



Commission for
Communications Regulation

Irish Communications Market

Quarterly Key Data

Explanatory Memorandum

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| Document No: | 10/43a |
| Date: | 17th June 2010 |

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Executive Summary

Following the publication of an annual market review in November 1999, ComReg's predecessor- the ODTR- published its first Quarterly Review on 22nd March 2000.

Since that date, ComReg has continued to collect primary statistical data from authorised operators on a quarterly basis, in order to both understand current trends in the Irish communications market and inform external users.

Electronic communications networks and services can be offered in Ireland without the need for a preceding licence or authorisation. Therefore, not all providers of networks and services operating in the Irish market may have provided data for this report. However the report does aim to represent at least 95% of the total market.

ComReg would like to thank operators who have submitted data to ComReg for this report and hopes to see their continued co-operation in the future. ComReg welcomes any comments or feedback on any aspect of the quarterly review process, and would be particularly interested in suggestions that may improve the accuracy of information received or that would ease the burden for operators in collecting the data.

The information and statistics contained within this document are derived from a variety of sources, but are mostly reliant on data obtained from authorised operators.

Historically, ComReg's Quarterly Reports have adopted a rigorous and exacting standard, both with regard to accuracy and completeness. This is notwithstanding the fact that occasionally, the available data is not as complete as ComReg would ideally wish it to be.

However, ComReg is intent on an ongoing basis, on improving its standards wherever possible.

ComReg intends to make on-going improvements to enhance our processes of data collection and analysis. As part of our continued enhancement of the report, where appropriate a list of corrections to data will be highlighted at the front of each Quarterly Key Data Report indicating data that has been revised since the previous report.

This memo provides data definitions for all statistics contained in the Quarterly Report as well as a glossary of technical terms used in the report. Section 1.1 Primary Data is based on data supplied to ComReg by authorised operators, while section 2.1 Secondary data uses data supplied to ComReg by additional sources, such as the European Commission and market research companies.

This memo is updated with each published Quarterly Report to reflect where data may differ from previously published reports.

All data is quarterly unless otherwise stated. When year-on-year comparisons are made, this indicates that data in the current quarter (i.e. a 3 month period) is compared with the same quarter in the previous year.

In most cases data has been rounded to one decimal place in this report.

Extracts of data used in this report can be downloaded at www.comstat.ie

Primary Data

| Figure/Section | Indicator | Definition |
|----------------|--|---|
| 1.1.1 | Total Number of Authorisations | Total number of cumulative authorisations issued since July 25 th 2003 by ComReg to fixed, mobile and broadcasting operators. |
| 1.2.1 | Fixed, mobile and broadcasting as a % of total revenues | The share of total revenue generated by the provision of retail and wholesale fixed voice and data services, retail mobile voice and data services as well as retail cable and MMDS broadcasting services |
| 1.3.1 | Share of Total voice call volumes (minutes) | Overall total volumes or minutes of basic and advanced voice calls made over both fixed and mobile public voice networks, broken down by call type and expressed as a percentage share of the total volume. Fixed Advanced minutes include calls via payphones, Voice Over IP/voice over broadband minutes (included for the first time in Quarter 2 2007). Mobile roaming calls made by visitors while in Ireland are excluded from the analysis, as analysis is based on usage by domestic customers only of fixed and mobile networks, i.e. those customers whose current residence is in Ireland |
| 1.3.2 | Total voice traffic | This table quantifies the total volume of voice calls originating (or initiated) from fixed (PSTN/ISDN) networks and from mobile networks. |
| 2.1.1 | Profile of Fixed Line revenues | Breakdown in % terms of share of total revenue generated by the direct ¹ and indirect ² provision of retail and wholesale fixed voice and data services, among a specific set of sub-categories: <ul style="list-style-type: none"> • Interconnection (i.e. wholesale revenues generated by inter-operator traffic transactions), • retail narrowband services (such as PSTN voice services and dial-up Internet services. This category also includes revenues from voice over broadband services.), • retail broadband services (This category also includes revenues from WiFi services); • leased line, managed services wholesale and retail revenues (including revenues from Partial Private Circuits) and other ancillary services including web-hosting, co-location services, directory publication & other services. |
| 2.1.1.1 | Operator share of fixed line revenues | The proportions of overall fixed line revenues (retail and wholesale) generated by alternative operators and Eircom. Includes shares of interconnection, retail narrowband, retail broadband services and leased line, managed services (including revenues from Partial Private Circuits), and other ancillary services including web-hosting, co-location services, directory publication and other services. |
| 2.1.1.2 | Eircom's market share | This chart plots <i>eircom's</i> share of total fixed line revenues over the previous 2 years. |

¹ Provided to customer over their supplier's own network infrastructure and/or by means of unbundled local loops

² Provided to customer by means of their supplier's wholesale access to another operator's network infrastructure

| Figure/ Section | Indicator | Definition |
|-----------------------|---|---|
| 2.2.1.1 | Direct and Indirect Fixed narrowband access paths | <p>Total number of direct³ and indirect⁴ fixed narrowband (data rates less than 144k) telephone lines, i.e. lines connecting the subscriber's terminal equipment to the public switched network and which have a dedicated port in the telephone exchange equipment. There is a one-to-one relationship between PSTN lines and access paths, i.e. one PSTN access path is equal to one line.</p> <p>ISDN lines can be separated by type: Basic, Fractional and Primary Rate. For basic rate ISDN line, each line is capable of carrying 2 access paths; for fractional rate ISDN, each line can carry up to 16 access paths; for primary rate ISDN, each line can carry up to 30 access paths. Therefore total fixed access paths are based on the number of PSTN lines plus the appropriate multiplier applied to the number of installed ISDN lines. These narrowband access paths are used to deliver voice telephony and/or dial-up internet access to subscribers.</p> |
| 2.2.2.1 | Narrowband Indirect access paths | <p>Total number of indirect⁵ fixed narrowband (data rates less than 144k) telephone paths provided to customers by means of carrier pre-select only or wholesale line rental over PSTN or ISDN lines.</p> <p>Carrier pre-select allows the user to receive all or a portion of calls from one provider and line rental from a second provider (usually <i>eircom</i>).</p> <p>Wholesale line rental (also known as single billing) allows the user to receive every aspect of telephone service, including all calls and line rental from an alternative operator other than the incumbent operator, <i>eircom</i>.</p> |
| 2.3.1 and 2.3.2 | Fixed voice call volumes (minutes) | <p>Total number of retail minutes or traffic generated by means of fixed voice calls both direct⁶ and indirect⁷</p> <p>Call volumes are broken down into domestic (including calls to Northern Ireland), international outgoing calls, calls to mobile and other/advanced minutes (this category includes calls made from payphones and voice over broadband /VoIP calls).</p> |
| 3.1.1 | Total number of active internet subscriptions in Ireland | <p>This table quantifies the number of subscriptions (both residential and business) with either narrowband or broadband internet access. The growth rates are for quarterly and year-on-year growth in subscription numbers across each form of internet access.</p> <p>A narrowband internet subscription is considered active if it has been accessed in the last 60 days of the quarter.</p> <p>Metered narrowband internet subscribers pay a variable charge per month based on their specific usage of the internet and access the internet primarily via the copper or PSTN network. This includes internet users who have a subscription with an Internet Service Provider (ISP) and those customers who do not have a subscription with an ISP.</p> <p>Flat-rate narrowband internet subscribers pay a fixed monthly fee for a defined number of hours of narrowband Internet access, primarily via the copper or</p> |

