Commission for
Communications Regulation

Irish Communications Market

Quarterly Key Data Report

June 2008

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Corrigendum for the March 2008, Quarterly Key Data Report, ComReg Doc 08/22

- Mobile subscriptions now include active SIMs bundled with HSDPA datacards and USB modems for internet access via laptops/PCs as well as SIM cards used in mobile phones for voice and data services. Q3 and Q4 2007 data have been revised to include these subscriptions.

LEGAL DISCLAIMER

1 Overall Market Data

Data presented in this report is based on quarterly questionnaires completed by authorised operators for the period from 1st January 2008 to 31st March 2008. The report is based on submissions from 62 active operators.

Number of Authorisations

Figure 1.1.1 - Total Number of Authorisations

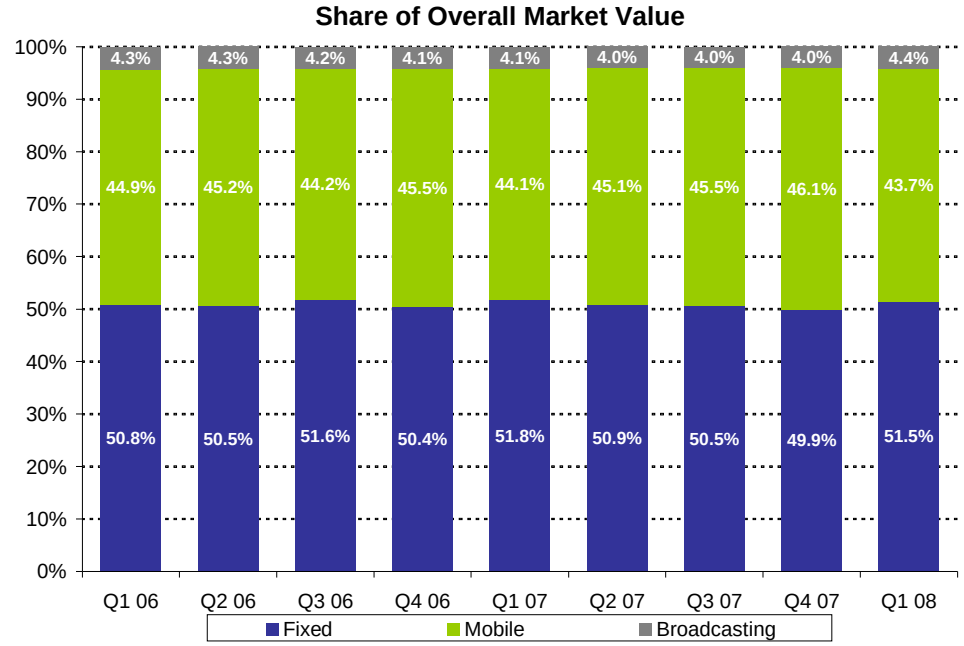
Total Authorisations	June 2008
No. of fixed and wireless authorisations	340
No. of mobile telephony authorisations	6
No. of broadcasting authorisations (incl. Cable TV, MMDS, Deflectors)	85
Total Number	431

Before providing networks or services to third parties, operators are required to submit a notification to ComReg for the purposes of compiling a register of authorised operators. At the date of publication there were 431 authorised undertakings in Ireland. It should be noted that the list above refers to the number of general authorisations granted by ComReg under the European Framework for Authorisations, and does not necessarily reflect the total number of commercially active organisations or entities currently operating in the market. The total number includes a number of undertakings who are authorised to use license-exempt spectrum for the provision of services.

Overall Electronic Communications Revenues[1]

Data presented in Figure 1.2.1 examines the proportion of industry revenue attributable to the provision of fixed line, mobile and cable broadcasting services.

Figure 1.2.1 – Fixed, Mobile & Broadcasting as a % of Total Revenues[2]



Source: Quarterly Key Data Questionnaire

Overall electronic communications network and service revenues at the end of March 2008 were over €1.12bn for the quarter[3]. Based on this, annualised revenues would be €4.46bn. Industry revenues decreased by 2.8% in the quarter and have fallen by 0.6% compared to Q1 2007. This is the first time in over two years that there has been a decline in revenues in the industry as a whole. While fixed line and broadcasting revenues increased over the quarter, mobile revenues declined significantly by over 7%.

In Q1 2008 fixed line revenues accounted for 51.9% of total electronic communications revenues, a 2% increase since the last quarter. In contrast the mobile industry's share of revenue, which grew quarter-on-quarter in the previous 12 months, decreased from 46.1%

1 For further detail on terms and definitions see ComReg Document Number 08/43a Explanatory Memorandum to Quarterly Key Data Report.

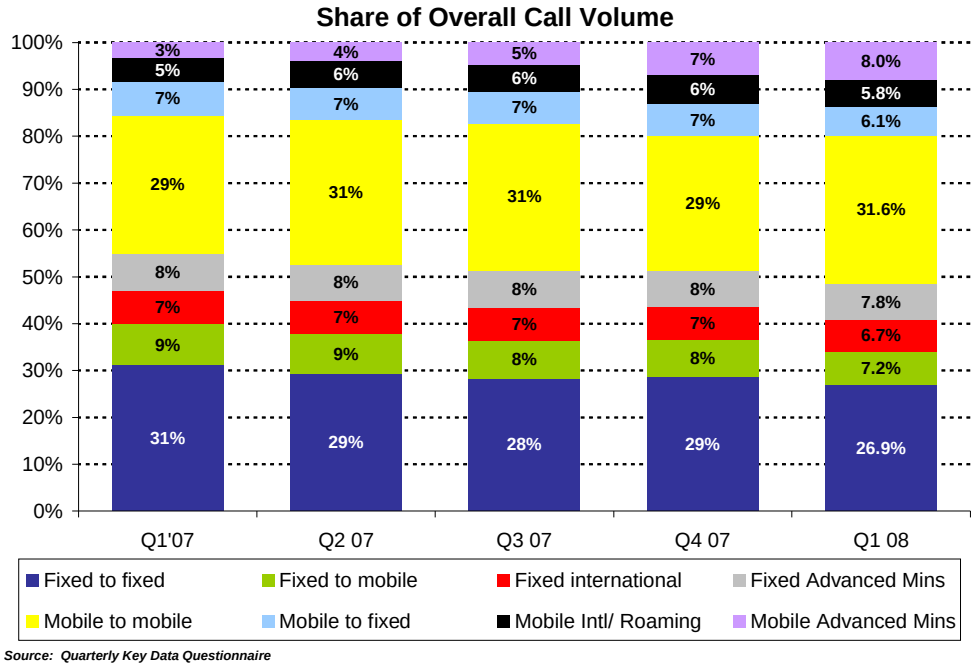
2 The following services are accounted for in the total revenues figure: fixed (interconnection, retail narrowband services, leased line & managed services including PPC revenue as well as other revenues ((including web-hosting, co-location services, directory publication & other services)) broadband), mobile (connection, voice and data services, roaming) and broadcasting (including cable/MMDS broadcasting services, connection, rental and other charges).

3 Total mobile revenues have fallen in Q1 2008 due to increased intensity of competition among operators, reductions in mobile termination rates, EU price caps on roaming charges and a fall in gross handset sales which may be due to seasonality issues.

in Q4 2007 to 43.7% in Q1 2008. This decline could be due to seasonal factors, as handset sales often drop off after the Christmas period.

Overall Call Volumes

Figure 1.3.1 - Share of Total Voice Call Volumes (Minutes)[4]



Source: Quarterly Key Data Questionnaire

Figure 1.3.1 profiles volumes of voice calls by call type for both fixed and mobile voice on a quarterly basis. Voice minutes for the first quarter of 2008 totalled over 4.75 billion minutes. This was a 4.5% increase on the previous quarter when total voice minutes were just over 4.54 billion minutes and a 6.62% increase on total voice minutes in the first quarter of 2007. Traffic originating on a fixed line network accounted for 48% of all voice minutes, while mobile originating voice minutes accounted for the remaining 52%. Table 1.1.1 shows the total voice traffic in Ireland at the end of Q1 2008. Both fixed and mobile minutes have grown significantly this quarter.

Table 1.1.1 – Total Voice Traffic in Ireland

	Q1 08 Mins ('000s)	Quarterly Growth Q4 07- Q1 08	Year-on-Year Growth Q1 07- Q1 08
Fixed voice minutes	2,406,142	+3.21%	-1.66%
Mobile voice minutes	2,551,158	+15.36%	+27.31%
Total voice minutes	4,957,300	+9.12%	+11.38%

4 Fixed advanced minutes include premium rate services minutes, freephone minutes, operator services minutes, national and international virtual private network minutes. Mobile advanced minutes include premium rate services minutes and other mobile minutes such as voicemail, DQ, call completion minutes etc.

Pricing Overview

This section examines Ireland's current and previous rankings based on a comparison of prices for specific consumer baskets in a number of EU countries. Data on PSTN[5] and mobile basket prices is provided to ComReg by Teligen who use an OECD-approved methodology to compare fixed (PSTN) and mobile tariffs.

This format follows a basic three-step process consisting of:

- the construction of one or more baskets of telephone services;
- the pricing of those baskets; and
- the conversion of the individual currencies to standard units (i.e. US Dollars or euros and Purchasing Power Parities (PPPs)).

Countries are then ranked based on PPPs, with the least expensive country ranked 1st.

The charts presented in this section provide an overview of Ireland's ranking relative to 19 other EU member states for which data is available since the revision of the OECD baskets in February 2006. Individual pricing charts for each basket for February 2008 are analysed under the heading "Pricing Data" in the specific mobile and fixed sections of this document. Ireland's position is ranked in relation to other EU member states.

For further information on Teligen's methodology please see the accompanying memorandum ComReg 08/43a.

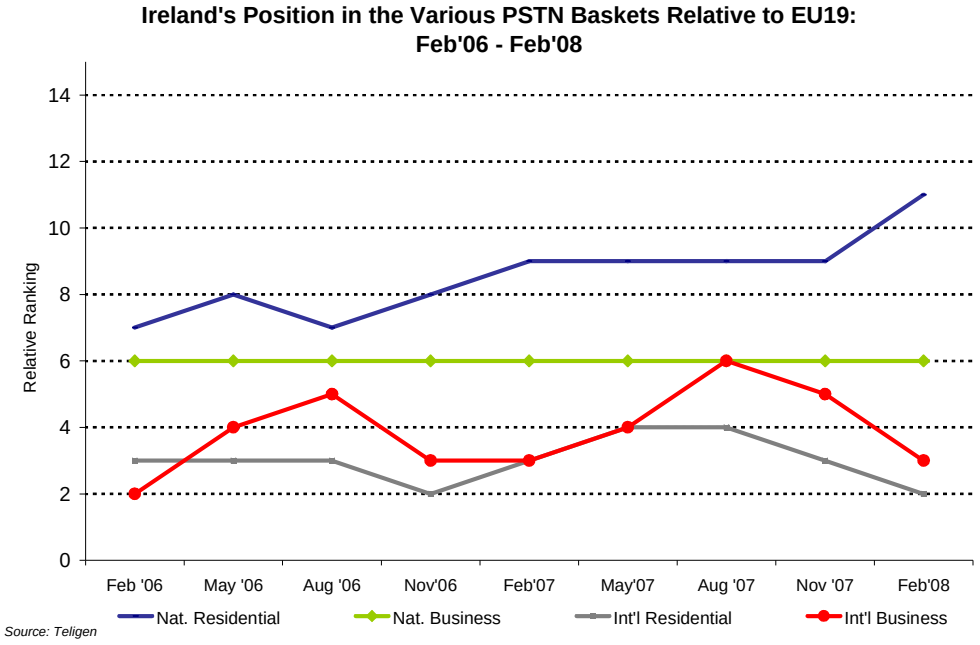
PSTN Baskets

Figure 1.4.1 shows the movement in Ireland's position relative to EU19 countries in all PSTN baskets since February 2006, where the least expensive country based on the methodology is ranked 1st. Ireland remains less expensive than the average basket cost across all of the PSTN services analysed. This quarter Ireland's position in the national residential call basket fell by two places to 11th. Ireland's position in the national business call basket is the same as in Q4 2007 (6th). Ireland's position in the national business basket has been ranked at 6th consistently since February 2006. Ireland's position has

5 The PSTN refers to a public switched telephone network or copper telephony network, on which calls can be made. A PSTN line is more commonly known as a copper telephone line.

improved one place in the international residential basket, moving from third to second place, while Ireland's international business basket placing has improved two places since November 2007 and is now ranked third.

Figure 1.4.1 – Ireland's Position in the Various PSTN Baskets

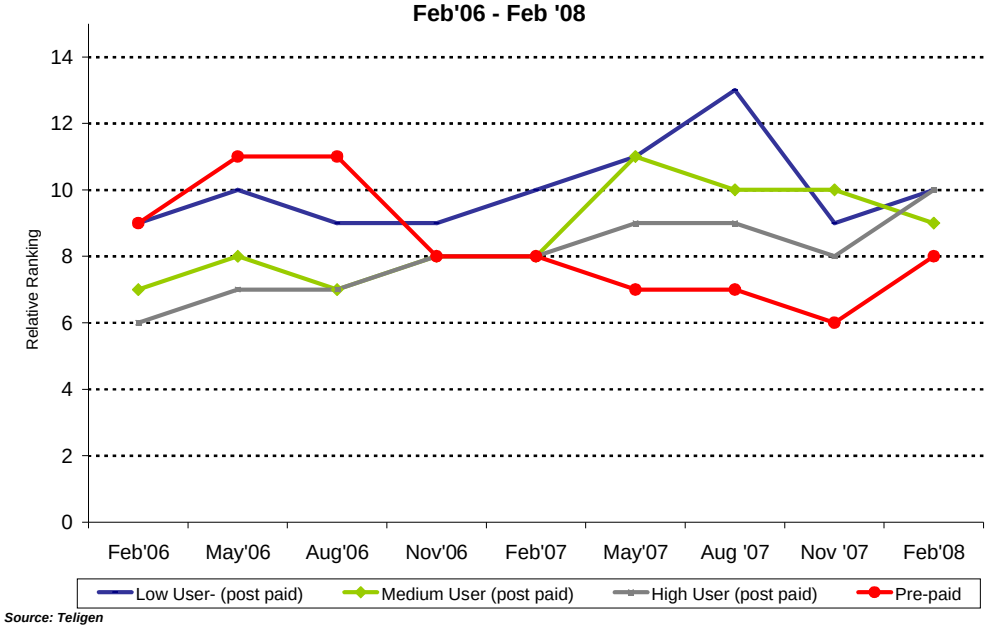


Mobile Baskets

Figure 1.4.2 shows the movement in Ireland's position in all mobile baskets since February 2006 relative to EU19 countries, where the least expensive country is ranked 1st. Ireland's position in the low user post paid basket has fallen from the last quarter by one place. Ireland's position has increased one place in the medium user post-paid basket, moving to 9th position. Ireland fell by two places in the high user post-paid basket and is now in 10th position. Finally, in the pre-paid basket Ireland's position also deteriorated from the last quarter falling from 6th to 8th.

Figure 1.4.2 – Ireland's Position in Various Mobile Baskets

Ireland's Position in the Various Mobile Baskets Relative to EU19: Feb'06 - Feb '08



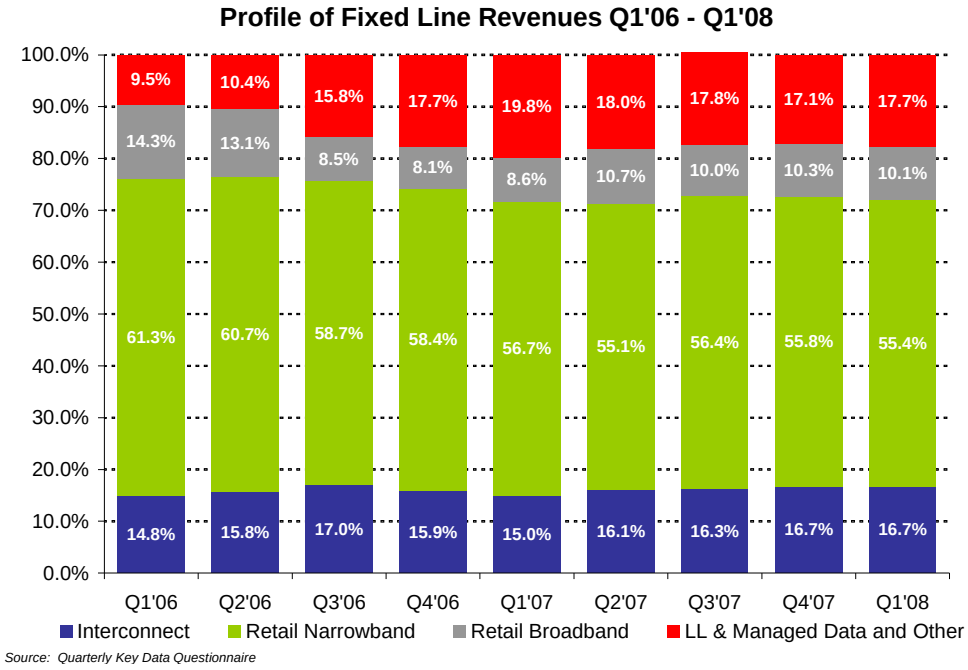
Source: Teligen

2 Fixed Market Data

Total Fixed Line Revenues

Figure 2.1.1 shows the profile of fixed line revenues in Q1 2008, which totalled over €578 million. This was a slight increase since the last quarter. In terms of the share of total revenues, retail broadband revenues declined marginally as did retail narrowband revenues. Wholesale revenues (from interconnect services) remained flat in the quarter while other retail revenues (from leased lines, managed data and other advanced data services) grew by 0.6% in Q1 2008.

Figure 2.1.1 – Profile of Fixed Line Revenues

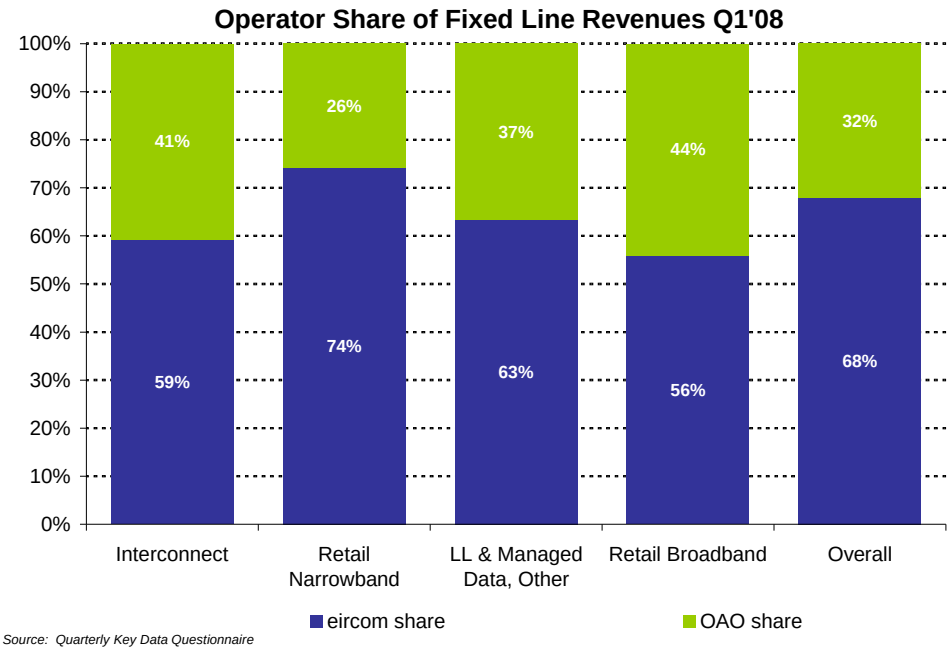


Source: Quarterly Key Data Questionnaire

Authorised Operators' Share of Overall Fixed Line Revenues

Figure 2.1.2, below, shows the market shares of the incumbent and other authorised operators (OAOs) in each of the fixed line service categories set out, above, in Figure 2.1.1. Market shares are grouped within a number of revenue categories to link related services; however this classification does not necessarily reflect the specific markets identified in ComReg's Market Review process.

