Commission for
Communications Regulation

Irish Communications Market

Quarterly Key Data Report

Explanatory Memorandum

Q2 2018

Reference: ComReg 18/79a

Version: Final

Date: 13/09/2018

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
1 Dockland Central, Guild Street, Dublin 1, D01 E4X0, Ireland.
Telephone +353 1 804 9600. Fax +353 1 804 9680. Email info@comreg.ie | Web www.comreg.ie

Contents

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:
http://www.comreg.ie/industry/electronic-communications/data-portal

Primary Data

Figure / Section	Indicator	Definition
1.1.1	**Fixed, Mobile & Broadcasting Retail Revenues**	Total aggregate industry retail revenues generated by operators, split between fixed line, mobile and broadcasting services.
1.2.1	**Fixed and Mobile 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. 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.
1.2.2	**Total Voice Traffic**	This table quantifies the total volume of voice calls originating (or initiated) from fixed (PSTN/ISDN, VoB) networks and from mobile networks.
1.4.1	**Total Subscriptions (Fixed and Mobile)**	This chart shows the total number of fixed and mobile retail subscriptions in Ireland.
2.1.1	**Profile of Fixed Line Retail Revenues**	Breakdown of total retail revenue generated by the direct[1] and indirect[2] provision of retail fixed voice and data services, among a specific set of sub-categories: • retail fixed voice 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 Wi-Fi services); • retail revenues from leased lines and managed data services including web-hosting, directory publication & other services.
2.1.1.1	**Fixed Retail Revenue Market Shares**	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	**Fixed Revenue Market Shares**	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

[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
		(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.
2.2.1.1	**Narrowband Fixed Access Paths and VoB subscriptions**	This table quantifies the total number of direct[3] and indirect[4] 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 and Voice over Broadband (VoB) subscriptions. The growth rates are for quarterly and year-on-year growth in line numbers across each form of narrowband access and in number of VoB subscriptions. There is a one-to-one relationship between PSTN lines and access paths, i.e. one PSTN access path is equal to one line. 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.
2.2.1.2	**Direct & Indirect Narrowband Fixed Access Paths and VoB subscriptions**	Total number of The Direct and Indirect Narrowband Fixed Access Paths and total number of VoB subscriptions.
2.2.2	**Narrowband Indirect Access Paths**	Total number of indirect[5] 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. 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 *Eir*). 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, Eir. 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.

[3] See note 1 above

[4] See note 2 above

[5] See note 2 above

Figure / Section	Indicator	Definition
2.2.3	**Fixed voice subscriptions**	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	**Fixed Market Retail Subscriptions by Type**	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.
2.3.1, 2.3.2 and 2.3.3	**Fixed Voice Call Volumes (minutes)**	Total number of retail minutes or traffic generated by means of fixed voice calls both direct[6], indirect[7] and VoB. 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. 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.
2.4.1	**Fixed Numbers Ported**	Total number of fixed numbers which have been retained by customers when they switched from one mobile operator to another. Switching between operators using the same underlying network for the provision of fixed voice services is not recorded in this number.
3.1.1	**Total Number of Active Broadband Subscriptions**	This table quantifies the number of subscriptions (both residential and business) with broadband Internet access. The growth rates are for quarterly and year-on-year growth in subscription numbers across each form of internet access. One subscriber may have more than one internet subscription.
3.1.2	**Total Broadband Subscriptions**	This chart shows the trend in fixed and mobile broadband as well as total broadband subscriptions over the last 2 years.
3.1.3	**Quarterly Growth in Broadband subscriptions**	This chart shows the quarterly growth rate in fixed and mobile broadband as well as total broadband subscriptions over the last 2 years.

[6] See note 1 above

[7] See note 2 above

Figure / Section	Indicator	Definition
3.1.4	**Broadband Subscriptions by Platform**	Total number of broadband subscriptions (both residential and business customers) by means of DSL, VDSL, cable modem, fibre to the premises, 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 data card, USB dongle attached to a laptop or Mi-Fi device.
3.1.5	**Broadband Subscriptions – Net additions**	This chart shows the net additions of each broadband platform to total broadband over the last 2 years.
3.1.6	**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.
3.1.7	**Fixed Broadband Subscriptions by Advertised (Headline) Download Speeds and Subscription Type**	This chart provides an indication of the percentage of total residential and total business fixed broadband subscriptions split by categories of advertised (i.e. headline) download speeds.
3.1.8	**Fixed Broadband Subscriptions by Advertised (Headline) Download Speeds and Broadband Platform**	This chart provides an indication of the percentage of total residential and total business fixed broadband subscriptions split by categories of advertised (i.e. headline) download speeds by each broadband platform.
3.1.9	**Fixed Broadband Subscriptions by Advertised (Headline) Download Speeds**	This chart shows total fixed broadband lines by advertised (i.e. headline) download speeds over the last 2 years.
3.1.10	**Subscription Market Share of the Fixed Broadband Market**	This chart shows the percentage market share of the fixed broadband market by operator with at least 2.0% market share.
3.1.11	**Subscription Market Share of the Mobile Broadband Market**	This chart shows the percentage market share of mobile broadband subscriptions by operator with at least 2.0% market share.
3.2.1	**Provision of DSL Access**	Proportions of Digital Subscriber lines (DSL) supplied to customers by means of direct retail supply by Eir, and wholesale supply by Eir to other operators by means of