³ See note 1 above

⁴ See note 2 above

⁵ See note 2 above

⁶ See note 1 above

⁷ See note 2 above

| Figure/ Section | Indicator | Definition |
|--------------------|--|--|
| | | <p>PSTN network.</p> <p>DSL broadband subscribers use the conventional copper PSTN line for high-speed broadband access. DSL services are usually "always-on", i.e. the user does not have to initiate the Internet connection to access the internet. Some providers also offer time-based broadband services, i.e. the user pays for a limited amount of hours of broadband access per month.</p> <p>Other broadband subscribers use high-speed broadband services over platforms other than DSL (i.e. the copper network) such as fixed wireless access, cable modem fibre, satellite and mobile broadband using HSDPA.</p> <p>One subscriber may have more than one internet subscription.</p> |
| 3.1.2 | Profile of active internet subscriptions in Ireland | <p>Proportion of total number of internet subscriptions (both narrowband and broadband in Ireland) broken down by copper (i.e. narrowband metered, narrowband flat-rate and DSL) and all other technology platforms (i.e. combined cable, satellite, fixed wireless access, satellite broadband, and mobile broadband over HSDPA) and expressed as percentages. This chart complements the table in figure 3.1.1.</p> |
| 3.1.3 | Total internet subscriptions | <p>This chart shows the trend in narrowband and broadband internet subscriptions over the last 6 years.</p> |
| 3.1.4 | Profile of Copper-based internet subscriptions | <p>Breakdown of internet subscribers over copper lines, including dial-up narrowband subscribers (PSTN and ISDN), flat-rate narrowband and DSL technologies, as a percentage of total internet subscribers.</p> <p>Narrowband Dial-up is defined here as a metered service (typically over a dedicated 1891 or 1892 number, but can also be provided over an 1890 number) where the customer pays a variable charge per month based on their specific usage of the internet. This includes customers who have a subscription with an ISP and those customers who do not have a subscription to an ISP.</p> <p>A narrowband Flat-rate Internet subscription is a service (typically provided over an 1893 number) where the customer pays a flat monthly fee for a defined number of hours of dial-up Internet access.</p> <p>Narrowband data includes both business and residential customers.</p> <p>Broadband subscriptions are Digital Subscriber Line (DSL) subscriptions i.e. those using their conventional copper PSTN line for high-speed broadband access. DSL services are usually "always-on", i.e. the user does not have to initiate the Internet connection to access the internet. Some providers also offer time-based broadband services, i.e. the user pays for a limited amount of hours of broadband access per month.</p> <p>Broadband data includes both business and residential customers.</p> |
| 3.2.1 | Provision of DSL access | <p>Proportions of Digital Subscriber lines (DSL) supplied to customers by means of direct retail supply by eircom,</p> |

| Figure/ Section | Indicator | Definition |
|--------------------|--|--|
| | | and wholesale supply by eircom to other operators by means of fully unbundled lines or bitstream. ⁸ DSL (Digital Subscriber Line) is a technology for bringing high-bandwidth or broadband information to homes and small businesses over ordinary copper telephone lines. |
| 3.2.2 | Number of local loops unbundled | This chart shows the total number of copper lines which have been unbundled by alternative operators and also shows the split between shared lines and those lines which have been fully unbundled. The local loop is the physical path, usually copper, which connects a local exchange to an end user. When availing of LLU, an operator has the option to rent either the entire loop ("full unbundling"), or, alternatively, to rent only the high capacity frequencies within the loop which are then used to provide broadband services ("LLU Line Share"). |
| 3.3.1 | Broadband subscriptions and growth rates by platform | This table details subscriptions (both residential and business subscribers) across DSL, cable, satellite, fibre, fixed wireless and mobile broadband. The growth rates are for quarterly and year-on-year growth in subscription numbers across each broadband access platform and for total broadband subscription growth. |
| 3.3.2 | Broadband subscriptions by platform | Total number of broadband subscriptions (both residential and business customers) by means of DSL, cable modem, fibre, satellite, fixed wireless access and/or mobile broadband. Cable modems allow internet broadband access by means of cable TV connections. Fixed wireless access allows internet broadband access by means of wireless devices or systems located in fixed locations, such as homes and offices. Mobile broadband allows users to access the Internet both at a fixed location and while on the move by means of a datacard or USB dongle attached to a laptop. |
| 3.3.3 | Quarterly Broadband Net Additions | This chart shows the total number of new additions added per quarter for each broadband platform, and in aggregate across all platforms over the last two years. |
| 3.3.4 | Broadband subscriptions by subscription type | This chart breaks out the proportions of total broadband subscriptions, and on specific broadband platforms such as cable modem and fixed wireless access, by business and residential segments of the market. Some of this data is based on estimates. |
| 3.3.5 | Broadband subscriptions by contracted download speeds and subscription type | This chart provides an indication of the percentage of total residential and total business broadband subscriptions split by categories of contracted (i.e. speed specified in the contract with the ISP as distinct from actual download speeds delivered by the ISP) download speeds. |
| 3.3.6 | Broadband subscriptions by contracted download speeds | This chart shows total broadband lines by contracted download speeds over the last 2 years. |
| 3.3.8 | Market share of Fixed broadband market | This chart shows eircom's and OAOs' retail broadband market shares across all broadband platforms (exc. mobile broadband), as a percentage of the total broadband market. |
| 3.3.9 | Subscription Market Share of the Fixed | This chart shows the percentage market share of the fixed broadband market by operators with at least 2% |

⁸ Bitstream access refers to the situation where the incumbent installs a high-speed access link to the customer premises and then makes this access link available to third parties, to enable them to provide high-speed services to customers. Bitstream depends in part on the PSTN and may include other networks such as the ATM network, bitstream access is a wholesale product that consists of the provision of transmission capacity in such a way as to allow new entrants to offer their own, value-added services to their clients. The incumbent may also provide transmission services to its competitor, to carry traffic to a 'higher' level in the network hierarchy where new entrants may already have a broadband point of presence

| Figure/ Section | Indicator | Definition |
|------------------------|---|---|
| | Broadband Market | market share. |
| 3.4.1 | Broadband data sources | This table shows what sources ComReg will use for some secondary broadband data and when the data will be published. |
| 3.5.1 | WiFi hotspots, access points and Minutes of Use | <p>This table lists the number of WiFi hotspots, access points in Ireland and usage volumes of these access points (expressed in total minutes) at the end of the reporting period.</p> <p>Hotspots are typically public locations at which broadband internet access can be obtained. At these hotspots, users with a computer (usually a laptop) can wirelessly connect to the internet either for free or on payment of a fee. Typical locations for such hotspots include cafes and restaurants, hotels and airports.</p> <p>In general terms, more than one access point can be found at a hotspot.</p> <p>Minutes of use are used to express usage as most WiFi users access or purchase WiFi networks on the basis of dedicated time-delimited sessions.</p> |
| 4.1.1 | Mobile subscriptions | Total number of mobile phone and data-card subscribers (GSM/2G and 3G/HSDPA, both contract and prepaid) in Ireland as measured by the total number of active SIM cards, 3G datacards and USB modems. A prepaid subscriber refers to an active prepaid subscriber – i.e. those who have made an event that decrements their balance in the previous 90 days such as a pre-paid top up, outgoing call, SMS, MMS or mobile internet usage. A contract customer refers to a customer with a current contract subscription. This chart provides separate lines for mobile subscriptions with and without mobile broadband datacards and USB modems. |
| 4.1.2 | Irish mobile penetration rate | Total number of mobile phone and data-card subscriptions (GSM/2G and 3G/HSDPA, both contract and prepaid) in Ireland as measured by the total number of active SIM cards, 3G datacards and USB modems divided by the total population and multiplied by 100. A prepaid subscriber refers to an active prepaid subscriber – i.e. those who have made an event that decrements their balance in the previous 90 days such as a pre-paid top up, outgoing call, SMS, MMS or mobile internet usage. A contract customer refers to a customer with a current contract subscription. This chart provides separate lines for mobile subscriptions with and without mobile broadband datacards and USB modems. |
| 4.2.1 | Profile of pre-paid and post-paid subscriptions | Percentages of total number of mobile phone and data-card subscriptions (GSM/2G and 3G/HSDPA) broken down by pre-paid and post-paid (i.e. contract) packages. |
| 4.2.3 | Profile of pre-paid and post-paid subscriptions by operator | Percentages of total number of mobile phone and data-card subscriptions (GSM/2G and 3G/HSDPA) to each of the mobile service providers, broken down by pre-paid and post-paid (contract) packages |
| 4.2.4 | Profile of pre-paid and post-paid mobile broadband subscriptions | This figure shows the split between pre-paid and post-paid mobile broadband subscriptions. |
| 4.3.1 | SMS, MMS and Call minute volumes | Total volumes of mobile voice (calls) and data messages (both SMS and MMS) ⁹ made over mobile networks on a quarterly basis. |
| 4.4.1 | Total Mobile Retail Revenues | Total aggregate retail revenues generated by mobile network operators, split between voice and data |

⁹ SMS – Short Messaging Service; MMS = Multimedia Messaging Service

| Figure/ Section | Indicator | Definition |
|--------------------|--|--|
| | | services. Revenues from interconnection and mobile termination are not included as they are considered to be wholesale revenue streams. Revenues from mobile broadband services are included under data revenues. |
| 4.6.1 | Market share – number of subscriptions (incl. Mobile Broadband) | Each mobile operator’s share of the total number of mobile subscriptions (GSM/2G Sims and 3G/HSDPA Sims, datacards and modems), expressed as a percentage. |
| 4.6.2 | Market share – number of subscriptions (excl. Mobile Broadband) | Each mobile operator’s share of the total number of mobile subscriptions (GSM/2G and 3G Sims) expressed as a percentage. HSDPA data cards and modems are excluded from data in this chart. |
| 4.6.4 | Mobile revenue market share | The largest mobile operators’ shares of total mobile retail revenues (GSM/2G and 3G/HSDPA), expressed as a percentage of total mobile retail revenues. |
| 4.7.1 | Cumulative Mobile Numbers Ported | Total number of mobile numbers which have been retained by customers when they switched from one mobile operator to another. Both a cumulative total since Mobile Number Portability (MNP) was introduced in July 2003 and a total for each quarter are charted. |

Secondary data

Pricing data

Sections 2.4, 3.6 and 4.8 contain comparative pricing data and are supplied by Teligen in its T-Basket and T-Connect products.

