



Commission for  
**Communications Regulation**

## Irish Communications Market

### **Quarterly Key Data**

#### **Explanatory Memorandum**

<b>Document No:</b>	<b>14/19a</b>
<b>Date:</b>	<b>14 March 2014</b>

# Contents

Contents.....	1
Executive Summary .....	2
Primary Data.....	3
Secondary data .....	9
PRICING DATA .....	9
OTHER DATA .....	12
Glossary .....	13
Appendix Revision of Teligen Basket Methodologies .....	19
1.1 NEW IN THESE BASKET DEFINITIONS .....	20
1.1.1 <i>Voice call calculations</i> .....	20
1.1.2 <i>Selective discounts</i> .....	21
1.1.3 <i>Local calling areas for the PSTN baskets</i> .....	23
PSTN baskets .....	25
1.2 GENERAL BASKET RULES: PSTN.....	25
1.3 PSTN BASKET PARAMETERS .....	26
1.3.1 <i>PSTN call durations</i> .....	27
Mobile baskets .....	28
1.4 GENERAL BASKET RULES .....	28
1.5 MOBILE BASKET PARAMETERS .....	29

## Executive Summary

Following the publication of an annual market review in November 1999, ComReg's predecessor- the ODTR- published its first Quarterly Review on 22<sup>nd</sup> 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](http://www.comstat.ie)

## Primary Data

Figure/Section	Indicator	Definition
1.1.1	<b>Total Number of Authorisations</b>	Total number of authorisations issued at the date of publication by ComReg to fixed, mobile and broadcasting operators.
1.2.1	<b>Fixed, Mobile and Broadcasting as a % of Total Retail Revenues</b>	The share of total retail revenue generated by the provision of retail fixed voice and data services, retail mobile voice and data services as well as retail cable and MMDS broadcasting services
1.3.1	<b>Share of Total voice Call Volumes (minutes)</b>	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. 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	<b>Total Voice Traffic</b>	This table quantifies the total volume of voice calls originating (or initiated) from fixed (PSTN/ISDN, VoB) networks and from mobile networks.
1.5.1	<b>Total Subscriptions (Fixed and Mobile)</b>	This chart shows the percentage split between fixed and mobile retail subscriptions in Ireland.
2.1.1	<b>Profile of Fixed Line Retail Revenues</b>	Breakdown in % terms of share of total revenue generated by the direct <sup>1</sup> and indirect <sup>2</sup> provision of retail fixed voice and data services, among a specific set of sub-categories: <ul style="list-style-type: none"> <li>• retail fixed voice services (such as PSTN voice services and dial-up Internet services. This category also includes revenues from voice over broadband services.),</li> <li>• retail broadband services (This category also includes revenues from WiFi services);</li> <li>• retail revenues from leased lines and managed data services including web-hosting, directory publication &amp; other services.</li> </ul>
2.1.1.1	<b>Fixed Retail Revenue Market Shares</b>	This chart shows the fixed line retail revenue market share for operators who have 2.0% or more revenues market share. Includes revenues from the provision of retail fixed voice services, retail broadband services and retail leased line, managed data, and other ancillary services including web-hosting, directory publication and other services.
2.1.1.2	<b>Fixed Revenue Market Shares</b>	This chart shows the fixed line retail and wholesale revenue market share for operators who have 2.0% or more revenues market share. Includes revenues from the provision of interconnection, wholesale fixed narrowband access, wholesale broadband access, wholesale leased lines and managed data services (including revenues from Partial Private Circuits), retail fixed voice services, retail broadband services and retail leased line, managed data, and other ancillary services including web-hosting, directory publication and other services.