Figure / Section	Indicator	Definition
		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	**Provision of VDSL Access**	Proportions of Very-high-bit-rate Digital Subscriber lines (VDSL) supplied to customers by means of direct retail supply by Eir, and wholesale supply by Eir to other operators by means of virtual unbundled local access (VULA) or bitstream.
3.4.1	**Fixed broadband and mobile data volumes**	Data usage (both downloads and uploads) made over fixed broadband and mobile networks on a quarterly basis. The growth rates are for quarterly and year-on-year growth in data volumes.
3.4.2	**Monthly data traffic per fixed broadband subscription by type**	Data usage (both downloads and uploads) over fixed broadband networks divided by the number of business and residential subscriptions to fixed broadband services respectively.
3.4.3	**Monthly data traffic per broadband subscription by platform**	Data usage (both downloads and uploads) over fixed broadband and mobile (only data traffic from dedicated mobile broadband subscriptions is considered in this figure) networks divided by the number of subscriptions split by each broadband platform.
3.6.1	**Wi-Fi hotspots, access points and Minutes of Use**	This table lists the number of Wi-Fi 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

[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
		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. Minutes of use are used to express usage as most Wi-Fi users' access or purchase Wi-Fi networks on the basis of dedicated time-delimited sessions.
4.1.1	**Mobile subscriptions**	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 data cards, USB modems and Machine to Machine subscriptions.
4.1.2	**Mobile subscribers using data services over 3G/4G networks**	This table shows total number of mobile subscription, total number of voice and data subscriptions and total number of dedicated mobile broadband subscriptions.
4.1.3	**Irish Mobile Penetration Rate**	Total number of mobile phone, data-card (GSM/2G, 3G/HSDPA and 4G LTE, both contract and prepaid) and M2M subscriptions in Ireland as measured by the total number of active SIM cards, 3G/4G data cards 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 data cards and USB modems.
4.2.1	**Profile of Pre-paid and Post-paid Subscriptions**	This figure shows the proportions of pre-paid and post-paid mobile subscriptions over the last year (left chart includes mobile broadband and M2M, right chart excludes both).
4.2.2	**Mobile subscriptions by pre-pay / post-pay split**	This chart shows the absolute numbers of mobile subscriptions split by pre and post pay type over time.
4.2.3	**Profile of Pre-paid and Post-paid Subscriptions by Operator**	Percentages of total number of mobile phone, data-card (GSM/2G, 3G/HSDPA and 4G/LTE) and M2M subscriptions to each of the mobile service providers, broken down by pre-paid and post-paid (contract) packages.

Figure / Section	Indicator	Definition
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.
4.2.5	**Post-paid Business and Residential Mobile Subscriptions**	This table shows the split between post-paid business and residential mobile subscriptions.
4.2.6	**Mobile Subscriptions by Network Used**	This figure shows the split of mobile subscribers (including mobile broadband and M2M subscribers) broken down by network used by these subscribers. For example, subscribers who purchase 4G plans and have generated traffic on a 4G network are categorised as 4G subscribers. Categories are mutually exclusive in that subscribers who have generated traffic on multiple networks (e.g. 2G and 3G) are categorised as users of the higher quality network (3G in this example).
4.3.1	**SMS, MMS, Other Data and Call Minute Volumes**	Total volumes of mobile voice (calls), messages (both SMS and MMS)[9] and data usage (both downloads and uploads) made over mobile networks on a quarterly basis. Exclude calls and messages from MNO.
4.3.2	**Voice Call Minute Volumes by Type**	This chart shows mobile voice minutes by category – mobile to mobile, mobile to fixed, mobile international / roaming and mobile advanced minutes.
4.3.3	**Mobile to Mobile Voice Call Volumes by Type**	This chart shows the number of on-net and off-net minutes made over mobile networks over the last year.
4.3.4	**Monthly Mobile Voice Call Minutes per Subscriber by Type**	Monthly mobile traffic for each category of calls is divided by the total number of mobile subscribers (mobile broadband subscriptions are excluded).
4.3.5	**Monthly Mobile Messaging and Data Volumes per Subscription**	Monthly mobile messaging is divided by the total number of mobile subscribers (mobile broadband subscriptions are excluded). Monthly data traffic from 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 subscribes.
4.3.6	**Mobile Data Volumes by Technology**	Total data usage (both downloads and uploads) broken down by network (2G/3G or 4G) on which this data was generated.
4.4.1	**Total Mobile Retail Revenues**	Total aggregate retail revenues generated by mobile network operators, split between voice, messaging and data services.