Figure 2.1.2 – Operator Share of Fixed Line Revenues[6]



Source: Quarterly Key Data Questionnaire

Eircom's overall share of fixed line market revenue fell by 1% since the last quarter and has declined by 2% since the first quarter in 2007. This decline is predominantly a result of increased OAO activity in the market (specifically in the Leased Line & Managed Data sector), but is also due to ongoing improvements in the quality of data returned by all operators[7] in their responses to the Quarterly Report questionnaire. Figure 2.1.3, below, shows Eircom's market share on a quarterly basis from Q1 2007 to Q1 2008.

6 Eircom's retail broadband share is calculated using DSL, FWA and Satellite revenues.

7 Updated data received by EU Networks, Fast Wireless, Glantel, Pure Telecom.

Figure 2.1.3 – Eircom's Market Share

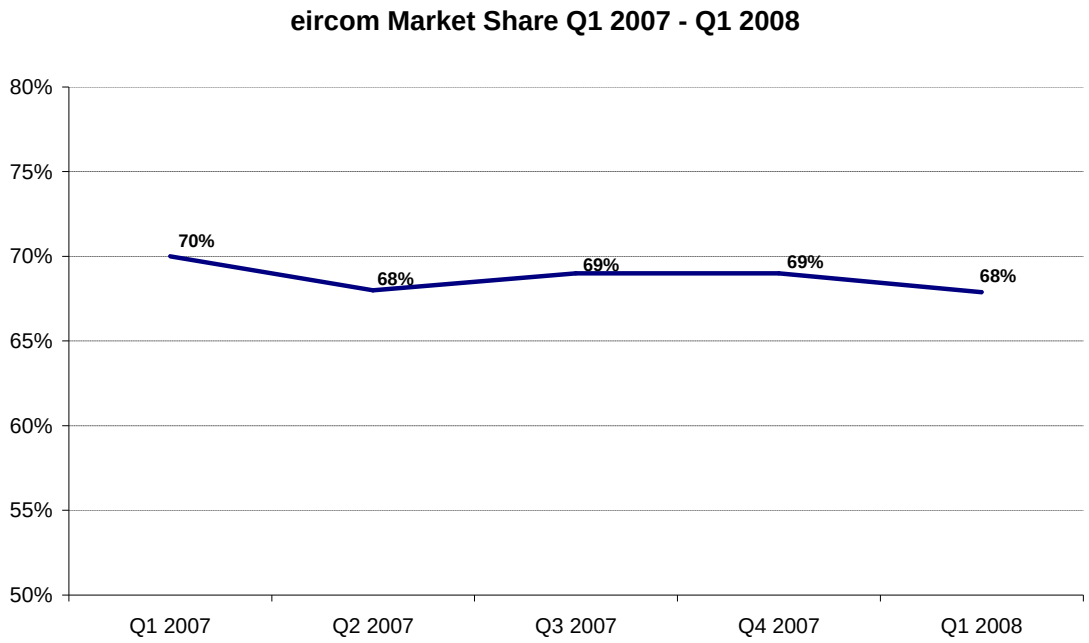
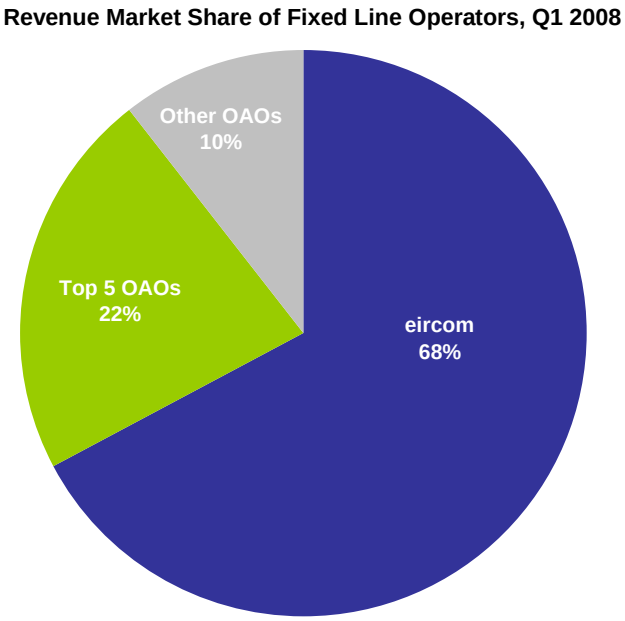


Figure 2.1.4, below, outlines revenue market share in Q1 2008 by breaking out the total fixed market in terms of shares held by the incumbent fixed line operator, the top five OAOs, and all other OAOs of fixed line revenue.

Figure 2.1.4 – Revenue Market Share for Incumbent Operator, Top 5 OAOs and all Other Market Operators



There was a slight change in the split of market share in Q1 2008. After Eircom, the largest revenue-earning operator in the market, with a 68% market share, ComReg estimates that the next five largest operators in terms of revenue contribute a further 22% of industry revenue, with the remaining 10% generated by all other operators in the fixed line market. Eircom's market share has fallen by 2% since Q1 2007 and the majority of this fall off in the incumbent's market share has been taken up by the top 5 OAOs.

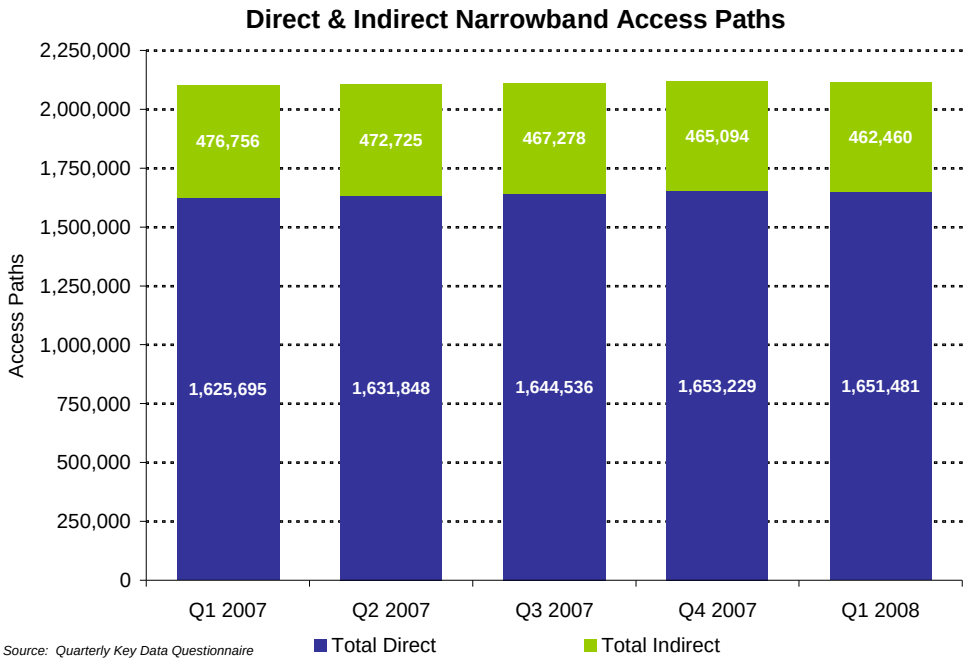
Figure 2.1.4 is presented as additional analysis of the fixed market, and should not be interpreted as a definitive statement of market shares, in particular fixed line market segments.

Fixed Line Access

Access Paths

Figure 2.2.1 presents the total number of narrowband fixed access paths (PSTN and ISDN) broken out by direct and indirect access[8]. There were just over 2.1 million direct and indirect PSTN and ISDN access paths in the Irish market in Q1 2008. There was a marginal decrease on Q4 2007. ComReg includes direct access provided by means of Local Loop Unbundling (LLU) in direct access paths, based on the assumption that the line is directly controlled by an alternative operator. Indirect access paths totalled over 462,000 in Q1 2008, a 0.6% decrease since Q4 2007, and this represents a 3% fall since Q1 2007. In Q1 2008, indirect access accounted for 22% of all access paths in the fixed market.[9] This figure has remained constant for over 2 years. As of March 2008, there were 1.612 million incumbent copper PSTN-only lines in Ireland.

Figure 2.2.1 - Fixed Access Paths



Source: Quarterly Key Data Questionnaire

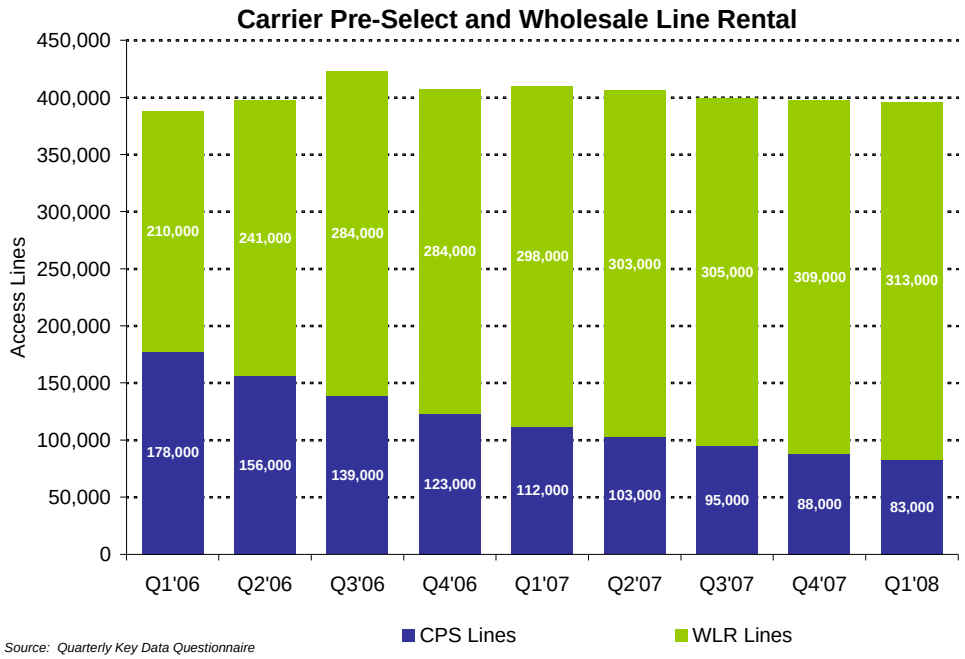
Indirect Access Lines

Figure 2.2.2 illustrates the overall number of PSTN and ISDN lines provided by means of either Carrier Pre-Selection (CPS) only or Wholesale Line Rental (WLR). Unbundled local loops, which are considered to enable OAO direct access, are not included in this

8 Indirect access paths relate to telephone lines provided to customers by means of carrier pre-select only or wholesale line rental. Carrier pre-select allows the user to receive all or a portion of calls from one provider and line rental from another provider (usually Eircom). 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 one single supplier.

figure. In Q1 2008, there were 396,000 active lines, enabling OAOs to provide services to customers by reselling elements of Eircom's copper network. The number of indirect access lines has remained generally static this quarter. Year on year, indirect access lines for the 12 months to the end of March 2008 decreased by 3%. This chart shows how OAOs are continuing to migrate their customer base to single-bill services, i.e. WLR rather than CPS-only (i.e. calls only) services to customers. WLR lines managed by OAOs now account for 79% of indirect access lines compared to 54% in Q1 2006. Despite the overall decrease in indirect access lines, WLR lines continue to see incremental growth.

Figure 2.2.2 - Indirect Access Lines[10]



Source: Quarterly Key Data Questionnaire

9 Access paths are not synonymous with access lines as for example in the case of ISDN paths, there may be more than 1 path provided via a single ISDN line.

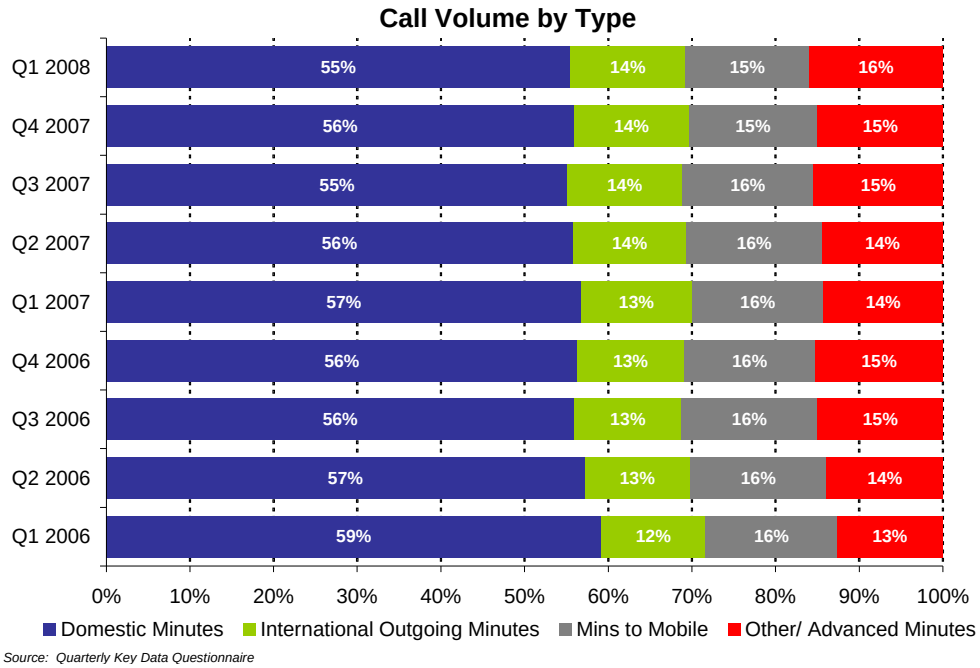
10 Number of lines are rounded to the nearest thousand.

Fixed Voice Call Volumes

Fixed call traffic in Q1 2008 was just over 2.4bn minutes, which was a 3% increase since Q4 2007 but a fall of 2% since Q1 2007. VoIP minutes now account for almost 2% of this total[11].

A factor which may impact fixed voice volumes over the telecoms network is the use of voice over internet services, such as those offered by Skype, and mobile substitution. ComReg currently does not collect data on voice over the internet. However, data on managed and unmanaged voice over broadband is collected. The year-on-year decrease in total fixed line traffic reported by operators is primarily a result of a fall in absolute volumes of total domestic traffic minutes between Q1 2007 and Q1 2008. This is also reflected in the proportion of total fixed line voice traffic categorised as domestic minutes. Since this analysis began in Q4 2004, the percentage split between domestic, international, mobile minutes and other minutes has remained relatively constant. However, a very slow decline in the percentage of domestic minutes is to be noted. Changes in the volumes and profile of fixed line traffic will continue to be monitored by ComReg for evidence of changes in fixed line usage, such as increased fixed-mobile substitution. Figure 2.3.1 illustrates trends in fixed voice call minutes since Q1 2006.

Figure 2.3.1 – Fixed Voice Call Volume[12]



Source: Quarterly Key Data Questionnaire

11 ComReg data provided by operators shows over 41m VoIP minutes for Q1 2008, while total fixed call minutes are over 2bn.

12 Domestic Calls include local & national calls. Advanced service and other minutes include minutes to premium rate numbers, freephone numbers, callsave, operator services, VPN minutes, payphones and other services.

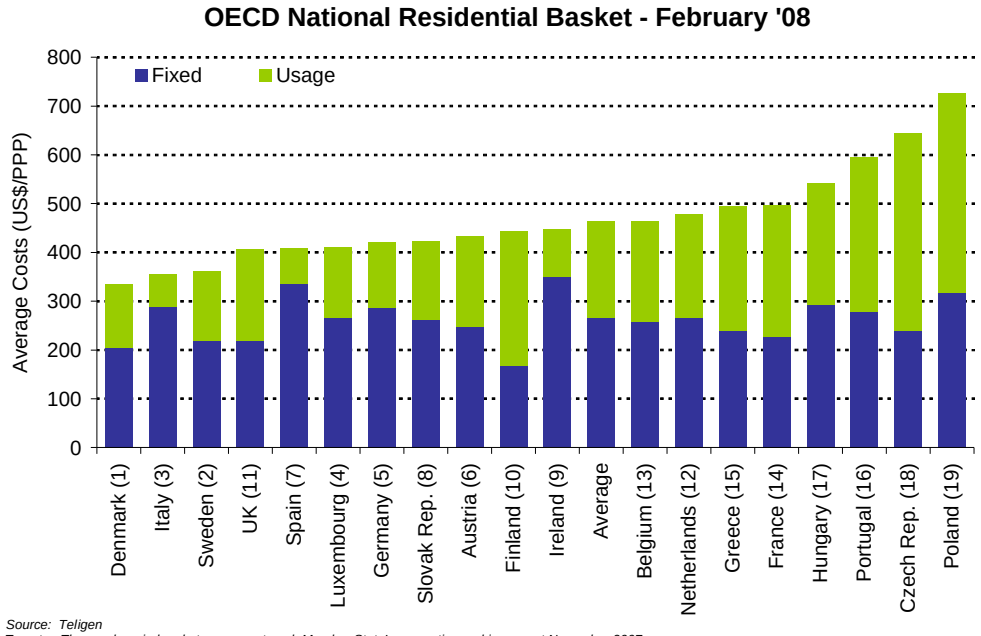
PSTN Pricing Data

ComReg presents independently-collated Teligen data using an OECD-approved methodology to examine the relative costs of a number of specific baskets of national and international telecoms services for both residential and business users. The data presented includes all EU countries for which data is available[13]. Using this methodology, data is presented using USD ($) and Purchasing Power Parities (PPPs). The latter provides an indication of the cost of telecoms services in countries analysed in relation to the cost of all other products and services, and takes account of exchange rate differences.

OECD National Residential Basket

Figure 2.4.1.1 illustrates Ireland's ranking in the national residential basket, based on a basket of calls and fixed costs for usage over a 12 month period. This chart is based on a comparison of the cheapest incumbent package available for a specific customer usage profile. In many cases this will be a bundled service which will include both line rental and a "bundle" of call minutes for a fixed monthly charge. It should therefore be noted that the "fixed" element in this basket is not an indication of the cost of basic line rental. In February 2008 Ireland ranked in 11th position, just ahead of the EU19 average in terms of the most competitive pricing for this basket. However, Ireland's position has fallen two places since November 2007.