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

<sup>2</sup> 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	<b>Narrowband Fixed Access Paths</b>	<p>This table quantifies the total number of direct<sup>3</sup> and indirect<sup>4</sup> 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. The growth rates are for quarterly and year-on-year growth in subscription numbers across each form of narrowband access.</p> <p>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>
2.2.1.2	<b>Direct and Indirect Narrowband Fixed Access Paths</b>	The percentage split of Direct and Indirect Narrowband Fixed Access Paths.
2.2.2	<b>Narrowband Indirect Access Paths</b>	<p>Total number of indirect<sup>5</sup> fixed narrowband (data rates less than 144k) telephone paths provided to customers by means of carrier pre-select only, wholesale line rental or White Label Access 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, Eircom.</p> <p>White Label Access-Voice Access (WLA-(Voice)) is a switchless voice service which allows an operator to purchase end-to-end call services without the need to have its own interconnection infrastructure.</p>
2.2.3	<b>Fixed voice subscriptions</b>	This chart shows the total number of fixed voice subscriptions (either standalone or part of a bundle) and the fixed voice subscriptions market share for operators who have 2.0% or more subscriptions market share.
2.2.4	<b>Fixed Market Retail Subscriptions by Type</b>	This chart shows the percentage of subscriptions by type. Subscriptions mean a customer with at least one contract with an electronic communications service provider. Bundled subscriptions are subscriptions of a single operator who receive two or more services such as fixed and mobile telephony service, access to TV programmes and broadband internet access from that single operator, usually for a single price and as part of a single bill.

<sup>3</sup> See note 1 above

<sup>4</sup> See note 2 above

<sup>5</sup> See note 2 above

<b>Figure/Section</b>	<b>Indicator</b>	<b>Definition</b>
<b>2.3.1, 2.3.2 and 2.3.3</b>	<b>Fixed Voice Call Volumes (minutes)</b>	<p>Total number of retail minutes or traffic generated by means of fixed voice calls both direct<sup>6</sup> and indirect<sup>7</sup>. Call volumes are broken down into domestic (including calls to Northern Ireland), international outgoing calls, calls to mobile and other/advanced minutes. The split of VoB minutes by category (i.e. domestic, international, mobile, other) has been placed into those respective categories.</p> <p>In figures 2.3.2 and 2.3.3 monthly business and residential traffic for each category of calls is divided by the number of business and residential subscriptions to fixed voice services respectively.</p>
<b>2.4.1</b>	<b>Fixed Numbers Ported</b>	Total number of fixed numbers which have been retained by customers when they switched from one mobile operator to another. A total for each quarter are charted.
<b>3.1.1</b>	<b>Total Number of Active Internet Subscriptions in Ireland</b>	<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>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, VDSL (very-high-bit-rate digital subscriber line), cable modem fibre, satellite and mobile broadband using HSDPA.</p> <p>One subscriber may have more than one internet subscription.</p>
<b>3.1.2</b>	<b>Total Internet Subscriptions</b>	This chart shows the trend in fixed and mobile broadband internet subscriptions as well as total internet (including narrowband) subscriptions over the last 2 years.
<b>3.1.3</b>	<b>Quarterly Growth in Total Internet and Broadband Subscriptions</b>	This chart shows the quarterly growth rate in internet and broadband subscriptions over time.
<b>3.1.4</b>	<b>Broadband Subscriptions by Platform</b>	Total number of broadband subscriptions (both residential and business customers) by means of DSL, VDSL, 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.
<b>3.1.5</b>	<b>Broadband Platform Contribution to Broadband Growth</b>	This chart shows the net additions of each broadband platform to total broadband over the last year.

<sup>6</sup> See note 1 above

<sup>7</sup> See note 2 above

<b>Figure/ Section</b>	<b>Indicator</b>	<b>Definition</b>
<b>3.1.6</b>	<b>Broadband Subscriptions by Subscription Type</b>	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.
<b>3.1.7</b>	<b>Fixed Broadband Subscriptions by Contracted Download Speeds and Subscription Type</b>	This chart provides an indication of the percentage of total residential and total business fixed 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.
<b>3.1.8</b>	<b>Fixed Broadband Subscriptions by Contracted Download Speeds and Broadband Platform</b>	This chart provides an indication of the percentage of total residential and total business fixed 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 by each broadband platform.
<b>3.1.9</b>	<b>Fixed Broadband Subscriptions by Contracted Download Speeds</b>	This chart shows total fixed broadband lines by contracted download speeds over the last year.
<b>3.1.10</b>	<b>Subscription Market Share of the Fixed Broadband Market</b>	This chart shows the percentage market share of the fixed broadband market by operators with at least 2% market share.
<b>3.1.11</b>	<b>Subscription Market Share of the Mobile Broadband Market</b>	This chart shows the percentage market share of mobile broadband subscriptions in Ireland.
<b>3.2.1</b>	<b>Provision of DSL Access</b>	Proportions of Digital Subscriber lines (DSL) supplied to customers by means of direct retail supply by Eircom, and wholesale supply by eircom to other operators by means of fully unbundled lines or bitstream. <sup>8</sup> DSL (Digital Subscriber Line) is a technology for bringing high-bandwidth or broadband information to homes and small businesses over ordinary copper telephone lines.
<b>3.2.2</b>	<b>Number of Local Loops Unbundled</b>	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").
<b>3.5.1</b>	<b>WiFi hotspots, access points and Minutes of Use</b>	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. 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. In general terms, more than one access point can be found at a hotspot.

