be obtained if the underlying raw data were collected/estimated on a different basis (number of subscribers, pre-paid card, minutes of conversation, etc.) or if a different method of calculation was used.

Apart from in the United Kingdom, the leading operator is a subsidiary of the incumbent fixed network operator.

Chart 3

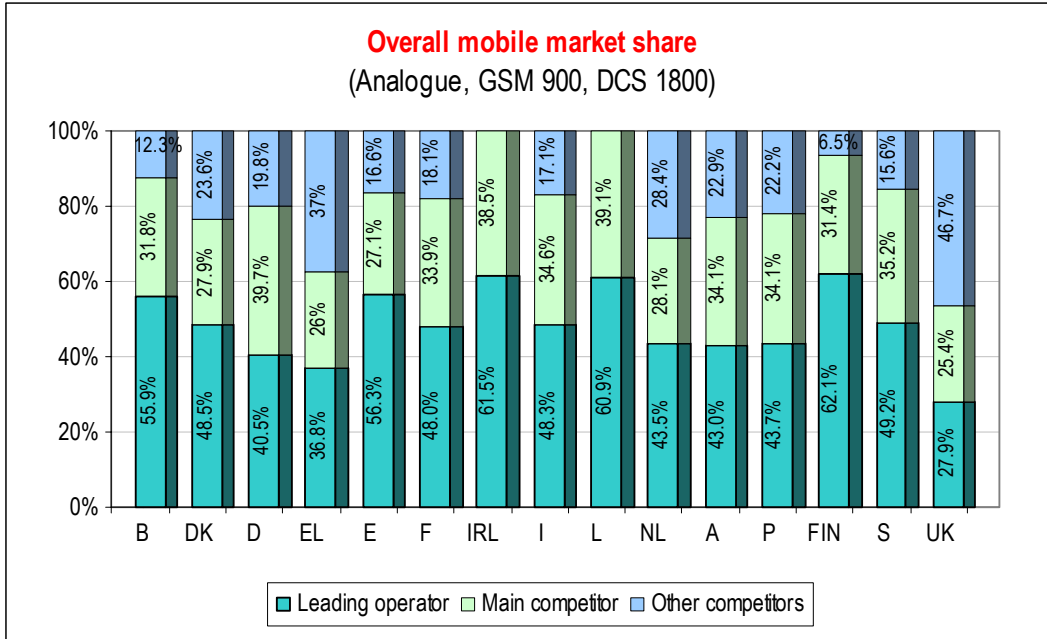
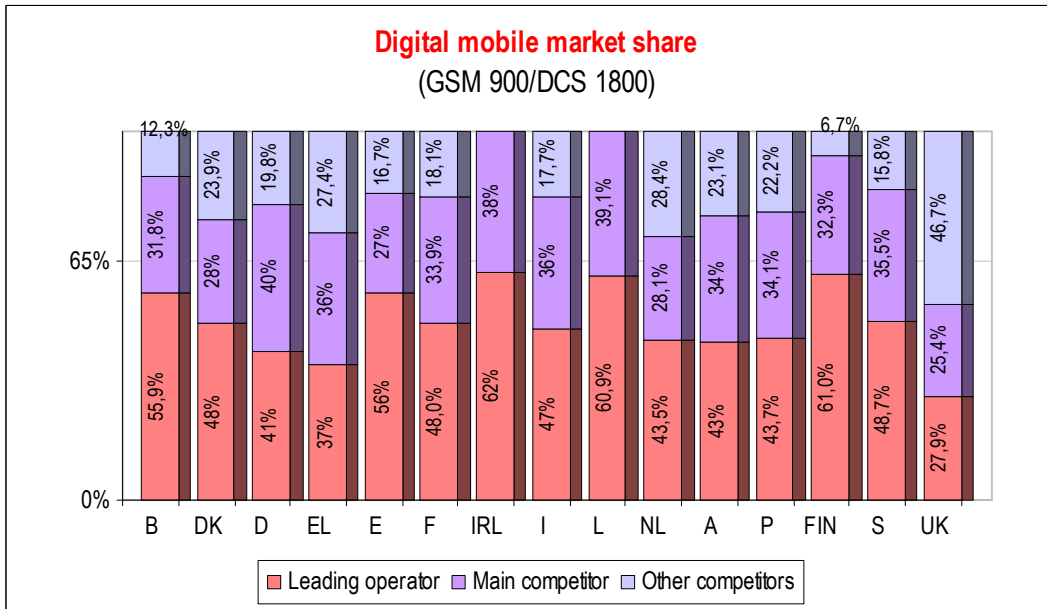


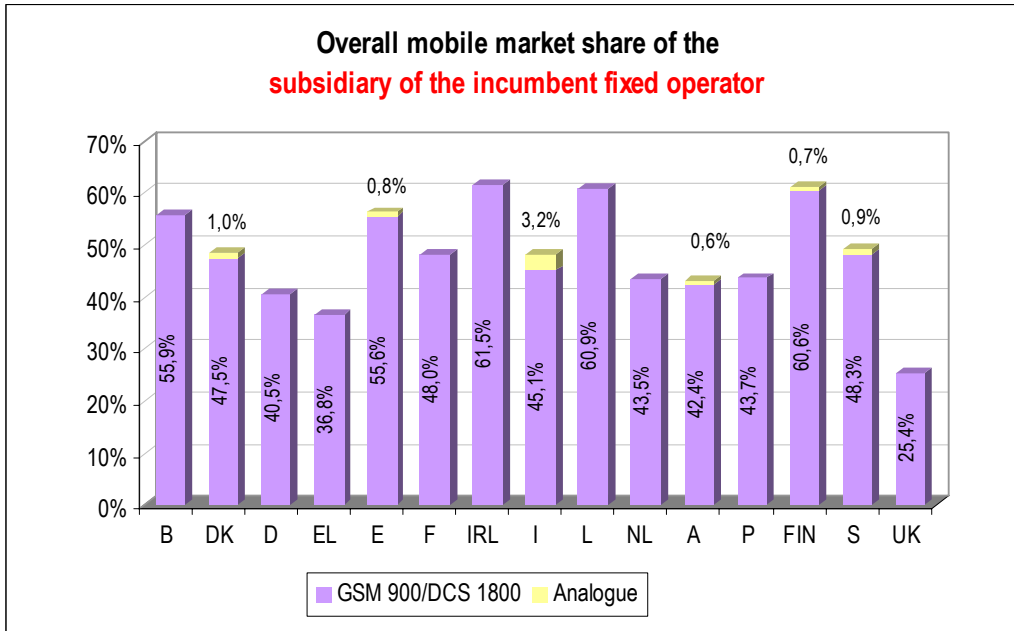
Chart 4 shows the shares of the leading operator, of the main competitor and of the other competitors on the digital mobile market only (100%). Comparison with the positions of the last year shows growing competition. It is worth noticing that in some countries (e.g. Greece and the United Kingdom) the identity of the leading operator has changed since last year.

Chart 4



The following chart shows the share of the overall mobile market held by the mobile subsidiary of the incumbent fixed operator. Where the incumbent still operates the analogue service, the shares of the overall mobile market of their analogue and digital services are indicated separately.

Chart 5



3 Frequency allocation and fees/charges paid by third generation mobile operators

Decision 128/1999/EC of the European Parliament and of the Council of 14 December 1998, on the co-ordinated introduction of a 3G mobile and wireless communication system (UMTS) in the Community requires Member States to take all actions necessary to allow the co-ordinated and progressive introduction of 3G mobile services in their territories. So far all but two Member States have issued 3G mobile licences. Table below summarises the current status of 3G mobile licensing in each Member State, while Table provides details on the coverage/roll-out obligations and deadlines for launch of services imposed on 3 G mobile operators and Table provides an overview of frequency allocation, administrative fees and spectrum charges paid by third generation operators.

The information in these tables and in the following charts is based on a study conducted for the European Commission by Aegis Systems Ltd and Connogue Ltd¹²

Table 1: Status of 3G Mobile Licensing in EU Member States

	Status of Licensing	No. of Licences	Licence Duration	Approach used
B	Complete, but the future of remaining band under study.	4 offered, 3 awarded	20 years	Auction
DK	Complete (September 2001)	4	20 years	Auction
D	Complete (Aug 2000)	6	20 years	Auction
EL	Complete (July 2001)	4 offered, 3 awarded	20 years	Auction
E	Complete (March 2000)	4	30 years	Beauty Contest
F	First round complete, further round expected	4 offered, 2 awarded	15 years[1]	Beauty Contest
IRL	Planned	4 likely	15 years[2]	Beauty Contest
I	Complete (October 2000)	5	15 years	Hybrid Auction/Beauty Contest
L	Planned	4	TBD	Beauty Contest
NL	Complete (July 2000)	5	16 years	Auction
A	Complete (November 2000)	6	20 years	Auction
P	Complete (November 2000)	4	15 years [3]	Beauty Contest
FIN	Complete (March 1999) Åland licences granted in September 1999.	4	20 years	Beauty Contest
S	Complete (December 2000)	4	15 years	Beauty Contest
UK	Complete (April 2000)	5	25 years	Auction

Notes: [1] An extension of the licence duration to 20 years has been proposed.

[2] Applies to service licence. Spectrum licence is renewable annually, but there is a presumption that such renewal will take place for as long as the spectrum is required to comply with the obligations of the service licence, and be subject to the annual fee being paid when due.

[3] Applies to service licence. Spectrum licence is 5 years duration, but renewable until the service licence expires.

¹² *Administrative Fees and Spectrum Charges for Telecommunication services using Spectrum*, November 2001.

Table 2: Roll-out obligations on 3G mobile operators in EU Member States

	Coverage and roll-out obligations	Deadline for launch of 3G services
B	30% population after 3 yrs, 40% population after 4 yrs, 50% population after 5 yrs, 85% population after 6 yrs, may be reviewed by Government.	Yes: September 2002
DK	30% population coverage by end of 2004, 80% population coverage by end of 2008	No
D	25% population by end 2003, 50% population by end 2005	No
EL	25% population by December 2003, 50% by December 2006	Yes: 2003
E	Coverage for all Spanish cities with over 250,000 inhabitants by 1 June 2002	Yes: postponed from August 2001 to 1 June 2002
F	2 years after launch: 25% population coverage for voice, 20% for 144 kbit/s packet data; 8 years after launch: 80% population coverage for voice, 60% for 144 kbit/s packet data	Yes, in individual licences: SFR March 2002; Orange June 2002
IRL	To be decided	To be decided
I	Regional Capitals within 30 months and provincial capitals within extra 30 months	No
L	To be decided	To be decided
NL	By 1 Jan 2007, coverage at 144 kbit/s must be provided in built-up areas of all municipalities with over 25,000 inhabitants, on all main connecting arteries and through motorways to Belgium and Germany, and in and around the three main airports. This equates to roughly 60% of population.	No
A	25% population by end 2003, 50% population by end 2005	Yes: 2003
P	Minimum 20% population after 1 yr, 40% after 3 yrs, 60% after 5 yrs, but each operator has committed to higher figures as part of the tender process - these are included in individual licences.	Yes: individual obligations postponed to 31 December 2002
FIN	No coverage obligation	Yes: 1 January 2002
S	99.98 % population coverage by 31 December 2003	Network capacity by 1 January 2002
UK	80% UK population by 31 st December 2007	No

Source: Aegis and European Commission

Table 3: Level of 3G Mobile Fees and Charges in EU Member States

	Network	Spectrum Licensed		Administrative Fees (€)		Spectrum Fees / Charges (€)	
		Paired	Unpaired	Once-off	Annual	Once-off	Annual
B	Belgacom (Proximus)	2 x 15	5	12,500	250,000	150.2 M (auction)	2,500,000 [5]
	Mobistar	2 x 15	5	12,500	250,000	150.0 M (auction)	2,500,000 [5]
	KPN Orange	2 x 15	5	12,500	250,000	150.0 M (auction)	2,500,000 [5]
DK	Hi3G Denmark	2 x 15	5	3,350,000	0	31,830,000 [6]	9,778,818 [7]
	TDC Denmark Internat.	2 x 15	5	3,350,000	0	31,830,000 [6]	9,778,818 [7]
	Telia Mobile AB	2 x 15	5	3,350,000	0	31,830,000 [6]	9,778,818 [7]
	Orange A/S	2 x 15	5	3,350,000	0	31,830,000 [6]	9,778,818 [7]
D	T-Mobil	2 x 10	5	0	0	4,370,000,000	Cost based charge will apply from 3 years after licence issue.
	Mannesman	2 x 10	5	0	0	4,340,000,000	
	E-plus Hutchison	2 x 10	5	0	0	4,310,000,000	
	Viag Interkom	2 x 10	0	0	0	4,320,000,000	
	Mobilcom Multimedia	2 x 10	5	0	0	8,430,000,000	
	Group 3G	2 x 10	5	0	0	4,330,000,000	
EL	Panafon	2 x 20	5	0	Levy will apply from 2005	176,376,199	0
	Cosmote	2 x 15	5	0		161,411,701	0
	Stet Hellas	2 x 10	5	0		146,735,169	0
E	Telefonica Moviles	2 x 15	5	0	Annual levy of 0.15% of turnover	129,220,000	162,980,000 [8]
	Airtel	2 x 15	5	0		129,220,000	162,980,000 [8]
	Amena	2 x 15	5	0		129,220,000	162,980,000 [8]
	Xfera	2 x 15	5	0		129,220,000	162,980,000 [8]
F	Itineris	2 x 15	5	305,000	152,500	4,966 M, payable in stages over 15 years [9]	
	SFR	2 x 15	5	305,000	152,500	4,966 M, payable in stages over 15 years [9]	
IRL	Not yet licensed						
I	Telecom Italia Mobile	2 x 10	5	56,810	61,975	2,442,000,000	0
	Omnitel	2 x 10	5	56,810	61,975	2,448,000,000	0
	Wind	2 x 10	5	56,810	61,975	2,427,000,000	0
	Ipse	2 x 15	5	56,810	61,975	2,427,000,000	0
	Andala (now renamed "H3G")	2 x 15	5	56,810	61,975	2,417,000,000	0
L	Not yet licensed						
NL	KPN Mobile	2 x 15	5	363[1]	356,670	711,000,000	98,243
	Libertel	2 x 14.6	5.6	0	353,949	713,800,000	98,243
	Telfort	2 x 10	5	0	353,949	430,000,000	135,907
	Dutchtone	2 x 10	5	0	353,949	435,600,000	145,907
	3G-Blue	2 x 10	5	0	353,949	395,000,000	98,243
A	Mobilkom Austria	2 x 10	10	7,267	Annual levy of 0.1 - 0.2% of turnover	171,500,000	0
	Max Mobil	2 x 10	10	7,267		170,800,000	0
	Connect Austria (One)	2 x 10	0	7,267		119,900,000	0
	Telefonica	2 x 10	0	7,267		117,700,000	0
	TeleRing	2 x 10	0	7,267		113,400,000	0
	Hutchison 3G	2 x 10	5	7,267		138,800,000	0
P	TMN	2 x 15	5	49,880	9,976	99,760,000	Currently based on number of base stations and mobile terminals
	Telecel	2 x 15	5	49,880	9,976	99,760,000	
	Optimus	2 x 15	5	49,880	9,976	99,760,000	
	Oni-way	2 x 15	5	49,880	9,976	99,760,000	
FIN	Sonera [2]	2 x 15	5	0	0	0	1,592,640 [4]
	Radiolinja [2]	2 x 15	5	0	0	0	1,592,640 [4]
	Telia Finland [2]	2 x 15	5	0	0	0	1,592,640 [4]
	Suomen 3G [2]	2 x 15	5	0	0	0	1,592,640 [4]
	Ålands Mobiltelefon [3]	2 x 15	5	0	0	0	
	Tele1 Europe Ab [3]	2 x 15	5	0	0	0	
S	Europolitan	2 x 15	5	10,893	€5,447 plus 0.15% of turnover	0	€17.43 per annum per base station
	Tele2	2 x 15	5			0	
	Hi3G Access	2 x 15	5			0	
	Orange Sverige	2 x 15	5			0	

	Network	Spectrum Licensed		Administrative Fees (€)		Spectrum Fees / Charges (€)	
		Paired	Unpaired	Once-off	Annual	Once-off	Annual
UK	BT Cellnet	2 x 10	5	0	Annual levy of up to 0.08% of turnover	6,500,000,000	0
	One2one	2 x 10	5	0		6,452,000,000	0
	Orange	2 x 10	5	0		6,468,000,000	0
	Vodafone	2 x 15	0	0		9,613,000,000	0
	Hutchison 3G	2 x 15	5	62,800		7,065,000,000	0

- Notes:
- [1] Applies to operators with SMP
 - [2] Covers all of Finland except Åland
 - [3] Covers Åland only
 - [4] Subject to reduction in the first five years
 - [5] Maximum amount payable, actual amount is based on spectrum actually in use.
 - [6] Initial 25% of auction bid
 - [7] 10 annual instalments each comprising 7.5% of auction bid, plus €228,000 annual spectrum fee
 - [8] The draft Budget Law for 2002 foresees an average reduction of 65% of the spectrum reservation charges for 3G mobile services.
 - [9] The French Government has announced plans to reduce the 3G licence charge to € 619 and to charge a levy on 3G revenue, which is yet to be fixed.

Comparative case studies on fees and charges

In the following, an attempt is made to compare the level of charges paid by third generation operators in the various Member States on the basis of hypothetical model networks. In Chart 6 the relevance of once-off and recurring payments are compared, whereas Chart 7 shows effective annual payments per subscriber for different penetration rates and in comparison with second generation services.

In order to carry out the comparisons, the following assumptions have been made concerning 3G networks:

- Amount of spectrum recommended by the UMTS Forum, i.e. 2 x 15 MHz paired plus 5 MHz unpaired.
- 28% market penetration for 3G mobiles services (based on UMTS Forum estimate for 2010).
- ARPU (average revenue per user) €27 / month for 3G mobile services, i.e. €324 per annum.
- Market share per operator 25% (based on four operators with equal shares)
- To support the higher data rates associated with 3G mobile services, it is assumed that one base station per 250 subscribers will be required .

The following assumptions have been made concerning the 2G network:

- Amount of spectrum: 2 x 10 MHz in the 900 band and 15 MHz paired in the 1800 band.
- The number of base stations for the dual band network here defined is assumed to be one per 1 333 subscribers.
- A market penetration of 60% throughout the EU.
- The presence of four competing operators in each Member State, each with a 25% share of the market.
- ARPU of €25.20 per month for personal use, €80.10 per month for business use. This reflects the increasing trend towards pre-pay tariffs with lower ARPU values.
- A subscriber base which is 75% personal users and 25% business users, consistent with the current typical market profile within the EU.

By applying the above parameters to each Member State, taking account of the actual population of the Member State, the number of subscribers, annual turnover and effective annual cost of fees and charges per subscriber can be deduced, for the assumed level of penetration and market share.

In those countries where auctions have been held and more than four operators have been licensed, the amount paid has been standardised by dividing the total amount bid for all the licences by four.

All once-off payments have been amortised over the life of the licence assuming a 5% finance charge and a 3% inflation rate, enabling an equivalent annualised rate to be determined. This is then added to any annual fee or charge levied by the NRA to provide a total effective annual payment, which is then divided by the number of subscribers.

Chart 6: Comparison of once-off and recurring payments (in terms of equivalent effective annual payments) for reference 3G mobile networks (€ per annum per subscriber, assuming 28% penetration)¹³

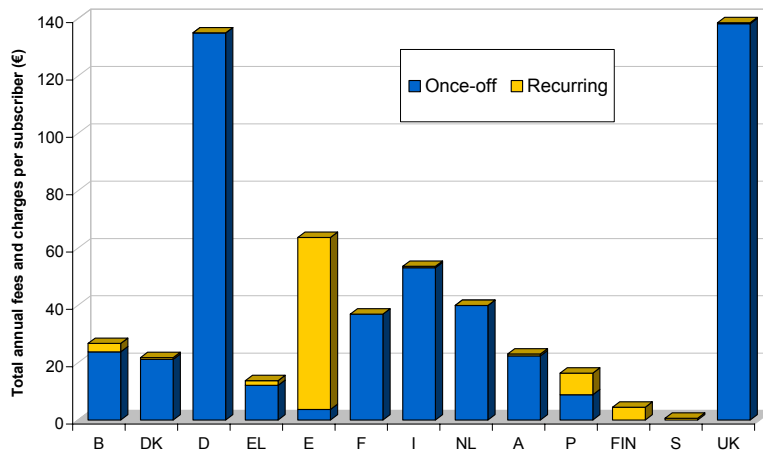
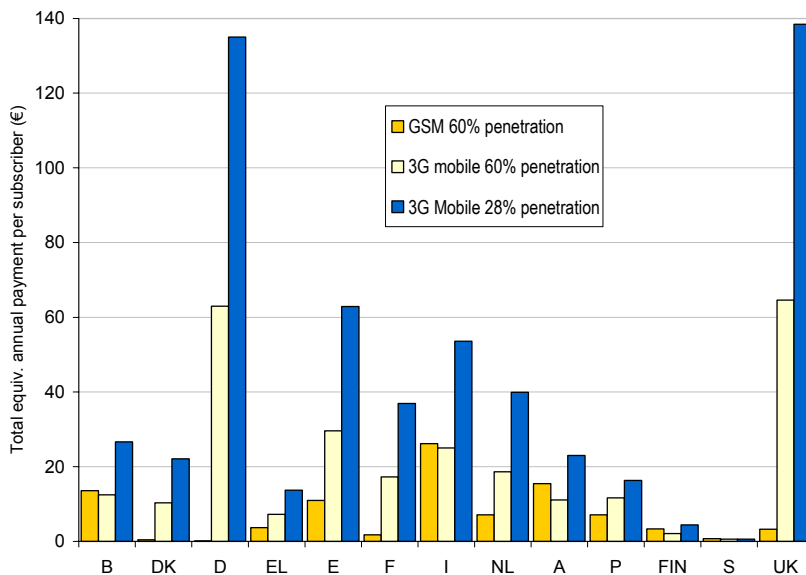


Chart 7: Effective annual payment of fees and charges for reference 3G mobile network (with 28% and 60% penetration) and reference dual-band GSM network (with 60% penetration)¹³

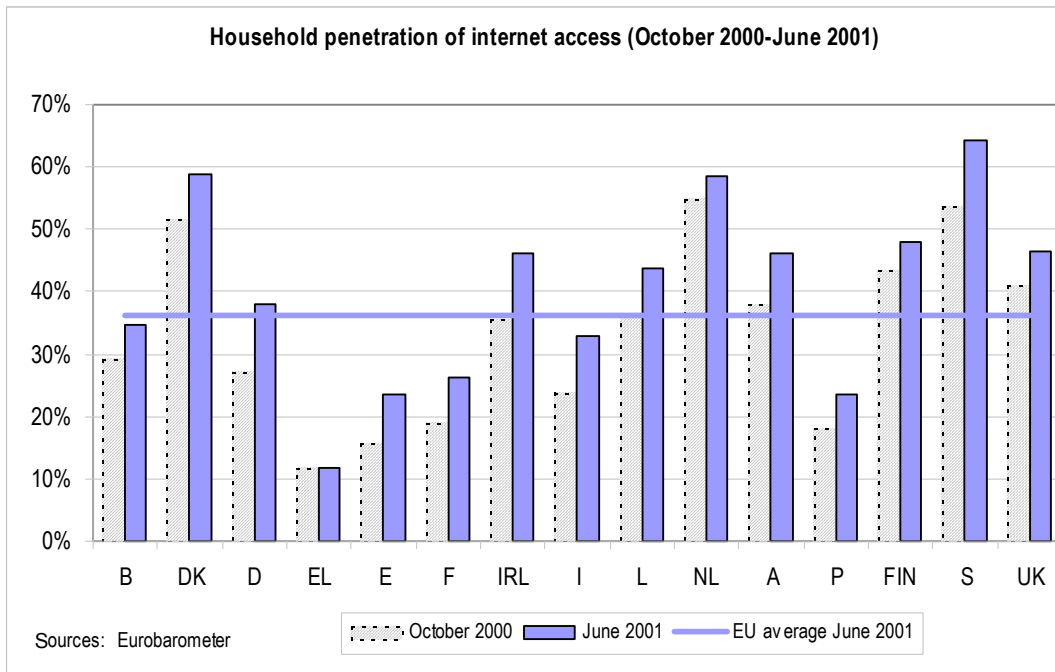


¹³ The assumed level of annual spectrum charges for 3G mobile in Spain is based on the 2001 budget. Spectrum charges for France reflect the position prior to the changes proposed in October 2001.