Figure 2.4.1.1 - OECD National Residential Basket – February 2008[14]



Source: Teligen
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

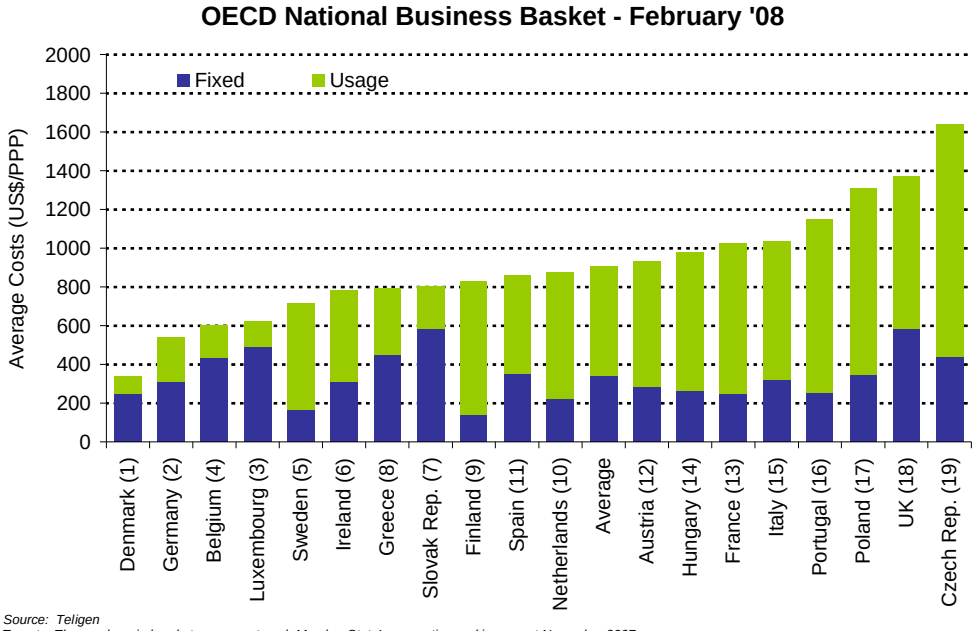
13 This will be determined by whether the EU country is also an OECD member.

14 Residential tariffs include VAT. VAT rates vary between member states.

OECD National Business Basket

As with the residential basket, this chart is based on a comparison of the cheapest incumbent business package available for a set number of voice calls over a 12 month period, and in many cases will include a fixed charge for access as part of a bundled service. It should be noted that the "fixed" element in this basket is not an indication of the cost of basic line rental. Ireland remains in 6th position in the rankings ahead of the EU19 average. As in November 2007, Denmark continues to be the best performer in this category.

Figure 2.4.2.1 - OECD National Business Basket – February 2008

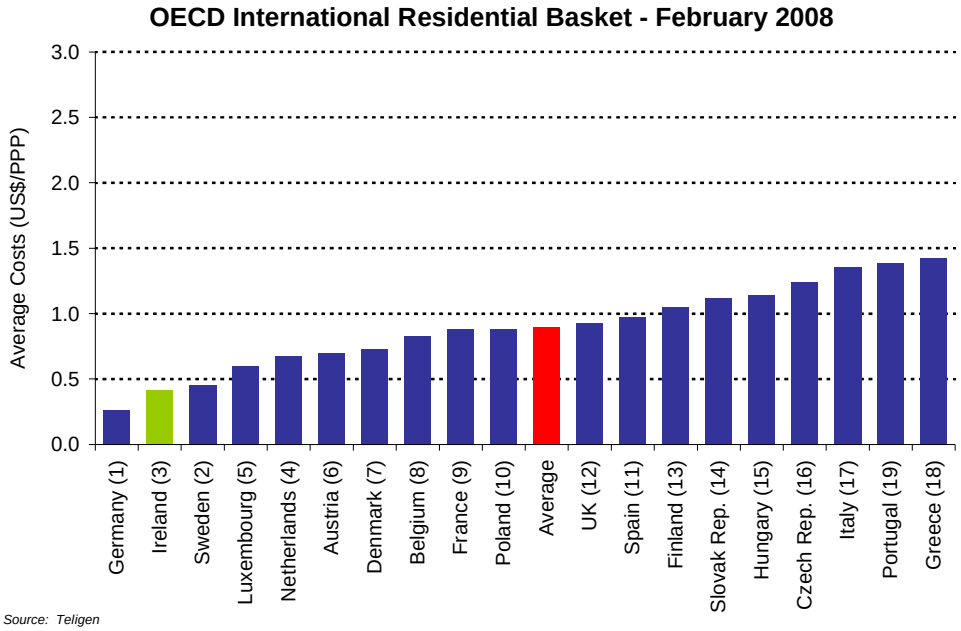


Source: Teligen
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

OECD International Residential Basket

Figure 2.4.3.1 shows that Ireland has moved up to 2nd position this quarter in terms of the cost of three-minute peak international calls and five-minute off-peak international calls from one country to all other countries in the basket. Ireland has improved by one place since the last quarter and ranks nine places above of the EU19 average for this service.

Figure 2.4.3.1 - OECD International Residential Basket – February 2008[15]

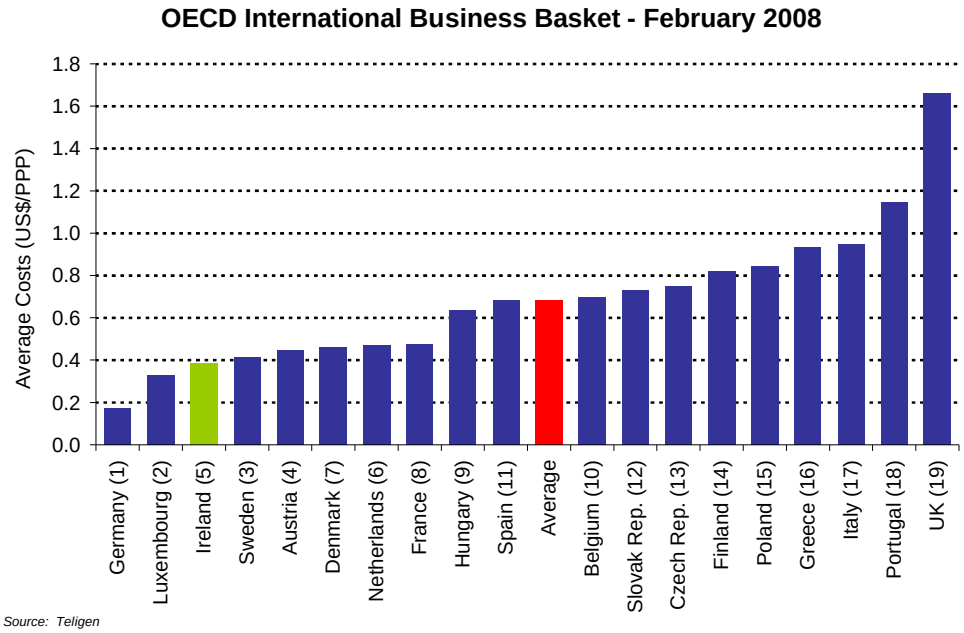


Source: Teligen
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

OECD International Business Basket

Ireland moved to third place in this service in February 2008, up two places since November 2007. As with the previous quarter, Ireland again compares very favourably with the EU19 average.

Figure 2.4.4.1- OECD International Business Basket – February 2008



Source: Teligen
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

15 Residential tariffs include VAT. VAT rates vary between member states.

3 Internet and Broadband

Total Internet Subscriptions

At the end of Q1 2008, there were almost 1.29 million active internet subscriptions in Ireland. This is a 5.7% growth on the previous quarter. Narrowband, both metered and flat rate, continued to decline, falling by 11% in Q1 2008 while broadband continued to grow strongly (12% in Q4 2007 and Q1 2008). Mobile broadband (HSDPA) in particular grew strongly (46%) in this quarter. Table 3.1.1 shows the total number of narrowband and broadband subscriptions to internet services in Ireland.

Table 3.1.1 – Total Number of Active Internet Subscriptions in Ireland

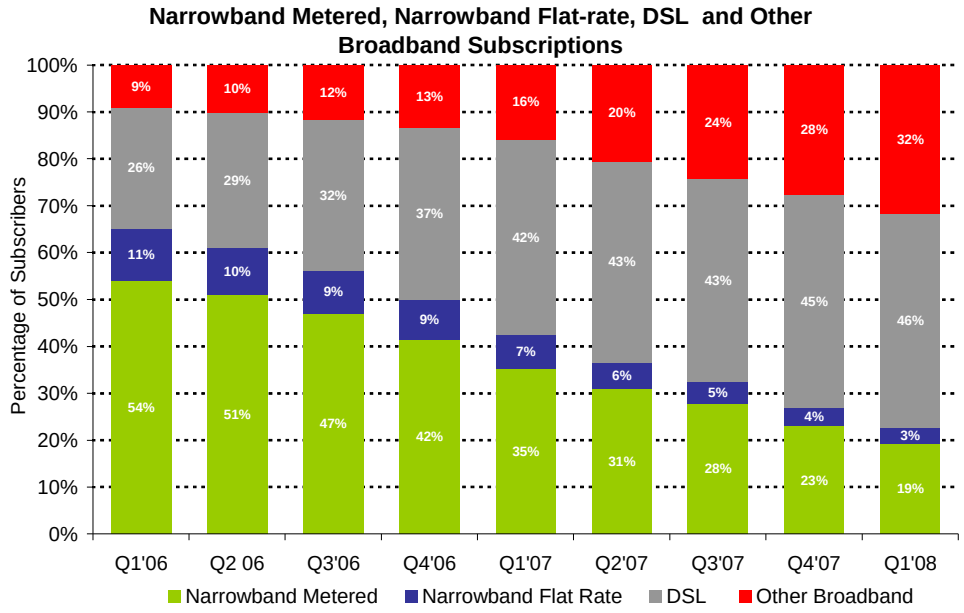
Subscription Type	Q1 08 Subs	Quarterly Growth Q4 07- Q1 08	Year-on-Year Growth Q1 07- Q1 08
Metered Narrowband	247,754	-11%	-33%
Flat Rate Narrowband	42,002	-13%	-45%
ADSL Broadband[16]	586,989	+7%	+35%
Other Broadband[17]	404,981	+20%	n/a
Total Internet Subscriptions	1,281,726	+5.7%	n/a

Figure 3.1.2 profiles internet subscriptions in Ireland using the classifications of subscription type outlined in figure 3.1.1. Broadband subscriptions, either using copper-based DSL services, or alternative broadband platforms now account for almost 78% of all internet subscriptions. Figure 3.1.2 provides a profile for the periods Q1 2006 - Q1 2008 for historical trend purposes: However, the inclusion of mobile broadband subscriptions in the other broadband category from Q2 2007 means quarter on quarter comparisons should not be drawn between the current period and other quarters profiled in Figure 3.1.2.

16 DSL refers to a digital subscriber line, the means by which broadband speeds (i.e. in excess of 144k downstream) are delivered over the copper telecoms network.

17 Other Broadband includes cable broadband, fixed wireless access, fibre, satellite and mobile broadband connections

Figure 3.1.2 – Profile of Active Internet Subscriptions in Ireland

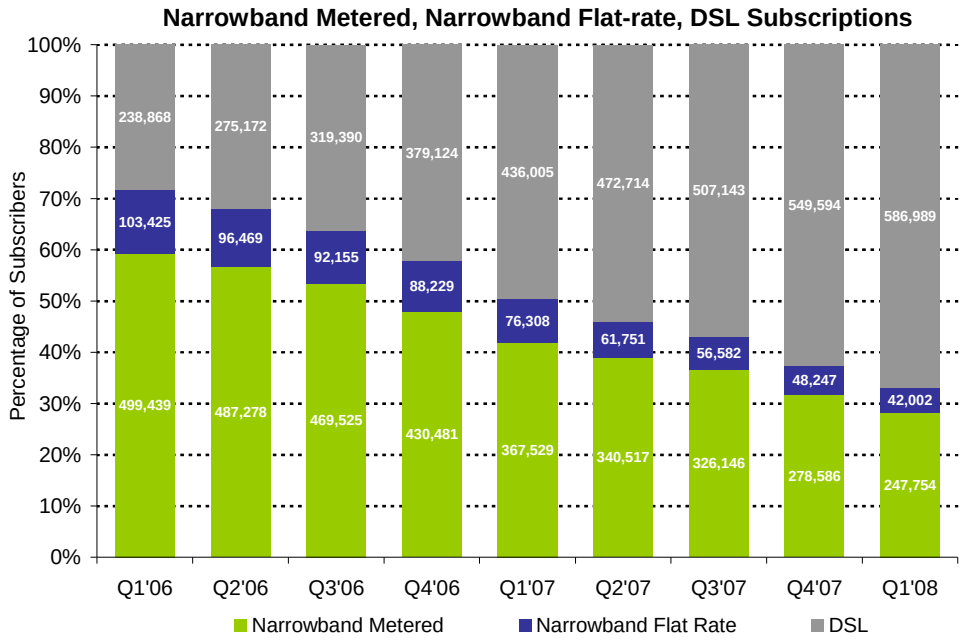


Source: Quarterly Key Data Questionnaire

Source: Quarterly Key Data Questionnaire

Figure 3.1.3 profiles only those internet subscriptions delivered over the copper telecoms network. It includes an analysis of metered or pay-as-you-go narrowband subscriptions, flat-rate narrowband subscriptions and DSL subscriptions. There were over 876,000 active internet subscriptions over the copper telecoms network at the end of March 2008, a 0.4% increase in the total number of copper-based subscriptions since Q4 2007. DSL accounted for 67% of copper-based internet subscriptions, while metered narrowband subscriptions accounted for a further 28% of internet subscriptions over copper, with flat rate narrowband internet subscriptions making up the remaining 5% of copper-based internet subscriptions.

Figure 3.1.3 – Percentage of Copper Based Internet Subscriptions

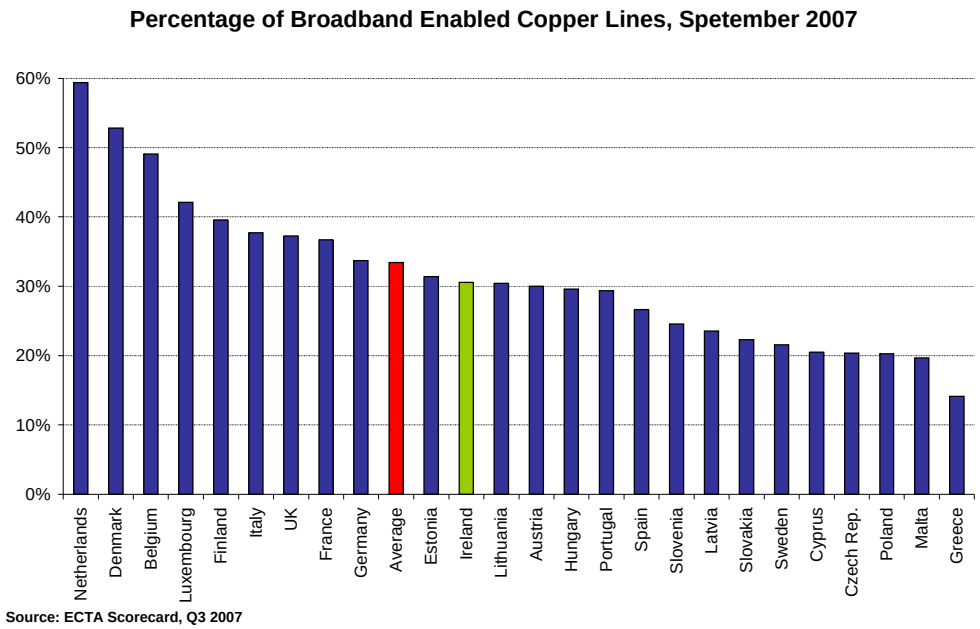


Source: Quarterly Key Data Questionnaire

Figure 3.1.4 shows the number of total copper lines which are enabled for broadband internet use[18]. 31% of copper lines in Ireland are used for DSL services compared to almost 60% in the leading country benchmarked i.e. the Netherlands. However, Ireland is close to the average of 33%. Ireland ranks ahead of most Eastern European countries (who generally favour wireless and fibre based solutions) but ranks behind most Western European countries.

18 Copper lines may include ISDN lines.

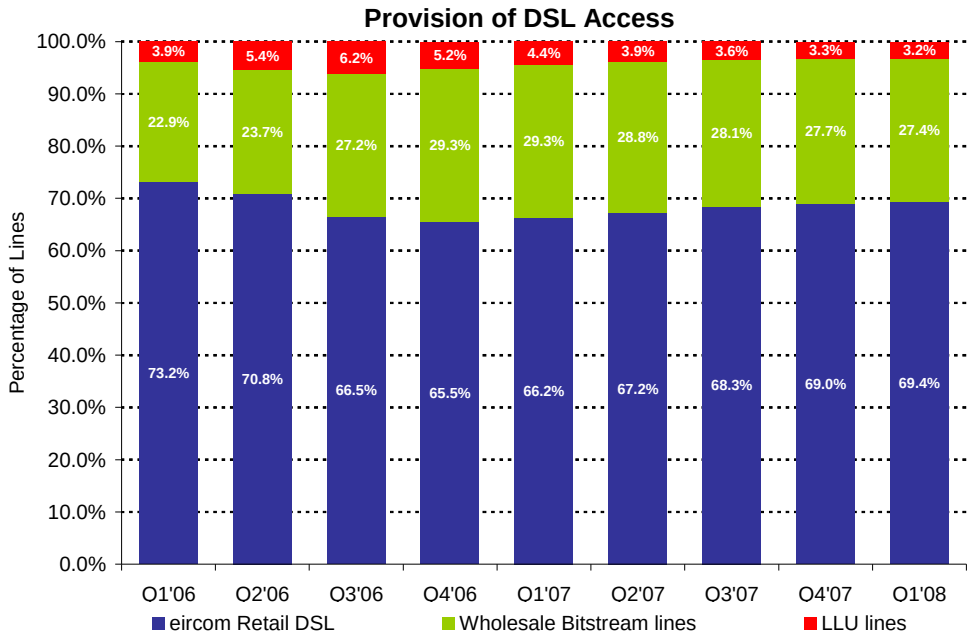
Figure 3.1.4 – Percentage of Broadband Enabled Copper Based Lines, September 2007



Provision of DSL Access

Figure 3.2.1 examines the provision of DSL access. DSL broadband services are provided to consumers by operators using three alternative methods of access. DSL may be provided directly to the consumer by eircom using direct access to its network; this accounted for 69.4% of all DSL subscriptions in March 2008. Retail DSL may also be provided by alternative operators (OAOs) who use either wholesale bitstream, which enables OAOs to resell eircom's DSL service, or by offering DSL-based broadband using local-loop unbundling (LLU). At the end of March 2008, 27.4% of all DSL lines were provided by OAOs using wholesale bitstream, and the remaining 3.2% of DSL lines were provided to subscribers by OAOs using local-loop unbundling. At the end of March 2008 there were 18,813 local loops unbundled. This represents a 5% increase since Q4 2007.