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

Figure / Section	Indicator	Definition
4.5.1	**Monthly Average Revenue per User by Type**	Weighted Average Revenue per User based on the estimates provided by operators.
4.6.1	**Market Share – Number of Business Subscriptions / Number of M2M Subscriptions**	This chart shows the percentage market share of Business subscriptions (excluding mobile broadband and M2M subscriptions) as well as percentage market share of Machine to Machine subscriptions in Ireland.
4.7.1	**Market share – Number of Subscriptions (incl. Mobile Broadband)**	Each mobile operator's share of the total number of mobile subscriptions (GSM/2G Sims, 3G/HSDPA Sims and 4G/LTE data cards and modems), expressed as a percentage.
4.7.2	**Market share – Number of Subscriptions (excl. Mobile Broadband)**	Each mobile operator's share of the total number of mobile subscriptions (GSM/2G, 3G/HSDPA and 4G/LTE Sims) expressed as a percentage. HSDPA and LTE data cards and modems are excluded from data in this chart.
4.7.3	**Mobile Revenue Market Share**	Mobile operators' shares of total mobile retail revenues (GSM/2G, 3G/HSDPA and 4G/LTE), expressed as a percentage of total mobile retail revenues.
4.8.1	**Gross Subscription Additions and Numbers Ported**	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 which is based on pricing analysis information supplied by Strategy Analytics (Teligen).

The pricing data is based on prices publicly advertised on operators' websites during Q1 2018.

An OECD-approved methodology is adopted by Strategy Analytics to compare fixed and mobile tariffs. This format follows a basic three-step process consisting of: (i) the construction of one or more baskets of telecommunications services; (ii) the estimated price of using those baskets; and (iii) the conversion of the individual currencies to standard units (e.g. US dollar with Purchasing Power Parities (PPPs)) when making international comparisons. Appendix A of this Quarterly Key Data Report Memorandum provides more detail on the base rates used to calculate PPPs in the OECD tariff baskets.

Fixed voice pricing analysis

The advertised price of each fixed voice tariff is examined and the total average monthly price of the product is calculated based on the four elements identified below, where applicable:

- Fixed charges: charges including non-recurring charges such as connection charges and monthly recurring charges (including line rental). Non-recurring charges are discounted over a five year period. i.e., a contribution to the monthly total cost equals the total non-recurring charges divided by 60. The full amount of monthly recurring charges is included in the total average monthly cost. Where any short term promotional discounts are applied to monthly charges, these are accounted for by calculating an average monthly cost over a five year period.
- Charges for calls to national fixed telephone networks: the full amount of such charges are included in the monthly cost (charges applied to calls exceeding any inclusive monthly calls allowance, where applicable)
- Charges for calls to national mobile telephone networks: the full amount of such charges are included in the monthly cost (charges applied to calls exceeding any inclusive monthly calls allowance, where applicable)
- Charges for international calls[10]: the full amount of such charges are included in the monthly cost (charges applied to calls exceeding any inclusive monthly calls allowance, where applicable)

Having regard to the above treatment, the total average monthly cost equals the sum of, fixed charges, plus any additional charges for calls to fixed networks, mobile networks and international calls (as applicable).

Fixed broadband pricing analysis

The advertised price of each broadband tariff is examined and the total average monthly price of the product is calculated based on the three elements identified below, where applicable:

- Non-recurring charges: These include one-off charges such as installation costs, service connection charges, equipment charges (such as modem/router charges). These non-recurring charges are discounted over a three year period. i.e., a contribution to the monthly total cost equals the total non-recurring charges divided by 36.

[10] See Table 15 below for the assumed distribution of international calls which is applied to each fixed voice tariff.

- Recurring monthly charges (including line rental, where applicable): the full amount of such charges is included in the total average monthly cost. Where any short term promotional discounts are applied to monthly charges, these are accounted for by calculating an average monthly cost over a three year period.
- Usage charges: the full amount of such charges are included in the monthly cost (charges applied to data usage exceeding any inclusive monthly data allowance, where applicable).

Having regard to the above treatment, the total average monthly cost equals the sum of, non-recurring charges, plus recurring monthly charges, plus usage charges (as applicable).

Mobile broadband pricing analysis

The advertised price of each broadband tariff is examined and the total average monthly price of the product is calculated based on the three elements identified below, where applicable:

- Non-recurring charges: These include one-off charges such as service connection and one-off SIM cost, device costs (where applicable).These charges are discounted over a three year period. i.e., a contribution to the monthly total cost equals the total non-recurring charges divided by 36.
- Recurring monthly charges[11]: the full amount of such charges is included in the total average monthly cost. Where any short term promotional discounts are applied to monthly charges, these are accounted for by calculating an average monthly cost over a three year period.
- Usage charges: the full amount of such charges are included in the monthly cost (charges applied to data usage exceeding any inclusive monthly data allowance, where applicable).

Having regard to the above treatment, the total average monthly cost equals the sum of, non-recurring charges, plus recurring monthly charges, plus usage charges (as applicable).