1. INTERNET MARKET DATA

The following chart shows the percentage of households having internet access, irrespective of the technologies used: normal public switched telephone network (PSTN) or broadband access (DSL, cable modem, ISDN, WLL).

Chart 1

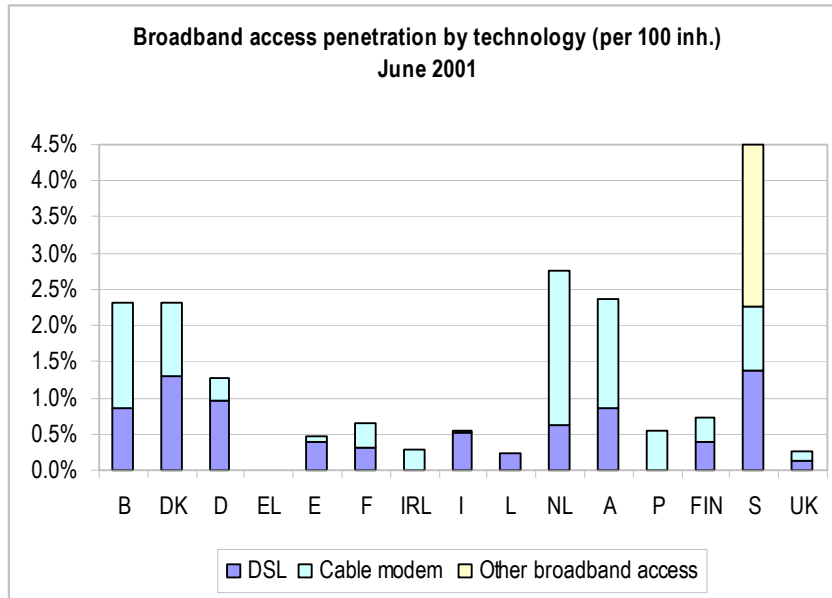


Standard dial-up is still by far the most popular means for households to access the internet in all Member States, with broadband technologies only just beginning to emerge (see the following charts). Current levels of penetration of broadband technologies are low, but figures show a rapid increase.

Of the broadband technologies now available, DSL overtook digital cable in 2001 in terms of penetration (see Chart 3), but neither of these access platforms has been available for very long: only 18% of the cable infrastructure is set up for two-way transmission, and DSL (usually ADSL) has only been commercially available since 2000 in most Member States.

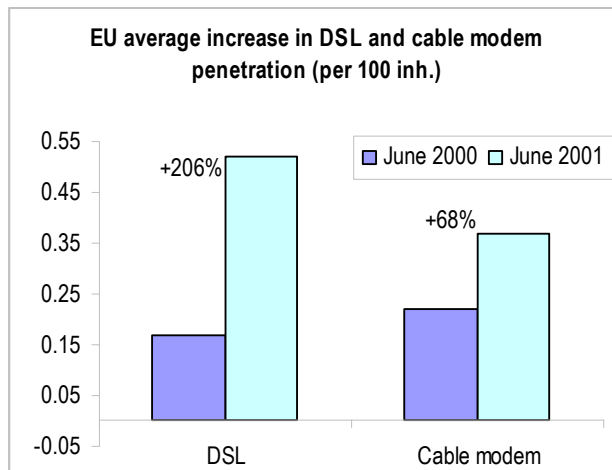
The following charts show broadband access penetration (per 100 inhabitants) for the Member State (split by technology) and the increase at EU level since June 2000. Figures are taken from the NRAs and OECD (cable modem, DSL access in 2000 and for some of the figures for 2001).

Chart 2



Sweden's other broadband access includes subscriber Ethernet LANs such as B2's high-speed fibre LAN service. Telia's LAN subscribers are reported under DSL. Cable data are for the two largest networks with smaller networks being included in the "other" category. Cable modems access for Germany refers to the year 2000.

Chart 3



2. INTERNET ACCESS PRICING (dial up)

This section deals with the cost of internet usage for residential (economy type usage) and business users (peak time usage) through dial up modems for access.

The figures and information are taken from a study carried out for the European Commission by Total Research-Teligen and inform us of the situation in August 2001.

The cost of such service will consist of four main elements:

- PSTN fixed charges: the monthly rental.
- PSTN usage charges¹⁴: the price for the local telephone calls to an Internet Service Provider (ISP) at 11:00 during weekdays for peak rate and at 20:00 during weekdays for off-peak rate.
- ISP fixed charges: the fixed price of internet access charged by the ISPs providing the cheapest internet charges
- ISP usage charge: the variable price (time-depending) of the internet connection charged by ISPs. If the usage charge is zero, it means that the access cost is embedded in the fixed price of the package.

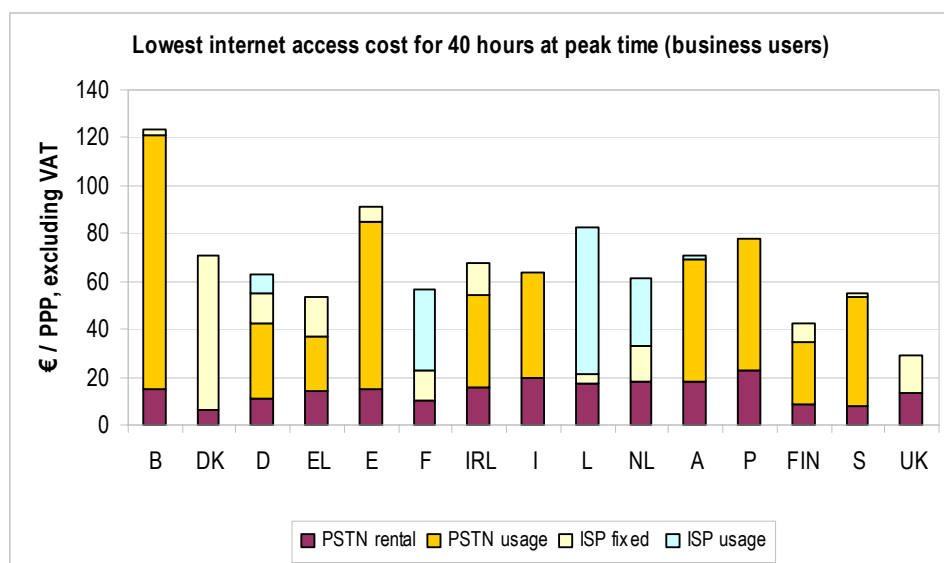
Operators in the Member States offer a great variety of internet packages: the four elements may be applied in any combination. Moreover, some packages are combined with regular local call PSTN charges, while other packages offer special charges, most often related to special access numbers.

157 internet packages in the 15 EU Member States have been analysed, including both incumbent and competitors' offerings. The two charts presented below show the best available package offered by any of the operators, for two consumer profiles in each country (business and residential):

- 40 calls of 1 hour per month, business usage, at peak time hours. (40 hours usage)
- 20 calls of 1 hour per month residential usage, at off peak hours. (20 hours usage)

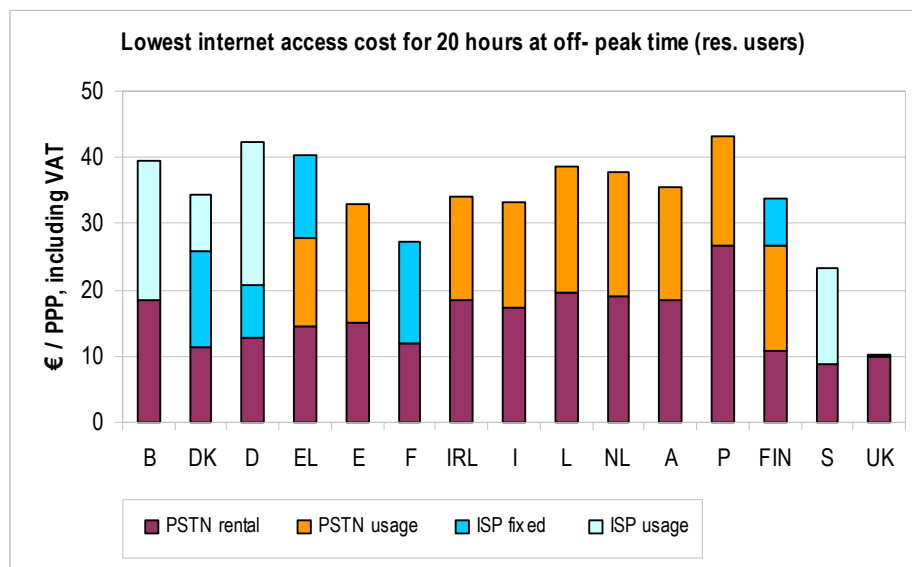
Special dial-up charges have been used for D, F, EL, L, A, P.

Chart 4



¹⁴ The PSTN access usage price have been selected as far as published information allows. There may be instances where a lower PSTN usage charge tariff should have been used, but where such information was not found.

Chart 5



3. ADSL ACCESS PRICING FOR THE INCUMBENTS

The xDSL technology is fast becoming popular as an economical way of having high speed internet access. For residential and small business users the ADSL service offers a variety of speeds (bitrates), and the advantage that no special lines need to be installed. A regular telephone line can serve as the basis for the service.

In order to encourage customers to pay a premium for increased bandwidth, operators appear to be targeting niche markets (such as early adopters and small businesses) with highly differentiated offers in terms of monthly rental, installation charge, length of contract and available bandwidth.

The charts below show the installation and monthly rental charges for ADSL services offered by incumbent operators in the EU Member States. At the moment, Greece and Ireland are not yet offering ADSL services, but a launch is expected in the near future. Portugal started its commercial ADSL offer at mid 2001 and there are no figures available.

In the following charts, the charges shown are for the ADSL service alone, and do not include any additional services like internet access. Charges related to the underlying telephone line are not included.

Chart 6 INSTALLATION CHARGES FOR ADSL CHARGED BY THE INCUMBENTS (€ / PPP, August 2001)

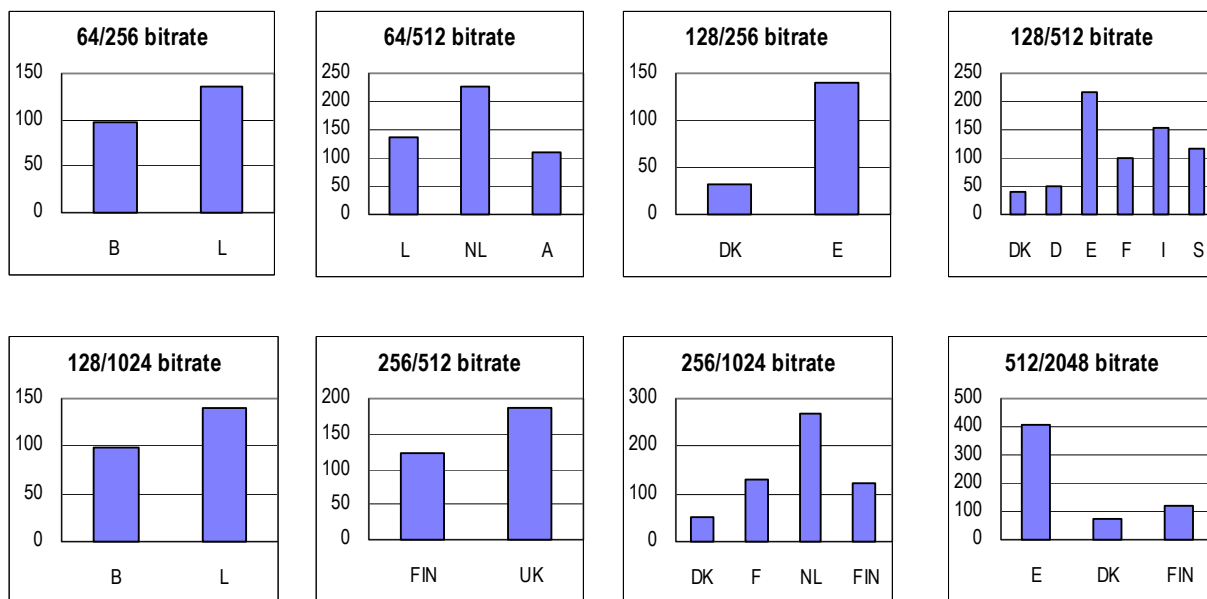
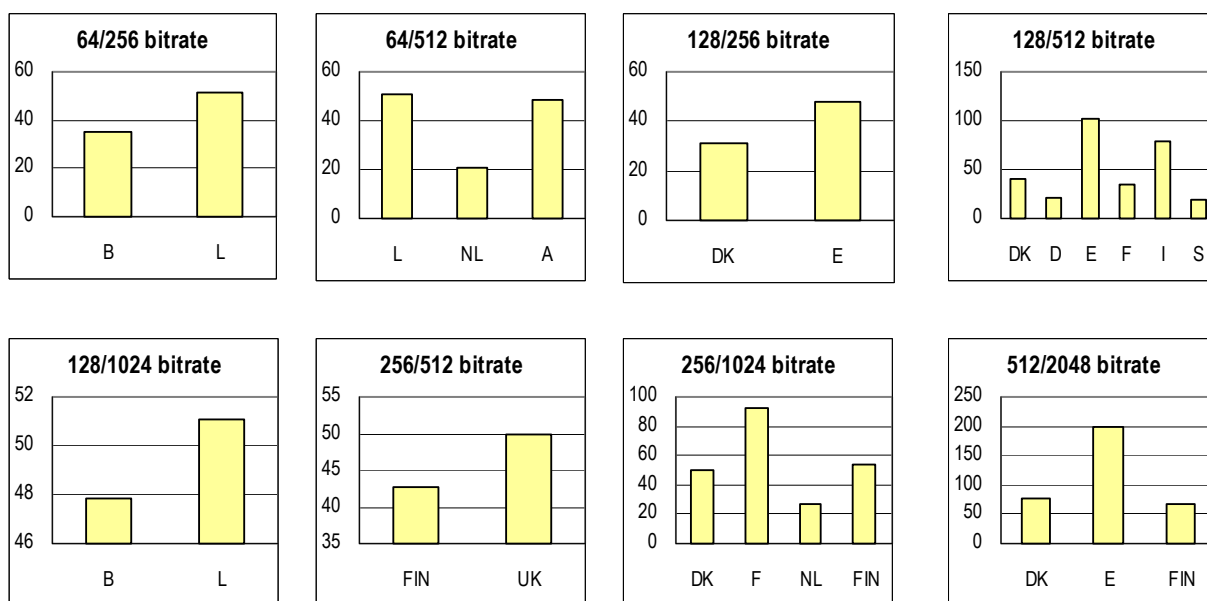
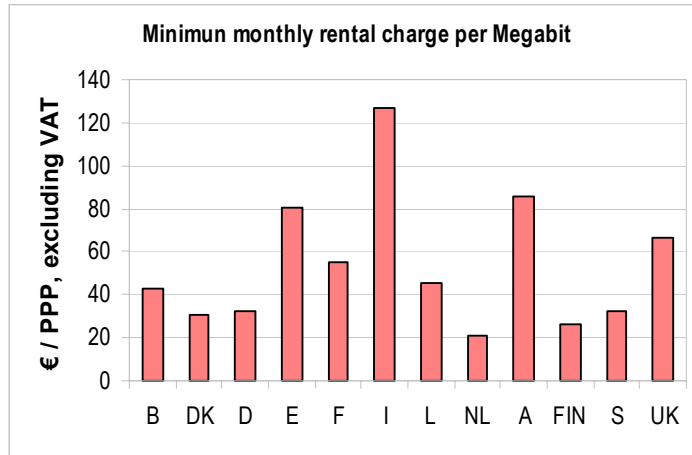


Chart 7 MONTHLY USAGE CHARGES FOR ADSL CHARGED BY THE INCUMBENTS (€ / PPP, August 2001)



The offerings from the different incumbents in the countries vary a lot, as the charts show. Different bitrate combinations are used, and it is difficult to make direct price comparisons. An attempt has been made to compare the price per Megabit of transfer capacity, assuming the sum of the two bitrates for up-link and down-link. The highest capacity offered in a country is then used as a basis, as this will produce the lowest price scenario. Lower bitrates will normally have a higher price per Megabit.

Chart 8



Annex 2

Regulatory Data, Including Implementation of the TV Signals Directive

2.1 LOCAL ACCESS

This section contains market data which provide insights on the degree of competition in the local access market. These data cover information on unbundling, such as the number of unbundled lines and the number of agreements concluded with the incumbent operators, wireless local loop licences granted and cable TV infrastructure.

The data are based on information provided by national regulatory authorities (NRAs) unless otherwise specified.

1. UNBUNDLING

Table 1 provides the date of publication or last update of reference unbundling offers (RUO) for full unbundling, shared access and collocation services at 1 August 2001. It should be noted that in the case of Italy a new RUO for full unbundling and collocation services has been presented on 7 September. Some of the RUOs referred to below are under examination of the competent NRA.

The following two charts show the number of fully unbundled lines and the percentage of main distribution frames (MDFs) for which collocation services are operational.

The charts provide a picture of the situation in July 2001, although it should be considered that this is an ongoing process, so that the exact numbers vary continuously .

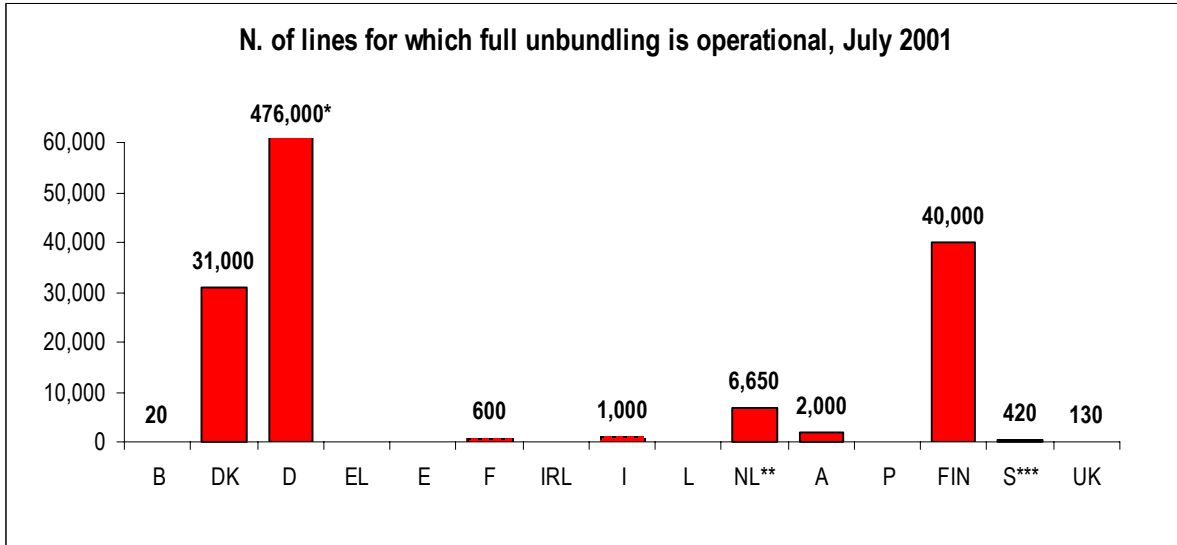
The number of lines referred to in the case of France and Italy are trial lines. However, at the end of September, both Member States present a positive number of actual fully unbundled lines of 1 000 in the case of Italy and about 10 lines in the case of France.

Those indicated for the United Kingdom are mostly trial lines. Field trials are also ongoing in Portugal. Figures for Austria should be considered minimum values.