The pricing data is valid at February 2010 for fixed and mobile baskets and March 2010 for broadband baskets.

An OECD-approved methodology was adopted by Teligen to compare fixed (PSTN) and mobile tariffs. This format follows a basic three-step process consisting of: (i) the construction of one or more baskets of telephone services; (ii) the pricing of those baskets; and (iii) the conversion of the individual currencies to standard units (e.g. US dollar with Purchasing Power Parities (PPPs)). The appendix of this document provides more detail on the base rates used to calculate PPPs in the Teligen tariff baskets.

Purchasing power parities (PPPs) are the rates of currency conversion that eliminate the differences in price levels between countries. Comparative price levels are defined as the ratios of PPPs to exchange rates. They provide measures of the differences in price levels between countries. The PPPs are given in national currency units per US dollar.

In their simplest form, PPPs are simply price relatives which show the ratio of the prices in national currencies of the same good or service in different countries.

For example, if the price of a cauliflower in the United Kingdom is 2.00 pounds and in Ireland it is 1.50 euro, then the PPP for cauliflower between the United Kingdom and Ireland is 2.00 pounds to 1.50 euro or 1.33 pounds to the euro. This means that for every euro spent on cauliflower in Ireland, 1.33 pounds would have to be spent in the United Kingdom to obtain the same quantity and quality – or, in other words, the same volume – of cauliflower. One of the best known examples of this principle is the comparison of relative prices of a McDonald's Big Mac between countries as presented in *The Economist*.

The Central Statistics Office has also provided a user-guide to PPPs on its website.¹⁰

Both the PSTN and mobile baskets were updated following a public workshop in Barcelona in 2009.

Changes made as a result of this workshop are in addition to any tariff changes.

Because substantial changes were rolled out in the February 2010 PSTN and mobile basket updates, comparisons are not made for previous quarters.

Each chart after February 2010 will display a number in brackets against each country which is the respective position in the previous period's baskets.

Further detail of the PSTN and mobile baskets are provided in the appendix of this document.

The broadband baskets are produced separately by Teligen in their T-Connect product and have been published by ComReg since December 2007. Therefore comparisons cannot be made with reports prior to Q4 2007 as the previous broadband tariff baskets were commissioned from Teligen by ComReg.

The baskets include analysis of cable modem as well as DSL tariffs in an attempt to broaden analysis of broadband beyond xDSL technologies.

The baskets assume an average usage profile for broadband of 30 hours and a 5GB data download allowance per month, with each internet session lasting 30 minutes for residential consumers and an average usage profile of 100 hours and 20GB data download allowance per month for business consumers.

¹⁰ http://www.cso.ie/surveysandmethodologies/surveys/prices/documents/word_docs/ppp.doc

While broadband is an always-on product, the assumption of an average user profile ensures that packages are comparable across countries. Upload and download speeds (based on contracted speeds) are also analysed for a range of packages offering contracted download speeds of between 1 and 4Mb and all speeds in the residential market and speeds of between 4 and 10MB in the business market.

The T-Connect product includes business and residential tariffs, as well as broadband tariffs that are bundled with additional telephony services such as line rental and/or telephone calls. Bundled tariffs include only internet and telephony services and only rental and charges related to the internet element are considered – in other words if calls are included in a bundle which contains broadband access, the call element is not added to the analysis, and standard PSTN and cable connection/rental charges are also not included. Bundles that include television services are also not analysed.

This is to ensure that the analysis is confined to the cost of broadband internet services, while also recognising that an increasing number of broadband users receive their broadband by means of a bundled service.

Where multiple bundles are offered in a specific country or by a specific operator, the cheapest bundle is used.

In general promotional offers such as “free connection” are not included unless such promotions are unlimited (e.g. permanent free connection promotions where the user never pays a connection fee).

T-Connect covers ADSL and/or cable modem packages from the incumbent ISP in each of the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

In this report ComReg has compared both residential and business tariffs.

Business tariffs and/or bundled tariff data were not available for some countries, either because such services are not offered or no published prices were available.

Three baskets are produced in the report:

- Lowest monthly residential broadband package in the 1-4Mb speed category – the Irish data is based on Eircom’s Home Broadband Starter 1Mb package
- Lowest monthly residential broadband package across all speeds- the Irish data is based on Eircom’s Home Broadband Starter 1Mb package
- Lowest monthly Business DSL basket in the 4-10 Mb speed category - the Irish data is based on Eircom’s Business Starter Package

Charges for modems or routers and ISP subscription charges are only included in the comparison in cases where they are bundled in with the complete service offering.

Results:

Results are given in €/PPPs and include VAT.

- It is important to remember that these comparisons do not consider some elements of broadband services that may well have an impact on the way they are priced – these might include carrier specific “Quality of Service” features, such as guaranteed transmission bitrates. They do, however, produce comparable price points for what are widely different offerings across the countries in the comparison. It should be noted that cheaper or more expensive services may be offered in each country by other service providers. Cable modem packages may not be nationally available due to the fact that cable operators in many countries, including Ireland, were originally awarded regional franchises only.

Other data

| Figure/ Section | Indicator | Definition |
|--------------------|--|--|
| 1.2.2 | Communications revenue and GNP | This chart shows the trend in communications revenues and Gross National Product over the last 5 years. |
| 1.4.1 | Consumer Price Index and Communications Sub-Component | This chart shows the annual percentage change in the consumer price index and its communications sub-component over the last three years. |
| 3.3.7 | European Fixed Retail Broadband Subscriptions by Contracted Download Speeds | This chart shows the breakdown of fixed retail broadband subscriptions by the following speed categories: 0.144 – 2Mbps; 2 – 10Mbps; and, >10Mbps. |
| 3.4.2 | European household broadband penetration | This chart shows fixed household broadband penetration rates among EU countries. This data is sourced from Informa Telecoms and Media. |
| 3.4.3 | European broadband population penetration | This chart shows fixed broadband penetration among the EU27 countries. This data is sourced from the EU's 15 th Implementation Report. |
| 4.1.3 | European mobile penetration rates | Total number of mobile phone subscriptions (GSM and 3G) in EU countries as measured by the total number of active SIM cards divided by the total population and multiplied by 100. The definition of "active subscription" differs from operator to operator and some country data (such as Ireland) includes HSDPA or mobile broadband subscriptions. This chart is based on data supplied by the Yankee Group. |
| 4.2.2 | European pre-paid and post-paid subscription growth | This chart shows the pre-paid and post-paid subscription split among European countries as of March 2010. |
| 4.2.5 | Mobile subscriptions by 3G technology | This chart shows the proportion of 3G technology among 14 EU countries based on active SIM connections. Where there are CDMA operators it refers to active SIM cards and then active devices with active subscriptions as CDMA operators do not use SIM cards. |
| 4.4.2 | Data revenues as a % of total mobile revenue | This chart ranks a number of EU countries based on the percentage of total mobile retail revenues contributed by data services such as SMS, MMS and HSDPA. Data is supplied by the Yankee Group based on analysis of operator data in each country, which is then averaged across all operators in each country. |
| 4.4.3 | European comparison of ARPU | This chart ranks a number of EU countries based on a blended monthly ARPU (Average Revenue per User) as calculated by the Yankee Group. As far as possible, ARPU figures are obtained directly from operators. Where unavailable, ARPU is calculated by dividing annual service revenues by the mid-term installed base (the sum of the opening and closing customer bases for the period divided by two). Once the Yankee Group has obtained or calculated all individual ARPU figures, they are applied to each operator's mid-term user base to obtain service revenues by operator, which are then combined to obtain a country total. This total revenue figure is then divided by total mid-term users to derive country-level ARPU. Revenues used to calculate ARPU are based on revenue accruing to network operators from traffic, subscription and access fees, roaming (both inbound and outbound), mobile data, wholesale interconnection and related value-added services. Revenues from handsets and other equipment sales, business professional services, extraordinary income and machine-to-machine revenue are generally excluded. Data revenue includes revenue from mobile data services as recognized by the carrier (i.e. excluding content provider revenue); voice service |