Figure 3.2.1 - Provision of DSL Access

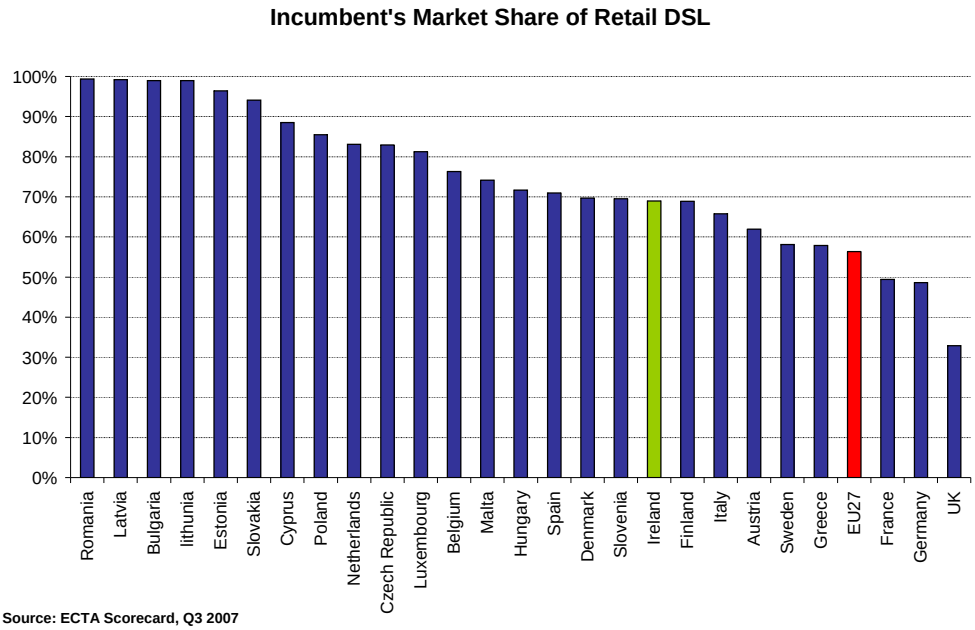


Source: Quarterly Key Data Questionnaire

Eircom's market share of retail DSL lines increased in Q1 2008 by approximately 0.4%.

Figure 3.2.2 charts the incumbent operator's retail share of DSL in the EU-27 countries. Intuitively, the lower the incumbent's retail share of DSL lines, the more competition there is among retailers in the individual country's market. The average share for the EU-27 is 56%. eircom's retail share in Ireland was 69% in Q1 2008.

Figure 3.2.2 – Q1 2008 Euro Incumbent's Retail Share of DSL



Source: ECTA Scorecard, Q3 2007

Provision of Broadband Services

Figure 3.3.1 summarises the total number of broadband subscriptions at the end of the quarter by access technology.

Figure 3.3.1 – Broadband Subscriptions[19] and growth rates by Platform

Platform	Q1 08 Subs	Quarterly Growth Q4 07- Q1 08	Year-on-Year Growth Q1 07- Q1 08
DSL	586,989	+13.5	+34.6%
Cable	88,647	+7.5%	+37.6%
FWA	121,842	+2.9%	+29.5%
Other[20]	8,454	+2%	+15%
Sub-Total	805,932	+6.2%	+34%
Mobile Broadband	186,038	+45.9%	n/a
Total	991,970	+12%	n/a

High Speed DownLink Packet Access (HSDPA) provides mobile broadband access to a growing number of Irish consumers. In order to fully reflect the range of broadband services available to customers in Ireland, ComReg started to include this data in its overview of the market in Q2 2007[21] report. However country to country comparisons will continue to exclude this figure at this time. Both the European Commission and the OECD have indicated that they intend to shortly start collecting data on mobile broadband and this should provide the basis for comparative data across countries in the near future.

At the end of March 2008, there were 991,970 broadband subscriptions in Ireland. This represents growth of 12% in the number of subscriptions for this quarter. Mobile broadband was the fastest growing platform, growing by almost 46% in Q1 2008.

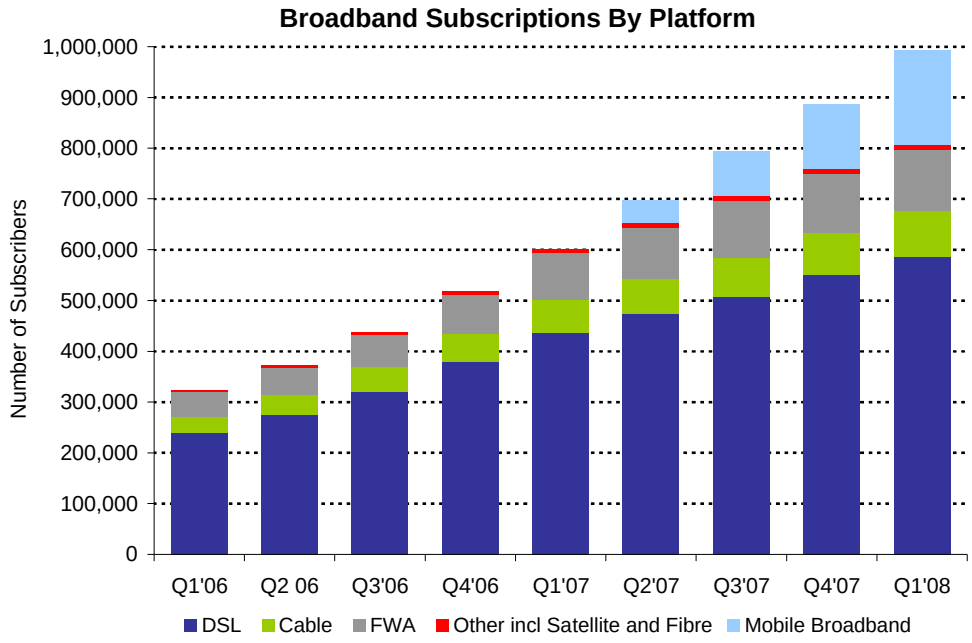
19 ComReg notes that the data provided in this section relates to active subscriptions reported by operators. It does not take into account multiple active subscriptions to broadband offerings by individual subscribers

20 Other Broadband includes Satellite and Optical Fibre broadband subscriptions.

21 In Q2 2007 an estimate of 45,000 mobile broadband subscribers was used.

DSL remains the largest broadband access platform in terms of subscriptions, accounting for 59% of all broadband subscriptions, while other platforms account for the remaining 41% of connections. Figure 3.3.2 illustrates the growth in total broadband subscriptions in the Irish market since Q1 2006. Mobile broadband subscriptions were included in Figure 3.3.2 for the first time in Q2 2007. Therefore total subscriptions levels from Q2 2007 presented in Figure 3.3.2 are not directly comparable with previous periods.

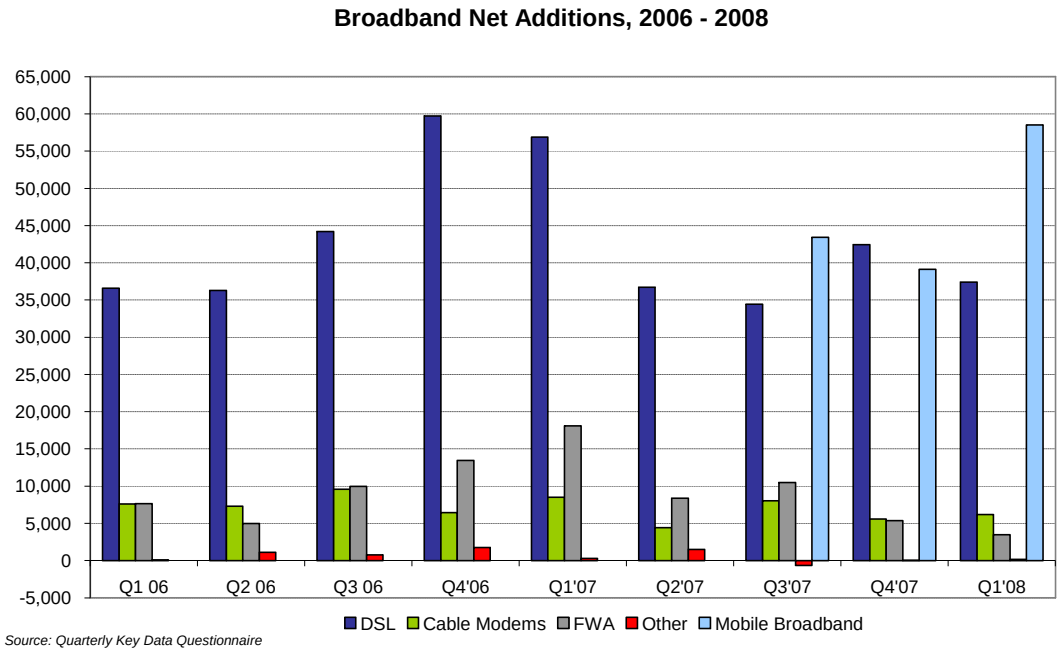
Figure 3.3.2 – Broadband Subscriptions by Platform



Source: Quarterly Key Data Questionnaire

Figure 3.3.3, included for the first time in this quarter, shows the number of broadband net additions by platform for each quarter from 2006. Although DSL remains the main means of broadband access to the internet, mobile broadband was the largest contributor to new broadband growth in Q1 2008. Mobile broadband experienced the largest increase in Q1 2008 growing by over 58,000 customers followed by DSL which grew by over 37,000 customers. The contribution of new DSL additions to broadband take up experienced a decline in Q1 2008 when compared to a peak in Q4 2006.

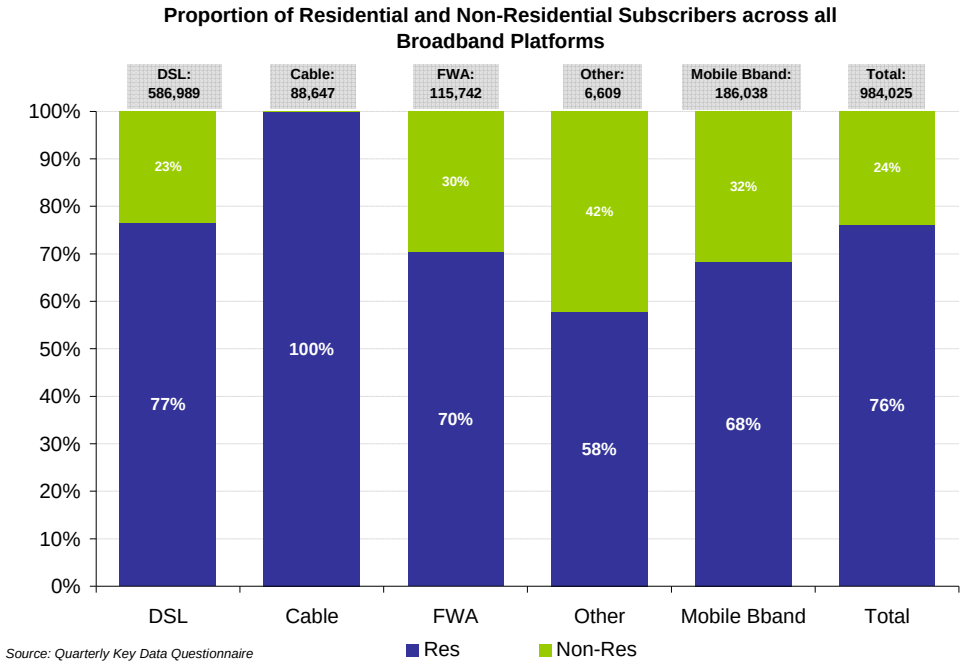
Figure 3.3.3 – Broadband Total Net Additions, 2006 - 2008



Source: Quarterly Key Data Questionnaire

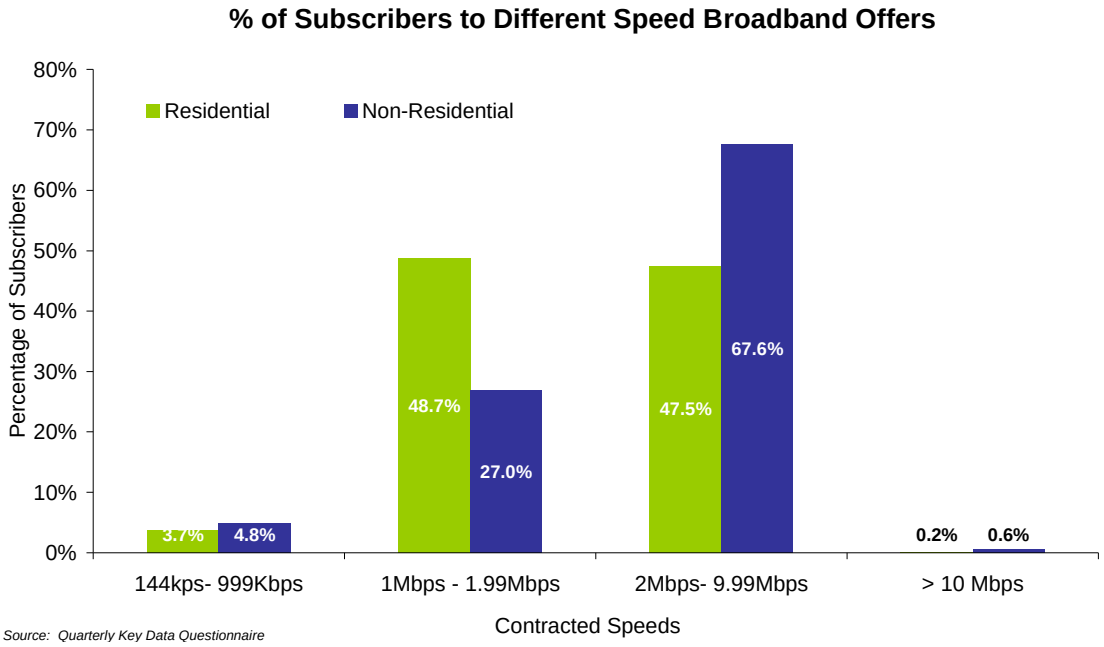
Figure 3.3.4 breaks down broadband subscriptions to provide an estimate of the proportion of business and residential subscriptions to DSL, cable, fixed wireless, mobile broadband, fibre and satellite broadband services. At the end of March 2008, 76% of broadband subscriptions on all platforms were residential broadband subscriptions. The platform with the highest percentage of residential subscriptions is cable broadband, while satellite and fibre broadband lines have the highest percentage of business customers.

Figure 3.3.4 – Broadband Subscriptions by Subscriber Type



ComReg provides a breakdown of broadband subscriptions by speed across all broadband platforms. Figure 3.3.5 illustrates that residential users are more likely to subscribe to packages of between 1Mb - 2Mb, whereas business subscribers are more likely to subscribe to broadband offers in the 2Mbps - 10Mbps category. Over the last quarter (Q4 2007 – Q1 2008) customers have been moving away from the 144KPS – 1 MB package towards packages in the 2MB – 10MB among both residential and business customers. There has also been a slight increase in the number of businesses using >10MBs packages.

Figure 3.3.5 – Broadband Subscriptions by Contracted Download Speeds



Source: Quarterly Key Data Questionnaire

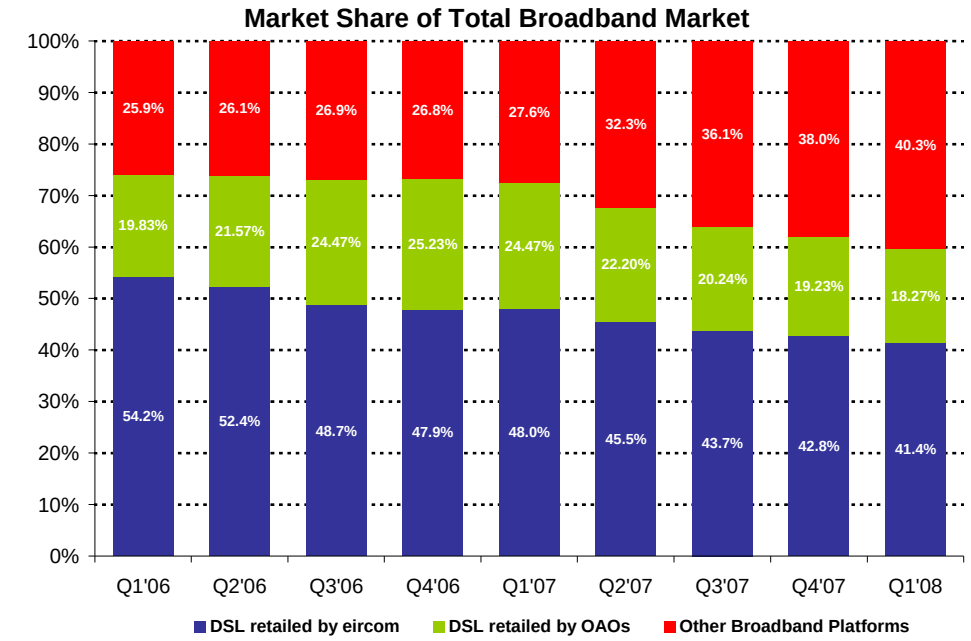
Figure 3.3.6 illustrates eircom's market share of total broadband subscriptions when compared to other authorised operators' (OAO) share of overall broadband subscriptions, including DSL and alternative access technologies (which includes mobile broadband subscriptions).

In this period, eircom held a 41.4%[22] market share of all retail broadband subscriptions. DSL provided by OAOs using either Bitstream or LLU represented a further 18.3% of all broadband subscriptions. The remaining 40.3% of subscriptions was held by operators on alternative broadband platforms which include cable broadband, fixed wireless, fibre, satellite and mobile broadband subscriptions.

Please note that data from Q2 2007 cannot be compared to previous quarters as it includes mobile broadband for the first time; data prior to Q2 2007 is included here for illustration of previous trends.

22 This percentage market share differs from the retail broadband market share (revenues) mentioned on page 12 as eircom's retail broadband market share includes other broadband platforms, for example FWA and Satellite.

Figure 3.3.6– Market share of Total Broadband Market



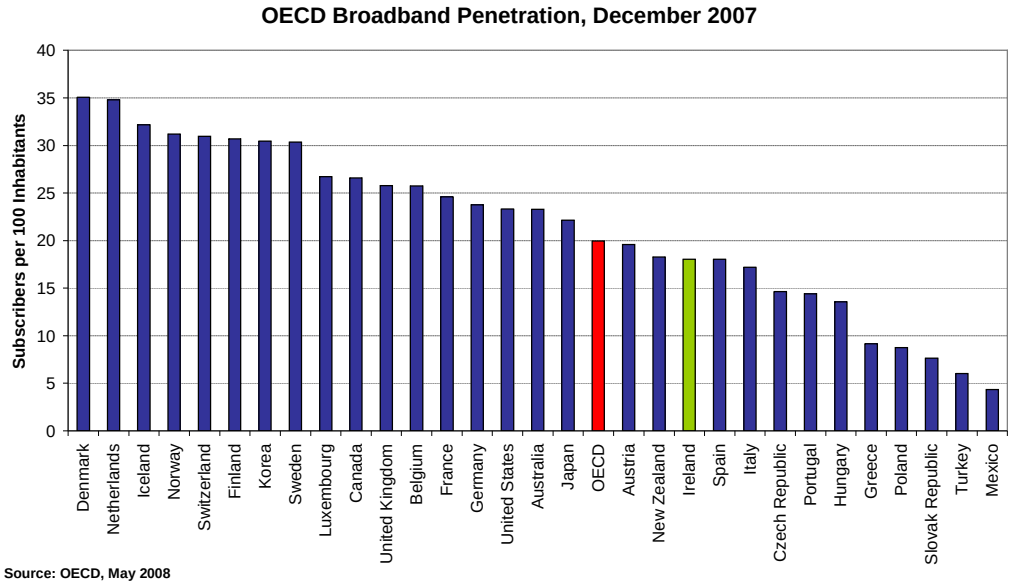
Source: Quarterly Key Data Questionnaire

In presenting broadband penetration benchmarks for European countries, ComReg uses either OECD or European Competitive Telecoms Association (ECTA) data based on the most recently published statistics at the time of publication. ComReg provides broadband data for Ireland to both organisations. Figure 3.3.7 illustrates broadband penetration rates calculated by the OECD per 100 inhabitants as at the end of December 2007[23]. Ireland's broadband penetration rate was 18.1 subscribers per 100 inhabitants in December 2007[24]. Based on the penetration data used by the OECD, Ireland ranks just three places behind the OECD average for the list of countries monitored.