Table 1

Date of last update of reference unbundling offers			
	full unbundling	shared access	collocation
B	02.05.2001	02.05.2001	02.05.2001
DK	31.01.2001	31.01.2001	01.11.2000
D	11.04.2001	No RUO	06.12.2000
EL	15.06.2001	No RUO	15.06.2001
E	21.01.2001	21.01.2001	21.06.2001
F	16.07.2001	16.07.2001	16.07.2001
IRL	13.07.2001	13.07.2001	13.07.2001
I	05.01.2000	No RUO	01.04.2001
L	24.07.2001	No RUO	24.07.2001
NL	16.05.2001	16.05.2001	16.05.2001
A	10.07.2001	10.07.2001	10.07.2001
P	16.07.01	No RUO	16.07.01
FIN	46 RUOs, all updated lately	46 RUOs, all updated lately	46 RUOs, all updated lately
S	15.03.2001	15.03.2001	15.03.2001
UK	31.12.2000	31.12.2000	04.07.2001

Chart 1



* Figure not to scale

** At beginning of October.

*** At beginning of June.

Chart 2

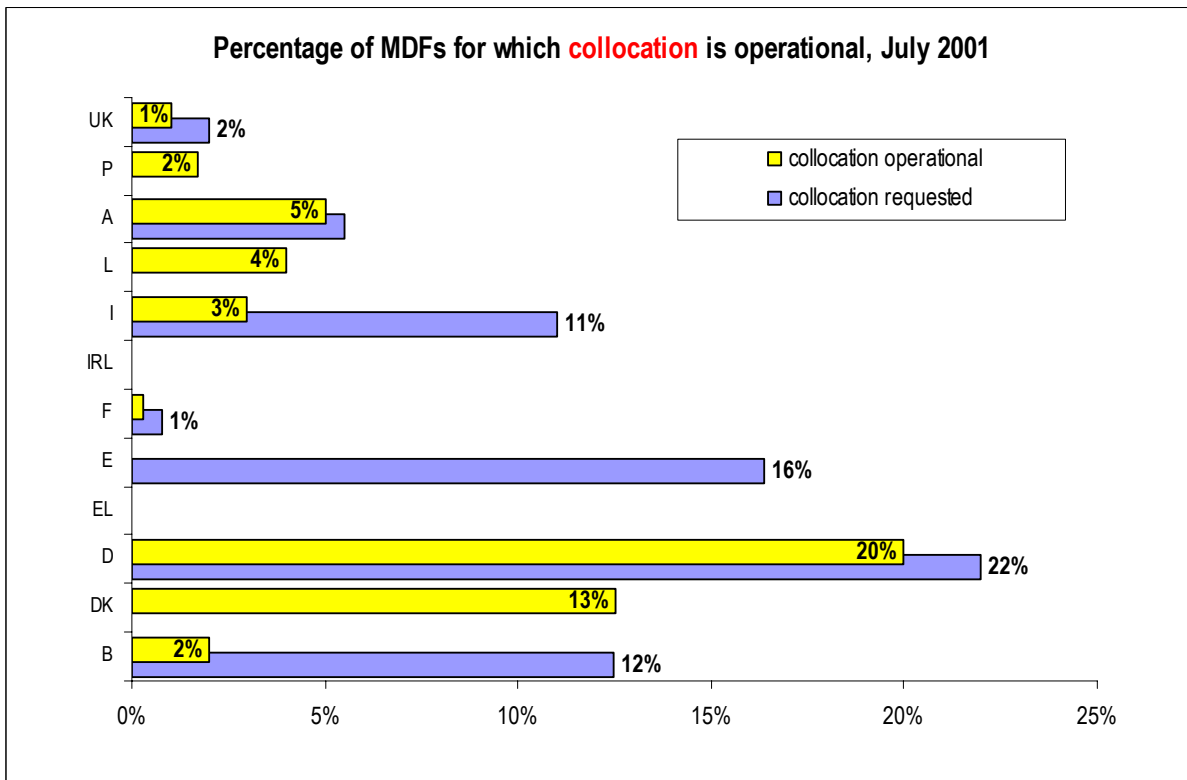


Chart 3 shows the number of new entrants with agreements concluded with incumbent operators for both full unbundling and shared access. In the case of France, the agreement has been concluded in the context of trials. The information is not available for the Netherlands.

Table 2 shows the number of shared access lines operational in July 2001. No figure is available for Denmark, while in the case of the Netherlands the record refers to the situation in October 2001.

Chart 3

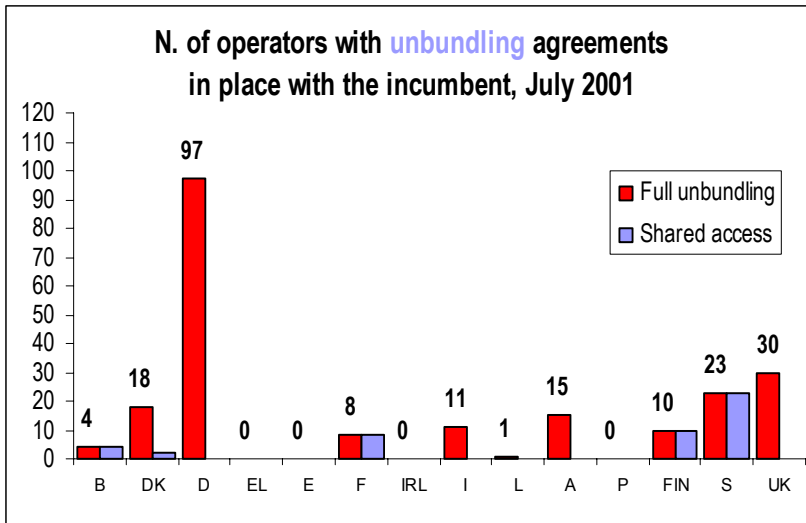
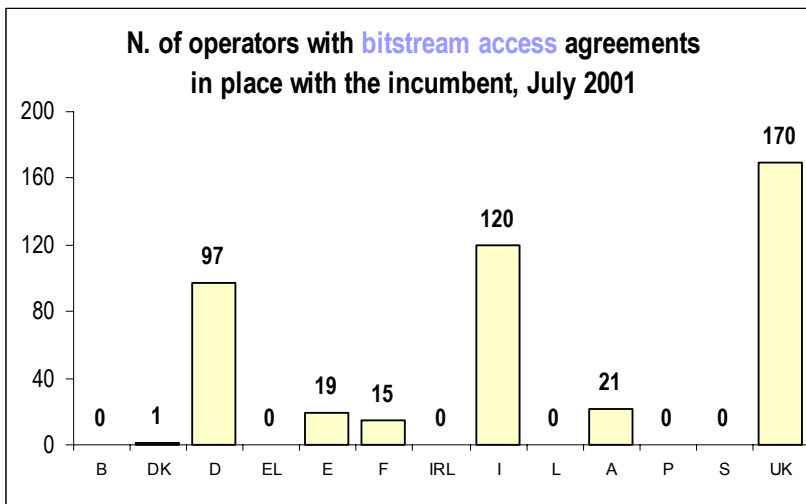


Table 2

B	20
D	0
EL	0
E	0
F	15 (trials)
IRL	0
I	0
L	0
NL	350
A	0
P	0
FIN	500
S	17
UK	0

Chart 4 shows the number of new entrants (including Internet service providers) with agreement with incumbent operators concerning bitstream access. No information is available for the Netherlands and Finland.

Chart 4

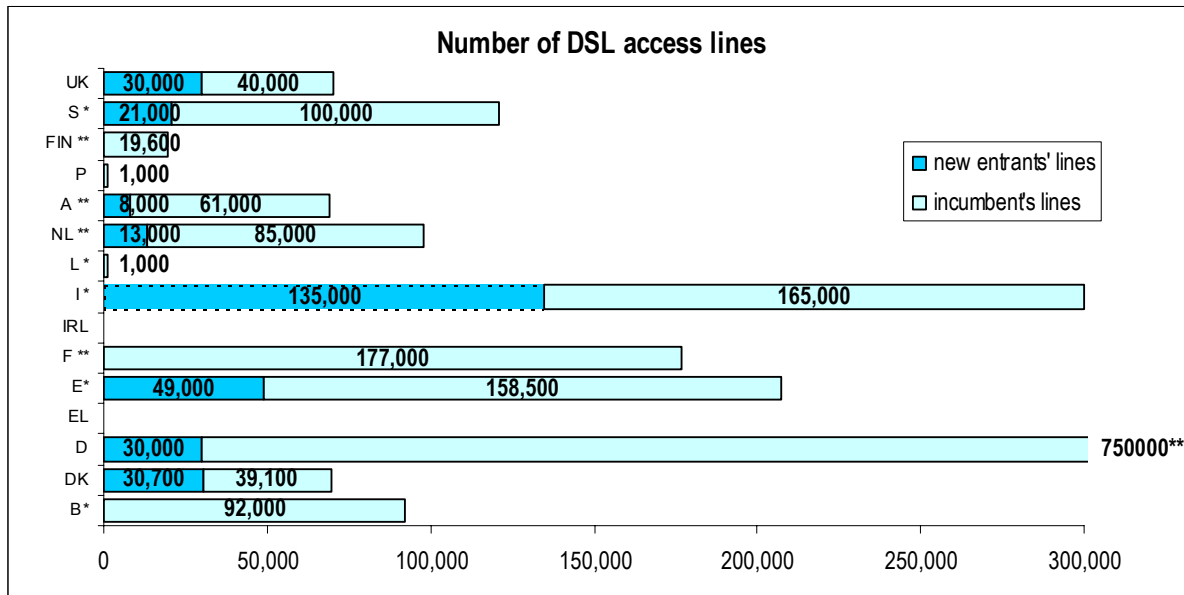


The following Chart 5 shows the number of DSL lines of incumbents and of new entrants. New entrants' DSL lines might be provided by means of bitstream access on the fixed lines of the incumbents or by alternative means (full unbundling, shared access, installation of new lines, etc.). The data in the chart are mostly based on information provided by the NRAs. The figures refer to the situation at 1 July 2001, unless otherwise stated.

In the case of Italy, the number of new entrants' lines refer to the number of wholesale DSL lines supplied by the incumbent. However, the number of retail DSL lines of the new entrants is significantly lower (estimated to 14 000) because wholesale lines are sold in lots.

In the case of Finland, the information on new entrants' lines is not available, whereas the figure on incumbent's lines refer to both Sonera and Elisa.

Chart 5



* At 1 October.

** At 1 June, source: OECD.

***Figure not to scale.

2. WIRELESS LOCAL ACCESS

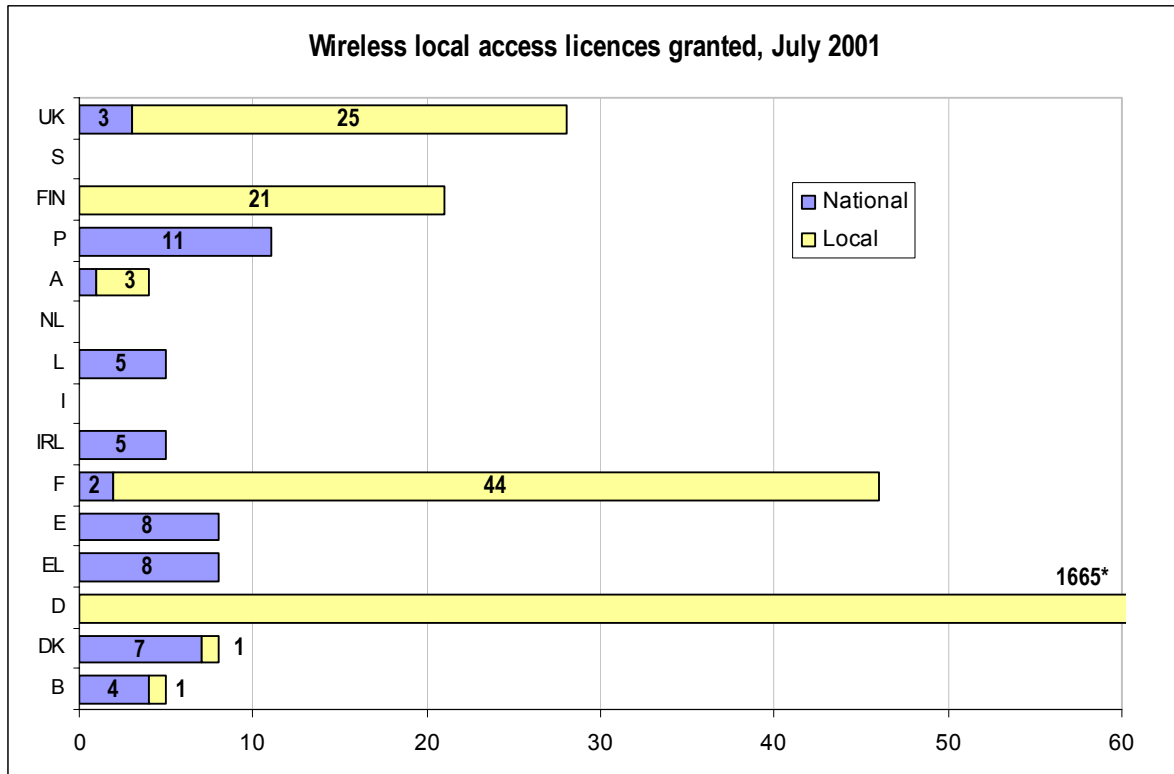
WLL services provide a radio based and relatively low cost alternative to the established copper loop for provision of fixed PSTN access to business and residential users. Whilst interest initially focussed on simple replication of the incumbent's narrow band loop, the emphasis has now shifted to the provision of broadband access to cater for high speed data applications such as Internet access and video on demand, at data rates up to 2 Mbit/s or beyond. At the time of writing all Member States except Italy, the Netherlands and Sweden have licensed WLL networks and all three of the latter have plans to license the services in the near future.

Chart summarises the number of WLL granted with reference to the geographical coverage of the licences. The licences concerned are of a different nature. The figures are based on information provided by the NRAs. The majority of licences have been granted to new entrants. However, in Belgium, Greece and Ireland incumbents have been granted 1 or 2 national licences, which correspond to 25% of the total of national licences granted. Local licences have been assigned to the incumbent in Finland and the United Kingdom.

The local licence granted in Denmark will expire in 2002. The figure for Spain includes two service licences granted to Retevisión and UNI2. In the case of Ireland, a further licence had been granted to an operator who is no longer active in the market. In Austria, several regional licences have been

granted to the same operator, who then covers the whole national market. The remaining three local licences were all allocated to a second operator.

Chart 6



* Figure not to scale.

Table 3 below provides details on the current status of WLL licensing in each Member State. The information in the table is based on a study conducted for the European Commission by Aegis Systems Ltd and Connogue Ltd¹⁵. In Table 3 narrowband and broadband licences are identified, although the distinction between the broadband and narrowband categories is becoming increasingly blurred. Broadband generally implies a potential data rate of 2 Mbits per second or above, whereas narrowband generally refers to voice services or data up to basic rate ISDN (144 kbit/s). Data rates between 144 Kbit/s and 2 Mbit/s are sometimes referred to as broadband and are in some cases being offered by WLL operators originally licensed as narrowband. In the table, these are normally regarded as broadband.

In order to allow for distinction between narrowband and broadband licences, dual-band licences are sometimes considered as separate licences, which accounts for apparent discrepancies (e.g. for Luxembourg and Ireland) with respect to the information provided in Chart 6. It should also be noted that, in the case of the United Kingdom, the table refers to the number of spectrum licences granted according to the Wireless Telegraphy Act, whereas in the previous chart the reference is to the number of licences granted on the basis of the Telecommunications Act.

¹⁵ *Administrative Fees and Spectrum Charges for Telecommunication services using Spectrum*, November 2001.

Table 3: Current status of WLL licensing in EU Member States

	Current status of WLL licensing	Licensing Procedure	National Licences		Regional or localised licences		Future plans
			Narrowband	Broadband	Narrowband	Broadband	
B	Licences issued in Feb 2001 in 3.5 GHz, 10 GHz and 26 GHz bands	Beauty contest	4 (no distinction between narrowband and broadband)		1 (no distinction between narrowband and broadband)		Further licences planned in 28 GHz (November 2001) and 40 GHz bands
DK	10-year licences issued in Dec 2000 in 3.5 GHz and 26 GHz bands.	Beauty contest	3	4	None	None	Further licences planned in 10 GHz and 28 GHz bands
D	Licences issued in 2.5 GHz, 3.5 GHz and 26 GHz bands	Beauty contest	None	None	1,671 in total (breakdown by bandwidth not available)		
EL	Licences issued in December 2000	Auction	3	5	None	None	
E	20-year licences issued in April 2000 in 3.5 GHz and 26 GHz bands	Beauty contest	3	3	None	None	
F	15-year licences issued in August 2000 in 3.5 GHz and 26 GHz band.	Beauty contest	2 (no distinction between narrowband and broadband)		None	44 [1]	Further 3.5 GHz licence planned.
IRL	10-year licences issued in 2000 in 3.5 and 26 GHz bands	Beauty contest	3	4	None	None	Further licences possible in 10 GHz, 26 GHz and 28 GHz bands
I	No licences yet issued	Auction	None	None	None	None	Licences planned for 26 GHz and 28 GHz bands
L	Licences issued in 3.5 GHz and 26 GHz bands	Beauty contest	5 (no distinction between narrowband and broadband)		None	None	
NL	No licences yet issued	To be decided	None	None	None	None	To be decided
A	10-year licences issued in February 2001 in 26 GHz band	Auction	None	1	None	3	To be decided
P	15-year licences issued in December 1999 in 3.5 GHz, 26 GHz and 28 GHz bands	Beauty contest	3	8	None	None	None currently
FIN	3.5 GHz, 10 GHz and 26 GHz bands are designated for WLL	First come, first served	None	None	20 (no distinction between narrowband and broadband)		Further regional licences available on a first come first served basis
S	No licences yet issued	Beauty contest	None	None	None	None	Licences planned in 3.5 GHz, 26 GHz and 28 GHz bands
UK	15-year licence issued in 28 GHz band in November 2000. In 2 GHz, 2.4 GHz and 10 GHz bands, licences awarded at various stages since 1994, annually renewable subject to payment of annual fees and roll out obligations.	Auction (28 GHz); Beauty contest (others)	4	None	5	16	Further licences planned in 3.5 GHz, 10 GHz, 28 GHz and 40 GHz bands

Notes: [1]: Aggregated among 5 operators.

3. CABLE TV LOCAL INFRASTRUCTURE

This section provides information on the availability of cable TV local infrastructure and the extent to which this is used to provide voice telephony services. See the section on internet for further details on broadband connections.

Chart 7

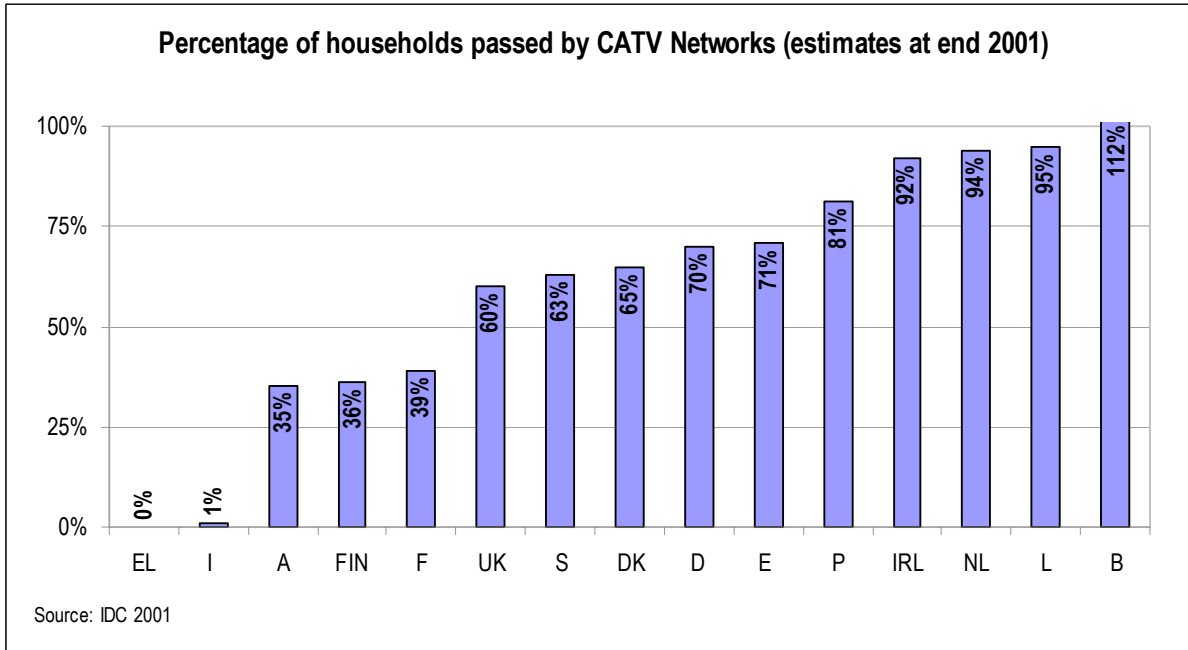
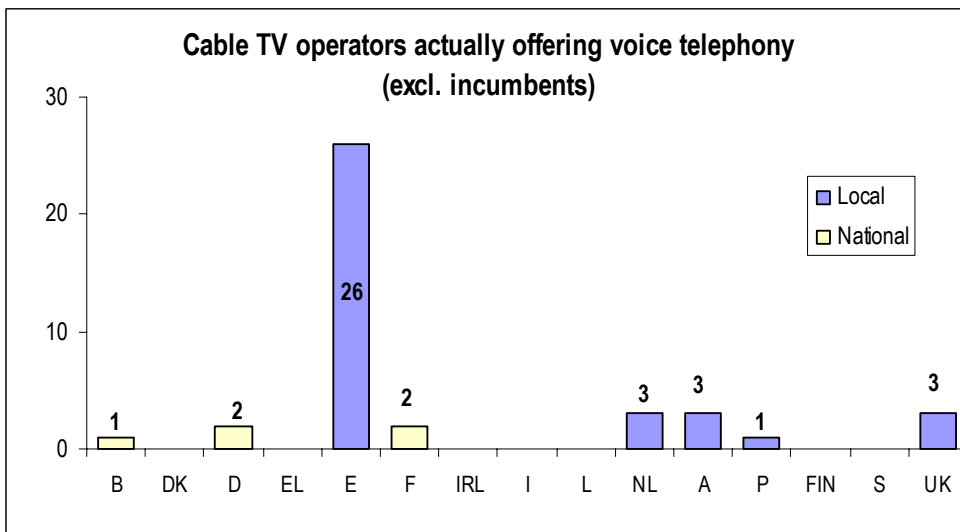


Chart 8



|

|

2.2 INTERCONNECTION

1. NUMBER OF INTERCONNECTION AGREEMENTS

Table 1 shows the number of agreements in place for interconnection with the incumbent's fixed network and between mobile networks.

The figures have been provided by the national regulatory authorities and refer to August 2001.

The number of interconnection agreements in place in each country depends on the number of licensed/authorised operators for public networks and public voice telephony (local and national) and the content of the interconnection agreements (some countries have separate interconnection agreements for each service, while others have a global interconnection agreement). These figures are therefore not strictly comparable between Member States.

International interconnection agreements are excluded.

For the Netherlands, separate data for the different categories of interconnection are not available.

In Finland, the figure given for fixed-to-fixed interconnection agreements includes mobile-to-fixed interconnection agreements.

Table 1 Number of interconnection agreements in place for call termination on fixed and mobile networks

	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Fixed-to-mobile	11	7	5	3	45	19	2	31	6	91	127	20	184	26	5
Fixed-to-fixed	21	141	98	1	112	72	14	75	6		416	31		75	239
Mobile-to-mobile	3	7	n.a.	3	3	0*	1	7	1		9	1	3	6	6

* French operators are interconnected, but apply "bill and keep" so do not define termination charges.

2. FIXED-TO-FIXED INTERCONNECTION CHARGES

The following charts show the per-minute interconnection charges for call termination on the incumbent's fixed network, based on a three-minute call at peak rate.