Mobile voice and handset data pricing analysis

The advertised price of each mobile voice and data tariff is examined and the total average monthly price of the product is calculated based on the three elements identified below, where applicable:

- Fixed charges: charges including non-recurring charges such as connection charges and monthly recurring charges (including line rental). Non-recurring charges are discounted over a three year period. i.e., a contribution to the monthly total cost equals the total non-recurring charges divided by 36. The full amount of monthly recurring charges is included in the total average monthly cost. Where any short term promotional discounts are applied to monthly charges, these are accounted for by calculating an average monthly cost over a three year period. Mandatory monthly top ups are treated as fixed charges.
- Charges for voice calls (including calls to both national fixed and mobile networks): the full amount of such charges are included in the monthly cost (charges applied to calls exceeding any inclusive monthly calls allowance, where applicable). Top up charges for pre-paid tariffs (excluding mandatory monthly top ups) are categorised as voice calls charges.

[11] If pre-paid tariff mandates mandatory monthly top-ups, the top up charge will be categorised as monthly recurring charge. Otherwise, top up charges are treated as usage charges. For pre-paid tariffs requiring periodic mandatory top ups (e.g. mandatory monthly (30 day) top ups), the full cost of the top up would be taken into consideration when estimating the total cost of these tariffs

- Charges for SMS: the full amount of such charges are included in the monthly cost (charges applied to SMS usage exceeding any inclusive monthly SMS allowance, where applicable).
- Charges for data usage: the full amount of such charges are included in the monthly cost (charges applied to data usage exceeding any inclusive monthly data allowance, where applicable)

Having regard to the above treatment, the total average monthly cost equals the sum of, fixed charges, plus any additional charges for voice calls, SMS and data usage (as applicable).

Further detail of the fixed voice, fixed broadband, mobile broadband and mobile baskets are provided in appendix B of this document.

Other data

Figure / Section	Indicator	Definition
1.3.1	**Consumer Price Index and Communications Sub-Component**	This chart shows the annual percentage change in the consumer price index and its communications sub-component overtime.
2.5.1	**Residential Standalone Fixed Voice Basket (National comparison)**	OECD national comparisons of advertised tariffs by residential standalone fixed voice service providers based on data sourced from Strategy Analytics.
2.5.2	**Residential Standalone Fixed Voice Basket (International comparison)**	OECD international comparisons of advertised tariffs by residential standalone fixed voice service providers based on data sourced from Strategy Analytics.
2.5.3	**Business Standalone Fixed Voice Basket (National comparison)**	OECD national comparisons of advertised tariffs by business standalone fixed voice service providers based on data sourced from Strategy Analytics.
2.5.4	**Business Standalone Fixed Voice Basket (International comparison)**	OECD international comparisons of advertised tariffs by business standalone fixed voice service providers based on data sourced from Strategy Analytics.
3.5.1	**Broadband Subscriptions per Capita**	Fixed broadband subscriptions per capita based on data sourced from Analysys Mason.
3.5.2	**Household Broadband Subscriptions**	Fixed and mobile household broadband subscriptions based on data sourced from the Eurostat.
3.5.3	**Household Broadband Penetration**	Fixed and mobile household broadband penetration based on data sourced from the Eurostat.
3.7.2	**Residential Fixed Broadband Basket (National comparison)**	OECD national comparisons of advertised tariffs by residential broadband (standalone and bundles) service providers based on data sourced from Strategy Analytics.
3.7.2	**Residential Fixed Broadband Basket (International comparison)**	OECD international comparisons of advertised tariffs by residential broadband (standalone and bundles) service providers based on data sourced from Strategy Analytics.
3.7.3	**Business Fixed Broadband Basket (National comparison)**	OECD national comparisons of advertised tariffs by business broadband (standalone and bundles) service providers based on data sourced from Strategy Analytics.
3.7.4	**Business Fixed Broadband Basket (International comparison)**	OECD international comparisons of advertised tariffs by business broadband (standalone and bundles) service providers based on data sourced from Strategy Analytics.
3.7.5	**Residential Mobile Broadband Basket (National comparison)**	OECD national comparisons of advertised tariffs by residential mobile broadband service providers based on data sourced from Strategy Analytics.
3.7.6	**Residential Mobile Broadband Basket (International comparison)**	OECD international comparisons of advertised tariffs by residential mobile broadband service providers based on data sourced from Strategy Analytics.
3.7.7	**Business Mobile Broadband Basket (National comparison)**	OECD national comparisons of advertised tariffs by business mobile broadband service providers based on data sourced from Strategy Analytics.
3.7.8	**Business Mobile Broadband Basket (International comparison)**	OECD international comparisons of advertised tariffs by business mobile broadband service providers based on data sourced from Strategy Analytics.
4.9.1	**Residential Pre-paid Mobile Phone Services Basket (National comparison)**	OECD national comparisons of advertised tariffs by residential pre-paid mobile phone service providers based on data sourced from Strategy Analytics.