| | | |
|--------------|---|---|
| | | revenue includes network operators `revenue from subscription & access, voice traffic and roaming. |
| 4.5.1 | Minutes of use | <p>This table provides comparative data on the average monthly usage of voice services by mobile subscriptions in Ireland and a number of other EU countries for quarters 3 and 4 of 2009. The average is based on an aggregate of blended (i.e. combined post-paid and pre-paid) minutes of use, based on both incoming and outgoing calls, provided by all mobile networks operators in each country. MoU is measured in minutes and should exclude traffic related to Mobile Data services.</p> <p>Both incoming and outgoing minutes to both fixed networks and mobile networks (off-net and on-net) are included as are outgoing roaming minutes. Incoming roaming minutes, i.e. calls made by foreign roamers on domestic mobile networks are excluded.</p> <p>Weightings are applied based on the size of the subscription base of each individual operator.</p> <p>The weighted subscriptions are based on the start period subscriptions plus the end period subscriptions divided by 2 (basically the average subscriptions between the start and end of the period).</p> <p>The weights are then put into a ratio format, based on each operator's share of weighted total subscriptions-where the weights for all operators total 1.</p> <p>Each operator MOU for prepaid/ postpaid/ total is then multiplied by the weight and added together. Data for other EU countries was provided by the Yankee Group.</p> |
| 4.5.2 | Annual change in European ARPU and MOU | This chart compares average % changes (i.e. growth) in minutes of use and average revenue per user between Q1 2009 and Q1 2010 for a number of EU countries. Comparative EU data for this chart is provided by the Yankee Group. |
| 4.6.3 | European mobile operator's HHI | This chart shows the Herfindahl-Hirschmann Index (HHI) for the mobile market in 14 EU countries based on mobile subscription market shares between March 2008-2010. The HHI is a measure of market concentration which takes into account the relative size and distribution of firms in the market. The HHI increases as the number of firms in the market decreases and the difference in size between those firms increases. |
| 4.9.1 | Capital expenditure and EBITDA | This chart shows the change in mobile capex and EBITDA by a number of European countries between Q4'08 and Q4'09. |
| 5.1.1 | TV homes by Reception | This table shows total TV homes by reception type which is determined by the TV channels a household receives. This data is sourced from TAM Ireland's Establishment Survey. The description of TV Homes is as follows. Multi Total: Made up of Multi Terrestrial homes plus Cable/Satellite homes and is therefore any home which receives more than just the four Irish channels. Irish Terrestrial Homes: which only receive the four Irish channels. Multi Terrestrial: Homes which receive at least one of the UK channels (BBC, UTV, Channel 4, HTV, S4C, Channel 5), but do not receive any Cable/Satellite channels. Cable/Satellite: Homes which receive any Cable/Satellite channels (Sky One, Sky News, Sports channels, MTV, E4, Movie channels, etc.). Digital: Have digital reception either via dish or cable service. |
| 5.1.2 | TV Homes by Reception Method | This chart shows the percentage of TV homes by the method by which the homes receive their channels. Each home can have more than one method of reception. e.g. aerial and cable or Sky, Sky and cable, etc. The question is asked for their main and up to 9 TV |

| | | |
|--------------|--|--|
| | | sets. For this reason, the total for the reception methods adds up to more than 100%. |
| 5.1.3 | TV Homes | This chart shows the total number of TV homes in Ireland over time. |
| 5.1.4 | DVD, Broadband, Games Console and PVR Trends | This chart shows the trend in household DVD, broadband access, games console and PVR ownership over time (A PVR is an electronic device used to record media digitally. This is a generic term, and can be used to describe portable media players, stand-alone units, and combination units. The PVR is also known as the digital video recorder or DVR). |
| 5.2.1 | European Pay Subscriber Household Penetration | This chart shows the penetration rate of digital TV among households across 17 EU countries. |

Glossary

| | |
|---|--|
| Access Line | A circuit that connects a subscriber to a switching centre. |
| ADSL | Asymmetric Digital Subscriber Line: Utilises a technology that transforms a normal telephone line into a high-speed digital line that enables access to telephony services and the Internet at the same time. ADSL provides always-on access to Internet or TV and Video on-demand services at speeds that are 10 to 40 times faster than a standard 56k modem. An ADSL line has a higher downstream speed (into the end user) than upstream speed (away from the end user). |
| Analogue | The direct representation of a waveform, as opposed to digital which is a coded representation. An analogue signal is one that varies continuously (eg. Sound waves). Analogue signals vary along two parameters, amplitude (strength) and frequency (tone). The unit of measurement is the Hertz, or cycle per second. |
| ATM | Asynchronous Transfer Mode – the internationally agreed basis for broadband ISDN. A technology that enables all types of information (data, voice and video in any combination) to be transported by a single network infrastructure. |
| ARPM | Average Revenue Per Minute- Average Revenue Per Minute generated by mobile customers, bob prepaid and post-paid, based on usage of voice services only. Revenues from data usage such as SMS and MMS are not included. |
| ARPU | Average Revenue Per User- A measure of the average revenue generated per subscriber over a specific time period; ARPU in this report is calculated on a monthly basis. |
| Bandwidth | The physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz) and in digital systems in binary bits per second. (Bit/s). |
| Bits per second | Basic unit of measurement for serial data transmission capacity; abbreviated as K bps, or kilobit/s for thousands of bits per second; M bps or megabit/s for millions of bits per second; G bps, or gigabit/s for billions of bits per second; T bps or terabit/s or trillions of bits per second. |
| Broadband | A service or connection allowing a considerable amount of information to be conveyed, such as television pictures. Generally defined as a bandwidth > 2Mbit/s although ComReg collects data based on the European Commission's base of 144kb upstream. The capability to integrate any type of communications signals (voice, data, image or multimedia) and carry them over a single broadband channel of 150-mbps and above, 4k regardless of their content. |
| Cable Modem | A cable modem is a device that enables a PC to be linked to a local cable TV line for internet/data services. |
| Calling Line Identity (CLI) | A facility that enables identification of the number from which a call is being made. |
| Carrier Pre-selection (CPS) | The facility offered to customers which allows them to opt for certain defined classes of call to be carried by an operator selected in advance (and having a contract with the customer), without having to dial a routing prefix or follow any other different procedure to invoke such routing. |
| Co-location | The provision of space for a customer's telecommunications equipment on the service provider's premises. |
| Dial-up | Connections made to a data network using the switched network to provide a voice band or data bearer. |
| Digital | The coded representation of a waveform by, for example, binary digits in the form of pulses of light, as opposed to analogue which is the direct representation of a waveform. |
| Digital Audio Broadcasting (DAB) | Digital audio broadcasting (DAB), also known as digital radio and high-definition radio, is audio broadcasting in which analogue audio is converted into a digital signal and transmitted on an assigned channel in the AM or (more usually) FM frequency range. |
| Digital Subscriber Line (DSL) | A family of technologies generically referred to as DSL or xDSL, which are capable of transforming a normal telephone line into a high-speed digital line. These include ADSL (Asymmetric DSL), SDSL (Symmetric DSL), HDSL (High data rate DSL) and VDSL (Very high data rate DSL). DSL enabled lines are capable of supporting services such as |

| | |
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| | fast Internet access and video or TV on-demand. |
| Digital Terrestrial Television (DTT) | Digital television broadcast entirely over earthbound circuits. DTT signals are broadcast over essentially the same media as the older analogue terrestrial TV signals. DTT provides a clearer picture and superior sound quality when compared to analogue TV, with less interference and offers far more channels, thus providing the viewer with a greater variety of programmes. |
| Direct Access | The situation where a customer is directly connected to a telecommunications operator by a wire, fibre-optic or radio link to connect that customer to the public telecommunication network. |
| Directory Enquiry Service (DQ) | Directory information service which is operator assisted and involves the operator looking up entries on a database. |
| Ethernet | An interface standard (such as IEEE 802.3) adopted as a method for connecting equipment/networks to "Wide Area Networks". The physical media can be wireless, copper or fibre. |
| Fibre Optic Cable | A transmission medium that uses glass or plastic fibres rather than copper wire to transport data or voice signals. The signal is imposed on the fibres via pulses (modulation) of light from a laser or a light-emitting diode (LED). Because of its high bandwidth and lack of susceptibility of interference, fibre-optic cable is used in long-haul or noisy applications. |
| Fixed Mobile Convergence (FMC) | FMC is a development of the concept of convergence in the telecommunications sector that covers the coming together of fixed telecommunications, including fixed cellular such as Wi-Fi and pure cellular |
| Fixed telephone Services | Means the provision to end-users at fixed locations of a service for the originating and receiving of national and international calls, including voice telephony services and may include, in addition, access to emergency 112 services, the provision of operator assistance, directory services, provision of public pay telephones, provision of service under special terms or provision of special facilities for customers with disabilities or with special social needs but does not include value added services provided over the public telephone system. |
| Flat Rate Internet Access (FRIACO) | The provision of a Flat Rate Internet Access Call Origination via a wholesale un-metered Internet access product. |
| Fixed Wireless Access (FWA) | A system that connects subscribers to the public switched telephone network (PSTN) using radio signals as a substitute for copper wires for all or part of the connection between the subscriber and the switch. |
| FTTx | Denotes a range of fibre-based services such as fibre to the home (FTTH), fibre to the kerb (FTTk), fibre to the cabinet (FTTC), and fibre to the office (FTTO), based on the installation and use of optical fibre from a central point directly to individual buildings such as residences, apartment buildings and businesses to provide unprecedented high-speed Internet access. FTTx dramatically increases the connection speeds available to computer users compared with technologies currently offered such as ADSL. |
| Global System for Mobile Communications (GSM) | A second generation digital mobile technology. Initially developed for operation in the 900MHz band and subsequently modified for the 850, 1800 and 1900MHz bands. GSM originally stood for Groupe Speciale Mobile, the CEPT committee which began the GSM standardisation process. |
| High Speed Data Packet Access (HSDPA) | HSDPA (High-Speed Downlink Packet Access) is a packet-based mobile telephony protocol used in 3G UMTS radio networks to increase data capacity and speed up transfer rates. HSPDA specifies data transfer speeds of up to 14.4 Mbps per cell for downloads and 2 Mbps per cell for uploads. |
| ICT | Information & Communications Technologies |
| Indirect Access | Where a customer's call is routed and billed through operator A's network even though the call originated from the network of operator B. It is the generic term for both easy access and equal access. |
| Integrated Services Digital Network (ISDN) | A network based on the existing digital PSTN which provides digital links to customers and end to end digital connectivity between them. ISDN2 provides a maximum bandwidth of 128kbit/s. |
| Interconnection services | Services provided by one telecommunications organisation to another for the purpose of the conveyance of messages and information between the two systems and including any ancillary services necessary for the provision and maintenance of such services. |