23 http://ec.europa.eu/information_society/policy/ecomm/library/communications_reports/annualreports/13th/index_en.htm

24 The OECD has defined broadband as 256 kbit/s in at least one direction. Mobile broadband is not included in this data.

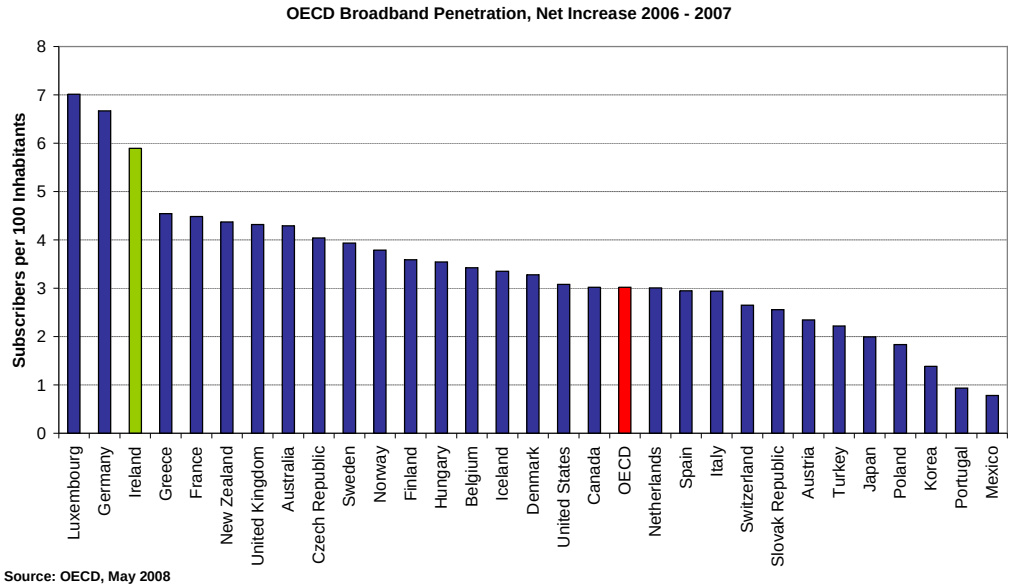
Figure 3.3.7 – OECD Broadband Penetration Rates, December 2007



Source: OECD, May 2008

Figure 3.3.8 shows that the number of broadband subscribers in Ireland has increased by 5.89 subscribers per 100 inhabitants over the last year. This is substantially higher than the OECD average (3.02). Only Luxembourg (7.01) and Germany (6.67) experienced stronger growth.

Figure 3.3.8 – OECD Broadband Penetration Yearly Increase, December 2006 - 2007



Source: OECD, May 2008

The total number of broadband subscribers in Ireland for Q1 2008 was 991,970, a 12% since Q4 2007. The broadband penetration rate in Q1 2008 is 22.9%. Without mobile broadband, the penetration rate is 18.6%.

WiFi Broadband Access

ComReg provides data on the provision of public and private broadband services over WiFi as such access provides an alternative means of internet access for those users without internet access at home and/or a supplementary means of access for users who are away from their home or office. ComReg presents data on the WiFi market based on the number of WiFi hotspots and access points located nationally. Internet hotspots are typically public wireless access points where a computer, usually a laptop, can connect to the internet. A WiFi hotspot can be made up of one or more WiFi access points[25].

In Ireland, as in many countries, WiFi hotspots tend to be found in airports, hotel lobbies and cafés and restaurants. In most cases, the user pays for high-speed internet access at an access point, based either on a vouchered payment for a specific amount of time online or a recurring monthly subscription. There are a number of providers of these services in Ireland including Bitbuzz, eircom and BT Ireland.

The number of WiFi Access Points has fallen by 3% between Q1 2007 and Q1 2008. Data for WiFi Hotspots has only been available since Q3 2007, therefore a YoY growth figure cannot be calculated.

Figure 3.4.1 – WiFi Hotspots and Access Points

	Q1 2008	Q4 07-Q1 08 Growth	Q1 07-Q1 08 Growth
WiFi Hotspots	1,221	-2.6%	n/a
WiFi Access Points	2,433	-4.8%	-3%

25 A WiFi access point is a base station through which WiFi users can access the internet

ADSL Pricing Data[26]

In this report broadband tariff baskets have been supplied by Teligen using their T-Connect product. It should be noted that like-for-like comparisons can only be made with the previous quarterly report as the broadband tariff baskets before this were commissioned independently from Teligen by ComReg.

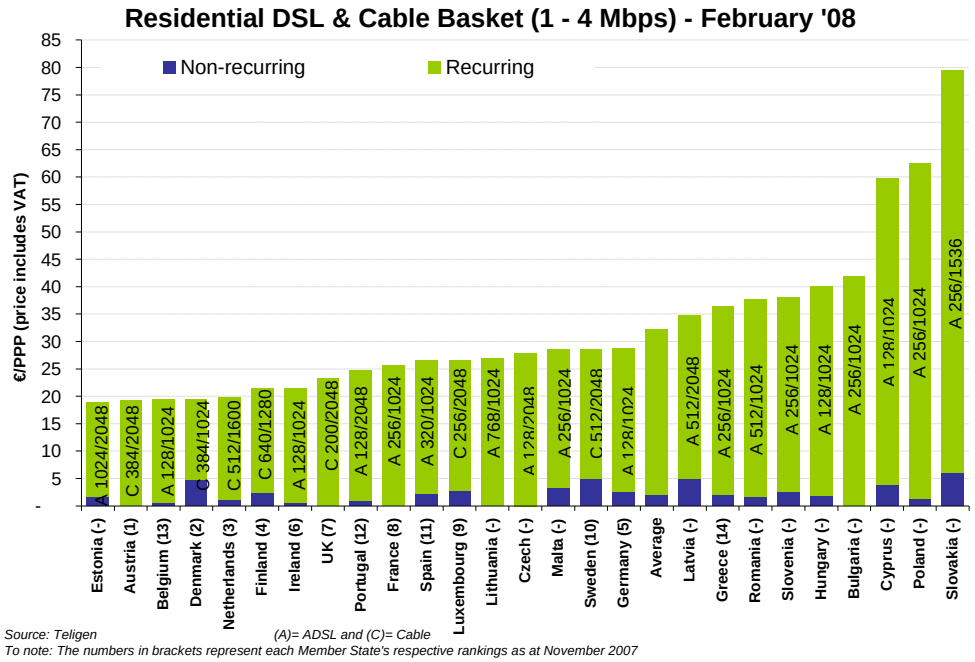
In order to ensure that services can be adequately compared, the benchmarking model prices a range of DSL and cable services based on defined usage of 30 hours per month, with each session assumed to last for 30 minutes. While broadband is an always-on product, the assumption of an average user profile ensures that packages are comparable across countries. It further assumes a download usage of 5 Gigabytes every month for each service. Upload and download speeds (based on contracted speeds) are also analysed. In this report ComReg has compared residential tariffs only.

The data presented in the following chart illustrates the cheapest product available in each country from the incumbent operator under these usage assumptions for residential DSL and cable offerings. These packages have advertised download speeds of between 1 – 4 Mbps and more specific details on the upload and download speeds for each of the analysed products are included in the figures. Speeds of 1-4Mb were chosen for incumbent operators across all benchmarked countries to ensure that a meaningful comparison can be made between packages in terms of contracted speeds offered. Incumbent operators' broadband packages are compared on the assumption that their products should be available nationally. Further information on the composition of the broadband basket can be found in the Explanatory Memorandum which accompanies this report[27].

26 This section does not include broadband tariff packages that are offered as special promotions. All tariffs are inclusive of VAT. VAT rates vary between Member States.

27 ComReg Document 08/43a

Figure 3.5.1 – Lowest Monthly Rental Residential DSL & Cable Basket (1 – 4 Mbps) – Feb '08



Source: Teligen *(A)= ADSL and (C)= Cable*
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

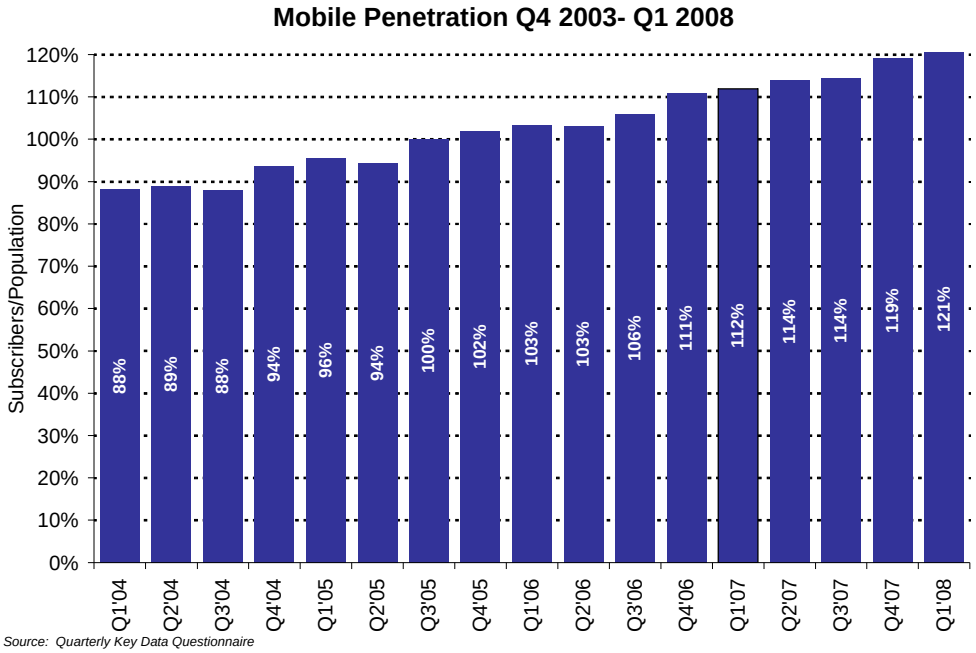
Ireland ranks in 7th place in the DSL & Cable basket and compares very favourably with the EU27 average. The Irish broadband product benchmarked is eircom's Broadband Home Starter package.

4 Mobile Market Data

Number of Subscriptions and Penetration Rate

Mobile Penetration in Ireland and Europe

Figure 4.1.1.1 – Irish Mobile Penetration Rate



Source: Quarterly Key Data Questionnaire

At the end of December 2007, there were over 5.4 million 2G and 3G mobile subscriptions in Ireland[28]. Figure 4.1.1.1 illustrates the growth in mobile penetration since Q1 2004 and notes that at the end of March 2008, mobile penetration, based on population data at the start of April 2008, in Ireland was 121%[29]. Total mobile subscriptions increased by almost 278,000 in the quarter driven by increases in the post paid and HSDPA customer base. Mobile penetration is recognised as the standard metric internationally to describe the adoption of mobile services, and is calculated based on the number of active SIM cards[30] per 100 of the population. Given that some mobile users may have used more than one active SIM card during the period, there is likely to be some over-estimation of actual mobile usage using this metric. [31]Mobile subscriptions now include active SIMs bundled with HSDPA datacards and USB modems for internet access via laptops/PCs as well as SIM cards used in mobile phones for voice and data services. Q3 and Q4 2007 data have been revised to include these subscriptions.

28 ComReg currently does not include a separate analysis of the 3G market in this report.

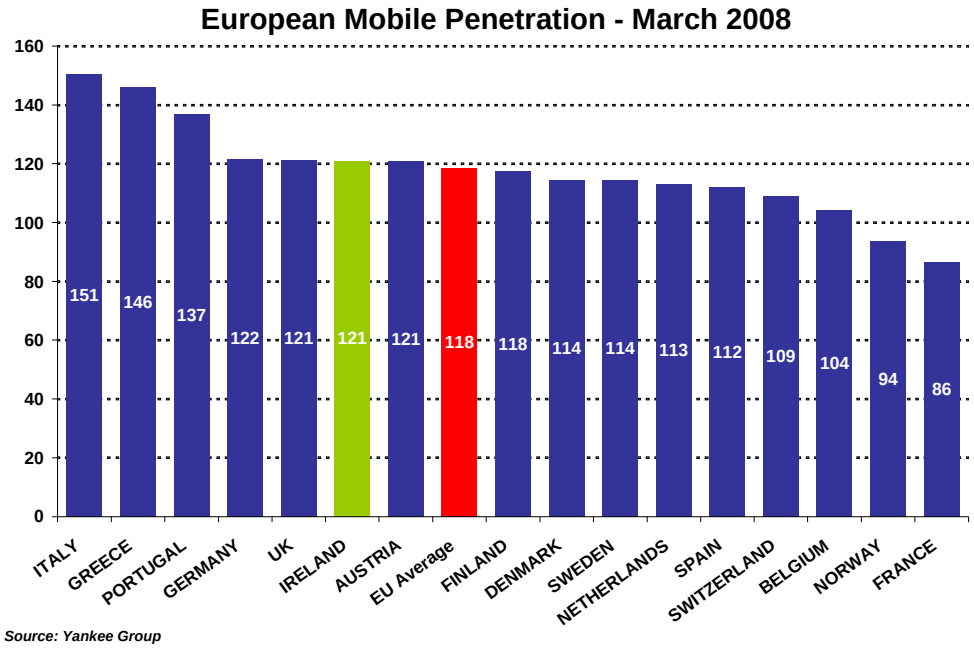
29 Figures since Q3 2007 have been amended in this report to include HSDPA subscribers.

30 Vodafone defines an active SIM as one on which a billable event, i.e. made an outgoing call or sent a text, has occurred in the previous 8 months; all other market operators define an active SIM as one on which a billable event has occurred in the previous 3 months.

31 Data for Tesco Mobile was included for the first time as of Q4 2007.

Figure 4.1.1.2 illustrates estimated national mobile penetration rates across European countries in March 2008. Ireland (121%) ranks above the average of 118%.[32]

Figure 4.1.1.2 – European Mobile Penetration Rates



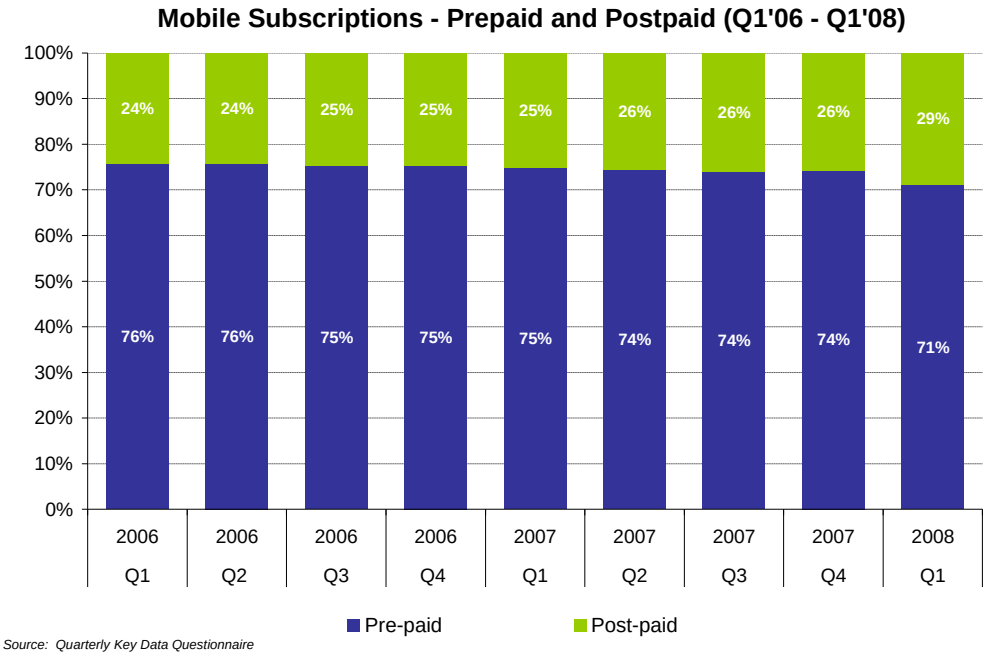
Source: Yankee Group

32 Irish data sourced from ComReg includes HSDPA subscribers. Not all countries in this chart may include HSDPA subscribers.

The *Profile* of Mobile Subscriptions in Ireland

Mobile subscribers in Ireland pay for their mobile service by either purchasing pre-paid credit, or by receiving a monthly bill from their mobile operator, described in this report as a post-paid payment option. Figure 4.1.2.1 illustrates the mobile subscription base in Ireland classified by the proportion of pre-paid and post-paid subscriptions on both 2G and 3G networks at the end of March 2008[33]. The pre-paid/post-paid subscriber split has seen little change since 2006. The proportion of post-paid subscribers has increased in Q1 2008 due to the inclusion of HSDPA datacards and USB modems. If HSDPA data was not included then the pre-paid/post-paid split would remain unchanged since Q2 2007.

Figure 4.1.2.1 – Proportion of Pre-Paid and Post-Paid Subscriptions

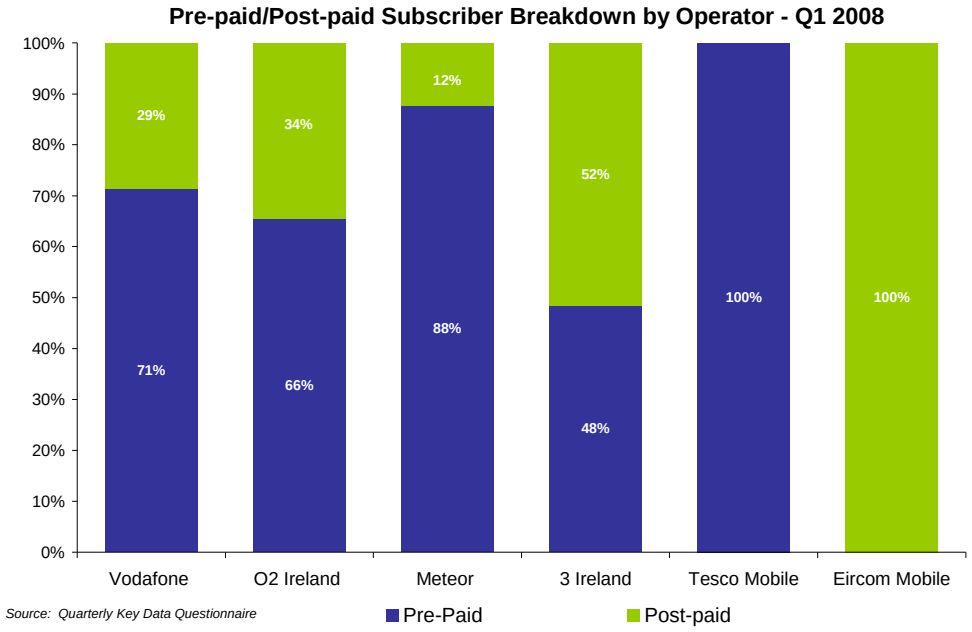


Source: Quarterly Key Data Questionnaire

Figure 4.1.2.2 indicates the pre-paid and post-paid subscription profile of each of the mobile operators in the Irish mobile market (unlike last quarter this figure includes HSDPA). Eircom mobile is included for the first time in this quarter. Eircom mobile, which is a business only service, has the highest proportion of post-paid customers with all of its subscriptions in the post-paid category. Tesco reports the largest proportion of pre-paid subscriptions, with all of its subscriptions base using the pre-paid payment option. Vodafone's subscriber base is split in favour of pre-paid subscriptions at 71%. O2 and Meteor's subscriber bases are also orientated in favour of pre-paid payment at 66% and 88% respectively. 3 Ireland's subscription base is marginally greater in the post-paid payment option, as initially, 3 Ireland offered only post paid services.