<sup>8</sup> 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.

<b>Figure/ Section</b>	<b>Indicator</b>	<b>Definition</b>
		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.
<b>4.1.1</b>	<b>Mobile subscriptions</b>	This chart shows the Total number of mobile phone subscriptions (both contract and prepaid) inclusive of and exclusive of mobile broadband subscriptions in Ireland. 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, USB modems and Machine to Machine subscriptions.
<b>4.1.2</b>	<b>Mobile subscriptions</b>	This table shows mobile subscriptions broken down by 3G SIMs and type.
<b>4.1.3</b>	<b>Irish Mobile Penetration Rate</b>	Total number of mobile phone, data-card (GSM/2G and 3G/HSDPA, both contract and prepaid) and M2M subscriptions 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.
<b>4.2.1</b>	<b>Profile of Pre-paid and Post-paid Subscriptions</b>	This chart shows the proportion of pre-paid and post-paid mobile subscriptions (including mobile broadband and M2M) over the last year.
<b>4.2.2</b>	<b>Mobile subscriptions by pre-pay / post-pay split</b>	This chart shows the absolute numbers of mobile subscriptions split by pre and post pay type over time.
<b>4.2.3</b>	<b>Profile of Pre-paid and Post-paid Subscriptions by Operator</b>	Percentages of total number of mobile phone, data-card (GSM/2G and 3G/HSDPA) and M2M subscriptions to each of the mobile service providers, broken down by pre-paid and post-paid (contract) packages
<b>4.2.4</b>	<b>Profile of Pre-paid and Post-paid mobile Broadband Subscriptions</b>	This figure shows the split between pre-paid and post-paid mobile broadband subscriptions.
<b>4.2.5</b>	<b>Post-paid Business and Residential Mobile Subscriptions</b>	This table shows the split between post-paid business and residential mobile subscriptions.
<b>4.3.1</b>	<b>SMS, MMS, Other Data and Call Minute Volumes</b>	Total volumes of mobile voice (calls), messages (both SMS and MMS) <sup>9</sup> and data usage (both downloads and uploads) made over mobile networks on a quarterly basis.
<b>4.3.2</b>	<b>Voice Call Minute Volumes by Type</b>	This chart shows mobile voice minutes by category – mobile to mobile, mobile to fixed, mobile international / roaming and mobile advanced minutes.
<b>4.3.3</b>	<b>Mobile to Mobile Voice Call Volumes by Type</b>	This chart shows the number of on-net and off-net minutes made over mobile networks over the last year.
<b>4.3.4</b>	<b>Monthly Mobile Voice Call Minutes per Subscriber by Type</b>	Monthly mobile traffic for each category of calls is divided by the total number of mobile subscribers (mobile broadband subscriptions are excluded).
<b>4.3.5</b>	<b>Monthly Mobile Messaging and Data Volumes per</b>	Monthly mobile messaging is divided by the total number of mobile subscribers (mobile broadband subscriptions are excluded). Monthly data traffic from

<sup>9</sup> SMS – Short Messaging Service; MMS = Multimedia Messaging Service



<b>Figure/Section</b>	<b>Indicator</b>	<b>Definition</b>
	<b>Subscription</b>	smartphones is divided by the number of smartphones. Monthly data traffic from dedicated mobile broadband subscriptions is divided by the number of dedicated mobile broadband subscribers.
<b>4.4.1</b>	<b>Total Mobile Retail Revenues</b>	Total aggregate retail revenues generated by mobile network operators, split between voice, messaging and data 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.
<b>4.5.1</b>	<b>Monthly Average Revenue per User by Type</b>	Weighted Average Revenue per User based on the estimates provided by operators.
<b>4.6.1</b>	<b>Market Share – Number of M2M Subscriptions</b>	This chart shows the percentage market share of Machine to Machine subscriptions in Ireland.
<b>4.7.1</b>	<b>Market share – Number of Subscriptions (incl. Mobile Broadband)</b>	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.
<b>4.7.2</b>	<b>Market share – Number of Subscriptions (excl. Mobile Broadband)</b>	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.
<b>4.7.3</b>	<b>Mobile Revenue Market Share</b>	Mobile operators' shares of total mobile retail revenues (GSM/2G and 3G/HSDPA), expressed as a percentage of total mobile retail revenues.
<b>4.8.1</b>	<b>Gross Subscription Additions and Numbers Ported</b>	Total number of gross additions and a number of mobile numbers which have been retained by customers when they switched from one mobile operator to another.