| | |
|--|---|
| Internet protocol (IP) | Packet data protocol used for routing and carriage of messages across the internet. |
| Internet telephony | A specific type of unmanaged VoIP service that uses the public Internet to carry the IP traffic (also referred to as Voice over the Internet). |
| ISP | Internet Service Provider |
| Leased line | Point to point symmetric capacity between network termination points, whether contended or uncontended, which does not include 'on demand switching' or routing functions controlled by the end user'. |
| Local Loop | The access network connection between a customer's premises and the local exchange. This usually takes the form of a pair of copper wires. |
| Local Loop unbundling (LLU) | LLU was mandated by the EU in December 2000. It requires those operators designated as having significant market power) to make their local networks (i.e. the telephone lines that run from a customer's premises to the local telephone exchange) available to other telecommunications companies on a wholesale basis. |
| Managed services | Managed services include fully outsourced network management arrangements, including advanced features like IP telephony, messaging and call centre, virtual private network (VPNs), managed firewalls, and monitoring/reporting of network servers. Most of these services can be performed from outside a company's internal network. |
| Mobile Number Portability (MNP) | The facility which allows mobile subscribers to retain their mobile number when moving between mobile networks e.g. a customer with an 083, 085, 086 or 087 mobile number can be an active subscriber on the network of their choice with their current number. |
| Modem | A device which converts digital signals from a data-transmitting terminal into modulated analogue signals which can be carried by a public telephone network. |
| Multimedia messaging Service (MMS) | A communications technology developed by 3GPP (Third Generation Partnership Project) that allows users to exchange multimedia communications such as pictures between capable mobile phones and other devices. MMS is an extension to the Short Message Service (SMS) protocol. |
| Multipoint Microwave Distribution System (MMDS) | Multipoint Microwave Distribution System (MMDS) is a system to allow for the distribution of multi-channel television. This is a subscriber-based system which operates in the microwave part of the band (2GHz – 3 GHz). Reception of MMDS is typically through a roof-top microwave antenna and set-top box. |
| Narrowband | A service or connection allowing only a limited amount of information to be conveyed, such as for telephony. This compares with broadband which allows a considerable amount of information to be conveyed. |
| Originating network | The network to which a caller who makes a call is directly connected. |
| Other Authorised Operators (OAOs) | An undertaking, other than the incumbent, providing or authorised to provide a public communications network or an associated facility or service |
| Partial private Circuit (PPC) | A type of wholesale leased line that allows OAOs to efficiently combine their network infrastructure with capacity provided by the incumbent. |
| Path | A path is a route between any two points or nodes. |
| Premium rate services (PRS) | Services, including recorded information and live conversation, run by independent service providers. All calls to these companies are charged at a higher rate than ordinary calls to cover the companies' costs in providing the content of the call and the operator's cost for the special network facilities needed. |
| Private circuits | Point-to-point circuits for customers exclusive use covering speech, data or image communications. |
| Public switched telephone network (PSTN) | A voice-oriented public telephone network. Also known as the Plain Old Telephone Service (POTS). |
| Public telecommunications network | A telecommunications network used, in whole or in part, for the provision of publicly available telecommunications services. |
| Purchasing Power | Purchasing Power Parities (PPPs) are currency conversion rates that |

| | |
|---|--|
| Parities (PPPs) | both convert to a common currency and equalise the purchasing power of different currencies. In other words, they eliminate the differences in price levels between countries in the process of conversion. |
| Resellers | Service Providers who do not have their own network. |
| RFID | RFID (radio frequency identification) is a technology that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency (RF) portion of the electromagnetic spectrum to uniquely identify an object, animal, or person. |
| Roaming | A service unique to GSM which enables a subscriber to make and receive calls when outside the service area of his home network e.g. when travelling abroad. |
| Short message service (SMS) | A service for sending messages of up to 160 characters (224 characters if using a 5-bit mode) to mobile phones that use Global System for Mobile (GSM) communication. |
| Spectrum | The range of wavelengths used, for example, for broadcasting radio, terrestrial television and satellite television. Usable wavelength ranges from about 100 KHz to about 400 GHz although there are as yet no broadcasts above about 12 GHz. |
| Subscriber Identity Module (SIM) | A smart card containing the telephone number of the subscriber, encoded network identification details, the PIN and other user data such as the phone book. A user's SIM card can be moved from phone to phone as it contains all the key information required to activate the phone. |
| Switch | Relates to a telecommunications network comprising at least one exchange and capable of routing signals and messages from one line to all other lines comprised in the network. |
| Telecommunications | Conveyance of speech, music and other sounds, visual images or signals by electric, magnetic, electro-magnetic, electro-chemical or electro-mechanical means. |
| Terminating network | The network to which a caller who receives a call is directly connected. |
| Third generation mobile systems (3G) | A European 3G mobile communications system provides an enhanced range of multimedia services (e.g. high speed Internet access). |
| Transit | A transit service is a conveyance service provided by a network between two points of interconnection. It is therefore a service that links two networks that are not in themselves interconnected. |
| Trunk network | A trunk network that connects major switching centres or nodes in a communications system |
| Voice over Internet protocol (VoIP) | The generic name for the transport of voice traffic using Internet Protocol (IP) technology. The VoIP traffic can be carried on a private managed network or the public Internet (see Internet telephony) or a combination of both. Some organisations use the term 'IP telephony' interchangeably with 'VoIP'. |
| Voice telephony service | A service available to the public for the commercial provision of direct transport of real-time speech via the public switched network or networks such that any user can use equipment connected to a network termination point at a fixed location to communicate with another user of equipment connected to another termination point. |
| Virtual private network (VPN) | These are used by a company or private group to make inter-site connections either for telephone speech or data as if there were dedicated leased lines between these sites. The equipment used is located within the public telecommunications operator's premises and forms an integral part of the public network but is software-partitioned to allow for a genuinely private network |
| Wholesale Line Rental (WLR) | A facility offered to customers of OAOs whereby they can opt to receive a single bill for their telephony rental, calls and other ancillary services. |
| Wi-Fi | Wi-Fi (short for "wireless fidelity") is a term for certain types of wireless local area network (WLAN) that use specifications in the 802.11 family of standards. The term Wi-Fi was created by an organization called the Wi-Fi Alliance, which oversees tests that certify product interoperability. Wi-Fi access points provide Internet connection and virtual private network (VPN) access from a given location e.g. public places, such as airports, hotels, and coffee shops. Access is facilitated via the user's own portable computer. |

WiMAX

WiMAX (Worldwide Interoperability for Microwave Access) is a wireless technology based on IEEE 802.16 standards for broadband wireless access (BWA) networks