33 Mobile broadband subscriptions (HSDPA) are included only from Q1 2008 in this chart due to data split availability issues.

Figure 4.1.2.2 – Profile of Pre-Paid and Post-Paid Subscriptions – by Operator



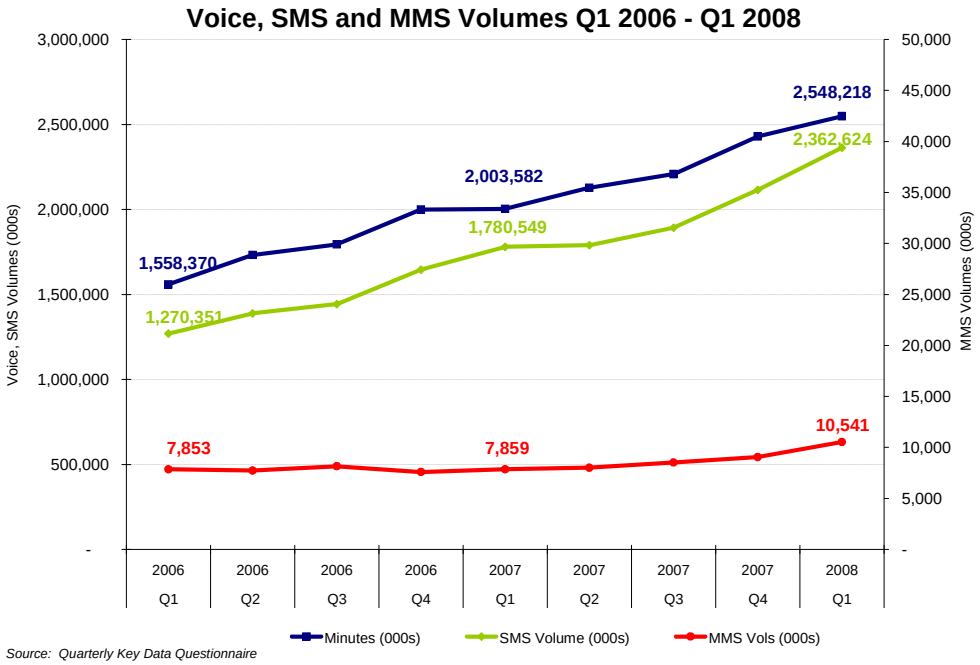
Source: Quarterly Key Data Questionnaire

Mobile Volumes

Total Voice, SMS and MMS Mobile Traffic

Figure 4.2.1.1 illustrates the growth in voice minutes, SMS, and MMS (Multimedia Messaging Service) messages sent since Q1 2006. Total retail mobile voice traffic totalled over 2.5 billion minutes in Q1 2008. This represents a growth rate of 5% in voice volumes since the previous quarter, and a 64% increase in voice volumes since the same period in 2006. Mobile originating minutes now account for 52% of all voice traffic in the Irish telecommunications markets. The total number of SMS messages sent by mobile users in Ireland totalled 2.32 billion in Q1 2008. SMS messaging grew by a steady 12% quarter on quarter, and volumes of SMS have increased by 86% on the same period in 2006. If the total volume of text messages is averaged over all active subscriptions, an average of 156 SMS messages were sent per subscription, per month in Q1 2008, compared with 125 in the same period last year. This large increase may be due to seasonality issues.

Figure 4.2.1.1 – SMS, MMS and Call Minutes



Source: Quarterly Key Data Questionnaire

The number of MMS messages, or multimedia messages such as picture messages, sent in the quarter, though relatively low when compared to voice minutes and SMS volumes, continues to increase. There were just over 10.5 million MMS messages sent during the quarter. This is an increase of 16% on the previous quarter. Again, this increase may be due to seasonality issues.

Mobile Revenues

In Q3 2007, HSDPA revenues were assigned to "Voice and Other Revenues". This method has been changed and now HSDPA revenues are included under "Data Revenues" along with SMS and MMS revenues. As a result, comparison is only worthwhile from Q3 2007 onwards. Data prior to Q3 2007 is presented here for historical trend purposes only.

Mobile retail revenues for the quarter were almost €496.8 million, a decrease of over €31 million on the previous quarter[34].

34 Total mobile revenues have fallen in Q1 2008 due to increased intensity of competition among operators, reductions in mobile termination rates, EU price caps on roaming charges and a fall in gross handset sales which may be due to seasonality issues.

Figure 4.3.1 – Total Mobile Retail Revenues Q1 06- Q1 08

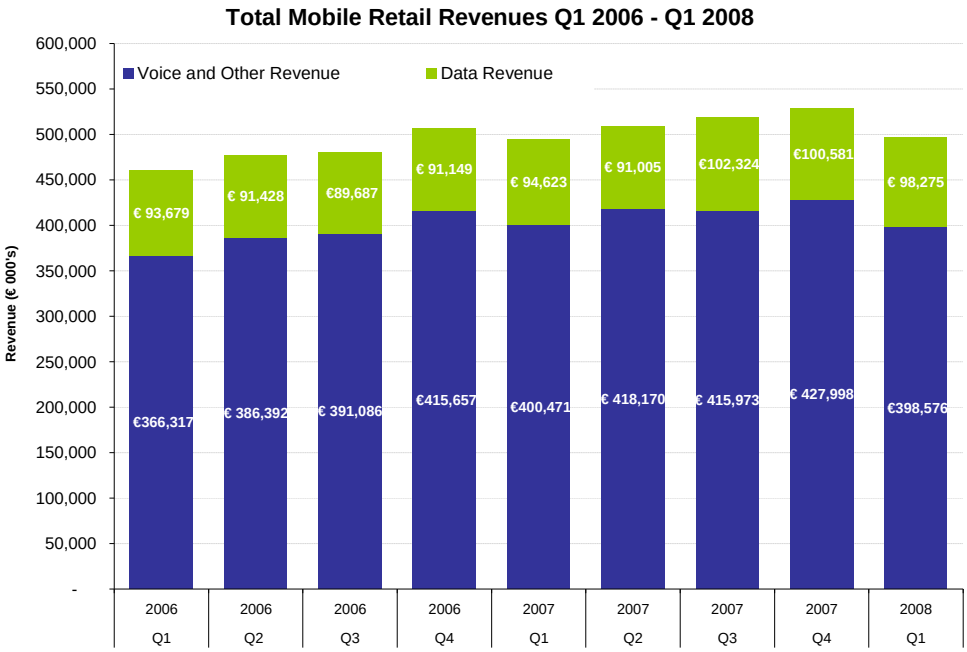
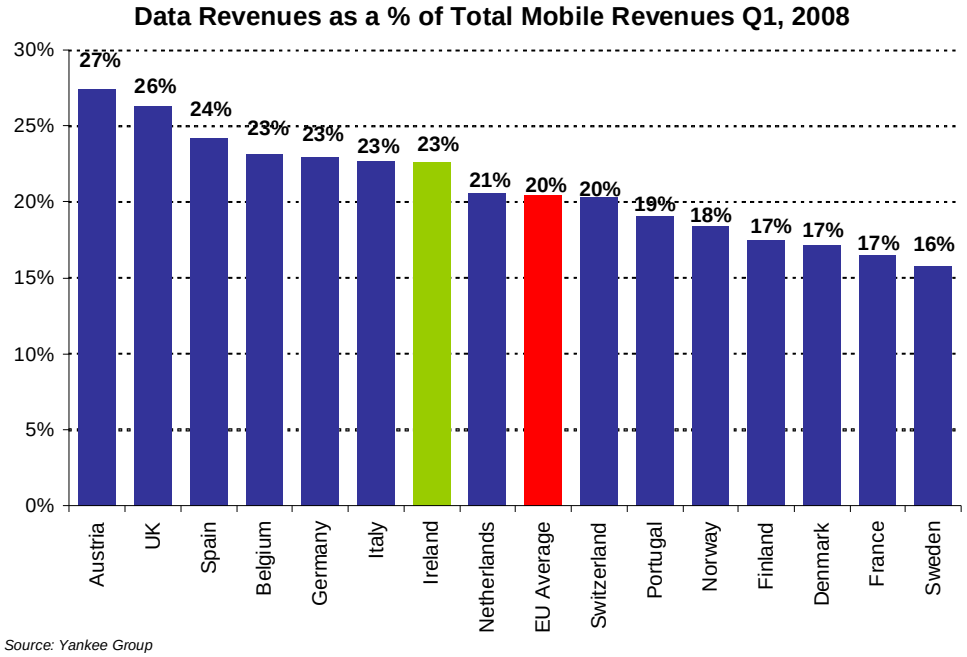


Figure 4.3.2 outlines the percentage of mobile revenues attributable to all data revenues in the Irish market compared to a number of other EU-15 markets. This benchmarking data is calculated independently by the Yankee Group, and includes data revenues not only from SMS and MMS messaging, but also data revenues from GPRS data services and 3G data services. Irish mobile operators have dropped two places since the last quarter to 7th, in terms of the highest level of data revenues among the countries analysed. Ireland has 23%[35] of total mobile revenues attributable to data revenues. This is a 2.4% increase since Q4 2007.

35 Data revenues identified by the Yankee Group include revenues from SMA, MMS, GPRS and 3G data services.

Figure 4.3.2 - Data Revenues as % of Total Mobile Revenue[36]



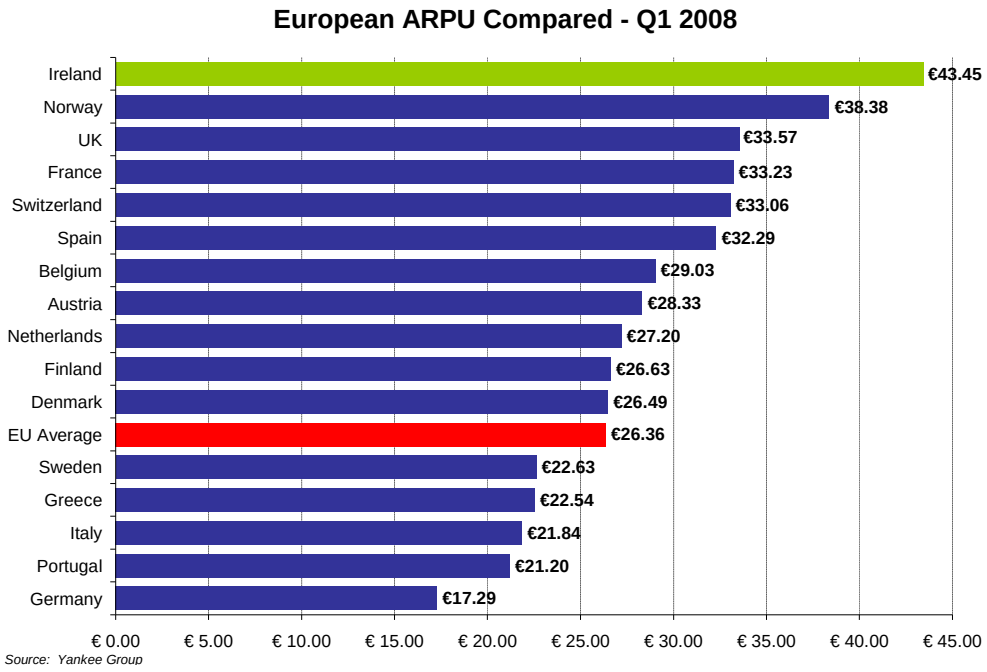
Source: Yankee Group

Figure 4.3.3 compares ARPU (average revenue per user) across 16 European countries[37]. Average revenue per user is an indication of average monthly revenue generated by mobile subscribers in each country. Mobile ARPU in Ireland is estimated at €43.53 per month in Q1 2008, a 2.3% decline in ARPU since the same period in 2007. The EU average ARPU has also fallen over this period. Mobile ARPU in Ireland still remains the highest among the EU member states monitored.

36 Note that the graph relates to EU-15 countries except Luxembourg where no data was available.

37 As far as possible, ARPU figures are obtained directly from operators. Where unavailable, ARPU is calculated by dividing annual service revenues by the mid-term installed base (the sum of the opening and closing customer bases for the period divided by two). Once the Yankee Group has obtained or calculated all individual ARPU figures, they are applied to each operator's mid-term user base to obtain service revenues by operator, which are then combined to obtain a country total. This total revenue figure is then divided by total mid-term users to derive country-level ARPU. Note that the graph relates to EU-15 countries except Luxembourg where no data was available.

Figure 4.3.3 - European ARPU Compared – Q1 2008



Average Minutes of Use

Mobile monthly ARPU is a function of both the price of mobile services and the level of usage of mobile services. The most frequently used metric to determine levels of mobile telephony usage is monthly minutes of use. ComReg has collected monthly minutes of use data from all operators in the Irish market since Q1 2007. Further information on the definition and calculation of average minutes of use by ComReg is detailed in the explanatory memorandum which accompanies this report[38]. Average minutes of use in Ireland for Q1 2008 were 227 minutes per month, a 2.8% decrease on usage since the previous quarter.

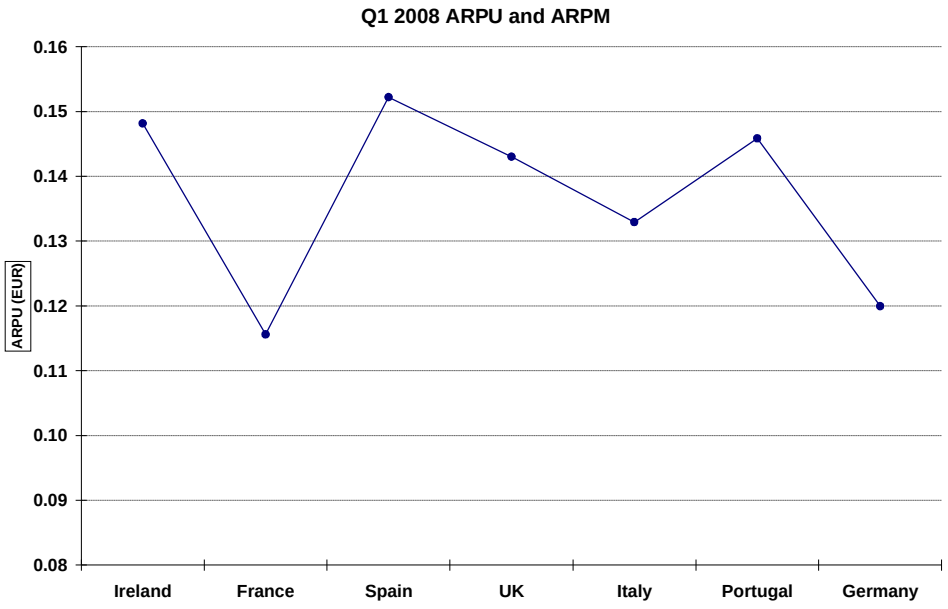
38 ComReg Document 08/43a

Figure 4.4.1 – Minutes of use Q4 2007-Q1 2008

Country	MoU Q407	MoU Q108	Quarterly Change Q407-Q108
France	240	240	+0.1%
Ireland	234	227	-2.8%
Spain	164	161	-2.1%
UK	170	173	+1.9%
Italy	131	127	-2.8%
Portugal	118	118	-0.6%
Germany	109	111	+2.3%

Yankee Group has provided ComReg with data which provides estimates of monthly minutes of use for mobile markets in 7 European countries. Figure 4.4.2 plots Average Revenue Per Minute (ARPM), which is published for the first time by ComReg, for these countries[39]. ARPM is not the rate per minute that would be paid by a customer in any of these countries. It is an indicative per minute rate based on a limited data set, not split by pre- and post-paid revenues[40]. ARPM shows that revenues per minute of use by an Irish customer are just below those of Spain and similar to those of Portugal.

Figure 4.4.2 – Average revenue per minute (ARPM), Q1 2008



Source: Yankee Group

39 The necessary data for calculating ARPM was only available for Ireland, France, Spain, UK, Germany, Italy, and Portugal.

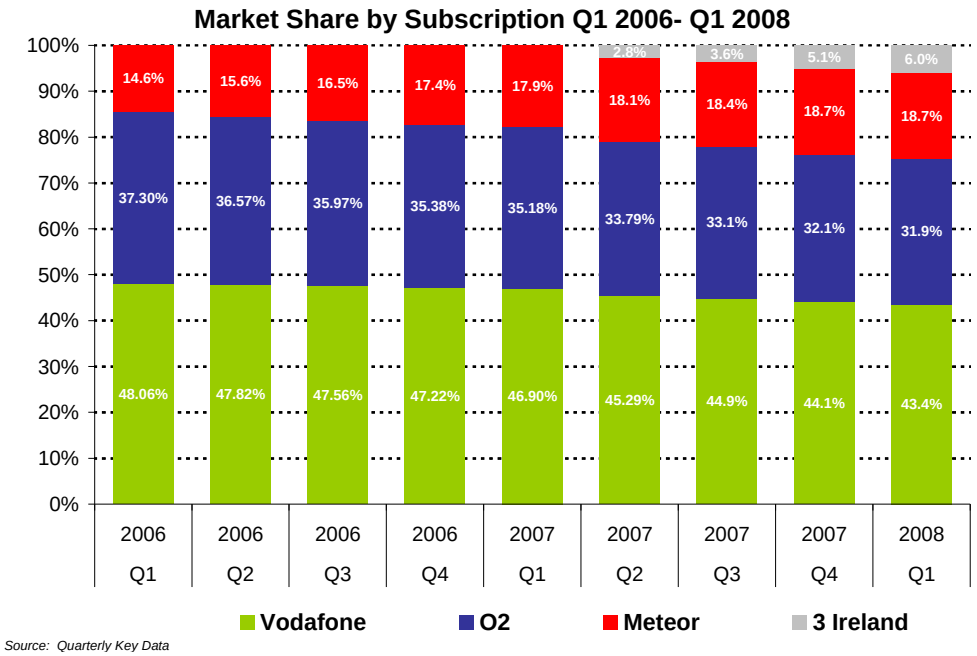
40 Average Revenue Per Minute is calculated by dividing monthly voice-only ARPU by MOU. Revenues used in the calculation include those related to roaming and wholesale termination.

Competition in the Mobile Market

Mobile Market Shares- By Subscription and Retail Revenues

Figure 4.4.1.1 outlines mobile market share based on the number of active subscriptions reported by each operator. Figures from Q3 2007 have been revised to include HSDPA subscribers. It should be noted that while a historical picture of market share is presented in these charts, market share figures presented since Q2 2007 are not comparable with data previously presented. It should be further noted that while 3 Ireland's market share is presented as a percentage of all market subscriptions in Ireland, 3 Ireland operates only in the 3G sector. Furthermore, Tesco Mobile, which entered the market in Q4 2007, only operates in the pre-paid sector and eircom Mobile, which entered the market in Q1 2008, only operates in the post-paid sector. Tesco and eircom mobile are not included in figure 4.4.1.1. 3 Ireland currently accounts for 6% of the total active mobile subscription base in Ireland. In Q1 2008, both Vodafone and O2 have seen slight declines in their market share while, between them, all other operators account for almost 25% of the market.