## Secondary data

### Pricing data

Sections 2.5, 3.6 and 4.9 contain comparative pricing data and are supplied by Teligen in its T-Basket and T-Connect and T-wireless products.

The pricing data is valid at November 2013 for fixed and mobile baskets and December 2013 for the fixed and mobile 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.<sup>10</sup>

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 fixed 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

---

<sup>10</sup> [http://www.cso.ie/surveysandmethodologies/surveys/prices/documents/word\\_docs/ppp.doc](http://www.cso.ie/surveysandmethodologies/surveys/prices/documents/word_docs/ppp.doc)

download allowance per month, with each internet session lasting 60 minutes for business consumers.

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.

Two baskets are produced in the report:

- Lowest monthly residential broadband package across all speeds- the Irish data is based on Vodafone’s Simply Broadband package.
- Lowest monthly Business DSL basket in the above 10 Mb speed category - the Irish data is based on Vodafone’s Value Plus Fibre package 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.

ComReg published mobile broadband basket comparisons based on Teligen’s T-wireless product for the first time in the Q1 2011 quarterly report. The following table shows the parameters used for the basket calculations.

Basket #	Usage duration	Each session	Usage volume	Usage distribution		
	Hours per month	Minutes per session	GB per month	% day	% evening	% weekend
1	10	60	2	25%	50%	25%
2	15	60	6	25%	50%	25%
3	20	60	11	25%	50%	25%
4	25	60	14	25%	50%	25%
5	30	60	18	25%	50%	25%
6	30	60	6	25%	50%	25%
7	45	60	18	25%	50%	25%
8	60	60	33	25%	50%	25%
9	75	60	42	25%	50%	25%
10	90	60	54	25%	50%	25%
11	10	20	1	25%	50%	25%
12	15	20	2	25%	50%	25%
13	30	30	5	25%	50%	25%
14	50	30	5	25%	50%	25%
15	75	60	10	25%	50%	25%
16	100	60	20	25%	50%	25%
17	125	60	30	25%	50%	25%
18	150	60	40	25%	50%	25%
19	175	60	50	25%	50%	25%
20	200	60	60	25%	50%	25%

Selected basket appears in blue

Baskets 1 - 10 are OECD baskets

### Speed range selection

Four ranges of speeds can be defined by setting the minimum speed for each range, in kb/s

Range #	Minimum bitrate
1	0 kb/s
2	1024 kb/s
3	4096 kb/s
4	10240 kb/s

### Normalisation bitrate

This bitrate is used as the reference normalised costs.

1024 kb/s

ComReg has published data based on usage profiles of basket 2 for residential pre-pay consumers, basket 4 for residential post-pay consumers and basket 5 for post-pay business consumers to represent typical mobile broadband usage in Ireland.

All speed categories have been included and represent advertised speeds.

Each of these baskets are single (non bundled) products. VAT is included for residential baskets and excluded for business baskets. Total cost includes some or all of the following three elements where applicable. Non-recurring costs from installation costs and costs of the modem are divided by the number of months of a depreciation period (3 years). Recurring cost from rental charges for the service and any modem rental costs and a usage cost from any time or volume charges over and above included allowance.