Appendix Purchasing Power Parities (February 2010)

| Exchange rates used: | | Feb-10 | |
|----------------------|-----------|-------------|--|
| Related to: | US\$ | US\$ PPP | |
| Australia | 0.8839 | 0.696722689 | |
| Austria | 1.3867 | 1.159754098 | |
| Belgium | 1.3867 | 1.114094488 | |
| Canada | 0.9347 | 0.849266055 | |
| Czech Rep. | 0.05302 | 0.068182927 | |
| Denmark | 0.1862 | 0.113254438 | |
| Finland | 1.3867 | 0.956013514 | |
| France | 1.3867 | 1.114094488 | |
| Germany | 1.3867 | 1.159754098 | |
| Greece | 1.3867 | 1.298073394 | |
| Hungary | 0.005119 | 0.007053247 | |
| Iceland | 0.008282 | 0.007539048 | |
| Ireland | 1.3867 | 0.962517007 | |
| Italy | 1.3867 | 1.13192 | |
| Japan | 0.0111 | 0.007832836 | |
| Korea | 0.0008705 | 0.001152254 | |
| Luxembourg | 1.3867 | 1.048074074 | |
| Mexico | 0.07648 | 0.122016129 | |
| Netherlands | 1.3867 | 1.141048387 | |
| New Zealand | 0.7015 | 0.637475728 | |
| Norway | 0.169 | 0.106447368 | |
| Poland | 0.3443 | 0.510147059 | |
| Portugal | 1.3867 | 1.400891089 | |
| Slovak Rep. | 1.3867 | 1.572111111 | |
| Spain | 1.3867 | 1.274684685 | |
| Sweden | 0.1355 | 0.116 | |
| Switzerland | 0.9431 | 0.57447205 | |
| Turkey | 0.6695 | 0.866455696 | |
| UK | 1.5987 | 1.548878505 | |
| USA | 1 | 1 | |

Appendix Revision of Teligen Basket Methodologies

The OECD has developed a set of methodologies for comparing retail prices of telecommunication services for the purpose of assessing the price levels experienced by consumers and businesses in the member countries.

The methodologies are based on a “basket” approach where a consumption pattern is described for different types of users, and the prices of corresponding services from each provider covered are used to calculate the resulting cost for each type of user. These baskets are referred to as the “OECD Baskets”.

The baskets are reviewed and revised periodically as consumption patterns change. Previous revisions of the baskets took place in 2000, 2002 (mobile only), 2005 and now in 2009 with an OECD / Teligen workshop in Barcelona.

The baskets are based on actual traffic data and consumption data, collected from operators and regulators in the OECD member countries. The OECD, together with Teligen, has developed an approach to the collection of data and the development of basket methodologies that is based on the following elements:

- Input from the OECD / Teligen basket workshop in Barcelona June 2009.
- Traffic data and views submitted by operators and regulators in the OECD member countries up until the end of October 2009 and comments on the proposal presented in December 2009.

Much of the background data which underpins the basket methodologies is commercially sensitive and operators have submitted the data to Teligen to be analysed on behalf of the OECD. The following basket definitions take into account all data received from operators and regulators.

1.1 New in these basket definitions

1.1.1 Voice call calculations

The 2009 basket revision includes a new method of accounting for different billing durations (e.g. per second, per minute). This issue concerns both the PSTN and the mobile baskets.

The former calculation of individual call costs was based on the standard (average) call duration specified in the basket for each type of call (destination and time). The call cost was calculated using the actual billing period, *i.e.* using the full number of billing units covering the call duration. Essentially, calls of various durations were rounded up to the next billing increment.

Table 1. Former method for calculating call durations by rounding to the nearest billable unit

| | |
|---------------------|---|
| 60 second billing: | $(75/60) = 2 \text{ units} = 120 \text{ seconds}$ |
| 20 second billing: | $(75/20) = 4 \text{ units} = 80 \text{ seconds}$ |
| Per second billing: | $(75/75) = 75 \text{ units} = 75 \text{ seconds}$ |

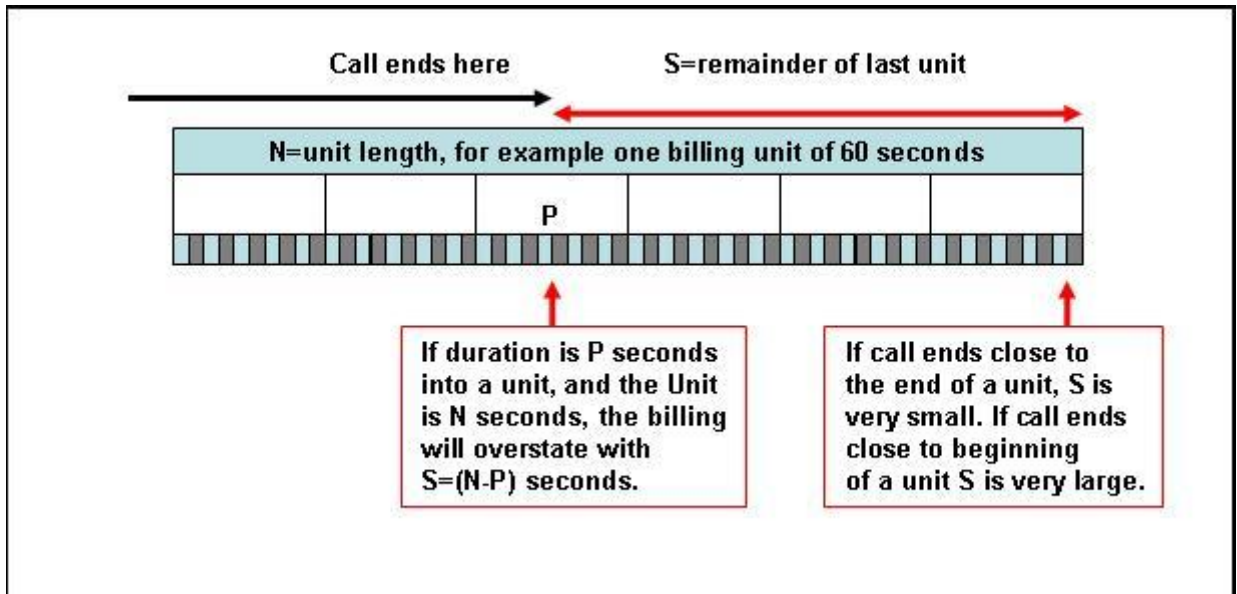
This meant that a 75 second call was billed as 75 seconds with per-second billing, and as 120 seconds with per minute billing. This approach took into account the billing system effect on the cost, but not the distribution of call durations. The selection of call duration in the basket would have a large influence on the level of overbilling of actual call time. For example, a call just over the billing increment would require a larger rounding up to reach the next increment while a call approaching the actual billing increment would have very little overbilling.

If the average duration used in the basket was just below a multiple of billing units there was a small additional time added as an effect of the billing. If, by contrast, the duration selected for the basket happened to be just above a multiple of billing units the additional time (and cost) added could be significant. The effect was somewhat arbitrary.

This 2009 revision changes the calculation to use the average duration defined by the basket, and then add an element related to the billing method and distribution. The rationale behind this can be explained as follows:

The new system for capturing differences in billing systems essentially calculates the price of a call based on the actual number of seconds stipulated by the basket and then adds an additional adjustment reflecting the average “overbilling” of calls corresponding to the billing system. Figure 2 below shows how the amount of overbilling varies for each call.

Figure 1. Implications of the new methodology on different time-based billing systems



A call can have any duration, defined as A (seconds), and it ends P seconds into the last unit. When the billing unit duration is N (seconds) the actual billing will overstate the average duration with

$$S=0, 1, 2, 3, \dots, N-1 \text{ seconds,}$$

depending on the value of A. If we assume that there is an even likelihood of any of these durations (which is a simplification), the average overstated duration will be $S=(N-1)/2$. By adding this to the average duration before calculating the cost of the call, the effect of both the billing unit and the call distribution will be taken into account. The call calculation will then always be calculated as if the billing is based on average per minute charge, calculated to the fractions of a second before an adjustment for the billing systems is made.

| | | |
|-----------------------|---|------------------------|
| Per minute billing | = | 29.5 second adjustment |
| Per 20 second billing | = | 9.5 second adjustment |
| Per second billing | = | 0 second adjustment |

Given an example with a 75 second call, the “adjusted” call duration will be calculated as follows under different billing systems:

Table 2. Revised method for calculating call durations based on the average overbilling for each method

| | |
|---------------------|---|
| 60 second billing: | $75 + (60-1)/2 = 75 + 29.5 = 104.5$ seconds |
| 20 second billing: | $75 + (20-1)/2 = 75 + 9.5 = 84.5$ seconds |
| Per second billing: | $75 + (1-1)/2 = 75 + 0 = 75$ seconds |

With this “adjusted” call duration the cost per call is calculated on the basis of the charge per second in all cases.

If the “adjusted” call duration is shorter than the billing unit the full price of one billing unit will be considered as the cost of the call. Any call set up charge will be added to the cost per call.