The charts show the absolute value of the interconnection charges (in €-cents) as of 1 August 2001, in comparison to the value as of August 2000.

The figures refer to the interconnection charges actually in place at 1 August 2001: these may have been approved by the NRA or simply agreed between operators, where the legal framework does not require NRA approval. However, in the case of the Netherlands these charges correspond to the charges set by OPTA in July 2001 and the NRA could not confirm that they were actually in place in August 2001. Furthermore, it worth mentioning that in Spain new interconnection rates have been published on 19 August and are considered applicable since this date, following renegotiations of existing agreements.

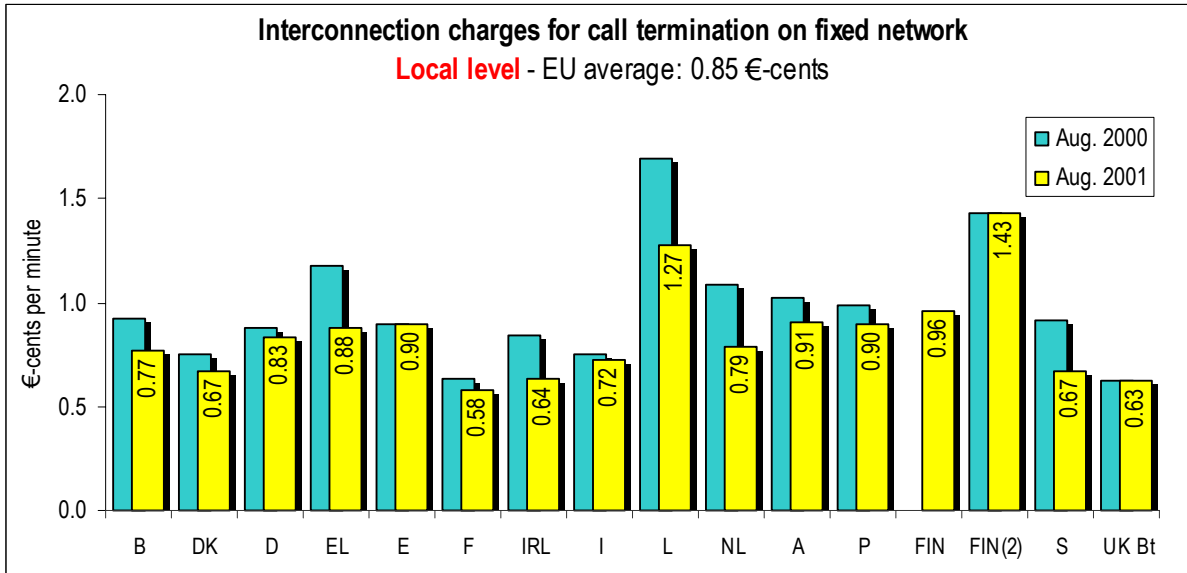
In Germany there is no 1:1 correlation between the four price zones, which are defined by distance, and the three bands of the former best practice recommendations (local, single and double transit), which are defined in technical terms.

In the case of France, in order to maintain consistency across Member States, the per minute charge indicated does not include the per minute charge related to the cost of the 2 Mbit/s port, which, however, according to ART, provides a better picture of the cost borne by the interconnecting party. By taking this additional charge into account, per minute charges would be €-cent 0.62, €-cent 1.26 and €-cent 1.76 respectively at local, single transit and double transit interconnection levels.

In Finland there are about 50 SMP operators that apply different charges. The charts refer to charges applied by the two major operators.

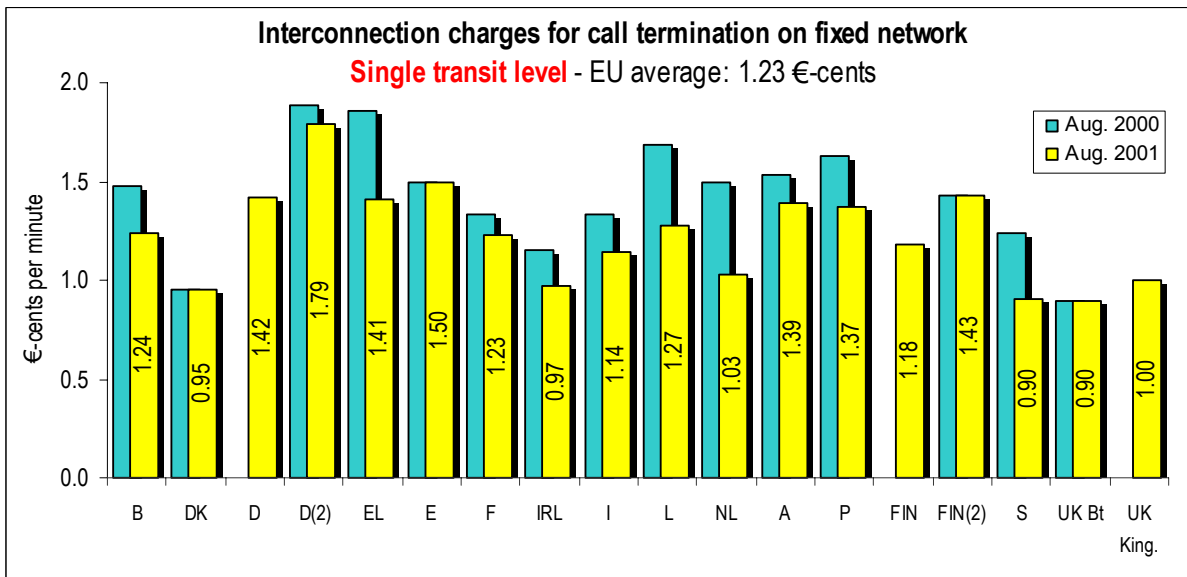
The EU average is a simple, rather than a weighted average.

Chart 1



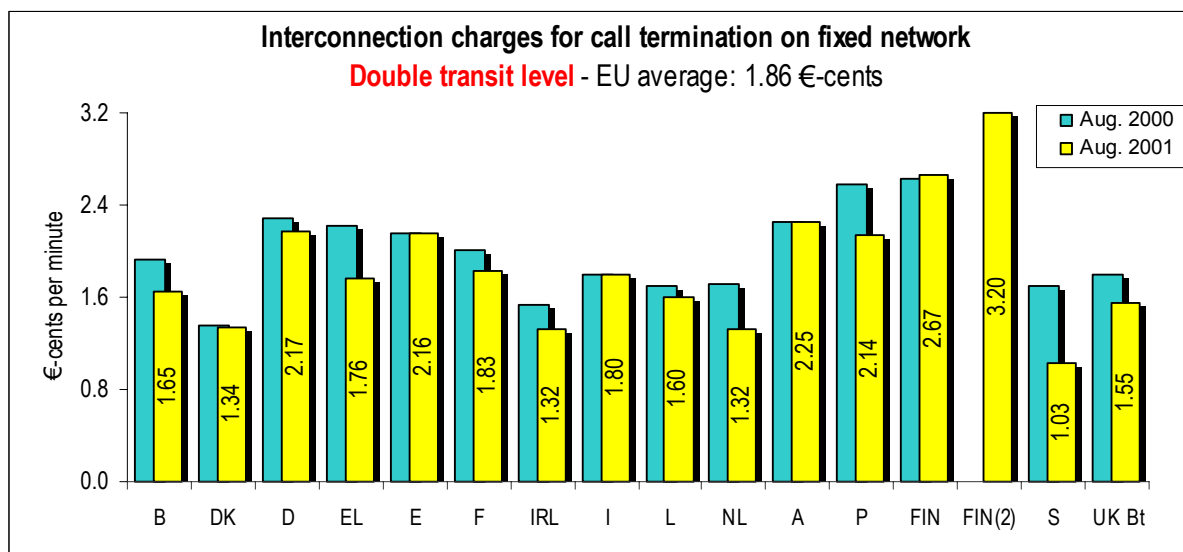
In Luxembourg there is no distinction between local and long-distance domestic calls.

Chart 2



D and D(2) refer respectively to Regio50 and Regio200 Zone rates. However, single transit interconnection is also established in the City Zone area, especially in large cities.

Chart 3



For D the reference is to National rates. However, double transit interconnection can also be established within the Regio200 Zone.

3. LEASED LINE INTERCONNECTION CHARGES

This section shows the monthly rental charges for short-distance leased lines (local ends) up to 2 and 5 km provided by the incumbent operator to other interconnected operators (excluding one-off connection fees).

Deviations from the “recommended price ceiling” set in Commission Recommendation 1999/3863 of 24 November 1999 are also shown. The recommended price ceilings are:

- € 80/month for a 64 Kbit/s leased line part circuit up to 5 km
- € 350/month for a 2 Mbit/s leased line part circuit up to 5 km;
- € 1 800/month for a 34 Mbit/s leased line part circuit up to 2 km;
- € 2 600/month for a 34 Mbit/s leased line part circuit up to 5 km.

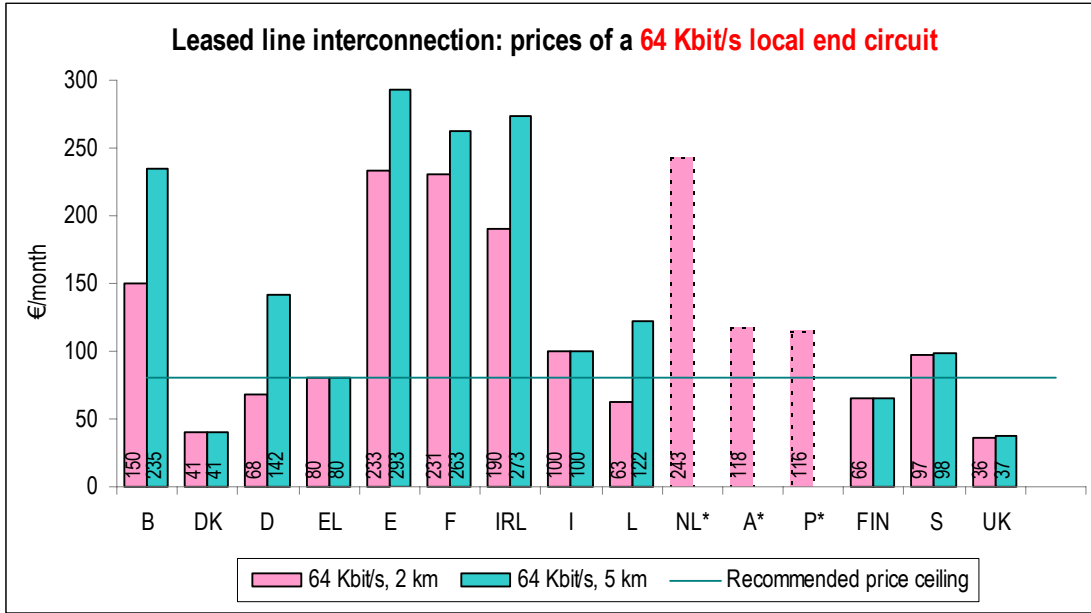
The following charts show the monthly rental prices charged by the incumbent operators for short-distance leased line interconnection circuits, excluding VAT.

These figures have been provided by the national regulatory authorities, apart from some categories of lines in the case of Luxembourg (for 34 Kbit/s 2 km circuits), the Netherlands (for 64 Kbit/s and 2 Mbit/s 2 km circuits), Austria and Portugal (for 64 Kbit/s 2 km circuits), for which rental prices have been estimated using retail prices provided by Total Research-Teligen¹⁶. Data indicate the position in August 2001.

The figures provided by Ireland are not fully comparable to the ones published in the Sixth Report, due to different underlying assumptions on location and type of interconnection. All other things being equal, 2001 charges are lower than last year.

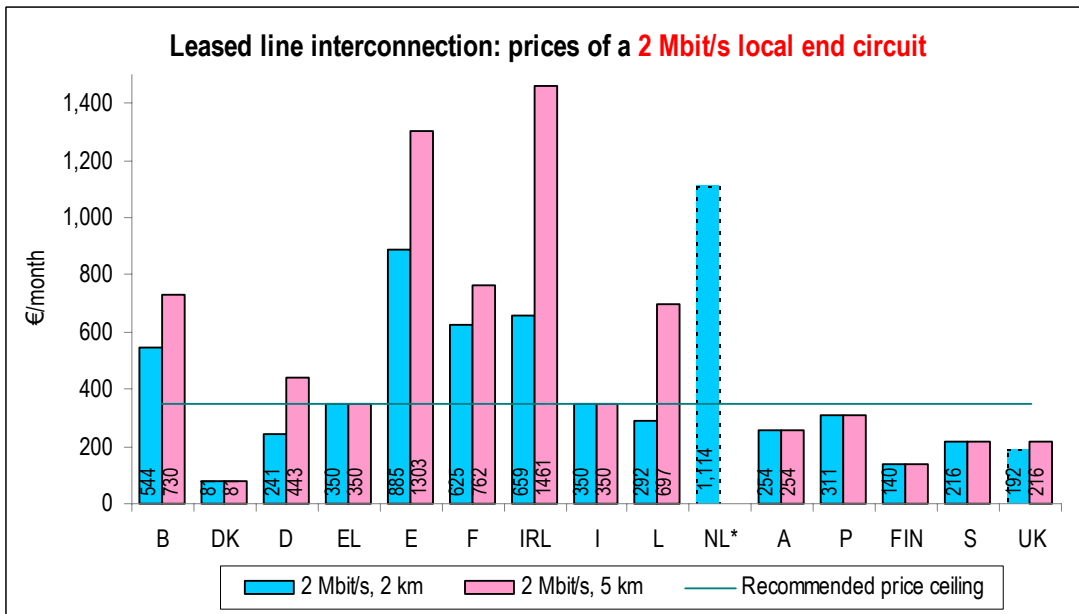
¹⁶ See also leased lines section.

Chart 4



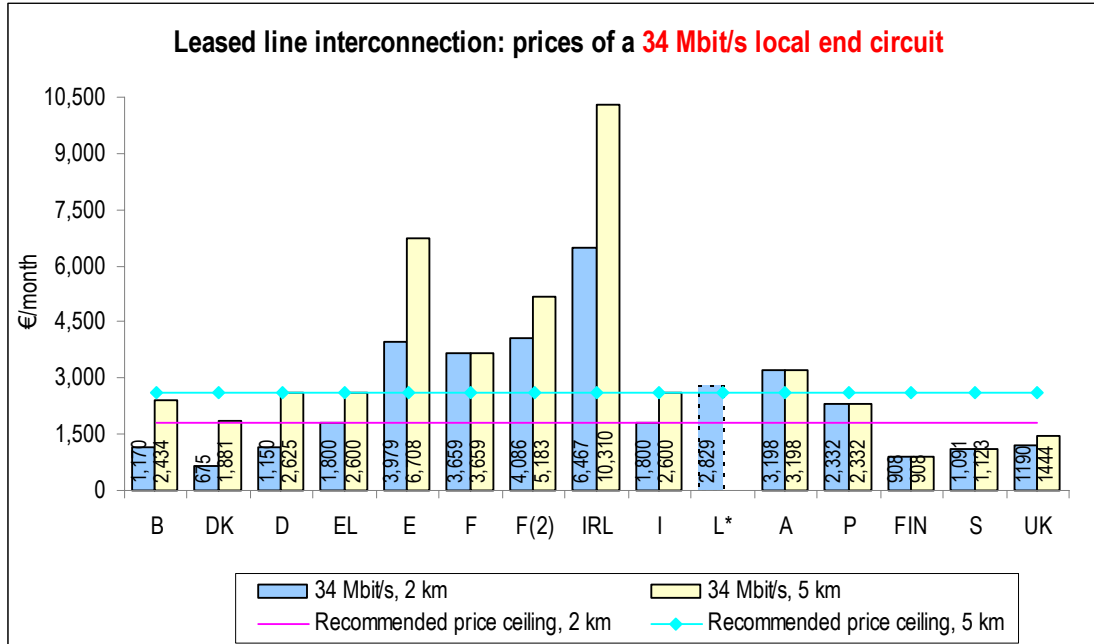
* Retail prices. Source Total Research-Teligen.

Chart 5



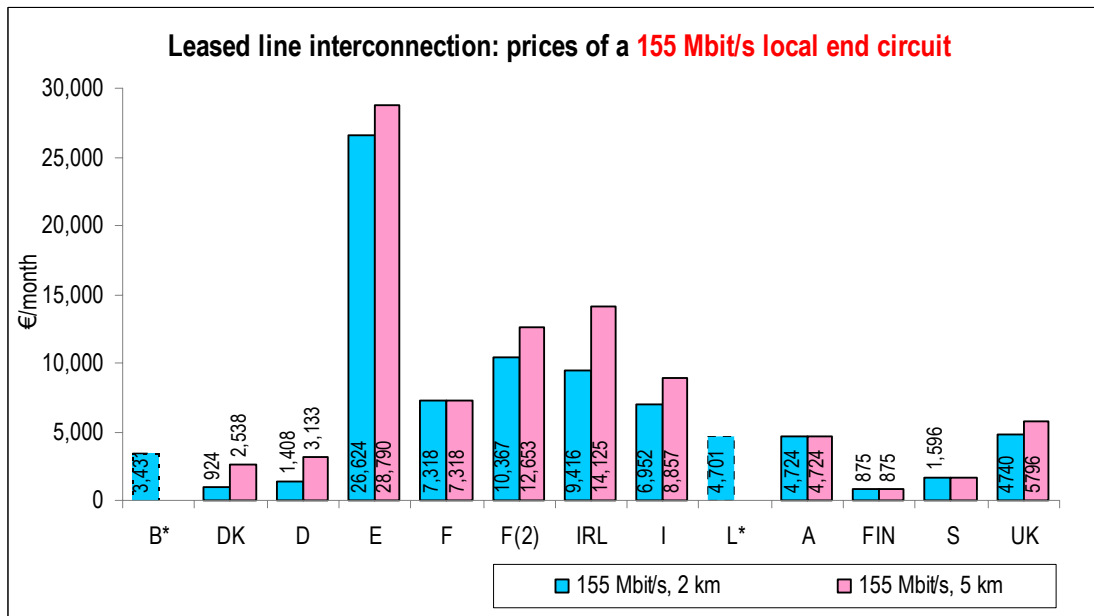
* Retail prices. Source Total Research-Teligen.

Chart 6



* Retail prices. Source Total Research-Teligen.
F refers to the price for a partial circuit within the Ile de France.
F(2) refers to the price for a partial circuit outside the Ile de France.

Chart 7



* Retail prices. Source Total Research-Teligen.
F refers to the price for a partial circuit within the Ile de France.
F(2) refers to the price for a partial circuit outside the Ile de France.

4. FIXED-TO-MOBILE INTERCONNECTION CHARGES

This section shows the per-minute interconnection charges for fixed call termination on the networks of mobile operators with significant market power (SMP) in the national market for interconnection. In those cases where there are no SMP operators, termination charges of the leading mobile operator are shown.

The charges are based on a three-minute call at peak rate. Different charges may apply for call termination on other mobile networks.

The figures have been collected by the NRA, except for Germany and the Netherlands. Figures for Germany are not publicly available; for the Netherlands, the interconnection charge has been estimated by the European Commission services on the basis of figures provided in August 2000. For all other Member States, the figures give the position in August 2001.

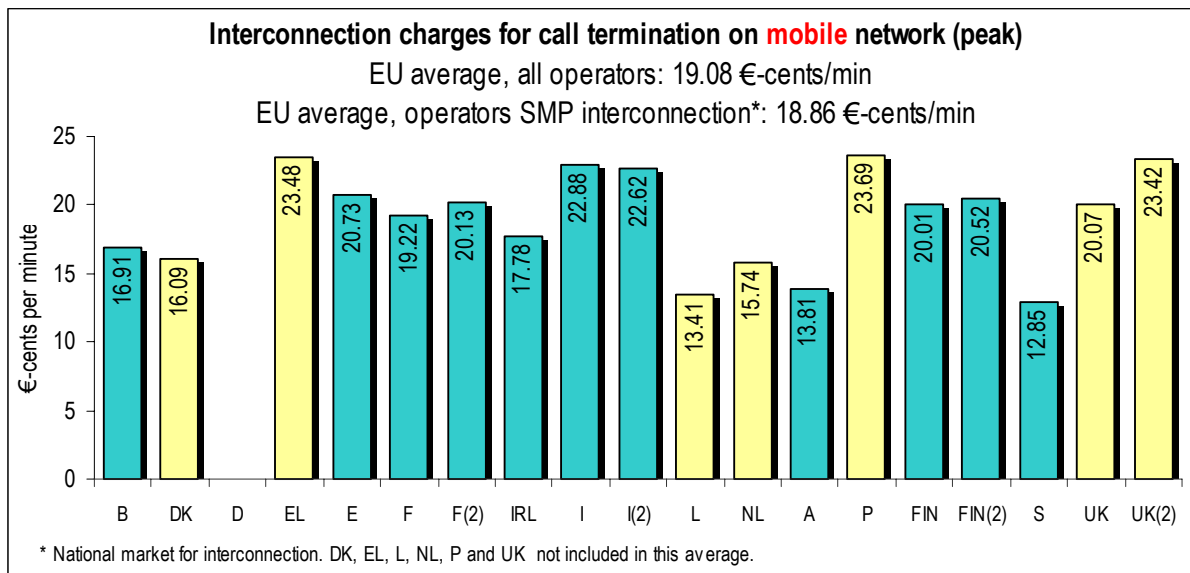
In France, Italy, Finland, Spain and Ireland two mobile operators have been notified as having SMP in the national market for interconnection. However, in Ireland and Spain the operators charge the same termination charges.

The following leading operators have been considered: TDC Mobil for Denmark, Cosmote for Greece, P&T for Luxembourg, TMN for Portugal, Sonera and Radiolinja for Finland. In the case of the United Kingdom, where Cellnet, Orange and Vodafone present very similar market shares the minimum (Cellnet) and the maximum (Orange) termination rates are shown.

The data for Finland indicate the interconnection charge for an international fixed call to a mobile network. They also apply to mobile-to-mobile calls.

The EU average is a simple average.

Chart 8 (Correction: please note that figures for the UK have been amended)



F and F(2) refer to FTM(Orange France) and to SFR.

I and I(2) refer to TIM and Omnitel.

FIN and FIN(2) refer to Sonera and Radiolinja.

UK and UK(2) refer to Cellnet and Orange. Vodafone's termination charge is comprised between the two.

2.3 IMPLEMENTATION OF DIRECTIVE 95/47/EC (THE TV SIGNALS DIRECTIVE)

Reporting requirements

Article 6 of Directive 95/47/EC provides that every two years the Commission shall examine the implementation of this Directive and the development of the market for digital television services throughout the European Union.