## Other data

<b>Figure/ Section</b>	<b>Indicator</b>	<b>Definition</b>
<b>1.4.1</b>	<b>Consumer Price Index and Communications Sub-Component</b>	This chart shows the annual percentage change in the consumer price index and its communications sub-component overtime.
<b>3.4.1</b>	<b>Broadband Subscriptions per Capita</b>	Fixed broadband subscriptions per capita based on data sourced from Analysys Mason.
<b>3.4.2</b>	<b>Household Broadband Subscriptions</b>	Fixed and mobile household broadband subscriptions based on data sourced from the EU Digital Agenda Scoreboard.
<b>3.4.3</b>	<b>Household Broadband Penetration</b>	Fixed and mobile household broadband penetration based on data sourced from the EU Digital Agenda Scoreboard.
<b>5.1.1</b>	<b>TV Homes by Reception Type</b>	This table shows total TV homes by reception type which is determined by the TV channels a household receives.
<b>5.1.2</b>	<b>TV Homes by Reception Method</b>	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%.
<b>5.1.3</b>	<b>TV Homes</b>	This chart shows the total number of TV homes in Ireland over time, including a break out of digital TV homes and multi total TV homes.
<b>5.1.4</b>	<b>DVD, Broadband, Games Console and PVR Trends</b>	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).
<b>5.1.5</b>	<b>Pay TV vs Free to Air TV Homes</b>	This chart shows the proportion of pay TV (cable/IPTV/satellite) homes and free to air TV homes, based on reception method.
<b>5.1.6</b>	<b>Digital and Analogue TV Reception</b>	This data is based on the type of channels received in a TV home, showing the change over time between analogue reception and digital reception.

## Glossary

<b>Access Line</b>	Access Line means a connection from the Network Termination Point to the entry point to the local switch or remote concentrator, whichever is nearer. In many cases this is the main distribution frame.
<b>ADSL</b>	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).
<b>Analogue</b>	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.
<b>ATM</b>	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.
<b>ARPM</b>	Average Revenue Per Minute- Average Revenue Per Minute generated by mobile customers, both prepaid and post-paid, based on usage of voice services only. Revenues from data usage such as SMS and MMS are not included.
<b>ARPU</b>	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.
<b>Bandwidth</b>	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).
<b>Bits per second</b>	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.
<b>Broadband</b>	Broadband access is defined as speeds of 144kbit/s or greater. Active broadband lines or subscriptions are required based on their maximum download speed as advertised by the provider.
<b>Cable Modem</b>	A cable modem is a device that enables a PC to be linked to a local cable TV line for internet/data services.
<b>Calling Line Identity (CLI)</b>	A facility that enables identification of the number from which a call is being made.
<b>Carrier Pre-selection (CPS)</b>	Carrier Pre Selection is the wholesale product offered to other authorised operators which facilitates them to offer their retail customers certain defined classes of calls to be carried by that operator. These calls are selected in advance based on a contract with the customer, without the customer having to dial a routing prefix or follow any other different procedure to invoke such routing.
<b>Co-location</b>	The provision of space for a customer's telecommunications equipment on the service provider's premises.
<b>Dial-up</b>	Connections made to a data network using the switched network to provide a voice band or data bearer.
<b>Digital</b>	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.
<b>Digital Audio Broadcasting (DAB)</b>	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.
<b>Digital Subscriber Line (DSL)</b>	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

	fast Internet access and video or TV on-demand.
<b>Digital Terrestrial Television (DTT)</b>	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.
<b>Direct Access</b>	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.
<b>Directory Enquiry Service (DQ)</b>	Directory information service which is operator assisted and involves the operator looking up entries on a database.
<b>Ethernet Leased Lines</b>	Leased Lines delivered with an interface defined under standard IEEE 802.3 is the OSI Model Layer 2 "Data Link Media Layer" or TCP/IP Model Layer 2, Data Link (Network Interface) layer and describes the Ethernet interface standard now adopted as a method for connecting equipment/networks to "Wide Area Networks". The physical media can be wireless, copper or fibre.
<b>Fibre Optic Cable</b>	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.
<b>Fixed Mobile Convergence (FMC)</b>	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
<b>Fixed telephone Services</b>	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.
<b>Flat Rate Internet Access (FRIACO)</b>	The provision of a Flat Rate Internet Access Call Origination via a wholesale un-metered Internet access product.
<b>Fixed Wireless Access (FWA)</b>	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.
<b>FTTx</b>	FTTx is the installation and use of optical fibre from a central point directly to individual buildings such as houses, apartment buildings or businesses to provide high-speed Internet access or services such as TV or voice telephony. FTTx refers to a range of fibre access installations such as fibre to the home (FTTH), fibre to the curb (FTTC) and fibre to the premises (FTTP).
<b>Global System for Mobile Communications (GSM)</b>	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.
<b>High Speed Data Packet Access (HSDPA)</b>	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. HSDPA specifies data transfer speeds of up to 14.4 Mbps per cell for downloads and 2 Mbps per cell for uploads.
<b>ICT</b>	Information & Communications Technologies
<b>Indirect Access</b>	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.
<b>Integrated Services Digital Network (ISDN)</b>	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.
<b>ISDN BRA</b>	Means Integrated Services Digital Network, Basic Rate Access.
<b>ISDN PRA</b>	Means Integrated Services Digital Network, Primary Rate Access
<b>Interconnection</b>	Services provided by one telecommunications organisation to another