1.1.2 Selective discounts

Selective discount plans allow users to typically specify 1, 2, 3 or up to 10 or more numbers (depending on the plan) to which calls and/or messages will be free or

discounted. The basket definitions generically refer to these plans as “selective discounts” although they are also known under brand names like “Friends and Family”, “Bestmates”, “Preferred numbers”, “Calling circle” etc.

It is also worth noting that there will normally be an overall traffic increase with the introduction of selected discounts. Most of this increase will go to the nominated numbers, and will only have a limited effect on the end user cost as such calls are free or heavily discounted. In the basket calculations this increase is not considered.

The handling of the selective discount is based on the following elements and assumptions:

The total number of minutes for all calls in the basket is V

The discount applies to N nominated numbers

The discount D (%) applies to each of these calls

(D=100% is a free call)

The proportion of minutes A (%) receiving the discount is calculated based on the formula below, using V and N as input data. The proportion A is adjusted according to the discount D

$(A_2 = A \times D)$

Mapping information will indicate which call types are affected by the discount.

The remaining proportion A_2 is used to calculate the number of minutes to be deducted from the basket minutes according to the call type mapping.

Cost of remaining minutes is calculated as usual.

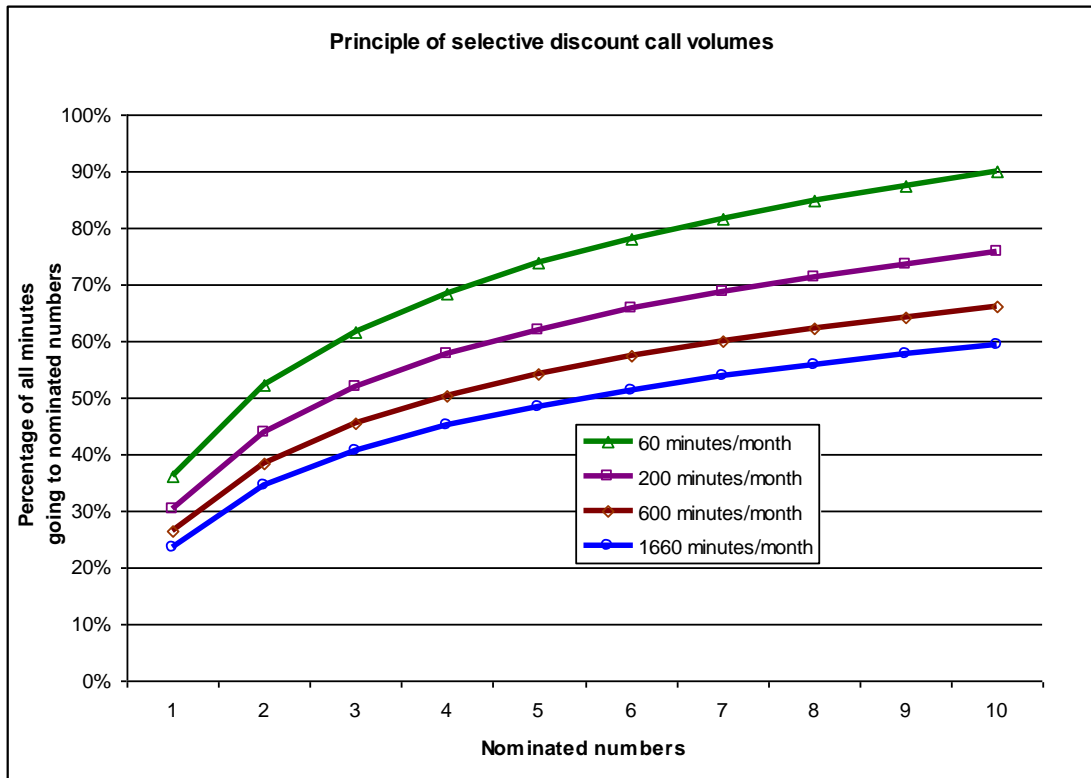
Where discounted SMS is offered as part of the discount they will be deducted using the same value A from the formula below, and the relevant discount applicable to the SMS.

The critical element is the calculation of A. This proportion is based on N (number of nominated numbers) and V (total minutes in basket), and an empirically developed function can be used to calculate the proportions as shown on the graph below. The function is:

$$A_{(\%)} = \text{Log}(10 \times N^{1.5}) / \text{Log}(10 \times V)$$

This function provides a proportion that resembles the amount of calls going to nominated numbers in the data received from operators in this basket review.

Figure 2. Selective call discount volumes



The selective discount will be taken before any minute, message and value allowances included in the package. The amount of minutes that will be deducted because of the selective discount is calculated as:

$$V_{(2)} = V_{(1)} \times (\text{Log}(10 \times N^{1.5}) / \text{Log}(10 \times V)) \times D$$

where $V_{(1)}$ is the total number of minutes defined by the basket, and $V_{(2)}$ is the number of minutes going to the nominated numbers

$V_{(2)}$ is then distributed to the specific call types according to the selective discount mapping. Each call type will have between zero and $V_{(2)}$ minutes to be deducted. The remaining minutes for each call type is used for the following distribution of allowances and calculation of call costs.

1.1.3 Local calling areas for the PSTN baskets

Previous versions of the baskets provided 14 discrete distances for national fixed line calls. This enabled both a distance distribution and a method for incorporating the size of local calling areas. The baskets now use only local and national areas to describe the national destinations for fixed line calls, due to considerable simplifications in the pricing of such calls in recent years.

In order to allow for differences in the size of local calling areas the following adjustment of the local and national call proportions will be used, based on the closest size of local calling area:

Table 3. Local and national call proportions

| Average local call radius | Local adjustment | National adjustment |
|---------------------------|------------------|---------------------|
| 10 km | -8.9% | +8.9% |
| 15 km | -4.2% | +4.2% |
| 20 km | -1.4% | +1.4% |
| 25 km | 0.0% | 0.0% |
| 30 km | 3.2% | -3.2% |
| 50 km | 6.4% | -6.4% |
| 100 km | 9.6% | -9.6% |

In addition the percentages above must be adjusted with the proportion of fixed line calls in each basket, as given in Table 4 below.

Table 4. Basket adjustment

| | Basket adjustment |
|---------------------------|-------------------|
| 20 calls basket | 81% |
| 60 calls basket | 75% |
| 140 calls basket | 73% |
| 420 calls basket | 90% |
| 100 calls business basket | 67% |
| 260 calls business basket | 66% |

An example: The 60 calls basket will have the following adjustment factors:

Table 5. Example – 60 call basket

| Average Local call area radius | Local adjustment | National adjustment |
|--------------------------------|------------------|---------------------|
| 10 km | -6.7% | 6.7% |
| 15 km | -3.2% | 3.2% |
| 20 km | -1.1% | 1.1% |
| 25 km | 0.0% | 0.0% |
| 30 km | 2.4% | -2.4% |
| 50 km | 4.8% | -4.8% |
| 100 km | 7.2% | -7.2% |

If the operator, for example, uses an average local calling radius of 15 km, the fixed-to-fixed local proportion will be $60\% - 3.2\% = 56.8\%$, and the fixed-to-fixed national portion will be $15\% + 3.2\% = 18.2\%$.

PSTN baskets

1.2 General basket rules: PSTN

Only incumbent operators are covered.

For each operator a relevant number of packages shall be included. Combinations of packages are allowed. Discounts shall be incorporated in the calculations of prices for each basket. Only tariffs presented clearly as current tariffs on the operator web pages will be considered.

Selective discounts are calculated with the algorithm described above.

There are 4 residential and 2 business baskets:

Table 6. Residential and business PSTN baskets

| Type of basket | Basket |
|----------------|--|
| Residential | 20 calls basket |
| Residential | 60 calls basket |
| Residential | 140 calls basket |
| Residential | 420 calls basket |
| Business | 100 calls business basket, single user |
| Business | 260 calls business basket, single user |

Nonrecurring charges are covered using the charge for a new installation of a service.

Nonrecurring charges are distributed over 5 years, except where the installation is a tradable asset (Japan) where the charge is distributed over 20 years.

Call costs are calculated using the duration of $D + (\text{Unit}_{(\text{seconds})} - 1) / 2$, based on basket call duration D converted to seconds and average per second charges. Unit is the billing unit in seconds.

National call charges to fixed networks are based on a local / national split. While this is adequate for most prices, some operators may split their prices into local / regional / national. In such cases only the prices for local and national areas will be considered.

The proportion of calls to the local calling area will be adjusted for local calling area radius as described above in Table 3.

When call charges to mobile networks differ by network, the weighted average charge for calls to all national mobile networks shall be used, based on available subscriber numbers.

International calls to other OECD countries are included, with call charges weighted according to actual traffic volumes. This means that those destinations with the most traffic will carry the most weight. Traffic volume weights can be provided by national regulators. Until such weights are provided the existing weights are used.

For international calls the highest charge is used for peak time, and the lowest is used for off-peak time.