In 1999, the Commission published its first Report¹⁷ under the Directive. One section of this document reported on the transposition of the main provisions of the Directive. Two other sections covered developments in the market, which was still at an early stage, and on technologies respectively.

For 2000-2001, the monitoring of the implementation of the Directive has been conducted in two main frameworks: firstly, in a Digital Broadcasting Expert Group created under the ONP Committee, which comprises experts from the Member States administrations and whose thrust is to share experiences as to the implementation of the Directive; secondly, in the context of the meetings organised with representatives from the national regulatory authorities and from industry in view of the preparation of this Report.

This section of the Report covers regulatory developments at the EU level, and in particular the main challenges facing regulators. The country chapters in Annex III include a section on the regulatory situation, with some market data, in each Member State. The annex to this section incorporates market and technological data.

Transposition and implementation of the Directive

Transposition has been slow in most Member States. The national transpositions of 95/47/EC are broadly convergent; however, they are adapted to the different national legal frameworks.

A third of the Member States have still not transposed all of the provisions of the Directive. The Commission has opened and pursued infringement proceedings, as appropriate. An argument that the Member States have frequently used is that there has been no need for the provision(s) that has (have) not been transposed, because the market for digital television has not really taken off as yet.

¹⁷ The Development of the Market for Digital Television in the European Union – Report in the context of Directive 95/47/EC of the European Parliament and of the Council of 24th October 1995 on the use of standards for the transmission of television signals – COM (1999)540.

In a number of Member States, in the context of the transposition of the Directive, rules and regulations have been adopted that do not fall under the scope of the Directive, but which constitute technical rules that are notifiable under Directive 98/34/EC¹⁸ to allow the Commission to assess whether or not they constitute obstacles to the Treaty provisions on the free movement of goods.

With regard to actual implementation, around half of the Member States have stressed (in the Digital Broadcasting Expert Group) that they do not have much experience with the practical implementation of the Directive, mostly because of the limited market development and also due to a lack of complaints or cases referred to the national regulatory authorities.

In a number of Member States, the situation is expected to change however, as a function of the timing of the launch of digital terrestrial television (DTTV).

Market developments

National digital television (DTV) markets are at very different stages of development in different Member States. At the Community level, the DTV market has enjoyed a high growth rate since its beginning in 1996, and the number of digital households rose to over 18.5 million in 2000 from 10.4 million in 1999¹⁹. This represents 77% growth in one year. The number of digital households was 2 million at the end of 1997.

However, 90% of the market (in terms of digital television households) is represented by a few Member States (UK, France, Spain, Italy, and Germany). Overall, digital penetration remains low in most Member States; it stood at 12.4% on average in terms of households at the end of 2000.

Different broadcasting markets are and remain separated by language, cultural and other regulations imposed by the Member States, notably to ensure that specific public interest objectives are met.

Pay-TV continues to drive the market

Pay-TV services, in particular those delivered by satellite, have driven the development of digital television. In the most developed markets, market growth has been based mainly on an increase in the number of subscriptions to digital pay-TV services and on customers switching from analogue pay-TV offers to digital TV offers.

The pay-TV markets are characterised by strong concentration, and are controlled by analogue TV leaders and powerful companies. Incumbent telecommunications operators have also shown increasing interest in the cable and/or satellite markets.

¹⁸ Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

¹⁹ Please see the market data annex.

There have been important transactions between the major players, and several interventions from the Community and national competition authorities under the competition rules (abuse of dominant position) and under the Merger Regulation.

Digital terrestrial television

The recent or imminent launch of DTTV services in a series of countries has been another significant feature in the last three years. The first DTTV services were launched in the EU at the end of 1998. These launches have been made with the support of the governments, but also under close regulatory control, as Member States go further in structuring the DTTV market than in the case of cable or satellite television.

Competing delivery mechanisms for digital TV services have drawn attention to the need that DTTV be launched and supported in a competition-neutral way.

Cable TV

The recent period has also seen an enhanced positioning of cable operators in the DTV market. According to some estimates²⁰, over 80% of the cable connections have been up-graded to digital. Overall, there have been relatively few offers bundling TV services, voice telephony and Internet access. Interactive television is a nascent market, and technologies, standards and business models are still evolving.

Interoperability

The Directive, with its basic requirements regarding interoperability, has brought regulatory certainty to the first stages of development of the market by providing a measured balance between the objective of promoting investment in digital television (and “first mover” advantage) and competition.

The Common Interface

As mentioned in the 1999 Report, in some Member States the authorities have attempted to impose the Common Interface as the exclusive interoperability technique between conditional access services (CAS), but renounced these projects after the Commission opened infringement proceedings. Since that Report, one Member State (Austria) considered implementing this approach, but finally decided not to follow that course.

The single, or universal decoder

Both the Simulcrypt interoperability technique and the Common Interface are now recognised in all of the Member States. They continue to evolve, however.

In December 2000, the Steering Board of the Digital Video Broadcasting Group (DVB) agreed specifications to standardise some more Simulcrypt interfaces in order to ensure improved inter-working between different manufacturers’ products.

²⁰ The figure mentioned is from a study commissioned by the Commission and conducted by IDATE.

Some national authorities and operators have expressed concern about the fact that while today, interoperability between CAS is mainly organised through Simulcrypt agreements, operators have been reluctant to conclude such agreements. They note that this leads to consumers being tied to individual providers' platforms, and to 'vertical markets', for example for receiver equipment like set-top boxes.

Consumers could be expected to benefit from greater use of open systems like the Multimedia Home Platform (for more details, see section "APIs and EPGs" below), and from the emergence of 'horizontal markets' where consumers could buy equipment able to receive services from different providers.

In some Member States, these concerns have been reflected in regulatory measures and/or debates concerning the implementation of a so-called "single" decoder (Italy) or "universal" decoder (Spain). For more details, see the relevant country chapters in Annex III.

Industry-led national initiatives

Similar concerns are also felt in other Member States, where the authorities have encouraged industry-led initiatives to achieve interoperability on a voluntary basis.

The Nordig consortium of broadcasters, which gathers key players from all the Nordic Member States, have specified MHP decoders for new customers from the end of 2002 and will phase out legacy systems by 2005.

In Germany, the open standards FUN-consortium created by ARD and ZDF has built up a population of 150 000 decoders. FUN will also migrate to MHP. In addition, in September 2001, in a joint statement the German broadcasters (ARD, ZDF, RTL, Kirch Gruppe and media authorities of the German Länder) formalised their commitment to migrate to MHP.

APIs and EPGs

Digital television is very dynamic. New technologies and associated facilities (such as Applications Programme Interfaces (APIs) and Electronic Programme Guides (EPGs)) are being continuously introduced. It takes time for interoperability to catch up with fast-moving technological developments. These new associated facilities are not covered by Directive 95/47/EC.

In respect of APIs, industry took the view that it would be impractical to develop interoperability techniques between the various APIs available when the market started. Instead, the DVB has developed a new architecture, the Multimedia Home Platform (MHP), which incorporates user requirements from both free-to-air operators and proprietary APIs, and migration paths from existing APIs. The MHP became an ETSI technical specification in May 2000.

Some Member States have adopted measures concerning APIs and EPGs. In practice, it appears that two approaches are followed, which are either to enforce standardisation measures, or to develop access rules and economic regulation based on commercial terms.

Meetings with industry

The Commission has organised a series of meetings with industry, which have revealed a wide range of views on MHP. Generally, pay-TV operators and CATV operators have stressed the uncertainty over the future direction of the market and technology, and expressed concerns over the cost of MHP and its lack of retroactive compatibility with the installed base of decoders²¹.

Free-to-air broadcasters and manufacturers have contended that standards facilitate the creation of content and are a key element for realising horizontal markets. Broadcasters with pay TV interests however underline the need for a return from existing technology investments. Generally, they support the implementation of the MHP over time, but oppose its imposition.

Manufacturers' opinions on this issue are very divided, notably between those producing decoders and those making integrated television sets.

The most widely represented view among industry is that the MHP is a positive development for the future, as long as it is not imposed. Mandating the MHP would risk undermining the co-operative DVB approach that led to MHP, as the latter was developed on the assumption that it would not be mandated through *ex ante* regulation. This suggests that a promotional approach would be appropriate for the implementation of the MHP.

A voluntary migration towards the MHP across the Community

Following the above meetings, an industry-led, non mandatory approach, to migration towards MHP across the single market is being followed, based on a European Memorandum of Understanding, to build upon and complement the work of national MHP implementation groups.

The Commission supports this process²².

The new regulatory framework

In the context of the review of the current Community regulatory framework for telecommunications, which was launched in 1999, the Commission has proposed to incorporate many provisions of Directive 95/47/EC in their entirety in the forthcoming converged framework for electronic communications.

²¹ Although migration paths exist in terms of software, many receivers in households lack the hardware resources (in terms of sufficient memory and processing power) to offer MHP applications.

²² This appears in the so-called «Helsinki Declaration» that was issued following a high level meeting between senior officials of the European Broadcasting Union, and Mr Liikanen, Member of the European Commission in charge of Enterprise and the Information Society, on 17 August 2001.

The Commission's objective has also been to enhance the current provisions, and notably to propose a mechanism to allow them to be extended to other associated facilities such as APIs and EPGs.

The Directives in the new regulatory framework for electronic communications are currently subject to negotiation between the European Parliament and the Council, under the co-decision procedure. It is expected that they will be formally adopted in the next few months, and will be applied on the same day in all Member States some 15 months after the date of adoption.

Details of the Commission proposal and subsequent European Parliament and Council texts can be found at:

http://europa.eu.int/information_society/topics/telecoms/regulatory/new_rf/index_en.htm

The purpose of this section is to address the requirement in Article 6 of Directive 95/47/EC on the use of standards for the transmission of television signals²³ that, every two years, “*the Commission shall examine (...) the market for digital television services throughout the European Union and submit a report*”. The last report was the subject of a separate Commission Communication in 1999²⁴.

Accordingly, this section provides information on the evolution of the EU market for digital television (hereafter referred to as ‘DTV’) in terms of households (both in absolute figures and percentage of penetration) and revenues. Data are broken down by Member State and DTV delivery mechanism (cable, satellite and terrestrial).

As regards the time scope, several tables and charts provide information on the years 1996 to 2001 in order to show the evolution of the EU market for DTV since its start in 1996. This seems justified considering that DTV is included for the first time in the Commission’s report on the implementation of the telecommunications regulatory package. Figures for 2001 are forecasts. Some tables also provide forecasts up to 2005.

Unless otherwise specified, DTV market penetration figures are expressed as a percentage of the total number of total households, not of ‘TV households’. However, these two magnitudes are very close in all EU Member States, where almost every household receives TV services (analogue, digital or both)²⁵.

DTV market data presented in this section cover both pay and free-to-air services, i.e. either received against payment of a subscription fee or not. In this regard, it is estimated that, in 2000, only 5% of DTV households received exclusively free-to-air services²⁶. However, in many cases, DTV subscribers receive certain free-to-air channels in addition to pay channels.

Figures for cable TV do not correspond to networks upgraded for digital services, but to households actually receiving the service.

Data come from different sources, mainly *Strategy Analytics*, “*Interactive Digital Television – February 2001 Market Forecast*”; *IDATE*, “*Development of digital television in the EU*” – *European overview*”, and the *Digital Broadcasting Experts Group*.

²³ OJ No L 281, 23. 11. 1995, p. 51.

²⁴ COM(1999) 540

²⁵ According to Eurostat, in 1998, on average, 97% of EU households had at least one TV set, and in no Member State this figure was lower than 90%. See *Eurostat*, “*Statistics in focus, theme 4 – 3/2001*”

²⁶ See *IDATE*, “*Development of digital television in the EU*” – *European overview*”. Available at http://europa.eu.int/information_society/topics/telecoms/regulatory/studies/index_en.htm

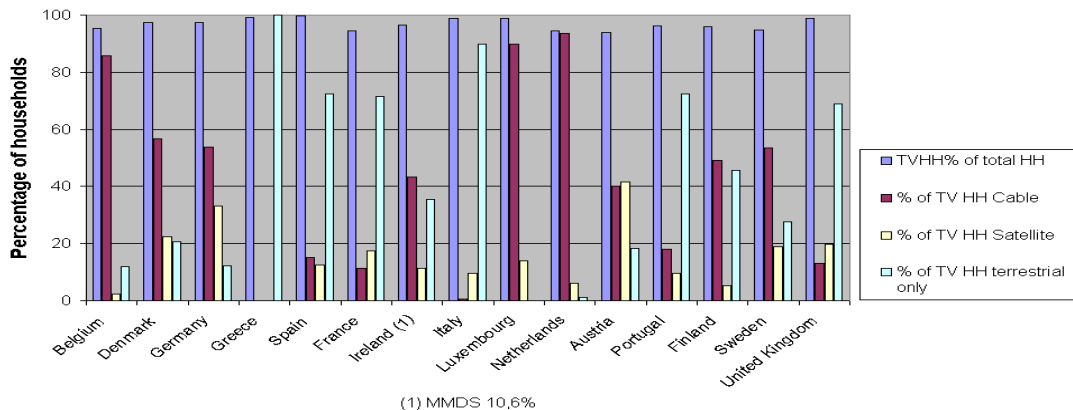
1. EU television market overview – analogue and digital tv

The starting positions of the Member States for the development of their digital TV markets differ widely, in terms of existing television infrastructure. Member States can be segmented into three groups according to the dominant analogue TV delivery mechanisms:

- Group 1 consists of multi-channel cable markets, i.e. Belgium, Netherlands and Luxembourg, where cable penetration is close to 100% of households;
- Group 2 consists of hybrid multi-channel markets, i.e. Germany, Denmark, Finland, Sweden, Ireland and Austria, where satellite and cable are well-established;
- Group 3 consists of other Member States where terrestrial has been the main television delivery mechanism, i.e. France, Greece, Italy, Portugal, Spain, UK.

In several Member States the introduction of pay-TV and free-to-air satellite services, initially in analogue, changed the TV landscape, notably reducing the proportion of terrestrial-only households. This trend has continued in digital markets, given the rapid and significant digitisation of satellite TV in comparison with cable and, especially, terrestrial TV. It should be noted that digital terrestrial television roll-out varies widely across Member States. Cable TV networks require upgrading in order to carry digital television.

Chart 1: Total TV services (analogue and digital) in the EU, 1999 market penetration by EU Member State and TV delivery mechanism



Source:

prepared by EC services from IDATE data

(1) In addition to cable TV networks, Ireland also has MMDS systems for the provision of multi-channel TV to rural areas.

‘HH’ stands for ‘households’. ‘EC services’ stands for ‘European Commission services’. The TV household percentage is established with reference to the total number of households in each country. The TV cable, satellite and terrestrial household percentages are established with reference to the total number of TV households in each country. This means that, for each Member State, the sum of the TV cable, satellite and terrestrial household percentages is 100%, and therefore higher than the total TV household percentage.

Table 1: Total TV market (analogue and digital) in the EU (plus Norway and Switzerland), evolution and forecast

Market Forecast Reference Data	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Household Population (M)	150	151	151	152	153	154	155	156	157	158	159
% with Cable TV *	24%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%
% with DTH Satellite *	11%	12%	14%	16%	17%	18%	20%	22%	24%	25%	26%
% with both (Dual-source)	1%	1%	1%	1%	1%	1%	2%	2%	2%	3%	3%
"Cable homes" (M)	36.5	38.6	41.0	42.7	44.3	46.0	47.5	49.5	51.2	53.5	55.5
"Satellite homes" (M)	16.2	18.3	21.4	23.7	25.7	28.0	31.3	34.2	37.2	39.0	41.1
"Dual-source homes" (M)	0.9	1.0	1.1	1.2	1.7	1.9	2.4	2.7	3.4	4.1	4.4
Total multichannel homes (M) **	53.7	57.9	63.5	67.6	71.7	75.9	81.2	86.4	91.8	96.6	101.0
Total TV set population (M)	217	222	227	232	238	243	248	253	258	263	269
Total TV Homes (M)	140	143	145	147	149	150	152	153	154	155	156
% with multichannel TV **	38%	41%	44%	46%	48%	50%	53%	57%	60%	62%	65%

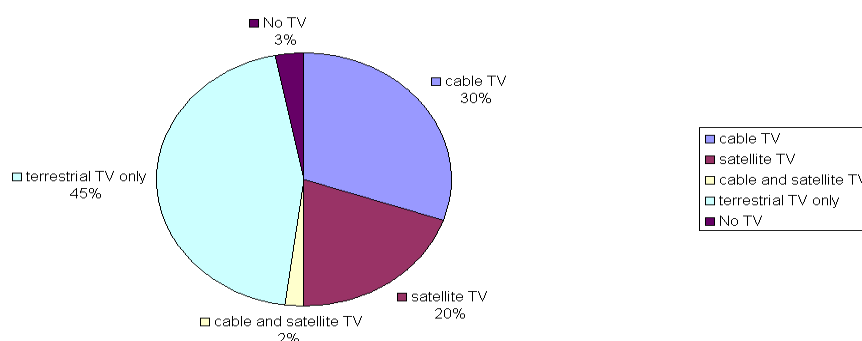
* total – analogue and/or digital

** excluding digital terrestrial

Source: Strategy Analytics, Feb 2001

Data in this table, also in some other tables and charts, include the EU plus Norway and Switzerland. However, the results shown can be considered as reflecting very closely the situation in the EU in regard of the relatively small population of Norway and Switzerland (around 2.1 and 3 million households respectively in 2001) in comparison to the total population of the EU (around 147 million households in 2001). In the case of Norway, according to *Strategy Analytics*, the average household penetration of digital TV in 2001 (19%) is very close to the average in the EU (18%). The figure for Switzerland is 7,5%. Figures for 2001 and onwards are forecasts. No separate figures for Luxembourg are available from Strategy Analytics.

Chart 2: Total TV market (analogue and digital) in the EU (plus Norway and Switzerland) in 2001, breakdown by TV delivery mechanism



Source: prepared by EC services from Strategy Analytics data

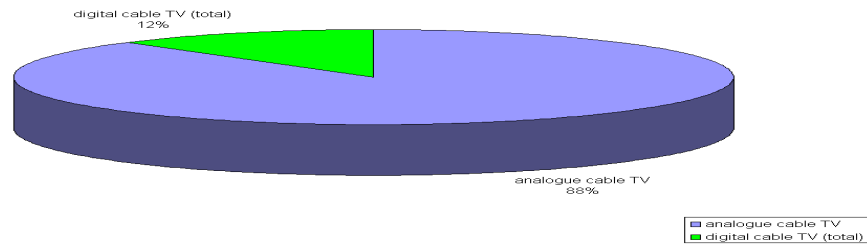
The percentage of households without TV (3%) refers to the EU situation in 1998. This figure comes from *Eurostat* (see reference in footnote above). The percentage of households receiving terrestrial TV only (45%) has been established as the difference between 100% and the addition of percentages for cable, satellite, cable and satellite, and the ‘no television’ share.

Table 2: Digital TV households in the EU (plus Norway and Switzerland), and digital share of total TV market, evolution and forecast

Digital TV Ownership Analysis	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Satellite											
Net new households (M)	0.0	0.4	1.5	2.3	4.2	6.0	4.9	4.8	4.2	4.1	3.6
Digital Satellite TV Households (M)	0.0	0.4	1.9	4.1	8.3	14.3	19.2	24.0	28.2	32.3	35.9
Digital share of total satellite homes	0%	2%	8%	17%	30%	48%	57%	65%	70%	75%	79%
Cable											
Net new households (M)	0.0	0.0	0.1	0.7	0.9	1.5	2.9	4.7	5.5	6.2	6.3
Digital Cable TV Households (M)	0.0	0.0	0.1	0.8	1.7	3.2	6.1	10.7	16.3	22.5	28.8
Digital share of total cable homes	0%	0%	0%	2%	4%	7%	12%	21%	30%	39%	48%
Terrestrial											
Net new households (M)	0.0	0.0	0.0	0.0	0.5	0.7	0.9	1.3	1.7	2.0	1.7
Digital Terrestrial TV Households (M)	0.0	0.0	0.0	0.0	0.5	1.3	2.1	3.5	5.1	7.1	8.8
Digital share of total homes	0%	0%	0%	0%	0%	1%	1%	2%	3%	5%	6%
Total Digital TV Households											
Net new households (M)	0.0	0.4	1.6	3.0	5.6	8.2	8.7	10.4	10.8	11.5	10.7
No. Digital TV Services per Household	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.02	1.03	1.04
TOTAL DIGITAL TV HOUSEHOLDS (M) *	0.0	0.4	2.0	5.0	10.5	18.7	27.4	37.8	48.7	60.1	70.8
Digital share of total households	0%	0%	1%	3%	7%	12%	18%	24%	31%	38%	44%

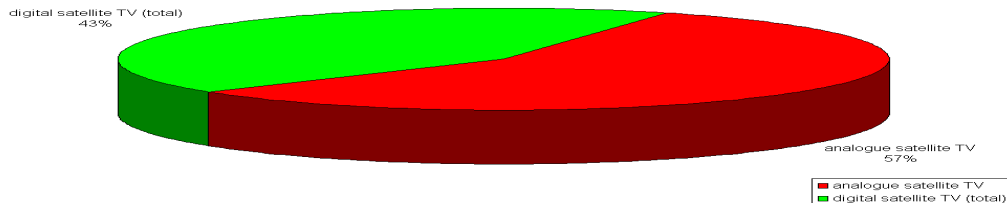
* Households with at least one digital TV service
SOURCE: STRATEGY ANALYTICS, FEB 2001

Chart 3: Cable TV in the EU (plus Norway and Switzerland), 2001 share of digital services



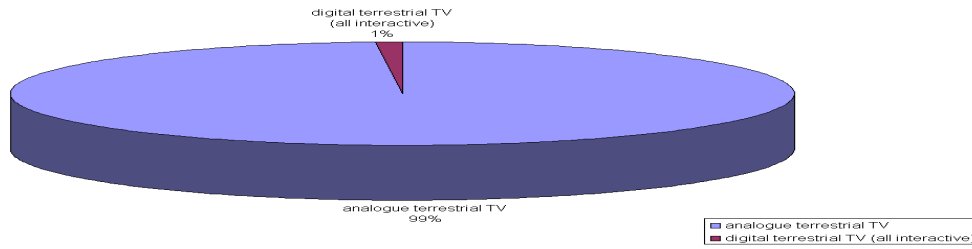
Source: prepared by EC service with data from Strategy Analytics

Chart 4: Satellite TV in the EU (plus Norway and Switzerland), 2001 share of digital services