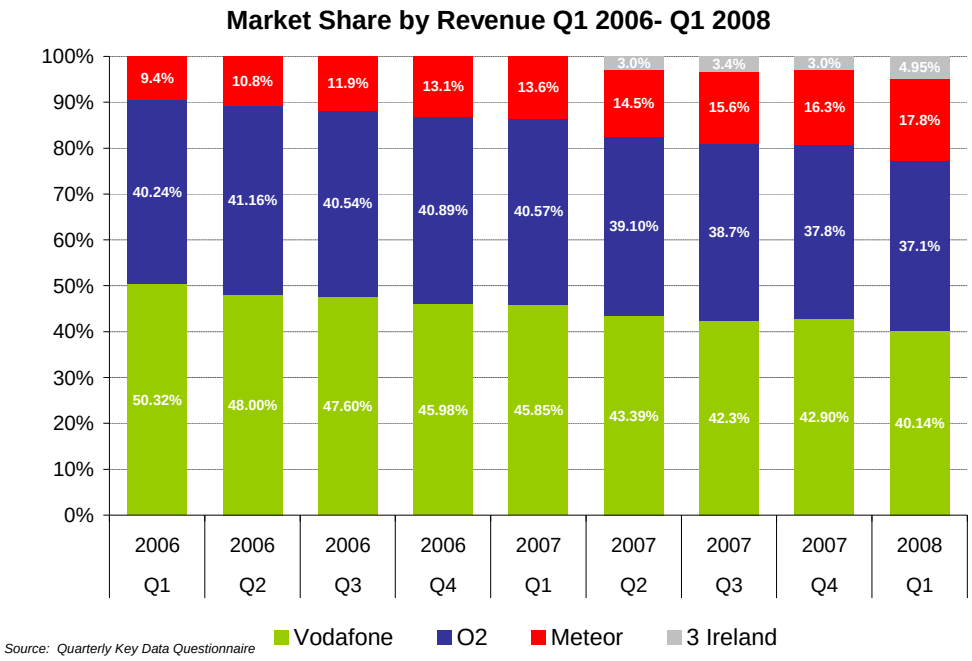
Figure 4.4.1.1 – Market Share – Number of Subscriptions



Source: Quarterly Key Data

Figure 4.4.1.2 provides an analysis of market shares by revenue for mobile operators in the Irish market. Tesco and eircom mobile are not included in figure 4.4.1.2. 3 Ireland accounted for 4.95% of mobile industry retail revenues in Q1 2008. Meteor's market share has continued to rise steadily and is now 17.8% in Q1 2008. The increase in Meteor's, and 3 Ireland's market shares has led to a decline in Vodafone's and O2's market share in Q1 2008.

Figure 4.4.1.2 – Market Share – Revenue



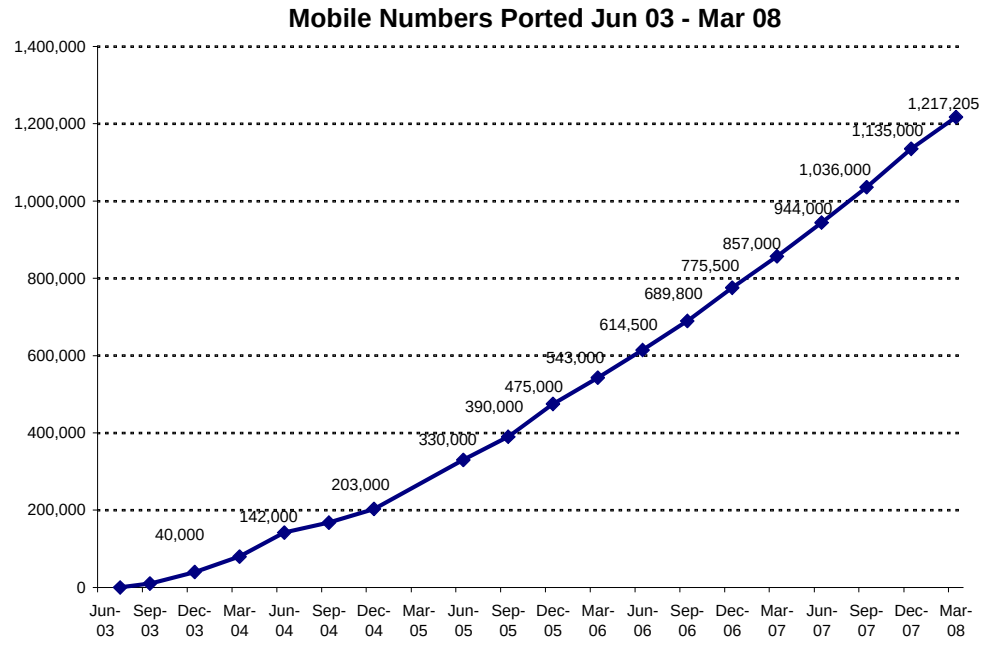
Source: Quarterly Key Data Questionnaire

4.1.1 Switching in the Mobile Market

Figure 4.4.2.1 illustrates the cumulative total of mobile numbers ported between Irish mobile operators since the launch of Mobile Number Portability (MNP) in June 2003. MNP allows mobile subscribers to switch mobile operator while retaining their mobile number.

A total of 1,217,205 people have used MNP to switch operator since June 2003. In Q1 2008 just over 82,500 numbers were ported to another operator; based on data since March 2007, an average of over 88,000 numbers are ported each quarter.

Figure 4.4.2.1 – Mobile Numbers Ported



Source: Quarterly Key Data Questionnaire

Mobile Pricing Data[41]

The Teligen mobile baskets presented in this Quarterly Report are based on an OECD-approved methodology using assumptions around specific usage levels for low, medium and high contract and pre-paid subscription packages. They are calculated and analysed independently by Teligen, using an OECD methodology which includes PPPs (Purchasing Power Parities) to reflect the real cost of mobile services compared to all other costs within a country. While all mobile post-paid tariff baskets presented in the Teligen baskets are currently based on typical 2G services as approved by the OECD, ComReg recognises that there may be other more competitive packages available with 3G handsets.

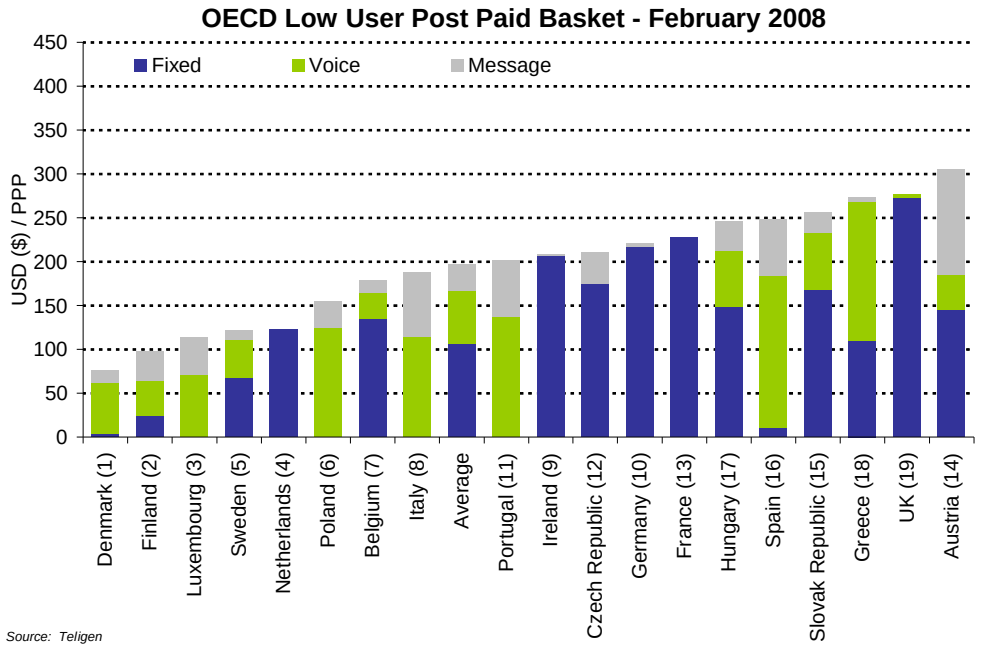
Low User Post Paid Mobile Basket[42]

Ireland ranks 10th out of the EU19 countries benchmarked. Ireland has dropped one place since the last quarter. The top five countries remain the same as the last quarter.

41 The 'Fixed' component of price refers to the standard charges imposed by operators, regardless of the amount of calls made (i.e. connection and rental). Teligen's calculation of this figure is made up of: Installation Charge/5 + Rental charge for 1 year. The 'Voice' component of price refers to the charges imposed by operators, arising from the number of voice calls made by the user, while "Message" refers to the charges imposed by operators, arising from the number of SMS and MMS messages sent by the user.

42 All tariffs are inclusive of VAT, rates will vary between Member States

Figure 4.5.1.1 - OECD Low User Post Paid Mobile Basket – February 2008

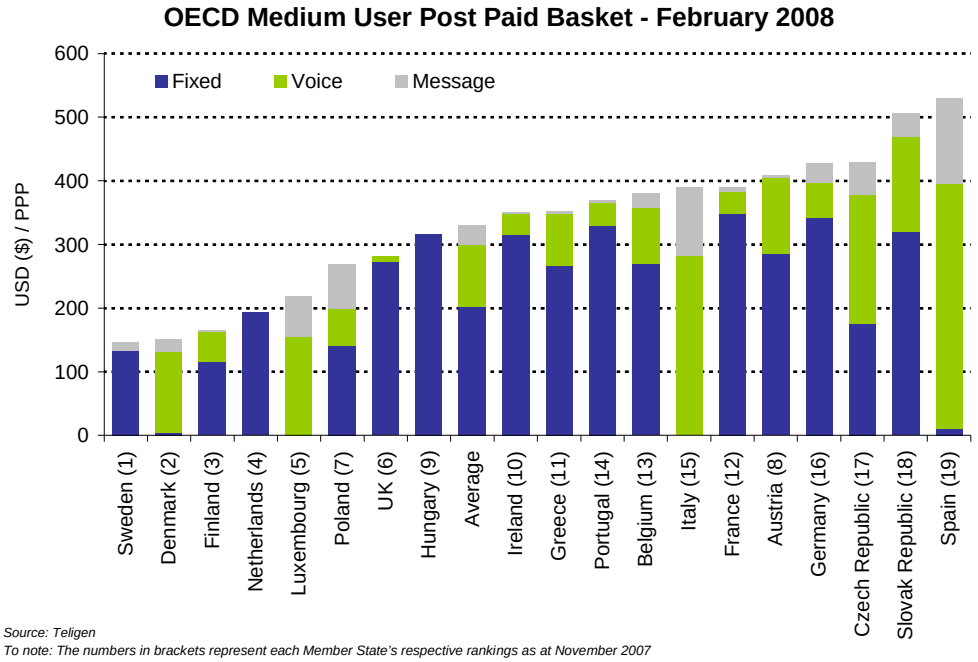


Source: Teligen
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

Medium User Post Paid Mobile Basket

Ireland ranks 9th on this measure, an improvement of one place since the last quarter. Ireland now lies just two places behind the EU19 country average for this basket.

Figure 4.5.2.1 - OECD Medium User Post Paid Mobile Basket – February 2008

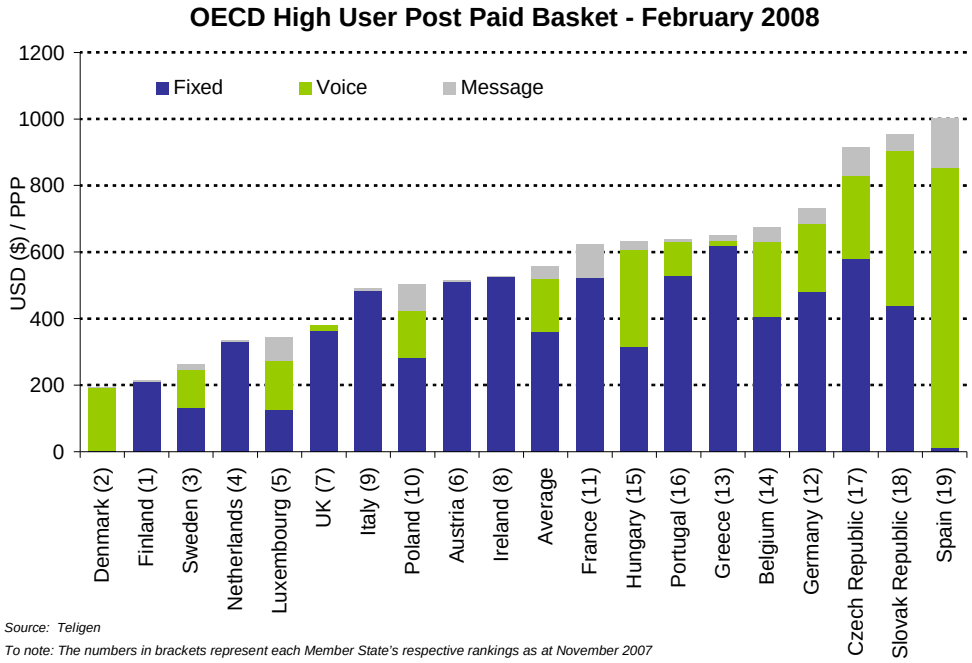


Source: Teligen
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

High User Post Paid Mobile Basket

In the High-User Post-Paid basket, Ireland now ranks 10th among the EU19 countries, a decrease of two places since the last quarter. Ireland now ranks just above the EU19 average.

Figure 4.5.3.1 - OECD High User Post Paid Mobile Basket – February 2008



Source: Teligen

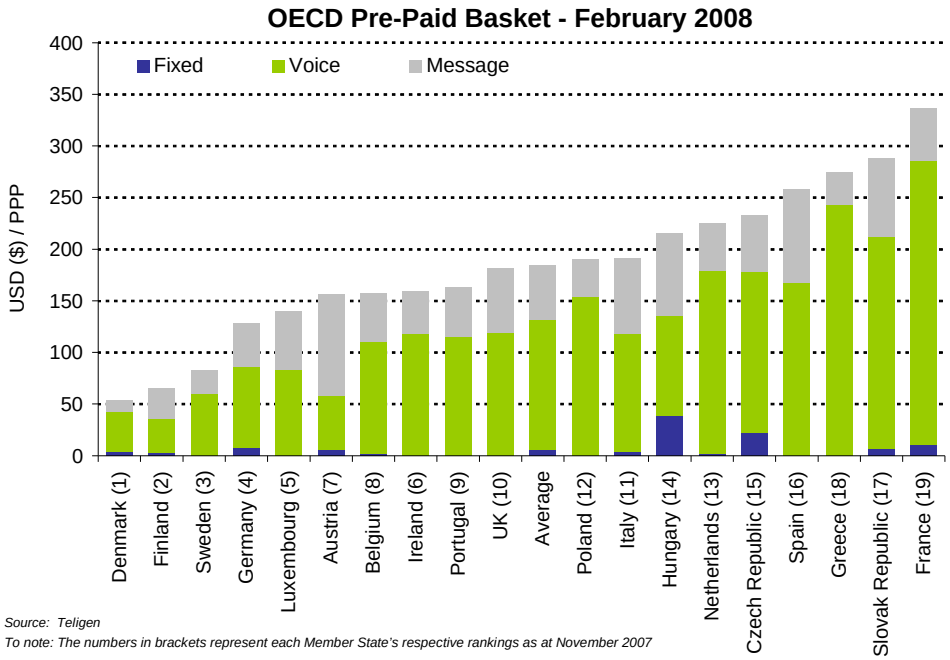
To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

Pre-Paid Mobile Basket[43]

Ireland ranks 8th on this measure, a decline of two places since the last quarter. However, Ireland still ranks above the EU19 average. Denmark continues to rank 1st on this measure while France maintains the lowest position among the benchmarked countries.

43 The OECD has found that there is little difference between the average pre-paid usage and low-user post-paid usage. Thus, the pre-paid and low user post paid baskets are based on the same usage assumptions.

Figure 4.5.4.1 - OECD Pre-Paid Mobile Basket – February 2008



Source: Teligen

To note: The numbers in brackets represent each Member State's respective rankings as at November 2007

5 Broadcasting

Overall Broadcasting Market

The broadcasting analysis provided in this report uses operator data in conjunction with CSO estimates[44] of the total number of TV households in Ireland. This is particularly relevant in deriving the number of households that use only a Free-to-Air[45] television service. There are 1.46 million TV households in Ireland, based on the CSO's 2007 Information Society report.

Of the total number of TV households at the end of March 2008 there were approximately 558,297 subscriptions to cable[46]/MMDS[47] television services in Ireland. For the same period BSkyB reported 548,000 Irish satellite[48] TV subscribers, a growth of 64,000 subscribers since the same reporting period last year. The total number of pay TV households in Ireland (cable, MMDS and satellite) is 1.106 million.[49] Pay-TV households now represent 76% of all homes with a television.

Figure 5.1.1 – Broadcasting Subscriptions and growth rates by Platform

Platform	Number of Subscriptions Q1'08	Quarterly Change Q407-Q108	Annual Change Q107-Q108
Analogue Cable	249,728	-3.1%	-10.8%
Digital Cable	217,606	+1.5%	+6.6%
MMDS	90,963	-0.6%	+4.4%
Satellite	548,000	+2.4%	+13.2%
Free-to-View	352,003	-2.2%	-12.7%

44 ComReg uses the most up to date figure for TV households as per CSO figures when calculating penetration of Pay TV services. The latest CSO data published in the 2007 Information Society and Telecommunications report, reported 1.4583 million TV households in Ireland.This figure will remain fixed in future quarterly reports as the CSO will not be revising this figure in the near future.

45 Free-to-Air television broadcasts are sent unencrypted and may be received via any suitable receiver. Although these channels are described as 'free', the viewer does pay for them by payment of a licence fee.

46 Cable television is a system of providing television to consumers via radio frequency signals transmitted to televisions through fixed optical fibres or coaxial cables as opposed to the over-the-air method used in traditional television broadcasting (via radio waves) in which a television antenna is required.

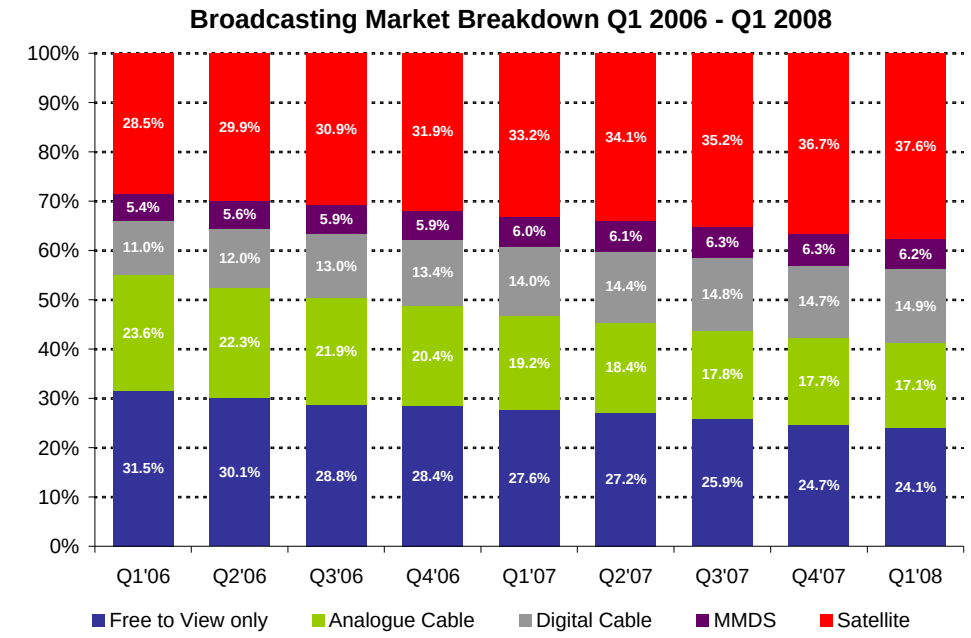
47 MMDS (Multichannel Multipoint Distribution Service) is a wireless telecommunications technology, used as an alternative method of cable television programming reception. MMDS is usually used in sparsely populated rural areas, where laying cables is not economically viable.