Allowances are deducted in the following order: Selective discounts, minute allowance, value allowance. Specific volume discounts will be deducted from the total cost at the end.

Results are presented in USD / PPP per month, excluding VAT for business baskets and including VAT for residential baskets. Nominal exchange rates can be used.

1.3 PSTN basket parameters

Table 7. Overall basket volumes and destination distribution (Fixed)

| Calls per month | Total calls | Call distribution | | | |
|---------------------------|-------------|----------------------|-------------------------|-----------------|---------------|
| | | Fixed to fixed Local | Fixed to fixed National | Fixed to mobile | International |
| 20 calls basket | 20 | 61% | 20% | 17% | 2% |
| 60 calls basket | 60 | 60% | 15% | 21% | 4% |
| 140 calls basket | 140 | 58% | 15% | 23% | 4% |
| 420 calls basket | 420 | 73% | 17% | 8% | 2% |
| 100 calls business basket | 100 | 48% | 19% | 30% | 3% |
| 260 calls business basket | 260 | 43% | 23% | 25% | 9% |

Table 8. Time of day distribution: Fixed to fixed

| | Fixed to Fixed | | |
|---------------------------|----------------|---------|---------|
| | Day | Evening | Weekend |
| 20 calls basket | 53% | 25% | 22% |
| 60 calls basket | 60% | 22% | 18% |
| 140 calls basket | 52% | 26% | 22% |
| 420 calls basket | 52% | 26% | 22% |
| 100 calls business basket | 69% | 17% | 14% |
| 260 calls business basket | 75% | 15% | 10% |

Table 9. Time of day distribution: Fixed to mobile

| | Fixed to Mobile | | |
|---------------------------|-----------------|---------|---------|
| | Day | Evening | Weekend |
| 20 calls basket | 45% | 28% | 27% |
| 60 calls basket | 57% | 22% | 21% |
| 140 calls basket | 46% | 27% | 27% |
| 420 calls basket | 46% | 27% | 27% |
| 100 calls business basket | 69% | 18% | 13% |
| 260 calls business basket | 77% | 14% | 9% |

Table 10. Time of day distribution: International (fixed)

| | International | |
|---------------------------|---------------|----------|
| | Peak | Off peak |
| 20 calls basket | 45% | 55% |
| 60 calls basket | 44% | 56% |
| 140 calls basket | 47% | 53% |
| 420 calls basket | 47% | 53% |
| 100 calls business basket | 75% | 25% |
| 260 calls business basket | 87% | 13% |

1.3.1 PSTN call durations

Table 11. PSTN call durations: Fixed to fixed local, minutes per call

| | Fixed to fixed local | | |
|---------------------------|----------------------|---------|---------|
| | Day | Evening | Weekend |
| 20 calls basket | 2.6 | 4.0 | 2.6 |
| 60 calls basket | 2.6 | 3.8 | 2.9 |
| 140 calls basket | 3.1 | 4.8 | 3.7 |
| 420 calls basket | 3.6 | 5.4 | 5.4 |
| 100 calls business basket | 1.9 | 2.3 | 2.1 |
| 260 calls business basket | 2.0 | 2.8 | 3.1 |

Table 12. PSTN call durations: Fixed to fixed national, minutes per call

| | Fixed to fixed national | | |
|---------------------------|-------------------------|---------|---------|
| | Day | Evening | Weekend |
| 20 calls basket | 4.0 | 6.3 | 5.4 |
| 60 calls basket | 4.1 | 6.4 | 6.4 |
| 140 calls basket | 4.7 | 7.6 | 7.1 |
| 420 calls basket | 5.3 | 8.1 | 8.1 |
| 100 calls business basket | 2.3 | 3.3 | 3.3 |
| 260 calls business basket | 2.4 | 2.7 | 3.4 |

Table 13. PSTN call durations: Fixed to mobile, minutes per call

| | Fixed to mobile | | |
|---------------------------|-----------------|---------|---------|
| | Day | Evening | Weekend |
| 20 calls basket | 1.5 | 2.1 | 1.3 |
| 60 calls basket | 1.9 | 2.4 | 1.9 |
| 140 calls basket | 1.7 | 2.3 | 2.1 |
| 420 calls basket | 1.8 | 2.3 | 2.3 |
| 100 calls business basket | 1.6 | 1.9 | 1.5 |
| 260 calls business basket | 1.7 | 2.2 | 1.9 |

Table 14. PSTN call durations: International

| | International | |
|---------------------------|---------------|----------|
| | Peak | Off peak |
| 20 calls basket | 4.6 | 6.2 |
| 60 calls basket | 4.7 | 6.8 |
| 140 calls basket | 4.7 | 6.8 |
| 420 calls basket | 5.0 | 8.1 |
| 100 calls business basket | 3.2 | 5.4 |
| 260 calls business basket | 3.7 | 4.1 |

Mobile baskets

1.4 General basket rules

At least two largest network operators are covered for each country, based on subscriber numbers. The operators covered should between them have at least 50% of the market share.

Discount brands offered by the network operators will only be included when clearly linked with the network operator's website and brand.

Offers shall be typical 2G and 3G services with the main focus on voice.

A range of relevant price packages shall be covered, allowing the lowest cost package to be selected for each operator. Only price presented clearly as current on the operator web pages will be considered.

The basket methodologies can be used to compare different types of offers such as pre-paid, post-paid or SIM-only plans.

Table 15. Mobile baskets

| Basket |
|------------------------------------|
| 30 calls per month |
| 100 calls per month |
| 300 calls per month |
| 900 calls per month |
| 40 calls per month pre-paid basket |
| 400 messages per month basket |

Nonrecurring charges are distributed over 3 years.

Selective discounts are calculated with the algorithm described in the section on selective discounts above.

The value of call and message allowances included in the package will be deducted from the usage element of the basket, up to the value of actual usage.

Allowances are deducted in the following order: Selective discounts, most restricted minute allowance, least restricted minute allowance, message allowance, value allowance. Specific volume discounts will be deducted from the total cost at the end.

Off-net mobile-to-mobile charges are weighted according to subscriber numbers for each country, where relevant for the pricing of calls.

Call costs are calculated using the duration of $D + (\text{Unit}_{(\text{seconds})} - 1) / 2$, based on basket call duration D given below converted to seconds and average per second charges. The Unit is the billing unit in seconds.

Results are presented in USD / PPP per month including VAT. Nominal exchange rates can be used.

1.5 Mobile basket parameters

Table 16. Mobile: Overall basket volumes and destination distribution

| Volume per month | Total calls per month | Call distribution | | | | SMS |
|-------------------------|-----------------------|-------------------|--------|---------|-----------|-----|
| | | Mobile to fixed | On-net | Off-net | Voicemail | |
| 30 calls basket | 30 | 16% | 55% | 25% | 4% | 100 |
| 100 calls basket | 100 | 17% | 52% | 28% | 3% | 140 |
| 300 calls basket | 300 | 14% | 46% | 37% | 3% | 225 |
| 900 calls basket | 900 | 14% | 55% | 28% | 3% | 350 |
| 40 calls prepaid basket | 40 | 14% | 64% | 18% | 4% | 60 |
| 400 messages basket | 8 | 8% | 55% | 25% | 12% | 400 |

Table 17. Mobile time of day distribution

| | Voice call distribution | | | Message distribution | | | |
|-------------------------|-------------------------|---------|---------|----------------------|----------|--------|---------|
| | Day | Evening | Weekend | Peak | Off-peak | On-net | Off-net |
| 30 calls basket | 46% | 29% | 25% | 66% | 34% | 53% | 47% |
| 100 calls basket | 51% | 26% | 23% | 66% | 34% | 51% | 49% |
| 300 calls basket | 49% | 32% | 19% | 66% | 34% | 50% | 50% |
| 900 calls basket | 49% | 32% | 19% | 66% | 34% | 50% | 50% |
| 40 calls prepaid basket | 46% | 29% | 25% | 66% | 34% | 53% | 47% |
| 400 messages basket | 46% | 29% | 25% | 66% | 34% | 50% | 50% |

Table 18. Mobile voice call durations

| | Call duration (minutes / call) | | | |
|-------------------------|--------------------------------|--------|---------|-----------|
| | Mobile to fixed | On-net | Off-net | Voicemail |
| 30 calls basket | 2.0 | 1.6 | 1.7 | 0.9 |
| 100 calls basket | 2.1 | 1.9 | 1.8 | 1.0 |
| 300 calls basket | 2.0 | 2.0 | 1.8 | 1.0 |
| 900 calls basket | 1.9 | 2.1 | 1.9 | 1.1 |
| 40 calls prepaid basket | 1.9 | 1.9 | 2.0 | 0.9 |
| 400 messages basket | 1.6 | 2.2 | 1.6 | 1.1 |