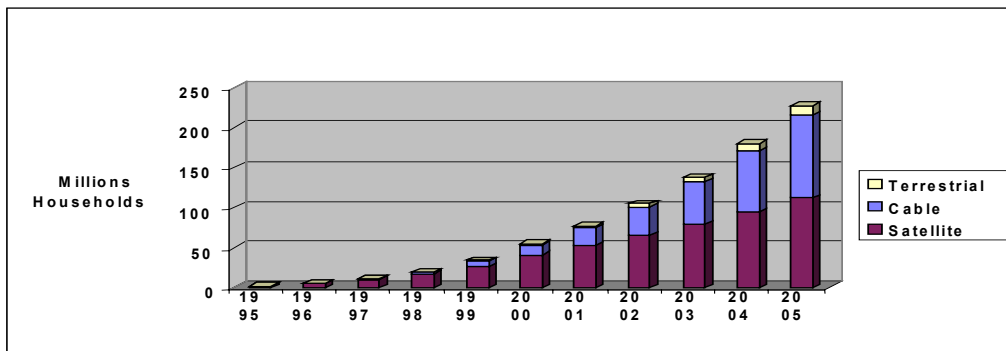
Source: prepared by EC services from Strategy Analytics data

Chart 5: Terrestrial TV in the EU (plus Norway and Switzerland), 2001 share of digital services



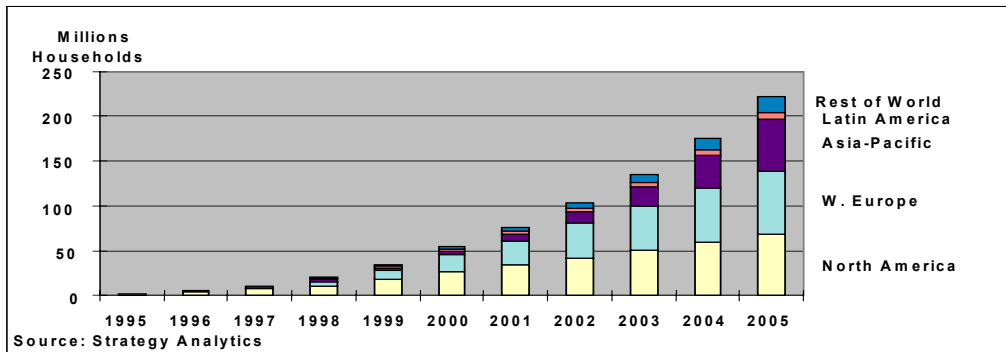
Source: prepared by EC services from Strategy Analytics data

Chart 6: World-wide Digital TV Households by Platform



Source: Strategy Analytics, Feb 2001

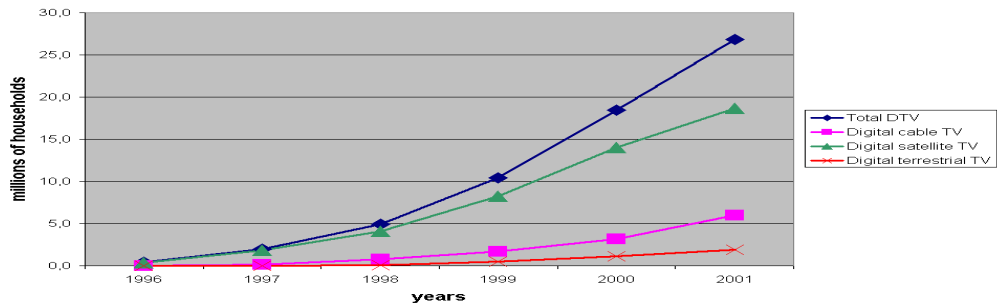
Chart 7: Households Receiving Digital TV



Source: Strategy Analytics

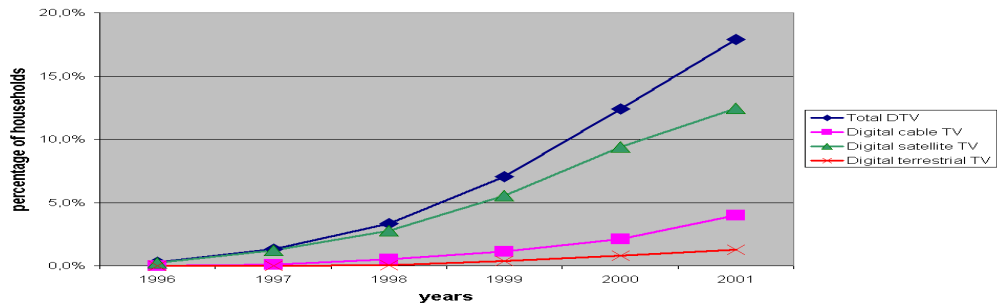
2. EU digital tv market, by delivery mechanisms and Member States

Chart 8: Evolution of digital TV in the EU (million households)



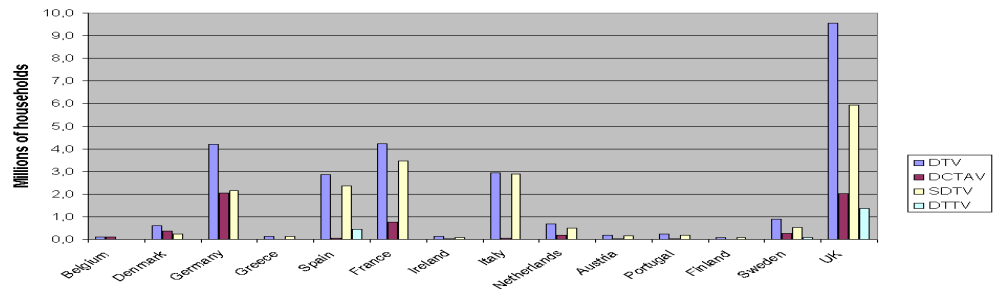
Source: prepared by EC services from Strategy Analytics data

Chart 9: Evolution of digital TV in the EU (percentage of households)



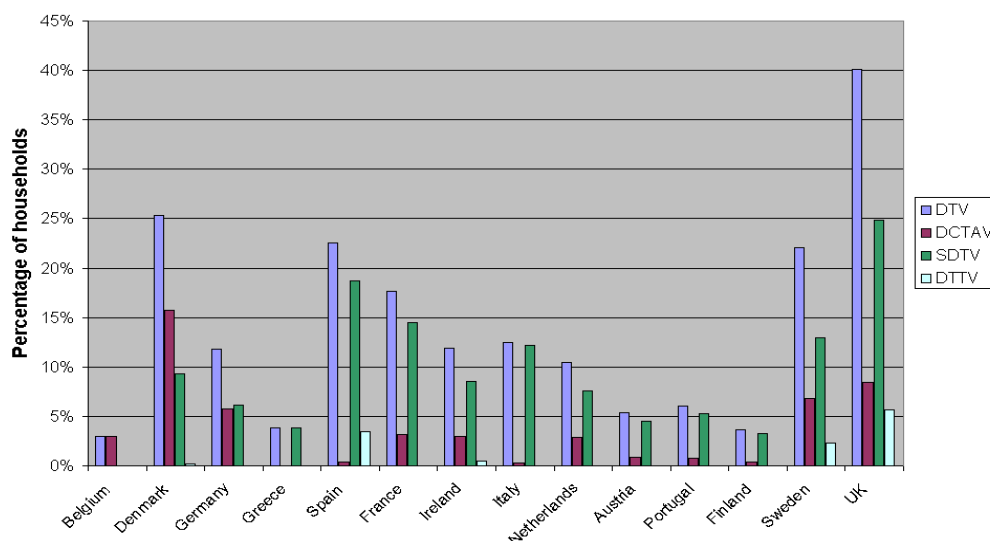
Source: prepared by EC services from Strategy Analytics data

Chart 10: Digital TV EU households in 2001, by Member State and delivery mechanism (millions of households)



Source: prepared by EC services from Strategy Analytics data

Chart 11: Digital TV EU household penetration in 2001, by Member State and delivery mechanism (percentage of households)



Source: prepared by EC services from Strategy Analytics data

Table 3: Evolution of total digital TV Households in EU Member States

Total digital TV Households												Source: prepared by EC services from Strategy Analytics data	
(in millions/ in % of digital households over total number of national households)													
	1996		1997		1998		1999		2000		2001		
	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	
Belgium	0,00	0,0%	0,01	0,3%	0,02	0,5%	0,04	1,0%	0,07	1,8%	0,11	3,0%	
Denmark	0,00	0,0%	0,01	0,4%	0,07	2,9%	0,18	7,9%	0,33	13,6%	0,61	25,3%	
Germany	0,02	0,1%	0,08	0,2%	0,62	1,8%	1,30	3,7%	2,54	7,2%	4,20	11,8%	
Spain	0,00	0,0%	0,36	2,9%	0,96	7,7%	1,23	9,9%	1,91	15,1%	2,86	22,5%	
Greece	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,05	1,3%	0,14	3,9%	
France	0,26	1,1%	1,12	4,8%	2,06	8,8%	2,73	11,6%	3,41	14,4%	4,21	17,6%	
Ireland	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,02	2,0%	0,06	5,9%	0,12	11,9%	
Italy	0,06	0,3%	0,29	1,3%	0,60	2,6%	1,46	6,3%	2,23	9,6%	2,94	12,5%	
Netherlands	0,05	0,8%	0,10	1,6%	0,18	2,7%	0,27	4,1%	0,43	6,5%	0,69	10,4%	
Austria	0,00	0,0%	0,01	0,3%	0,03	0,9%	0,05	1,4%	0,09	2,8%	0,19	5,3%	
Portugal	0,00	0,0%	0,00	0,0%	0,03	0,8%	0,07	1,9%	0,13	3,4%	0,22	6,1%	
Finland	0,00	0,0%	0,00	0,0%	0,01	0,2%	0,02	0,9%	0,04	1,7%	0,08	3,7%	
Sweden	0,00	0,0%	0,01	0,1%	0,04	1,0%	0,14	3,6%	0,48	11,9%	0,88	22,0%	
UK	0,00	0,0%	0,00	0,0%	0,32	1,4%	2,90	12,4%	6,72	28,4%	9,55	40,1%	
TOTAL EU	0,39	0,3%	1,97	1,4%	4,89	3,4%	10,37	7,2%	18,38	12,6%	26,63	18,2%	
Japan	0,20	0,0%	0,50	1,0%	1,20	3,0%	1,90	5,0%	2,80	7,0%	4,40	10,0%	
USA	4.4	4.0%	6.9	7.0%	10.4	10.0%	16.5	16.0%	24.6	24.0%	31.8	31.8%	

Abbreviations used: HH: households, DTV: digital television, DCATV: digital cable television, DSTV: digital satellite television, DTTV: digital terrestrial television.

In the above table the total EU digital household penetration is a weighted average that takes into account the number of households of the different Member States (Norway and Switzerland, which were included in the original data source, have been disregarded here). No figures are available from Strategy Analytics for Luxembourg. Figures for 2001 are forecasts.

Chart 12: Digital Television Adoption Rates – Major European Union Markets

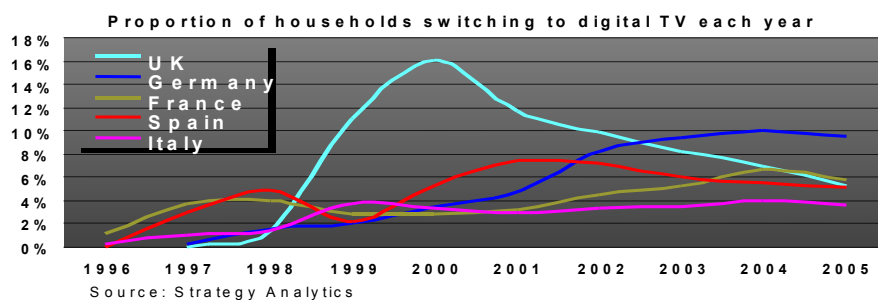


Chart 13: Digital Television Adoption Rates – Major European Union Markets

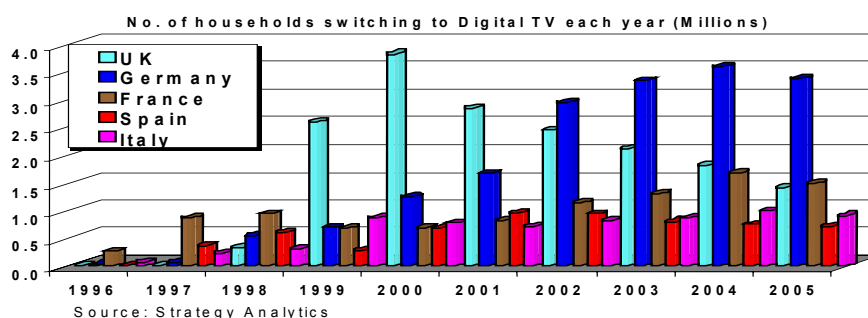


Table 4: Digital TV households in the EU in 2001, by Member State / delivery mechanism

Digital TV households in EU 2001, by delivery mechanism (in millions/ in % of digital households over total number of national households)									
	Total DTV			DCATV		DSTV		DTTV	
	Total HH	Digital HH	% digital HH	Digital HH	% digital	Digital HH	% digital	Digital HH	% digital
Belgium	3,8	0,11	3,0%	0,11	3,0%	0,00	0,0%	0,00	0,0%
Denmark	2,4	0,61	25,3%	0,38	15,8%	0,22	9,3%	0,01	0,2%
Germany	34,7	4,20	11,8%	2,03	5,7%	2,16	6,1%	0,00	0,0%
Spain	12,4	2,86	22,5%	0,05	0,4%	2,37	18,7%	0,44	3,5%
Greece	3,6	0,14	3,9%	0,00	0,0%	0,14	3,9%	0,00	0,0%
France	23,2	4,21	17,6%	0,75	3,1%	3,46	14,5%	0,00	0,0%
Ireland	1,0	0,12	11,9%	0,03	2,9%	0,08	8,5%	0,00	0,5%
Italy	22,8	2,94	12,5%	0,06	0,3%	2,87	12,2%	0,00	0,0%
Netherlands	6,5	0,69	10,4%	0,19	2,9%	0,50	7,6%	0,00	0,0%
Austria	3,3	0,19	5,3%	0,03	0,8%	0,16	4,5%	0,00	0,0%
Portugal	3,5	0,22	6,1%	0,03	0,8%	0,20	5,3%	0,00	0,0%
Finland	2,3	0,08	3,7%	0,01	0,4%	0,08	3,3%	0,00	0,0%
Sweden	3,9	0,88	22,0%	0,27	6,8%	0,52	12,9%	0,09	2,3%
UK	23,6	9,55	40,1%	2,02	8,5%	5,92	24,9%	1,35	5,7%
TOTAL EU	143,7	26,63	18,3%	5,94	4,1%	18,54	12,6%	1,89	1,3%
Japan	41,7	4,40	10,0%	0,00	0,0%	4,40	10,7%	0,00	0,0%
USA	105,0	31,8	31,8%	13,60	13,5%	18,10	17,7%	0,10	0,1%

Source: prepared by EC services from Strategy Analytics data

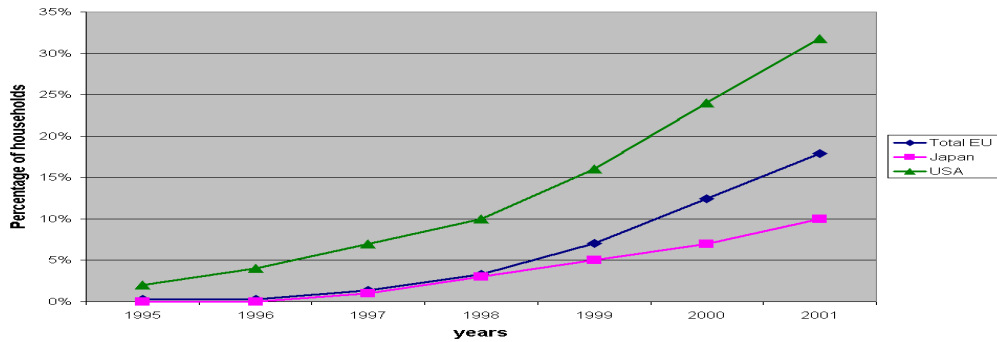
Table 5: Evolution of digital TV households in the EU, by delivery mechanism and Member State

Cable digital TV Households												
Source: prepared by EC services from Strategy Analytics data												
(in millions/ in % of digital households over total number of national households)												
	1996		1997		1998		1999		2000		2001	
	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%
Belgium	0,00	0,0%	0,01	0,3%	0,02	0,5%	0,04	1,0%	0,07	1,8%	0,11	3,0%
Denmark	0,00	0,0%	0,00	0,0%	0,05	2,0%	0,15	6,2%	0,24	10,0%	0,38	15,8%
Germany	0,00	0,0%	0,00	0,0%	0,40	1,1%	0,79	2,2%	1,16	3,3%	2,03	5,7%
Greece	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Spain	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,05	0,4%
France	0,01	0,0%	0,07	0,3%	0,22	0,9%	0,36	1,5%	0,50	2,1%	0,75	3,1%
Ireland	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,01	1,0%	0,03	2,9%
Italy	0,01	0,0%	0,05	0,2%	0,07	0,3%	0,08	0,3%	0,07	0,3%	0,06	0,3%
Netherlands	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,05	0,7%	0,19	2,9%
Austria	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,03	0,8%
Portugal	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,03	0,8%
Finland	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,01	0,4%
Sweden	0,00	0,0%	0,01	0,1%	0,03	0,8%	0,04	1,1%	0,14	3,5%	0,27	6,8%
UK	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,20	0,8%	0,91	3,9%	2,02	8,5%
TOTAL EU	0,02	0,0%	0,14	0,1%	0,79	0,5%	1,66	1,1%	3,16	2,2%	5,94	4,1%
Japan	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
USA	0,00	0,0%	0,30	0,3%	1,30	1,3%	5,00	4,9%	9,30	8,9%	13,60	13,0%

Satellite digital TV Households												
Source: prepared by EC services from Strategy Analytics data												
(in millions/ in % of digital households over total number of national households)												
	1996		1997		1998		1999		2000		2001	
	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%
Belgium	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Denmark	0,00	0,0%	0,01	0,4%	0,02	0,9%	0,04	1,7%	0,09	3,6%	0,22	9,3%
Germany	0,02	0,1%	0,08	0,2%	0,22	0,6%	0,51	1,4%	1,37	3,9%	2,16	6,1%
Greece	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,05	1,3%	0,14	3,9%
Spain	0,00	0,0%	0,36	2,9%	0,96	7,7%	1,23	9,9%	1,76	13,9%	2,37	18,7%
France	0,25	1,1%	1,05	4,5%	1,84	7,9%	2,36	10,1%	2,90	12,3%	3,46	14,5%
Ireland	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,02	2,0%	0,05	4,9%	0,08	8,5%
Italy	0,05	0,2%	0,24	1,0%	0,53	2,3%	1,38	6,0%	2,16	9,3%	2,87	12,2%
Netherlands	0,05	0,8%	0,10	1,6%	0,18	2,7%	0,27	4,1%	0,38	5,8%	0,50	7,6%
Austria	0,00	0,0%	0,01	0,3%	0,03	0,9%	0,05	1,4%	0,09	2,8%	0,16	4,5%
Portugal	0,00	0,0%	0,00	0,0%	0,03	0,8%	0,07	1,9%	0,13	3,4%	0,20	5,3%
Finland	0,00	0,0%	0,00	0,0%	0,01	0,2%	0,02	0,9%	0,04	1,7%	0,08	3,3%
Sweden	0,00	0,0%	0,00	0,0%	0,01	0,3%	0,10	2,5%	0,29	7,3%	0,52	12,9%
UK	0,00	0,0%	0,00	0,0%	0,28	1,2%	2,16	9,2%	4,72	20,0%	5,92	24,9%
TOTAL EU	0,37	0,3%	1,84	1,3%	4,07	2,8%	8,16	5,6%	13,94	9,6%	18,54	12,6%
Japan	0,20	0,5%	0,50	1,2%	1,20	2,9%	1,90	4,6%	2,80	6,7%	4,40	10,6%
USA	4,40	4,4%	6,60	6,5%	9,10	8,9%	11,50	11,2%	15,30	14,7%	18,10	17,2%

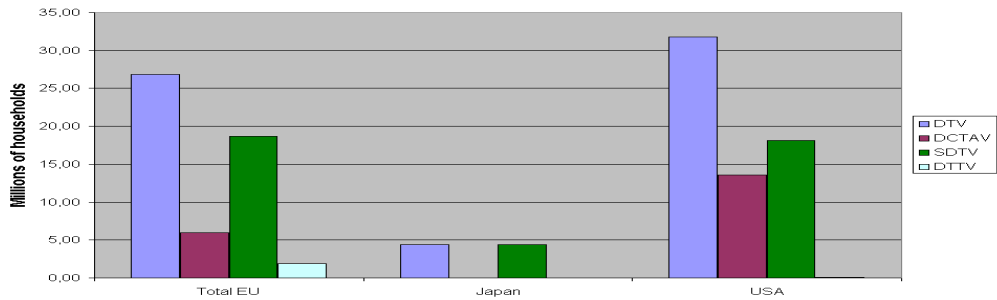
Terrestrial digital TV Households												
Source: prepared by EC services from Strategy Analytics data												
(in millions/ in % of digital households over total number of national households)												
	1996		1997		1998		1999		2000		2001	
	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%	Digital HH	%
Belgium	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Denmark	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,01	0,2%
Germany	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Greece	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Spain	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,15	1,2%	0,44	3,5%
France	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Ireland	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Italy	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Netherlands	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Austria	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Portugal	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Finland	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
Sweden	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,1%	0,04	1,1%	0,09	2,3%
UK	0,00	0,0%	0,00	0,0%	0,04	0,2%	0,52	2,2%	0,97	4,1%	1,35	5,7%
TOTAL EU	0,00	0,0%	0,00	0,0%	0,04	0,0%	0,52	0,4%	1,16	0,8%	1,89	1,3%
Japan	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%
USA	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,00	0,0%	0,10	0,1%	0,10	0,1%

Chart 14: Evolution of digital TV household penetration, comparison EU-Japan-USA



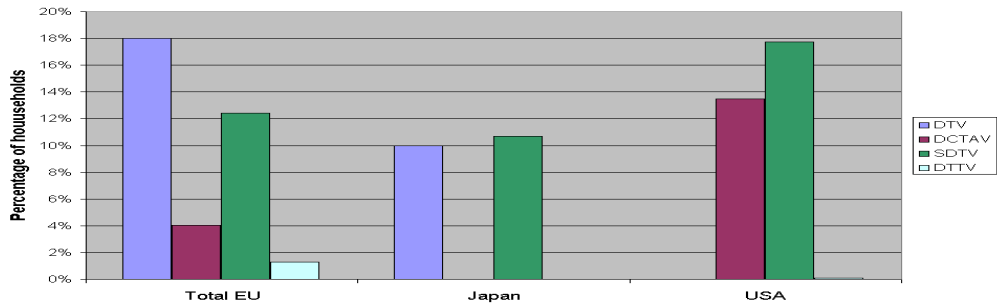
Source: prepared by EC services from Strategy Analytics data