<b>services</b>	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.
<b>Internet protocol (IP)</b>	Packet data protocol used for routing and carriage of messages across the internet.
<b>Internet telephony</b>	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).
<b>ISP</b>	Internet Service Provider
<b>Leased line</b>	The term "leased lines" refers to fixed, permanent telecommunications connections providing symmetric or near symmetric capacity between two points. A leased line is permanent, in that capacity is available between the two fixed points, although capacity could be reserved or shared through the associated network depending on the nature of the leased line. Provision of the service is "technology neutral" and can be provided over either wired or wireless media and data for both should be provided. N.B. the national portion of international leased lines should be included in the figures supplied in all cases. The national access portion connecting a customer site to an operator international switching centre or node would count as an access line and an associated value ascribed to it.
<b>Local Loop</b>	The access network connection between a customer's premises and the local exchange. This usually takes the form of a pair of copper wires.
<b>Local Loop unbundling (LLU)</b>	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.
<b>Machine to Machine (M2M)</b>	Machine to Machine (M2M) refers to technologies that involve data communication between devices or systems in which, at least in principle, human intervention is not a part. These technologies may encompass either wireless or wired communications, or both.
<b>Managed services</b>	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.
<b>Mobile Number Portability (MNP)</b>	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.
<b>Modem</b>	A device which converts digital signals from a data-transmitting terminal into modulated analogue signals which can be carried by a public telephone network.
<b>Multimedia messaging Service (MMS)</b>	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.
<b>Multipoint Microwave Distribution System (MMDS)</b>	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.
<b>Narrowband</b>	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.
<b>Network Termination Point</b>	Means the physical point at which a subscriber is provided with access to a public communications network; in the case of networks involving switching or routing, the network termination point is identified by means of a specific network address, which may be linked to a customer number or name.
<b>Originating network</b>	The network to which a caller who makes a call is directly connected.
<b>Other Authorised Operators (OAOs)</b>	OAO means a legal entity other than eircom which is designated under Section 4 (1) of the European Communities (Electronic



	Communications Network and Services) (Authorisation) Regulations 2003 (S.I N0.306 of 2003), to provide an electronic communications network or service.
<b>Partial private Circuit (PPC)</b>	A type of wholesale leased line that allows OAOs to efficiently combine their network infrastructure with capacity provided by the incumbent.
<b>Path</b>	A path is a route between any two points or nodes.
<b>Premium rate services (PRS)</b>	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.
<b>Private circuits</b>	Point-to-point circuits for customers exclusive use covering speech, data or image communications.
<b>Public switched telephone network (PSTN)</b>	A voice-oriented public telephone network. Also known as the Plain Old Telephone Service (POTS).
<b>Public telecommunications network</b>	A telecommunications network used, in whole or in part, for the provision of publicly available telecommunications services.
<b>Purchasing Power Parities (PPPs)</b>	Purchasing Power Parities (PPPs) are currency conversion rates that 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.
<b>Resellers</b>	Service Providers who do not have their own network.
<b>RFID</b>	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.
<b>Roaming</b>	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.
<b>Short message service (SMS)</b>	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.
<b>Spectrum</b>	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.
<b>Subscriber Identity Module (SIM)</b>	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.
<b>Switch</b>	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.
<b>Telecommunications</b>	Conveyance of speech, music and other sounds, visual images or signals by electric, magnetic, electro-magnetic, electro-chemical or electro-mechanical means.
<b>Terminating network</b>	The network to which a caller who receives a call is directly connected.
<b>Third generation mobile systems (3G)</b>	A European 3G mobile communications system provides an enhanced range of multimedia services (e.g. high speed Internet access).
<b>Transit</b>	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.
<b>Trunk network</b>	A trunk network that connects major switching centres or nodes in a communications system
<b>Very-high-bit-rate digital subscriber line (VDSL)</b>	VDSL is a DSL technology providing data transmission faster than ADSL over a single flat untwisted or twisted pair of copper wires (up to 52 Mbit/s downstream and 16 Mbit/s upstream), and on coaxial cable (up to 85 Mbit/s down- and upstream) using the frequency band from 25 kHz to 12 MHz. These rates mean that VDSL is capable of supporting applications such as high-definition television, as well as telephone services (voice over IP) and general Internet access, over a single connection. VDSL is deployed over existing wiring used for analogue telephone service and lower-