4.9.2	**Residential Pre-paid Mobile Phone Services Basket (International comparison)**	OECD international comparisons of advertised tariffs by residential pre-paid mobile phone service providers based on data sourced from Strategy Analytics.
4.9.3	**Residential Post-paid Mobile Phone Services Basket (National comparison)**	OECD national comparisons of advertised tariffs by residential post-paid mobile phone service providers based on data sourced from Strategy Analytics.
4.9.4	**Residential Post-paid Mobile Phone Services Basket (International comparison)**	OECD international comparisons of advertised tariffs by residential post-paid mobile phone service providers based on data sourced from Strategy Analytics.
4.9.5	**Business Post-paid Mobile Phone Services Basket (National comparison)**	OECD national comparisons of advertised tariffs by business post-paid mobile phone service providers based on data sourced from Strategy Analytics.
4.9.6	**Business Post-paid Mobile Phone Services Basket (International comparison)**	OECD international comparisons of advertised tariffs by business post-paid mobile phone service providers based on data sourced from Strategy Analytics.
5.1.1	**TV Homes by Reception Type**	This table shows total TV homes by reception type which is determined by the TV channels a household receives.
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, including a break out of digital TV homes and multi total TV homes.
5.1.4	**Broadband, Games Console and PVR Trends**	This chart shows the trend in household broadband access, games console and PVR ownership over time (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).
5.1.5	**Pay TV vs Free to Air TV Homes**	This chart shows the proportion of pay TV (cable/IPTV/satellite) homes and free to air TV homes, based on reception method.

Glossary

Access Line	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.
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 (e.g. 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, both 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	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.
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)	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.
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 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 Leased Lines	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.
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.
FTTP	FTTP 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. FTTP refers to a range of fibre access installations such as fibre to the home (FTTH), fibre to the premises (FTTP) and fibre to the curb.
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.
ISDN BRA	Means Integrated Services Digital Network, Basic Rate Access.
ISDN PRA	Means Integrated Services Digital Network, Primary Rate Access
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	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.
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.
Long Term Evolution (LTE)	LTE is a standard for wireless communication of high-speed data for mobile phones and data terminals. Often called Fourth Generation Cellular Network, but still on the GSM/EDGE and UMTS/HSPA network technologies, increasing the capacity and speed using a different radio interface together with core network improvements
Machine to Machine (M2M)	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.
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.
Network Termination Point	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.
Originating network	The network to which a caller who makes a call is directly connected.
Other Authorised Operators (OAOs)	OAOs mean legal entities other than Eir which are 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.

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 Parities (PPPs)	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.
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
Very-high-bit-rate digital subscriber line (VDSL)	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.
Voice over Broadband (VoB)	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.
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)	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.
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.
White Label Access (WLA)	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 A: Purchasing Power Parities (March 2018)

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

Exchange rates used:		Jun-18
Related to:	US$	US$ PPP
Australia	0.757	0.6154
Austria	1.16801	1.1231
Belgium	1.16801	1.0916
Canada	0.77476	0.7309
Chile	0.00159	0.0021
Czech Rep.	0.04521	0.0655
Denmark	0.15692	0.1154
Estonia	1.16801	1.5369
Finland	1.16801	1.0069
France	1.16801	1.1124
Germany	1.16801	1.1564
Greece	1.16801	1.4420
Hungary	0.00365	0.0062
Iceland	0.0095	0.0059
Ireland	**1.16801**	0.9983
Israel	0.28008	0.2315
Italy	1.16801	1.2041
Japan	0.0092	0.0096
Korea	0.00093	0.0010
Luxembourg	1.16801	0.9574
Mexico	0.05031	0.0867
Netherlands	1.16801	1.0815
New Zealand	0.69968	0.5980
Norway	0.12228	0.0913
Poland	0.27074	0.4923
Portugal	1.16801	1.4244
Slovak Rep.	1.16801	1.7433
Slovenia	1.16801	1.4244
Spain	1.16801	1.3124
Sweden	0.11353	0.1014
Switzerland	1.01375	0.7139
Turkey	0.22189	0.4824
UK	1.33045	1.1774
USA	1	1

Appendix B: OECD Basket Methodologies[12]

This section describes the basket methodology defined and used by the OECD. This methodology forms the basis for the analysis of telecommunications services prices conducted by ComReg for its Quarterly Key Data Report. To better reflect the Irish market however, ComReg has considered some modifications to the baskets and how the results are presented, notably:

- An extended list of operators has been considered, in each of the countries analysed, to capture at least 80% of the market for each individual service, to reflect more fully the competitive environment in each market.
- Tariffs of up to five operators are included for national tariff comparisons. For some telecommunications services only tariffs advertised by two or three operators were analysed and presented[13].
- For international comparisons, the prices advertised by three largest operators (in terms of the number of subscribers to mobile voice services) in each of the respective countries during the relevant period are analysed for selected OECD telecommunication service.
- National results for Ireland are presented in Euros, and are inclusive of VAT for residential tariffs. Prices of business tariffs are exclusive of VAT. International comparisons are presented in Euros PPP (purchasing power parities) and exclude VAT.
- Some results, while still using the OECD baskets, are based on selected sub-sets of data. For example, a prepaid-only residential basket has been analysed for mobile voice and handset data. Additionally, some of the fixed broadband basket results are based on both lower and upper speed limitations; by contrast, the OECD fixed broadband baskets only define a lower speed limit.