48 Satellite television is television delivered by way of communications satellites, as compared to conventional terrestrial television and cable television. Figures for satellite homes are based on Sky's publicly announced figures.

49 TV can also be delivered through other mechanisms such as over the internet (IPTV). While this data is not presented in this quarter, ComReg hopes to include such information in the future.

Figure 5.1.2 profiles TV households in Ireland based on those households who subscribe to an analogue or digital cable television service, MMDS, a digital satellite service, or a free-to-air television service.

Figure 5.1.2 - Delivery of Broadcasting Services

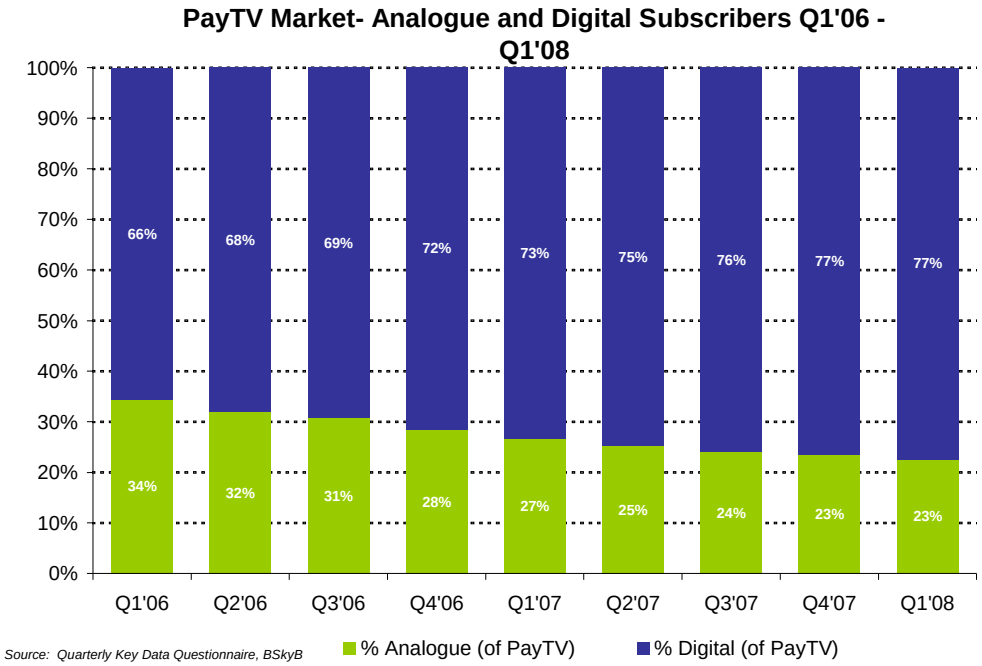


Source: Quarterly Key Data Questionnaire, BSkyB

Pay TV

Figure 5.2.1 profiles the pay-TV market in Ireland, comparing those who subscribe to an analogue service provided by cable operators, and those who pay for digital TV, provided via either a digital cable service (inc. MMDS) or satellite service. In Q1 2008 77% of all those subscribing to a paid television service in Ireland had a digital subscription. This figure remains unchanged from the last quarter, but represents a growth rate of 5.4% between Q1 2007 and Q1 2008.

Figure 5.2.1 - Pay TV Market (Analogue and Digital)



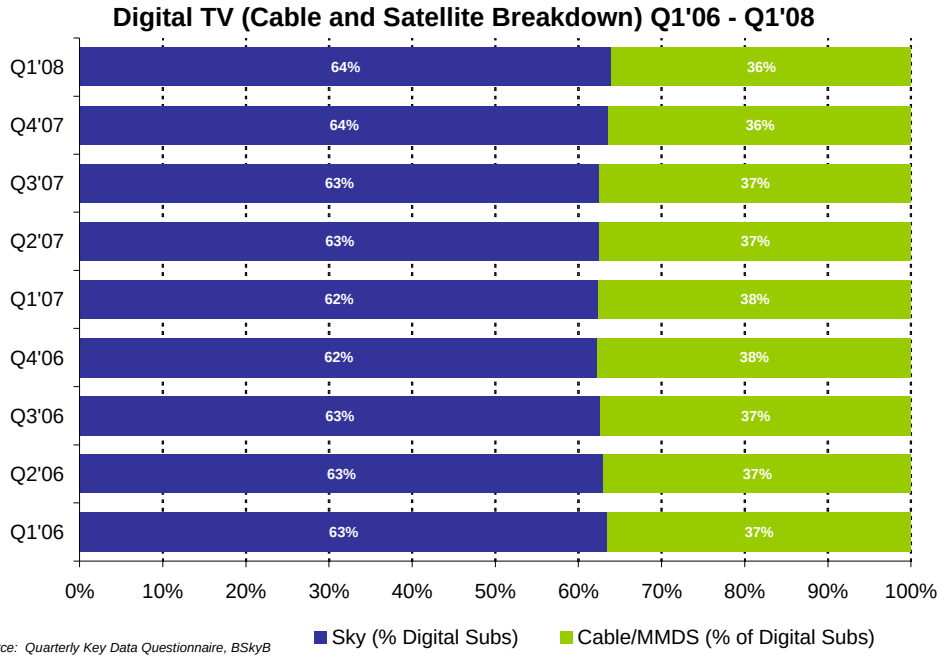
Source: Quarterly Key Data Questionnaire, BSkyB

Digital TV

At the end of March 2008, there were 856,569 digital TV subscribers which include cable/MMDS and satellite customers; this is an absolute increase of over 15,600 subscribers since Q4 2007. 59% of all TV households in Ireland now receive their TV service via a digital television signal, based on either digital cable (inc. MMDS) or satellite.

Figure 5.3.1 profiles the digital TV market, examining the proportion of digital subscribers who receive their TV signal via a satellite subscription compared with those using digital cable. This split of the consumer base has remained relatively unchanged over the last two years.

Figure 5.3.1 - Digital TV (Cable and Satellite Breakdown)



Source: Quarterly Key Data Questionnaire, BSkyB

6 Emerging Trends

IPv6 – Next Generation Internet Protocol

The Emerging Trends series in the Quarterly Report aims to provide information on innovations and emerging technologies within the electronic communication sector. Since its inception in the late sixties,[50] the internet has rapidly developed to become a fundamental infrastructure for economic and social activity globally. This quarter's Emerging Trends looks at the Next Generation of Internet Protocol – IPv6, which has been designated as the successor to the current version IPv4.

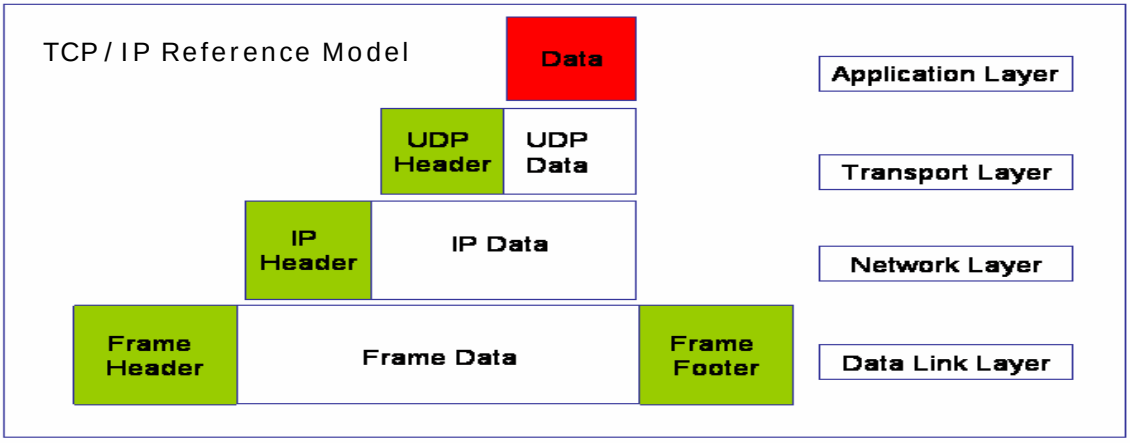
Internet Protocol – An overview:

The Internet is a worldwide, publicly accessible series of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP). It is a system of networks that consists of millions of smaller domestic, academic, business, corporate and government networks, which together transmit various information and services, such as electronic mail, online chat and file transfer. Each computer or host on the Internet has at least one IP address that distinctively identifies it from all other computers on the Internet. When a user sends or receives data, the message gets divided into segments called packets. Each of these packets contains both the sender's Internet address and the receiver's address. Any packet is sent first to a gateway computer that understands a small part of the Internet. The gateway computer reads the destination address and forwards the packet to an adjoining gateway which in turn reads the destination address and so on across the Internet until one gateway distinguishes the packet as belonging to a computer within its domain. That gateway then forwards the packet directly to the computer whose address is specified. Because a message is divided into a number of packets, each packet can be sent by a different path across the Internet. Packets can arrive in a different sequence than the order in which they were originally sent. The Internet Protocol merely delivers them. It is up to another protocol, the Transmission Control Protocol (TCP) to arrange them in the correct sequence.

The TCP in conjunction with the IP is termed the Internet protocol suite and essentially is the set of communications protocols that implement the protocol stack or communication stack on which the Internet and most commercial networks run. The TCP/IP reference model consists of four layers. From lowest to highest, these are the data link layer, the network layer, the transport layer, and the application layer. Each layer solves a series of problems involving the transmission of data, and provides a defined service to the upper layer protocols based on using services from some lower

[50] A Brief History of the Internet: Origins of the Internet. Version 3.32, Dec. 2003. Leiner, B., et. al. – Published by The Internet Society.

layers. Upper layers are closer to the user and deal with more abstract data, relying on lower layer protocols to translate data into forms that can eventually be physically transmitted. TCP/IP, originally built for low-reliability wireless packet radio networks, is now the most dependable and widely deployed network in the world.



IPv6 – What is it and why do we need it?

The IPv4 version developed in the 1970's remains the predominant protocol in use today. However, with the rapid growth of the Internet through the 1990's, there was an equally rapid decrease in the number of free IP addresses available under IPv4. IPv4 uses 32-bit addresses, limiting it to just over 4 billion unique addresses, many of which are reserved for special purposes such as local networks or multicast addresses, reducing the number of addresses that can be allocated as public Internet addresses. A typical 32 bit IP address looks like this: 216.27.61.149. To make it easier for us to remember, IP addresses are normally expressed in decimal format as a "dotted decimal number" like the one above. But computers communicate in binary form and the same IP address would look like this 11011000.00011011.00111101.10010101.

As of June, 2008, almost 1.408 billion people use the Internet according to Internet World Stats.[51] There is now an expectation that IPv4 will run out of previously allocated space by 2010 or 2011 as only 16% (or 700 million) of the total IPv4 address space remains unused as of early 2008.[52] Several factors threaten the Internet with address exhaustion including the spread of mobile devices such as laptops and smart phones, always-on connections and inefficient address usage. Each of these considerably increases the demand on the limited supply of 32-bit addresses.

A number of solutions are being discussed in order to try and mitigate for the inevitable exhaustion of IPv4, including; implementing a resource reclaiming policy, making use of experimental blocks of IPv4 which was initially set aside for experimental reasons and

[51] World usage stats; www.internetworldstats.com
[52] Internet address space: Economic Considerations in the management of IPv4 and in the deployment of IPv6. Organisation for Economic Co-operation and Development .14/05/08

the use of Network Address Translators (NATs). However, any apparent solutions involving IPv4 would be at best medium-term and thus a better long term solution was required. Recommended in January 1995, sometimes also referred to as the Next Generation Internet Protocol, or IPng – IPv6 was put forth as a feasible solution. The Internet Engineering Task Force (IETF) – the main body in charge of developing the protocols used in the Internet - settled on IPv6 as the successor to IPv4. Internet Protocol Version 6 is an upgrade to the most currently available IPv4.

The Benefits of IPv6:

Larger address space

The main feature of IPv6 is the larger address space: addresses in IPv6 are 128 bits long. The larger address space avoids the potential exhaustion of the IPv4 address space without the need for NATs and other devices that break the end-to-end nature of Internet traffic. It will also play a fundamental role in the deployment of 3G Mobile Networks and its new generation of multimedia services and applications.

Auto configuration of hosts and efficient routing topology

IPv6 hosts can be configured automatically when connected to a routed IPv6 network. When first connected to a network, a host sends a link-local multicast request for its configuration parameters; if configured suitably, routers respond to such a request with a *router advertisement* packet that contains network-layer configuration parameters. By using a recognized and simpler header structure, IPv6 will supposedly improve the performance of routing.

Multicasting and Jumbograms

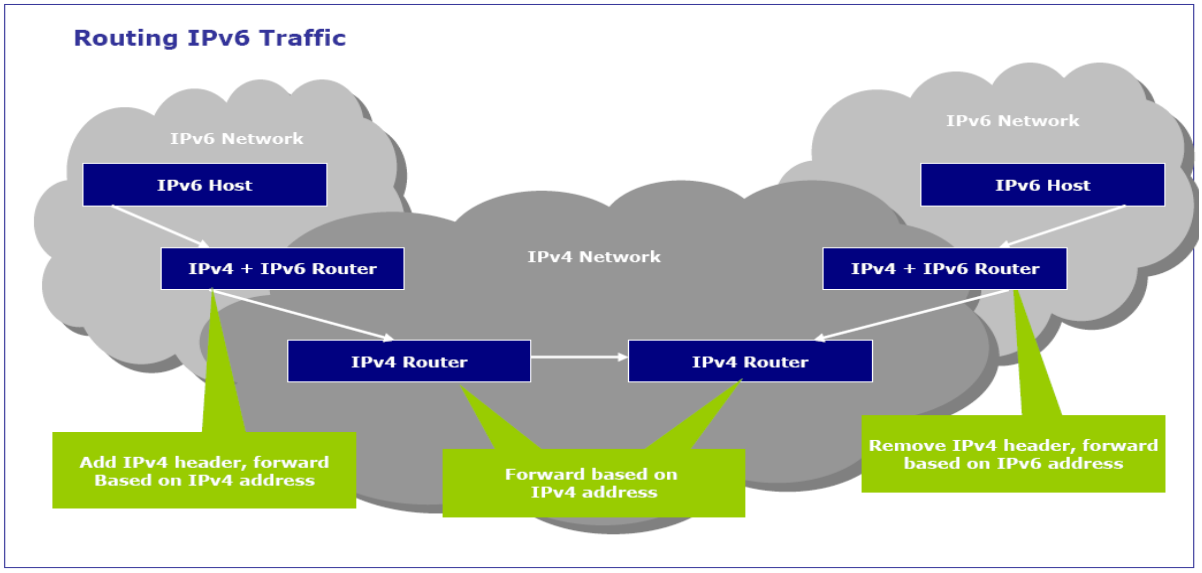
Another example of an IPv6 upgrade is multicasting, which is standard in IPv6 but only optional in IPv4. Multicasting is delivering a data stream to multiple destinations at the same time, with no duplication unless called for. Those functionalities are not supported by IPv4. In IPv4, packets are limited to 64KiB of payload. When used between capable communication partners, IPv6 has support for packets over this limit, referred to as jumbograms. Use of jumbograms might improve performance over high-throughput networks.

Network-layer security and mobility

IPv6 also has two other significant advantages over IPv4. IPv6 offers a higher level of built-in security, and it has been specifically designed with mobile devices in mind. The security comes in the form of IPsec, which allows authentication, encryption, and compression. The mobility comes in the form of Mobile IP, which allows roaming between different networks without losing an established IP address.

Coexistence of/Transition from IPv4 and IPv6

Coexistence: IPv6 and IPv4 are two completely separate protocols. IPv6 is not backwards compatible with IPv4, and IPv4 hosts and routers will not be able to deal directly with IPv6 traffic (and vice versa). IPv4 software and infrastructure will need to be replaced or upgraded. It is also impossible to switch the entire Internet over to IPv6 overnight, therefore for a period of time we will be dealing with a network in which the two protocols will be operating side by side. During the transition period, IPv6 nodes are going to need to communicate with IPv4 nodes, and isolated 'islands' of IPv6 installations will use the wider IPv4 network to connect to each other. Dual IP stacks have been proposed to solve the first problem, and tunnelling to solve the latter. Using a technique called tunnelling; IPv6 packets are put within IPv4 headers to pass through networks without a problem. First, addresses are transformed from IPv4 to IPv6 by adding leading zeroes, and then the IPv6 packet itself is inserted into the header area of an IPv4 packet. The data is then sent out and travels normally through existing infrastructure. At the end of the transmission, an IPv6-aware router can strip the IPv6 packet out of the IPv4 header and route it appropriately to its destination.



Transition: Islands of IPv6 are already in use but infrastructure support has a long way to go and IPv6 traffic has to go through a cumbersome process of remapping onto the IPv4 address space. Many products currently support IPv6, including:

- Cisco routers
- Juniper routers
- Windows XP
- Mac OS X
- Solaris
- Most Linux distributions

Such broad support will make the eventual transition from IPv4 to IPv6 much easier. The transition won't be entirely seamless because some applications and network

services hard-code network addresses into their transmissions and thus will require some major reworking as IPv6 becomes the dominant IP standard. Theoretically from the beginning of 2008 it should be possible to set up an all-IPv6 link because internet root servers have all been provided with the necessary address information. This is just the top level of the routing hierarchy, however, and there is a need for a lengthy and costly upgrade throughout the internet system.

IPv6: Ireland and the Rest of the World

According to a report published by the Organization for Economic Cooperation and Development (OECD), businesses alone are not doing enough to avert an impending shortage of Internet Protocol addresses, and governments must work with them to secure the future of the Internet economy. Twenty-five per cent of all European users should have the opportunity to use IPv6 by the end of 2010, and should be able to access most of their normal services and content with it. The EU Commission set this goal in a statement, published at the end of May, on the new internet protocol and progress in the net[53]. The Commission is joining organisations like the Réseaux IP Européens Network Coordination Centre (RIPE) in calling for rapid action in the face of dwindling reserves of IP addresses.

According to Silicon Republic 'Europe's 'backbone' internet network for research GEANT is already entirely IPv6 compatible and has led to Europe having the highest take-up of IPv6 addresses of any region in the world. However, this improvement has yet to filter through to the public internet'.[54] The U.S. Federal government has mandated initial compliance with IPv6 by June of 2008, and many non-government organizations, including corporations and universities are also strategizing how to best migrate their network infrastructures to IPv6. Ireland's IPv6 Task Force is a group made up of public and private sector representatives all seeking to promote the deployment and awareness of IPv6 under the auspices of The Department of Communications, Energy and Natural Resources. The Taskforce in conjunction with the National IPv6 centre supports the local and global IPv6 community providing technical depth and engagement with the research community and political influence through strategic international partnerships, in particular with the global IPv6 Forum and the worldwide network of the IPv6 taskforces. More information, on the work they are currently involved in can be accessed at the following website http://www.ipv6-ireland.org/

[53] Full document available at : ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=4133

[54] IPv6 will spawn limitless internet addresses - Silicon Republic 28/05/2008