	speed DSL connections.
<b>Voice over Broadband (VoB)</b>	IP-based services that facilitate voice calls to and/or from the PSTN over a broadband connection. With this service, the customer may either have broadband access from an ISP and acquire voice over broadband services from a separate entity, or have both broadband and voice over broadband services bundled together by the same supplier. Voice services bundled with digital TV services and delivered over digital cable TV networks should also be recorded here.
<b>Voice telephony service</b>	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.
<b>Virtual private network (VPN)</b>	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
<b>Wholesale Line Rental (WLR)</b>	Wholesale line rental, or WLR, is when the incumbent offers at a wholesale level, narrowband access lines and associated features at the local switch in order to allow rival operators to offer retail customers a complete fixed narrowband access services with one single bill.
<b>Wi-Fi</b>	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.
<b>WiMAX</b>	WiMAX (Worldwide Interoperability for Microwave Access) is a wireless technology based on IEEE 802.16 standards for broadband wireless access (BWA) networks
<b>White Label Access (WLA)</b>	White Label Access-Voice Access (WLA-(Voice)) is a switchless voice service which allows an operator to purchase end-to-end call services without the need to have its own interconnection infrastructure.

## Appendix Purchasing Power Parities (November 2013)

Exchange rates used:		Nov-13
Related to:	US\$	US\$ PPP
Australia	0.9487	0.6634
Austria	1.3672	1.1685
Belgium	1.3672	1.1299
Canada	0.9562	0.7774
Chile	0.001967	0.0026
Czech Rep.	0.05315	0.0664
Denmark	0.1833	0.1183
Estonia	1.3672	1.5715
Finland	1.3672	1.0053
France	1.3672	1.1489
Germany	1.3672	1.2207
Greece	1.3672	1.3537
Hungary	0.004646	0.0068
Iceland	0.008375	0.0064
Ireland	1.3672	1.1026
Israel	0.2843	0.2389
Italy	1.3672	1.1993
Japan	0.010169	0.0086
Korea	0.000944	0.0012
Luxembourg	1.3672	1.0127
Mexico	0.07714	0.1118
Netherlands	1.3672	1.1489
New Zealand	0.8266	0.6408
Norway	0.1689	0.1030
Poland	0.3271	0.5192
Portugal	1.3672	1.4545
Slovak Rep.	1.3672	1.7306
Slovenia	1.3672	1.4545
Spain	1.3672	1.3021
Sweden	0.1555	0.1119
Switzerland	1.1083	0.6677
Turkey	0.5017	0.7378
UK	1.6035	1.3823
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:	$(75/75) = 75 \text{ units} = 75 \text{ seconds}$