[12] For the Q1 2018 QKDR the OECD price baskets were reviewed and revised in line with the 2017 OECD methodology. This methodology was retrospectively applied to the period Q4 2017 in order to initially present two quarters of pricing data. The criteria for the 2017 OECD methodology differs from the previous 2010 methodology used in previous QKDR reports and are therefore not strictly comparable. The 2017 OECD methodology for price baskets may be accessed at:
http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CDEP/CISP(2017)4/FINAL&docLanguage=En

[13] For example, see national tariff comparisons for business standalone fixed voice service, business mobile broadband service and business mobile phone service. This can arise for reasons such as operators not offering these services to business customers or not advertising prices publicly.

A. Fixed Voice Benchmarking Methodology

A.1. OECD Fixed Voice Baskets, 2017

A.1.1. Overview

The OECD 2017 basket methodology for fixed voice services is built up by the following elements:

Installation	Assuming that the average life of a fixed voice connection is 5 years the installation elements consists of 1/5 of any one-off charges related to the connection of the service.
Rental	As the OECD basket results are calculated for one month the rental element is made up of any line rental charges and other recurring charges, calculated to a period of one year.
Fixed line calls	The fixed line call element covers all local and national fixed line calls. Calls are divided into local and national calls, describing the shortest and longest call distances within the country. The local calling area is specified for each operator/country as covering all distances up to a certain radius. Regional calls, if defined in the price list, are not considered.
Calls to mobiles	Calls to mobiles are included for all major national networks. The call charges are weighted according to the best possible market share information available

For fixed line calls and calls to mobiles a time of day-weighting dividing the week into Daytime, Evening and Weekend times is applied. Call charges for all of these three times are calculated separately and weighted. Weekend is defined as the “end-of-working-week” period in any country.

The calculation of national calls is done as close to actual billing principles as possible, applying units, minimum charges, maximum charges and call set up charges as specified by the tariff.

International calls are no longer included in the baskets. This is a change made in the 2017 revision.

OECD 2017 fixed voice 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

A.1.2. Fixed voice call distribution

Overall basket volumes and destination distribution (Fixed)

		Call distribution		
Calls per month	**Total calls**	**Fixed to fixed Local**	**Fixed to fixed National**	**Fixed to mobile**
20 calls basket	20	61%	20%	19%
60 calls basket	60	60%	15%	25%
140 calls basket	140	58%	15%	27%
420 calls basket	420	73%	17%	10%
100 calls business basket	100	48%	19%	33%
260 calls business basket	260	43%	23%	34%

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%

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%

A.1.3. Fixed voice call durations

Fixed Voice 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

Fixed Voice 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

Fixed Voice 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

Note: Day and Evening applies to weekdays, while Weekend applies to the entire "end-of-working-week" period. Call durations are given in fractions of minutes, i.e. 4.6 minutes mean 4 minutes and 36 seconds.

A.1.4. Other OECD 2017 basket rules

- 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.
- 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.
- 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.
- Selective discounts mean discounts to a chosen set of numbers or destinations. The effect of such discounts is calculated using the approach taken in the OECD baskets, see A.1.6 below.
- Results are presented in US$ / PPP per month, excluding VAT for business baskets and including VAT for residential baskets.

A.1.5. Local calling areas for the fixed voice 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:

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 below.

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:

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%.

A.1.6. Selective discounts

Selective discounts are discounts which are limited to calls to a set of nominated numbers. Users can typically specify 1, 2, 3 or up to 10 or more numbers (depending on tariff) to which calls and/or messages will be free or discounted. Such plans are also known under brand names like “Friends and Family”, “Bestmates”, “Preferred numbers”, “Calling circle” etc.

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.