Chart 15: Digital TV households in 2001, comparison EU-Japan-USA



Source: prepared by EC services from Strategy Analytics data

Chart 16: Digital TV household penetration in 2001, comparison EU-Japan-USA



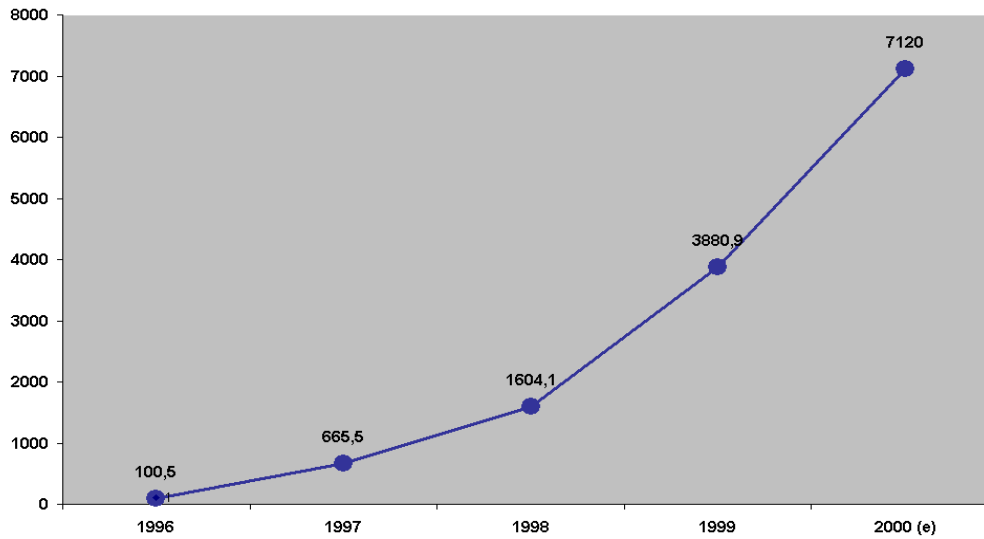
Source: prepared by EC services from Strategy Analytics data

Table 6: DTV revenues in 1999 in the E.U. (in M Euro)

	Digital TV subscription revenues	Total TV subscription revenues	DTV weight
Italy	326	560	58,1%
Spain	430	877	49,0%
United Kingdom	1647	3670	44,9%
France	1099	3018	36,4%
Belgium	14	93	14,7%
Germany	290	2750	10,5%
Netherlands	11	106	10,4%
Ireland	25	288	8,7%
Austria	14	180	7,7%
Denmark	11	223	5,0%
Greece	5	125	3,6%
Finland	3	75	3,5%
Sweden	8	400	1,9%
Total EU 15	3883	12497	31,1%

Source : IDATE

Chart 17: Digital TV subscription revenues since 1996 (in M Euro)



SOURCE: IDATE

Table 7: Households with Interactive Digital TV in the EU (plus Norway and Switzerland)

Interactive Digital TV Households

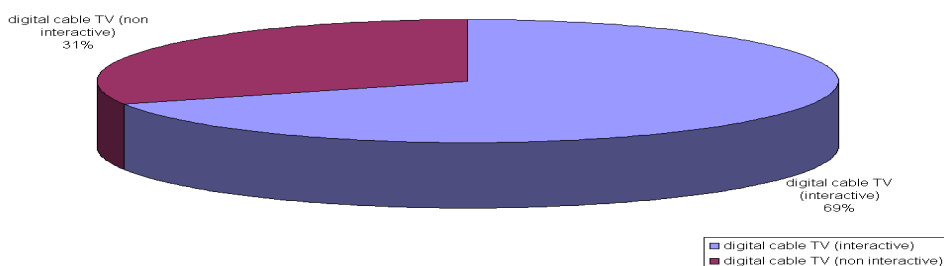
(owning at least one set-top box with middleware capable of supporting at least one of online shopping, interactive ads, information services, banking, games or Internet (email, web access))

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cable											
Digital Cable TV Households (M)	0.0	0.0	0.1	0.8	1.7	3.2	6.1	10.7	16.3	22.5	28.8
% Interactive capable		50%	63%	40%	47%	61%	69%	74%	81%	89%	96%
No. of Interactive Digital TV Households (M)	0.0	0.0	0.1	0.3	0.8	2.0	4.2	7.9	13.1	19.9	27.7
<i>Growth Rate (%)</i>			750%	272%	149%	149%	114%	89%	66%	51%	39%
Satellite											
Digital Satellite TV Households (M)	0.0	0.4	1.9	4.1	8.3	14.3	19.2	24.0	28.2	32.3	35.9
% Interactive capable		14%	39%	59%	86%	87%	90%	92%	95%	98%	100%
No. of Interactive Digital TV Households (M)	0.0	0.1	0.7	2.4	7.1	12.3	17.3	22.1	26.7	31.7	35.9
<i>Growth Rate (%)</i>				235%	193%	73%	40%	28%	21%	18%	13%
Terrestrial											
Digital Terrestrial TV Households (M)	0.0	0.0	0.0	0.0	0.5	1.3	2.1	3.5	5.1	7.1	8.8
% Interactive capable				100%	100%	100%	100%	100%	100%	100%	100%
No. of Interactive Digital TV Households (M)	0.0	0.0	0.0	0.0	0.5	1.3	2.1	3.5	5.1	7.1	8.8
<i>Growth Rate (%)</i>						133%	68%	61%	49%	39%	24%
Total Interactive Digital TV Households	0.0	0.1	0.8	2.8	8.5	15.6	23.6	32.9	43.3	55.4	69.7
<i>Growth Rate (%)</i>				244%	203%	84%	52%	39%	32%	28%	26%
iDTV Household Penetration	0%	0%	1%	2%	6%	10%	15%	21%	28%	35%	44%

Analytics, Feb 2001`

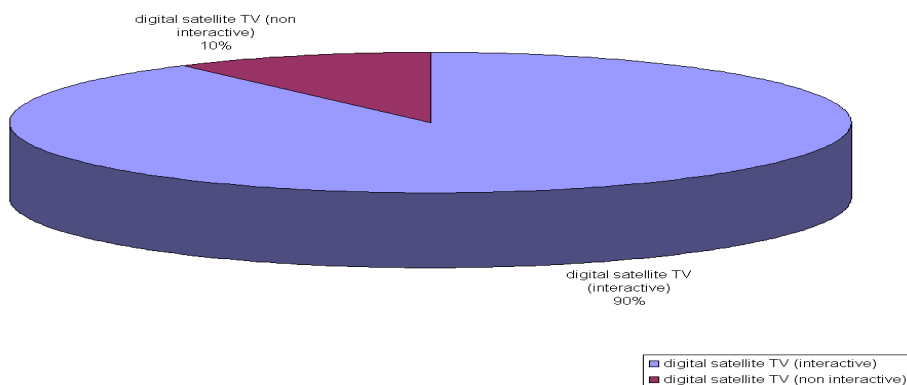
Source: Strategy

Chart 18: Digital cable TV market in the EU (plus Norway and Switzerland), 2001 share of interactive services



Source: prepared by EC services from Strategy Analytics data

Chart 19: Digital satellite TV market in the EU (plus Norway and Switzerland), 2001 share of interactive services



Source: prepared by EC services from Strategy Analytics data

3. Digital TV technology aspects

Table 8: Main TV satellite systems in the EU (2000)

Satellite systems	Digital platforms	Countries mainly targeted
	BskyB	Great Britain, Ireland
	Canal Satellite Digital	Spain
	Premiere world (DF1, Premiere Digital)	Germany, Austria
	ZDF.vision, ARD Digital	
SES- Astra	ORF, TW1	Austria
	ABsat	France, Belgium, Luxembourg
	Canalsatellite numérique	
	CanalDigitaal	The Netherlands
	Stream	
	RAI	Italy
	D+	
Eutelsat	Absat	France, Belgium, Luxembourg
	TPS	
	MSG	Germany
	NOVA	Greece
Hispasat	Via Digital TV Cabo	Spain Portugal
Thor	Canal Digital AS	Finland, Denmark, Sweden
Intelsat	Canal Digital AS	Finland, Denmark, Sweden
	Source : IDATE	

Table 9: Conditional access and API systems in Europe

Systems	Designers
Viaccess	France Télécom
Mediaguard	Seca
BetaCrypt	Beta-Research
N/a	Irdeto
Nagravision	Kudelski
Videoguard	News Data System
Conax CAS3	Conax Telenor
N/a	Telewest
API in Europe	
Systems	Designers
Open TV	Open TV
TVMediahighway	Seca
Power TV	Scientific Atlanta
Liberate TV Navigator	Liberate
Betanova	Beta-Research

Source : IDATE

With regard to *Application Programme Interfaces (APIs)*, it should be noted that the *Multimedia and Hypermedia Experts Group (MHEG)*, an API standardised by ISO) is used by free-to-air digital terrestrial broadcasters in the UK.

Work on technical specifications of the *Multimedia Home Platform (MHP)* has continued and prototype decoders have been presented at the Berlin *IFA* broadcasting fair in August 2001. Industry agreements concluded in different Member States aim at the migration from proprietary standards to the MHP. Such a commitment to the MHP was made within *Nordig*, an organisation grouping several Scandinavian television and telecommunication companies, and in a joint declaration from German broadcasters in September 2001. Some national authorities have also indicated that MHP use should be encouraged. Finally, relevant industry players are currently working on a European Memorandum of Understanding for the promotion of the MHP.

2.4 REGULATORY ISSUES: SUPPLEMENTARY DATA

1. NATIONAL REGULATORY AUTHORITIES

▪ **Table 1: Financing and staff of the national regulatory authorities for telecommunications services (at 1 August 2001)**

	Operational budget for the year 2001 (millions of €)	Main sources for financing of the NRA's budget for the year 2000 (%)	Number of full-time staff* (occupied posts)	
			Current (1.8.2001)	Projected (for 2002)
B	29.59	100% financed by the fees/charges paid by all licensed (fixed and mobile) operators, of which 79.8% form the incumbent/SMP operators (including fees from private radio licences)	34	42
DK	31 ²⁷	51% of the budget financed by market actors (of which 49% by incumbent/SMP operators); 10% by the state budget; 28% by frequencies fees and 10% by tendering fees (these two last categories of financing are due to cover one-off administrative costs for the UMTS tendering process)	159	162
D	144,5	100% financed by the state budget	1899	N/A
EL	16	94% financed by the fees/charges paid by all licensed (fixed/mobile) operators, of which 83% from the incumbent/SMP operators; 6% of the budget comes from fines	50	141
E	13.46	98.6% financed by the fees/charges paid by all licensed (fixed/mobile) operators: of the following categories of services: 65% for the provision of wholesale and retail services; 32% for the provision of value added services; 0.87% for the provision of data transmission; 0.28% for the provision of cable services; 0.54% for authorizations and licences	93	100
F	15.4	100% financed by the state budget	149	149
IRL	23.58	28,5% financed by the fees/charges paid by all licensed (fixed/mobile) operators (16% from the incumbent/SMP operators); 58.5% financed by spectrum income; the remainder by radio licensing (3.6%); cable and MMDS licensing (8%) and bank interest (1.4%)	84	95
I	41.8	68.4% financed by the state budget; 17,5% by fees/charges paid by incumbent/SMP operators; 9,8% by fees/charges paid by all other licensed operators (including fees from audio-visual and publishing sectors); 4,2 by other sources	216	260
L	3 (for the year 2000)	44% financed by the fees/charges paid by all licensed (fixed/mobile) operators (20% from the incumbent/SMP operators); 58% financed by spectrum licensing	21	N/A
NL	13.3	87,2% financed by the fees/charges paid by all licensed (fixed/mobile) operators (40,3% from the incumbent/SMP operators); 12,8% financed by the state budget	107	125
A	7.6	100% financed by the fees/charges paid by all licensed (fixed/mobile) operators, of which 90,73% from the incumbent/SMP operators	58	62
P	64.6	92,3% financed by the fees/charges paid by all licensed (fixed/mobile) operators, of which 58% from the proceeds resulting from the activities for which the operators have been notified as having SMP. The remainder 7,7% comes from approvals, homologations, laboratory tests and financial gains	402	410
FIN	25	33% financed by the fees/charges paid by all licensed (fixed/mobile) operators, including frequencies fees (27% from the incumbent/SMP operators); 39% by TV licence fees; 14% from radio equipment licences; 4% from postal entities; 10% other (non operator) licence fees.	227	241
S	21.2	94,4% financed by fees/charges paid by all licensed (fixed/mobile) operators (23,4% from the incumbent/SMP operators). The remainder 5,6% is state funded.	195	210
UK	10.2	82% financed by fees/charges paid by all licensed (fixed/mobile) operators (72% from the incumbent/SMP operators); 16% by state budget and 2% by sales of publications and VAT received.	233	240

* Numbers in *italics* also include staff working on other matters than telecommunications (i.e. audio-visual, publishing, etc.).

²⁷ About 40% of this figure is represented by an extraordinary item related to the costs of organising the auction of UMTS frequencies (e.g. consultant fees).

2. TARIFFS

- Table 2: Fixed public voice telephony tariffs of SMP operators: rebalancing, regulation, period of public notice before the implementation of tariff changes, and report on the evolution of tariffs

	Tariff rebalancing completed	Type of regulation of end-user voice telephony tariffs of SMP operators	Period of public notice before the implementation of tariff changes by operators with SMP in the fixed public voice telephony market	Date and reference of publication of the last report on the evolution of tariffs
B	No	Price cap	Tariff increase: 15 days Tariff decrease: 1 day	25 June 2001 www.ibpt.be/Telecoms/ServiceUniversel/rapport 2000.pdf
DK	Yes	Price cap	14 days on top of the notice of termination of contract ²⁸	15 June 2001, Tele Yearbook 2000 www.tst.dk
D	No ²⁹	Price cap/NRA approval	1 month	No 02 of 26.01.00, Notice 46/2000 No 04 of 23.02.00, Notice 124/2000 No 04 of 23.02.00, Notice 125/2000
EL	No ³⁰	Ex ante approval by the NRA under ONP conditions	45 days ³¹	None
E	Yes	Price cap	Under price cap: 10 days Under maximum tariff regime: 15 days	30 June 2001, CMT Annual report (www.cmt.es) A comparison of the prices of fixed operators is also available on the web site
F	Yes	Ex ante approval by the Ministry under ONP conditions	8 days	Report 2000: "Le service public des télécommunications", quarterly Avis ART 01-475, 18 May 2001
IRL	No ³²	Price cap	21 days	Price cap on eircom 2000 – D4/00 ODTR Document 01/20
I	Yes	Price cap/NRA approval	30 days	30 June 2001, AGCOM Annual report (www.agcom.it)
L	No	Freely set by operator	No period set	None
NL	Yes	Price cap/price squeeze/NRA approval	2 weeks	"Oordeel" 28 June 2001, OPTA/EGM/2001/201632
A	Yes	Ex ante approval by the NRA under ONP conditions	2 months	A report on market evolution for the period 01.01.2000-31.03.2001 will be published in Q4/2001 A permanent comparison of the prices of all fixed operators is available at www.rtr.at

²⁸ Except for tariff decreases.

²⁹ According to DT AG, its end-user tariffs have still not been fully rebalanced. However, the NRA is not preventing DT from eliminating any remaining access deficit by further rebalancing its end-user tariffs. Moreover, the NRA considers that the sole comparison between the basic monthly charge applied by DTAG for analogue connections and the charge for unbundled local loop access is not sufficient to prove the existence of anti-competitive price squeeze.

³⁰ Tariff rebalancing is nearly completed.

³¹ Decision no. 210/4 of 28.02.2001.

³² Eircom may increase local access rentals at the rate of up to CPI+2 each year during the period 2000-2003. There are currently several costing work streams in relation to access underway by OTDR and these should be finalised over the coming months and identify whether there is a need for further rebalancing.

	Tariff rebalancing completed	Type of regulation of end-user voice telephony tariffs of SMP operators	Period of public notice before the implementation of tariff changes by operators with SMP in the fixed public voice telephony market	Date and reference of publication of the last report on the evolution of tariffs
P	No	Freely set by operator in respect of ONP conditions ³³	5 days	In 1999 and 2000 ICP published press release on tariff changes occurred during those years
FIN	Yes	Freely set by operator ³⁴	No period set ³⁵	A study of telecommunications prices in 2000 ³⁶ can be requested to the Ministry of Transport and Communications
S	No	Price cap	No period set (in practice 1 month for tariff increase)	June 2000
UK	No ³⁷	Price cap	28 days (1 day when market determined as competitive)	Several documents published up to 31 July 2001 ³⁸

³³ According to the price agreement concluded between the Directorate-general for Trade and Competition, ICP and Portugal Telecom concerning fixed telephony services provided as part of the Universal Service.

³⁴ Subject to the obligation of cost orientation for local calls.

³⁵ Users notified of tariff changes prior to entry into force.

³⁶ "Suomen telemaksujen hintataso vuonna 2000".

³⁷ Residential line rental income is not yet sufficient to cover fully allocated costs. However, the NRA believes that BT's residential line rental charge now covers the incremental cost of providing the line. There are no regulatory constraints preventing BT from further rebalancing of its tariffs.

³⁸ These include: an annual statistical note (last published in February 2001) on the median bill of BT's residential consumers; Oftel's Consultative Document "Competition in the provision of fixed telephony services", 31 July 2001, on the impact of price changes for different customer groups; International benchmarking reports for a range of services (last publication June 2001); 2000 Annual Report (published 11/07/01) showing change in BT retail prices subject to price controls. Furthermore, typical bills payable to residential consumers with different leading suppliers can be compared through a free, industry-funded website, endorsed by Oftel at www.phonebills.org.uk.

3. COST ACCOUNTING

■ **Table 3: Current and planned cost methodologies for calculating interconnection charges**

	Cost accounting system actually in place for interconnection by SMP operators		Deadline for implementation of a system based on current costs
	Cost base	Cost standard	
B	Historic ³⁹	FDC	Implemented for network assets
DK	Historic and best practice	FDC	31.12.2002 (LRAIC)
D	Forward looking	LRAIC	Implemented
EL	Tariffs based on best current practice	Tariffs based on best current practice FDC	LRIC planned for 2002
E	Multi-standard	Multi-standard	Implemented (on 31.7.2001)
F	Historic	FDC ⁴⁰	LRIC planned for RIO 2002
IRL	LRIC	LRIC	Implemented
I	Current	FDC	Implemented (on 1.1.2001)
L	Historic	FDC	In principle LRIC for RIO2001
NL	Current	EDC for originating i/c Bottom-up LRIC for terminating i/c	Implemented
A	Current	FDC ⁴¹	Implemented
P	Historic	FDC	No deadline set
FIN	Historic/Current ⁶⁹	Company specific ⁴²	Ongoing implementation
S	Historic	AIC	No deadline set
UK	Forward looking/ current	LRIC + FDC	Implemented

Legend:

Cost base: historic, current, forward-looking

Cost standard: AIC: average incremental costs
 LRIC: long-run incremental costs
 LRAIC: long-run average incremental costs
 FDC: fully distributed costs
 EDC: embedded direct costs

³⁹ With regard to network assets, historic costs are converted into current costs.

⁴⁰ Fully allocated historic costs, with significant forward-looking elements.

⁴¹ Telekom Austria uses the FDC top-down model; the NRA uses the forward-looking LRAIC bottom-up model.

⁴² The NRA does not set interconnection charges for SMP organisations. Operators set their own prices. There are 50 SMP operators in Finland and their prices must be cost-based. Cost structures, prices and accounting systems vary between operators. The Ministry approved the operators' descriptions of their accounting systems on 11 February 1998. The NRA uses both FDC top down models based on historic costs and current costs methodology when evaluating the cost orientation of charges.

Table 4: Verification of compliance with the cost accounting system

	Verification of compliance with the CAS by a competent and independent body			Statement concerning compliance	
	Voice telephony	Interconnection	Last accounts verified (accounting year)	Date of last publication	Reference in the national Official Journal or other
B	No	Yes	1998 and 2000 ⁴³	None	-
DK	Yes	Yes	1999 ⁴⁴	14.03.2001 (VT) 06.03.2001 (IC)	http://www.tst.dk/dk/forbrugerforhold/onp.htm (VT) http://www.tst.dk/dk/samtrafik/indberetning_om_tdk_s_forretni.htm (IC)
D	Yes ⁴⁵	Yes	2000	End 1999 ⁴⁶	Activity report of REGTP ⁴⁶
EL	No ⁴⁷	No ⁴⁷	None	None	-
E	Yes	Yes	2000 ⁴⁸	22.02.2001	N/A
F	Yes	Yes	1999	15.06.2001 (year 1998) 4.7.2001 (year 1999)	Decision 01-564 Decision 01-664
IRL	Yes	Yes	Year ended on 31.3.2000	22.11.2000	OTDR Document 01/11
I	Yes	Yes	1998	None ⁴⁹	- ⁴⁹
L	No	No	None	None	-
NL	Yes	Yes	2000 ⁵⁰	2001	Decision OPTA/IBT/2000/202891, also at www.opta.nl
A	Yes ⁵¹	Yes ⁵¹	None	10.07.2001 ⁵¹	RASR 4/01, www.rtr.at
P	Yes	Yes	1999	27.02.2001 (year 1998) ⁵²	Diário da República n°49, III Series of 27.02.01
FIN	No (but requested only for local calls) ⁵³	No	-	None	-

⁴³ 1998 for accounting separation and 2000 for interconnection. Accounting separation is implemented and verified by BIPT.

⁴⁴ Further statements, concerning the compliance of TDC's accounts for the year 2000, were published in October 2001.

⁴⁵ Price cap requires an individual authorisation procedure.

⁴⁶ Next publication in the Official Journal of REGTP, probably end 2001. According to the administrative provisions on cost accounting - published in Official Journal 120/2001 - REGTP will publish annually in its Official Journal a general report on compliance with the provisions and thus on the further development of the cost accounting system. This report concludes with an observation as to whether the undertaking possesses a suitable cost accounting system.

⁴⁷ Underway for the first time.

⁴⁸ The verification for 2001 is ongoing.

⁴⁹ The statement concerning compliance for accounting year 1998 and the description of TI's accounting system have been published after 1 August 2001, see NRA's Decision no.402/01/CONS of 10 October 2001, available in the NRA's web-site (www.agcom.it). Moreover, the NRA considers that a statement concerning compliance has been published in July 1999 with regard to audit for accounting year 1997 (Decision no. 101/99 of 25 June 1999, published in the OJ n.155, 5 July 1999).