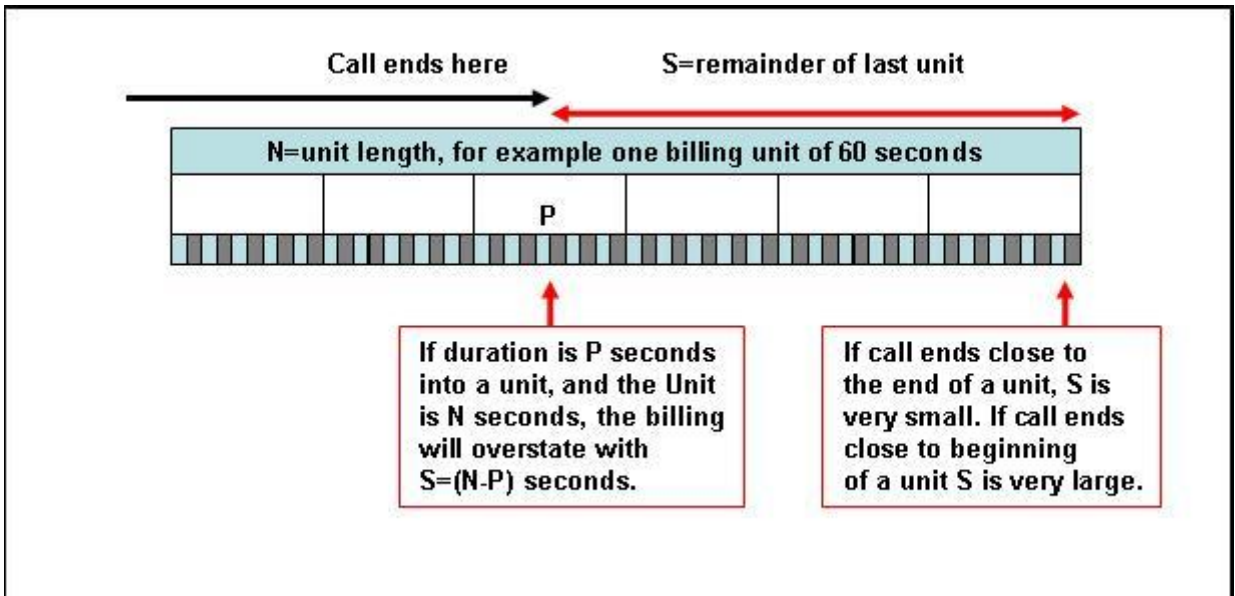
This meant that a 75 second call was billed as 75 seconds with per-second billing, and as 120 seconds with per minute billing. This approach took into account the billing system effect on the cost, but not the distribution of call durations. The selection of call duration in the basket would have a large 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.

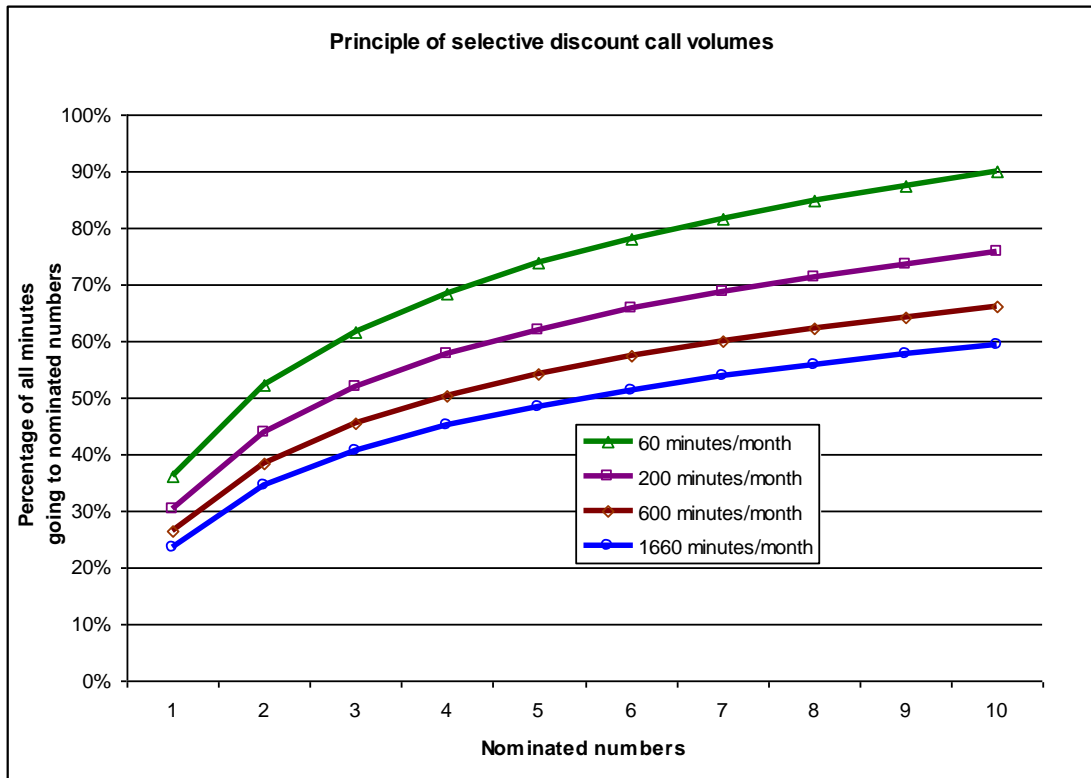
Where discounted SMS is offered as part of the discount they will be deducted using the same value A from the formula below, and the relevant discount applicable to the SMS.

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