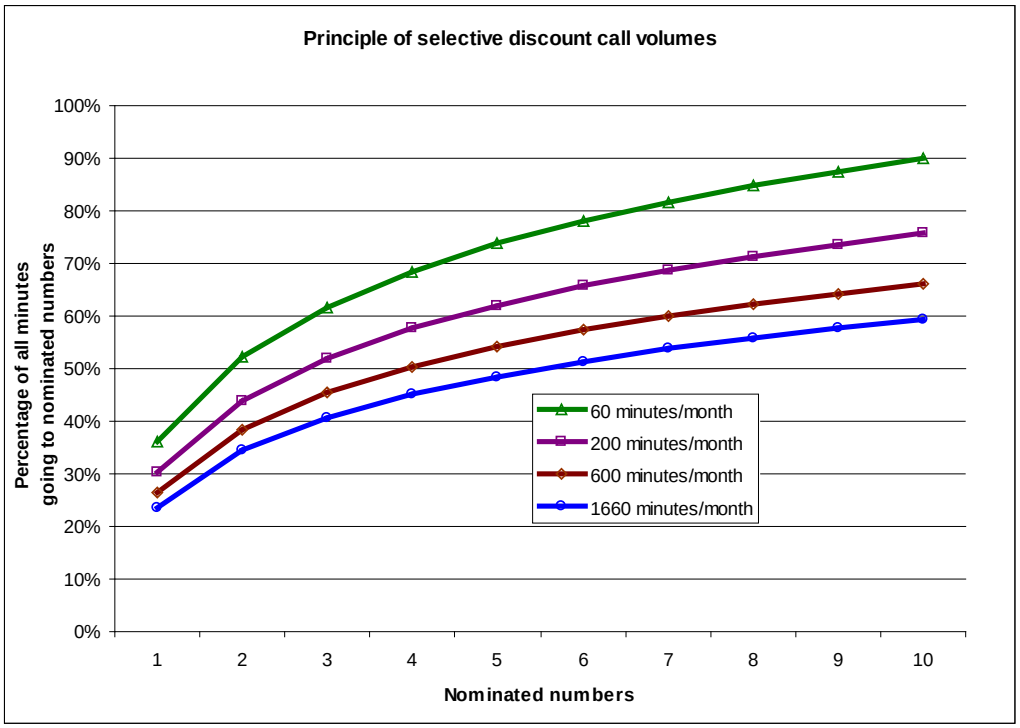
- The discount applies to N nominated numbers
- The discount D (%) applies to each of these calls
    - (D=100% is a free call)
- The proportion of minutes A (%) receiving the discount is calculated based on the formula below, using V and N as input data. The proportion A is adjusted according to the discount D
- (A_2 = A x 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.

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.

Selective call discount volumes



The selective discount will be taken before any minute, message and value allowances included in the tariff. 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.

B. Mobile Voice Benchmarking Methodology

B.1. OECD Mobile Voice and Data Baskets, 2017

B.1.1. Overview

Reflecting the changes in mobile services over time, and the benchmarking requirements, the mobile voice and data baskets have been changed in the latest revision in 2017. Offers shall include 3G and 4G mobile phone services, covering post-paid, pre-paid and SIM only tariffs. The baskets are built with these elements:

Installation	Assuming that the average life of a mobile connection is 3 years the installation elements consists of 1/36 of any one-off charges related to the connection of the service.
Rental	As the OECD basket results now are calculated for one month the rental element is made up of any monthly charges for service provision and options taken with the tariff.
Fixed line calls	The fixed line call element covers local and national fixed line calls.
On-net calls	On-net calls to same network
Off-net calls	Off-net calls to other networks. When charges distinguish between networks the weighted average using market share is used.
Voicemail retrieval	Voicemail retrieval is included, and that also implicates any recurring charges for the provision of basic voicemail service.
SMS	SMS to own network and other networks
Allowances	Voice and message 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. Add-on packages for SMS and data can be included.
Selective discounts	Selective discounts are included as described in section B.2.7 above.

Call charges are split into day, evening and weekend times. For messages only peak and off-peak definitions are used.

The calculation of selective discounts and allowances is a particularly complicated part of this basket. Several levels of allowances are possible, and the implementation of such calculations can make a significant difference.

There are 6 mobile basket definitions:

OECD 2017 mobile voice and data baskets

Basket	Voice calls	SMS	Data (GB)
30 calls, no data	30	10	0
100 calls, no data	100	20	0
30 calls, 0.1 GB	30	20	0.1
100 calls, 0.5 GB	100	40	0.5
300 calls, 1 GB	300	80	1
900 calls, 2 GB	900	160	2
Unlimited voice, 5 GB	Unlimited	Unlimited	5
30 calls, 0.5 GB	30	10	0.5
100 calls, 2 GB	100	20	2
300 calls, 5 GB	300	40	5
900 calls, 10 GB	900	80	10
Unlimited voice, 20 GB	Unlimited	Unlimited	20

The OECD basket definitions contain the following metrics:

B.1.2. Overall destination and time distribution

	Voice call distribution				Voice call day/week distribution		
	M2F	**On-net**	**Off-net**	**Voicemail**	**Day**	**Evening**	**Weekend**
30 calls basket	15%	55%	28%	2%	46%	27%	27%
100 calls basket	15%	55%	28%	2%	46%	27%	27%
300 calls basket	15%	55%	28%	2%	46%	27%	27%
900 calls basket	15%	55%	28%	2%	46%	27%	27%

B.1.3. Call durations

	Call duration (minutes / call)			
	M2F	**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%

B.1.4. SMS distribution

	Destination		Time of Day	
	On-net	**Off-net**	**Peak**	**Off-peak**
30 calls basket	53%	47%	66%	34%
100 calls basket	53%	47%	66%	34%
300 calls basket	53%	47%	66%	34%
900 calls basket	53%	47%	66%	34%

B.1.5. Additional notes

No distinction of 3G and 4G results.