⁵⁰ However, no public accountant verification took place.

⁵¹ Costing data is verified by the NRA, on the basis of experts' opinions, in the context of individual proceedings for approval of the incumbent's tariffs and interconnection dispute settlements. However, no verification is done on an annual basis.

⁵² The statement of compliance concerning year 1998 does not cover interconnection. Publication concerning verification for year 1999 is expected soon.

⁵³ Finland does not require cost orientation for international or long-distance voice telephony calls, because it is considered to be effective competition on those markets, but does require this for local calls and interconnection. Verification of compliance may take place on an *ad hoc* basis and, at the present stage, verification is not performed systematically.

	Verification of compliance with the CAS by a competent and independent body			Statement concerning compliance	
	Voice telephony	Interconnection	Last accounts verified (accounting year)	Date of last publication	Reference in the national Official Journal or other
S	Yes	Yes	2000	2001	N/A
UK	Yes	Yes	Year ended on 31.03.2000	30.09.2000 ⁵⁴	The audit report is contained in the regulatory accounts, formally known as "British Telecommunications plc: Current Cost Financial Statements for the Businesses and Activities 2000 and Restated 1999 Financial Statements".

⁵⁴ Next publication is due 30.09.01 for the year that ended on 31.03.01.

4. NUMBERING

Table 5 shows the availability throughout the country of carrier selection and pre-selection facilities for different types of calls on 1 August 2001. For a full understanding of this table it should be noted that:

- Portugal has a derogation for the implementation of carrier pre-selection until end 2001, but has implemented all forms of number selection except calls to non-geographic numbers;
- Greece has a derogation for the implementation of carrier pre-selection until end 2002.

Table 5: Availability of carrier selection and pre-selection by type of call

	Local calls		Long-distance calls		International calls		Calls to mobile		Calls to non geographic numbers	
	CS	CPS	CS	CPS	CS	CPS	CS	CPS	CS	CPS
B	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
D	01.01.03	01.01.03	Yes	Yes	Yes	Yes	Yes	Yes	No	No ⁵⁵
EL	Yes	01.01.03	Yes	01.01.03	Yes	01.01.03	Yes	01.01.03	Yes	01.01.03
E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
IRL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
L	Yes	Yes	Not applicable		Yes	Yes	Yes	Yes	Yes	Yes
NL	Yes	Yes ⁵⁶	Yes	Yes	Yes	Yes	Yes	Yes	No	No
A	Yes ⁵⁶	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
P	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
FIN	01.09.01	01.09.01	Yes	Yes	Yes	Yes	01.09.01	01.09.01	No	No
S	Yes	Yes ⁵⁶	Yes	Yes	Yes	Yes	Yes	Yes	No	No
UK	Yes	Yes ⁵⁷	Yes	Yes	Yes	Yes	Yes	Yes ⁵⁷	Yes	Yes ⁵⁷

Table 6 shows the availability of number portability (for users wishing to keep the same number when they change operator) on 1 August 2001. For a full understanding of this table it should be

⁵⁵ The facility was available until July 2000, then it was stopped on the basis of a multilateral agreement between operators (DT and new entrants) because it was considered to be network inefficient.

⁵⁶ However, the area code must be dialled.

⁵⁷ CPS is available from Kingston. BT has adopted an interim solution which allows carrier pre-selection using “autodiallers” from April 2000. Permanent carrier pre-selection (using switch software) will be implemented in December 2001 for local calls and calls to mobile and other non-geographic numbers.

noted that Portugal and Greece have been granted the same derogation periods as in the case of carrier pre-selection.

Table 6: Availability of operator number portability by type of number

	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Geographic	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non-geographic ⁵⁸	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes ⁵⁹	Yes	Yes	Yes	Yes

⁵⁸ For example, emergency numbers, free-phone numbers, premium rate services, personal numbers. Mobile numbers are excluded.

⁵⁹ Except for numbers which do not conform to the Numbering Plan.

5. QUALITY OF SERVICE

Table 7 provides information on the type of regulation of quality of services for public voice telephony existing in different Member States.

The information is based on data provided by the national regulatory authorities. No information is available on Luxembourg.

Table 7: Quality of service (QoS) for public fixed voice telephony (at 1 August 2001)

Member State	Does the NRA set QoS for:		Do SMP/US ⁶⁰ operators measure QoS pursuant to the following standards? (yes/no)			Have measurements of QoS for year 2000 been published by		Date of latest publication and reference in the national Official Journal or other
	SMP/US ⁶⁰ operators?	Other fixed operators?	ETSI ETR 138	ETSI EG 201	Other	SMP/US ⁶⁰ operator?	the NRA?	
B	Yes	No	Yes	No	N/A	N/A	Yes	25 June 2001 (www.ibpt.be/Telecom/ServiceUniversel/rapport2000.pdf)
DK	Yes	No	Yes	Yes ⁶¹	No	No	No	None
D	Yes ⁶²	No	No	Yes ⁶³	Reg. 169/99 ⁶⁴	N/A	First publication by end of 2001	None
EL	Yes	Yes	N/A	Yes ⁶⁵	N/A	No	No	None
E	Yes	No	Yes	Yes ⁶⁵	No	No	No	No
F	Yes	Yes	N/A	N/A	N/A	Yes	No	N/A
IRL	No	No	Partially ⁶⁶	N/A	MLOP programme ⁶⁶	No	First publication by end of 2001	None
I	Yes	Yes	Yes	Yes	N/A	Yes	No	Published by SMP operator in its semestrial report
NL	Yes	Yes	Yes ⁶⁷	Yes ⁶⁷	No	No	First publication by end of 2001	None
A	Yes ⁶⁸	Yes	Yes	Yes	No	No	No ⁶⁹	www.rtr.at

⁶⁰ Operators having significant market power in the provision of fixed telephone networks and/or voice telephony services or having been designated in accordance with Article 5 of Directive 98/10/EC.

⁶¹ The requirements of the Terms of reference for the provider of universal service obligations are being revised in conformity with ETSI EG 201.

⁶² Under §2 of the Telecommunications Universal Service Order (TUDLV), the quality of voice telephony US is based on the standard of telephone service achieved on 31 December 1997. There is no quantifiable description or designation of these standards.

⁶³ ETSI EG 201 769 is applied for the first eight parameters of Annex III of the voice telephony Directive 98/10/EC. REGTP's Regulation 169/1999 provides for adaptation of ETSI EG 201 769 to the peculiarities of the services/network of national voice telephony service providers.

⁶⁴ The ninth parameter (billing accuracy) of Annex III of the voice telephony Directive 98/10/EC is measured on the basis of definitions provided in Regulation 9/1999.

⁶⁵ In the course of implementation.

⁶⁶ The Measuring Licence Operator programme establishes a framework for measuring the quality of service provided by fixed line telecommunications operators to their customers. ODTR's MLOP programme has set parameters which are partially based upon ETR 138.

⁶⁷ ETSI ETR 138 was implemented by end of 2000. ETSI EG 201 has been used since the beginning of 2001.

⁶⁸ Ordinances on Universal Service: BGBl. II N. 192/1999 and BGBl. II N. 173/2000.

Member State	Does the NRA set QoS for:		Do SMP/US ⁶⁰ operators measure QoS pursuant to the following standards? (yes/no)			Have measurements of QoS for year 2000 been published by		Date of latest publication and reference in the national Official Journal or other
	SMP/US ⁶⁰ operators?	Other fixed operators?	ETSI ETR 138	ETSI EG 201	Other	SMP/US ⁶⁰ operator?	the NRA?	
P	Yes	No ⁷⁰	Yes	N/A	N/A	Pending ⁷¹	No	Not available
FIN	No	No	Yes ⁶⁷	Yes ⁶⁷	N/A	N/A	Yes ⁷²	Telecommunications statistics (Aug. 2001)
S	No	No	-	-	-	No	No	None
UK	No	No	Partially ⁷³	Yes ⁷³	Yes ⁷³	Yes	Indirectly, through CPIs initiative ⁷⁴	SMP operators' indicators are available at www.Groupbt.com. Latest publication is for period Oct.00 – Mar. 01 CPIs are available at www.cpi.org.uk. Latest publication is for period Jul.- Dec.00

⁶⁹ The indicators have however been published after the 1 August 2001 and are available at: <http://www.rtr.at/WWW/RechtsDB.nsf/pages/UD-Leistungskennwerte>.

⁷⁰ According to Article 5 of Law-Decree 474/99, 8 November 1999, ICP can set indicators of quality of service, but not objectives of performance.

⁷¹ According to point h) in Article 7 of the regulation of provision of fixed telephony services, it is Portugal Telecom's duty to publish the results of the above mentioned quality indicator. The authorities are waiting for the operator to comply with this measure.

⁷² QoS indicators published by the Ministry represent the average of all operators. QoS measurements of individual operators can be requested by the operator concerned.

⁷³ Comparable Performance Indicators (see below) used ETR138 as a starting point. However, the parameters are tailored to reflect the demands of UK users on quality of service. Any deviation from ETR138/EG202 is a result of evidence based decision making in the interest of consumers and business users.

⁷⁴ Comparable Performance Indicators (CPIs) is a self-regulatory initiative. This initiative includes QoS measurements for 13 network operators in the UK, including the SMP operator.

6. DATA PROTECTION

The following tables provide information on data protection measures applied in EU Member States in relation to Directive 97/66/EC. Table 8 relates to unsolicited calls and e-mails referred to in Article 12. Table 9 and Table 10 relate to the implementation of Articles 6(2), 7, 10 and 11 of the Directive, on the maximum period for storage of billing data, subscribers' rights to receive non-itemised billing, the stopping of automatic call forwarding and the charge, if any, for subscribers to be omitted from the telephone directory.

The information is based on data provided by the national regulatory authorities. No information is available for Luxembourg.

Table 8: Unsolicited calls and electronic mails

Member State	Is (informed ⁷⁵) consent of the called party needed for:		Requirements for consent ⁷⁶	Which institutions manage opt-out lists for e-mails?	Is consultation of opt-out lists required prior to sending unsolicited e-mails?
	Unsolicited phone calls and faxes? (yes/no)	Unsolicited e-mails? (yes/no)			
B	Yes (faxes) ⁷⁷	No	Not regulated	Not regulated	Not regulated
DK	Yes	Yes	Oral or Written (active)	Not relevant ⁷⁸	Not relevant
D	Yes ⁷⁹	Yes ⁷⁹	Oral, but also implied	Private associations or other private third parties	No, consultation of opt-out lists is voluntary
EL	Yes	Yes	Written (passive)	N.A.	No
E	Yes	No ⁸⁰	Unequivocal consent	<u>Federación de Comercio Electrónico y Marketing Directo</u>	Yes
F	No ⁸¹	No	Not applicable	No ⁸¹	No ⁸¹
IRL	No	No	Not applicable	Irish Direct Marketing Association (IDMA) ⁸²	No
I	Yes	Yes	Written (active)	None	No
L	No	No	Not applicable	None	N/A

⁷⁵ Consent given by the called party after being informed on the identity of the calling party and on the type of content to be provided.

⁷⁶ In this column, NRAs are requested to specify if the consent to be collected from the user is to be *written* or *oral* and, if written, to specify if consent can be *passive* (e.g. the user does not delete a pre-ticked box corresponding to the declaration of consent) or is to be *active* (e.g. the user must tick the box corresponding to the declaration of consent).

⁷⁷ In case of distance selling contracts.

⁷⁸ Denmark has adopted an opt-in model. The Danish Marketing Practices Act (section 6a, para. 1) requires that the customer, prior to receiving the "call using mail", has requested the call.

⁷⁹ Based on case law under unfair competition law. There is a principle of consent for unsolicited e-mails in case law, but it has not yet been confirmed by the highest court.

⁸⁰ However, draft legislation on Information Society and Electronic Commerce establishes the need for consent of the called party.

⁸¹ It will be addressed by new legislation.

⁸² Lists managed on their behalf by the DMA based in the US. The IDMA is affiliated to the DMA.

Member State	Is (informed ⁷⁵) consent of the called party needed for:		Requirements for consent ⁷⁶	Which institutions manage opt-out lists for e-mails?	Is consultation of opt-out lists required prior to sending unsolicited e-mails?
	Unsolicited phone calls and faxes? (yes/no)	Unsolicited e-mails? (yes/no)			
NL	Yes	No	Not regulated	DMSA Nederlandse Associatie voor Direct Marketing, Distance Selling en Sales Promotion	Self-regulation applies ⁸³
A	Yes	Yes	Oral ⁸⁴ or written (passive ⁸⁵)	Not relevant ⁸⁶	No, unsolicited e-mails are forbidden
P	Yes	No ⁸⁷	Written (active)	Not available	No ⁸⁷
FIN	Yes	Yes	Oral or written ⁸⁸	Not relevant ⁸⁹	No
S	Yes	No	N/A	N/A	No
UK	No for unsolicited phone <u>calls to individuals</u> unless the subscriber has registered with the opt-out system. Yes for sending unsolicited <u>faxes to individuals</u> . No for <u>corporate subscribers</u> ⁹⁰ .	No	Not regulated	The direct Marketing Association manages a voluntary scheme	No

⁸³ Parties that adhered to the *Stichting Reclame Code* commit themselves to the application of codes of conduct concerning unsolicited mails and SMS.

⁸⁴ However, even oral consent must have been provided before the reception of the unsolicited call.

⁸⁵ The law does not explicitly require “active” consent, so therefore generally the inclusion of a declaration of consent in a document to be signed by the user (in such a way that the latter would have to delete the passage if he wishes to refuse consent) is accepted.

⁸⁶ Austria has adopted an opt-in model.

⁸⁷ However, the called party has the right to refuse, free of charge, the reception of direct marketing unsolicited calls.

⁸⁸ No specific form is prescribed by law for written consensus, which is normally passive.

⁸⁹ Finland has an “opt-in” model.

⁹⁰ Corporate subscribers are considered legitimate targets for telephone marketing. Registration with opt-out lists is foreseen only to prevent reception of unsolicited fax, in which case informed consent would be needed.

Table 9: Data protection: storage of data and other provisions of the Data Protection Directive

	Maximum period permitted for the storage of billing data	Charge for subscribers to be omitted from the directory	Availability and cost of stopping automatic forwarding by a third party	Itemised billing	
				Possibility to receive non-itemised bills	Number of digits from the called number deleted
B	Not specified in the law	BEF 105	Free of charge	Yes	No rules exist
DK	5 years ⁹¹	Free of charge	Free of charge	Yes	No deletion for private customers, two for business customers
D	6 months after sending of bill	Free of charge	Free of charge, where technically possible	Yes	Three last digits/complete itemisation on request
EL	5 years	GRD 330/month ⁹²	Free of charge	Yes	In general, no deletion
E	5 years	Free of charge	Free of charge	Yes	Defined number ⁹³
F	Not specified in the law ⁹⁴	FRF 15.26/month	Available ⁹⁵	Yes	Last four
IRL	N/A	Free of charge	N/A ¹²⁹	Yes	No deletion
I	5 years ⁹⁶	Free of charge	N/A	Yes	Last three/complete itemisation in certain cases ⁹⁷
L	Not specified in the law	Free of charge	Not available	Yes	Incumbent: no deletion; others: not defined
NL	Not specified in the law ⁹⁸	Free of charge	Free of charge	Yes	No deletion
A	Company specific ⁹⁹	Free of charge	Not available	Yes	Company specific ¹⁰⁰
P	6 months	Free of charge	Free of charge	Yes	Four
FIN	Min. 3 months after maturity date of the bill; max 3 years after bill has been paid in full	Free of charge	Free of charge	Yes	Three last digits/complete itemisation in certain cases
S	3 years ¹⁰¹	SEK 60 annual charge	Free of charge	Yes	No deletion
UK	6 years ¹⁰²	Free of charge	Free of charge	Yes	No deletion

⁹¹ The end of the period during which the bill may be lawfully challenged or payment may be pursued.

⁹² EETT is entitled to express its opinion on the level of the charge.

⁹³ To be specified in secondary legislation.

⁹⁴ But, for France Télécom, a maximum period of one year has been set by the Commission nationale de l'informatique et des libertés.

⁹⁵ Information given for France Télécom.

⁹⁶ According to Civil Code.

⁹⁷ If the subscriber needs to start a legal action.

⁹⁸ The forthcoming legislation regarding traffic and billing data states that the period for which the billing information may be stored is the period in which the bill can be lawfully challenged or the payment may be pursued.

⁹⁹ According to the conditions stipulated in the contracts with the operators.

¹⁰⁰ Legislation does not set the precise number of digits to be deleted, which could be two or more. Many companies, including Telekom Austria, delete the last three digits.

¹⁰¹ Period within which the bill must be paid, or else it will be time-barred.

¹⁰² Limitation period for contractual disputes.

Table 10 : Data protection: calling line identification (CLI)

	Availability and cost		Availability and cost for the called subscriber to:			Availability to and cost for the organisation dealing with emergency calls of overriding the elimination of the presentation of the CLI
	For the calling user to eliminate the presentation of the CLI on a per-call basis	For the subscriber to request the service provider to (temporarily) override the elimination of the presentation of the CLI ¹⁰³	Eliminate the presentation of the connected line identification to the calling user	Prevent the presentation of the CLI of incoming calls	To reject incoming calls where the presentation of the CLI has been eliminated by the calling user	
B	Free of charge	Available	Free of charge	Free of charge for a reasonable use	Available	Free of charge
DK	Free of charge	Not available	Free of charge	Free of charge	Free of charge	Free of charge
D	Free of charge	Available, cost not regulated	Free of charge	Free of charge	Free of charge	Free of charge
EL	Free of charge	Not available ¹⁰⁴	Free of charge	Not available ¹⁰⁴	Not available ¹⁰⁴	Free of charge
E	Free of charge	Free of charge	Free of charge	Free of charge	Free of charge	Free of charge
F	Free of charge	Not available ¹⁰⁵	No connected line identification offered	Available by default ¹⁰⁶	Not available	Free of charge
IRL	Free of charge	Not available	Free of charge	Free of charge	Not available	Free of charge
I	Free of charge	Available (€ 77.46 for 1-5 days, € 103.29 for 6-10 days, € 129.11 for 11-15 days, excluding tax)	Free of charge	Available (€ 1.29/month, excluding tax)	Not available	Not available ¹⁰⁷
L	Free of charge	Not regulated	Free of charge	Not available	Not available	Free of charge
NL	Available, free of charge	Not available	Available for ISDN only (part of CLI service)	Free of charge	Not available	Available No standard tariff apply
A	Free of charge	Available (€ 6.54 + € 0.73 per day + €1.45 per identification)	Available: €6.54 (single payment)	Free of charge	Free of charge ¹⁰⁸	Available: €4.36 (single payment)
P	Free of charge	Not available ¹⁰⁹	Free of charge	Free of charge	Not available	Available
FIN	Free of charge	Free of charge ¹¹⁰	Free of charge	Free of charge	Available	Available ¹¹¹
S	Free of charge	SEK 500 + SEK 50 per tracing ¹¹²	Free of charge	Free of charge	Not available	Available ¹¹³
UK	Free of charge	Available free of charge when malicious or nuisance calls are subject to formal investigation ¹¹⁰	Provided free of charge on ISDN networks	Available ¹¹⁴ , free of charge	Available on analogue services (BT charges £ 9.99 a quarter, some other operators provide it free of charge) ¹¹⁵	Free of charge

¹⁰³ For tracing malicious or nuisance calls.

¹⁰⁴ Facility mandated by the law, but not yet implemented.

¹⁰⁵ Regarding malicious and/or nuisance calls, France Télécom provides a service to its subscribers that allows these latter either to block so-called "secret calls" (i.e. calls for which the calling line identification is not presented) or to block calls marked with an "R" (i.e. calls from lines that are on a list established by the subscriber).

¹⁰⁶ France Télécom only offers CLI upon subscription.

¹⁰⁷ Not regulated.

¹⁰⁸ Available since 1st quarter of 2001.

¹⁰⁹ Although this facility is foreseen by the law, there is no information on its actual availability.

¹¹⁰ Calling line identification available to law enforcement authorities.

¹¹¹ Override category available, but organisation pays installation costs.

¹¹² Malicious call identification is ordered for two weeks at a charge of SEK 500 including 5 successful tracings. Extra tracings: SEK 50 each.

¹¹³ The charge is included in the general charge to the organisation dealing with emergency calls to receive information about subscribers from the operators.

¹¹⁴ If specifically requested from service provider.

¹¹⁵ Not available on digital services (GSM, ISDN) yet because appropriate technical standards (EN 300 356 V4) have just become available.

2.5 APPENDIX: EURO EXCHANGE RATES

This section explains the exchange rates used in Annexes I and II.

1. Exchange rate used in Annex 1.3 on public voice telephony tariffs, Annex 1.4 on leased line tariffs and Annex 1.6 on internet

Retail tariffs have been compared using the euro exchange rate expressed in terms of purchasing power parities (€-PPP), in order to compare retail prices between Member States in real terms.

PPPs are widely used by international organisations as an alternative to monetary exchange rates when making international economic comparisons. They are, in effect, “real” exchange rates, based on a comparison of the relative purchasing power of each country’s currency.

Purchasing power parities equate the purchasing power of different currencies. This means that a given sum of money, when converted into different currencies at the PPP rates, will buy the same basket of goods and services in all countries, thus eliminating differences in retail price levels between countries.

The €-PPP exchange rates listed below have been calculated using the OECD’s Comparative Price Levels information for April 2001. In order to make comparisons between European Member States more significant, the €-PPP has been set up using the Austrian schilling as the reference currency.

The use of €-PPP does not reflect differences in the underlying costs of providing services. The use of PPP should be limited to international comparisons.

Table 1 Exchange rates August 2001, national currency to Euro

	Exchange rate to euro	
	EURO	EURO PPP
Belgium	0.0247894	0.0263717
Denmark	0.1343093	0.112865
Germany	0.5112997	0.5112997
Greece	0.0029347	0.0038615
Spain	0.0060101	0.0073294
France	0.1524483	0.1571632
Ireland	1.26968	1.2825051
Italy	0.0005165	0.0006148
Luxembourg	0.0247894	0.025556
Netherlands	0.4537823	0.4879379
Austria	0.0726728	0.0726728
Portugal	0.004988	0.0071257
Finland	0.1681888	0.1488396
Sweden	0.1079412	0.0999456
UK	1.6299919	1.4684611
USA	1.1449508	1.0504135
Japan	0.0092519	0.0061679

2. Exchange rates used in Annex 1.5 on mobile services and Annex 2.2 on interconnection

The exchange rates used are the same as in Table 1, except for the following:

Table 2 Exchange rates June 2001, national currency to Euro

	EURO
Denmark	0.1340482
Sweden	0.1089324
United Kingdom	1.6129032