- Basket results will normally not distinguish between 3G and 4G offers.

Voice usage is defined in calls

- As several tariff elements are calculated based on the number of calls rather than minutes it is more relevant to commence the voice basket calculation with the number of calls, hence the definition of calls rather than minutes.

For reference, the four voice baskets cover the following number of minutes (total across all calls):

Calls	Minutes
30	50
100	188
300	577
900	1,795

- Many mobile voice tariffs will include a data allowance as part of the tariff. However, in addition to this allowance it is often possible to purchase additional data bundles to reduce or manage the cost of handset data. The implementation of the OECD baskets now includes the possibility to include a range of such add-

on data packages, and to automatically optimise the cost to the lowest cost package option.

- Many tariffs will also apply limitations to the data usage, often with a “Fair Usage Policy” (FUP) that effectively limits the use of data by reducing speed or stopping the data service at the FUP limit. When the usage exceeds the FUP limit of such tariffs the tariff as a whole is deemed inappropriate for the usage level of the basket, and removed from the analysis.

C. Fixed Broadband Benchmarking Methodology

C.1. OECD Fixed Broadband Baskets

The OECD baskets for fixed broadband were defined in December 2017, and are included in this analysis. A minimum of the top three providers in each country shall be covered, ranked by market share and shall represent at least 80% of the market. In general, there is a wide range of offerings for broadband, with speeds from 256[14] kb/s upwards.

C.2. Fixed Broadband methodology

The fixed broadband benchmarking methodology contains these elements:

Installation	A 3 year lifetime of service is assumed, dividing all one off installation and modem costs[15] by 36 months. Charges related to the provision of the physical line are not included.
Rental	The sum of the monthly service cost and any option charges related to for example modem. Charges related to the provision of the physical line are not included.
Usage limitations	Indication of time or data limit if applicable. There will also be a text description of what the consequence of breaking the limit will be.
Usage cost	If usage beyond the time or volume limit results in further charges per minute, hour or MB, such charges will be included in the overall cost calculation as "Usage"
Maximum usage cost	Some tariffs that apply usage charges may also have a maximum usage cost per billing period.
Speed	The advertised up- and down-load bitrates.
Contract duration	Minimum duration of contract (in months)

The non-charge elements of the methodology are used for assessment of the service suitability and perceived value. The costs may be calculated in one of two ways:

- Actual cost of installation, rental and usage based on a specific usage profile.
- The cost of installation, rental and usage, normalised to for example 1 Mb/s speed, based on a specific usage profile.
- Results are presented in USD / PPP per month including VAT. Nominal exchange rates can be used.

OECD 2017 mobile voice and data baskets

Minimum Download Speed (Mb/s)	Low alternative data volume (GB/month)	Medium data volume (GB/month)	High alternative data volume (GB/month)
0.256	5	15	45
10	10	30	90
25	20	60	180
100	40	120	360
1000	100	300	900

- The fixed broadband baskets are defined by "Minimum Download Speed". This means that the basket results can include any offer with a download speed higher than the minimum. A maximum speed may be applied for as an alternative within the QKDR.

[14] The speed of 128 kb/s offered by some providers is not considered broadband in the OECD context, and is omitted from this analysis.

[15] Modem cost may be included in the basic installation cost, or specified separately. If specified separately it is added to the installation cost.

D. Mobile Broadband Benchmarking Methodology

D.1. OECD Mobile Broadband Baskets

Mobile Broadband baskets were defined by the OECD in December 2017. A subset of the 7 defined baskets is used in this study, as indicated below.

The baskets are defined by usage volume only, and do not consider speed.

OECD baskets for Mobile Broadband

Basket	Usage volume (GB / month)
0.5 GB basket	0.5
1 GB basket	1
2 GB basket	2
5 GB basket	5
10 GB basket	10
20 GB basket	20
50 GB basket	50

The data volume indicated is the accumulated data volume over one month.

All baskets assume that the tariff is in use 30 days a month. Tariffs that are based on time billing (e.g. paid per hour of use), or have validity of less than 1 month, are not considered in the analysis.

Results and presented in US$ / PPP per month, including VAT for residential tariffs and excluding VAT for business tariffs.

D.2. Mobile Broadband methodology

The mobile broadband benchmarking methodology contains these elements:

Installation	A 3 year lifetime of service is assumed, dividing all one off connection by 36 months.
Rental	The sum of the monthly service cost and any option charges.
Usage limitations	Indication of time limit or volume limit if applicable. Exceeding the allowance or fair use policy may result in exclusion of the tariff.
Usage cost	If usage beyond the time or volume allowance may result in further charges per minute or MByte, such charges will be included in the overall cost calculation as “Usage”
Maximum usage cost	Some tariffs that apply usage charges may also have a maximum usage cost per billing period.
Contract duration	Minimum duration of contract (in months)