Office of Utility Regulation

Audit of Broadband Services in Guernsey

Information Notice

Document No: OUR 05/14R **June 2005**

Office of Utility Regulation
Suites B1 & B2, Hirzel Court, St Peter Port, Guernsey, GY1 2NH
Tel: (0)1481 711120, Fax: (0)1481 711140, Web: www.regutil.gg

Introduction

In February 2005, the Office of Utility Regulation (OUR) commissioned a study into the provision of broadband services in Guernsey. The purpose of the study was twofold:

- To compare the current broadband offerings in Guernsey with a number of other countries: and
- To identify what issues, if any, in Guernsey were impacting upon the range and cost of broadband services for users in the Bailiwick.

In undertaking this study, which was carried out by GOS Consulting, the OUR is mindful of the important role that broadband can, and increasingly is playing in our everyday lives. Small and medium size businesses are increasingly using broadband to improve their efficiency. The increasing ability to work from home – either full or part-time – is further driving demand for high-speed internet services.

In other countries, there is no doubt that initiatives by central governmental to increase both the speed of roll-out of broadband and also its uptake have helped to drive the broadband market forward. In the UK, the Government has established the Broadband Stakeholder Group (BSG) as the Government's key advisory group on promoting the roll-out and take-up of broadband services. Similar initiatives, such as “e-Europe” are promote by the European Commission. The States of Guernsey promotes e-commerce though its ‘e-business in Guernsey’ initiative.

The common characteristic of these initiatives is an acceptance that, as well as creating opportunities and providing improved productivities, a high-speed broadband infrastructure could also act as a stimulus for economic growth, potentially stimulating growth in research and development and higher value industries. In the UK, the Institute of Directors in a report published in October 2004 noted that 84% of business leaders believed investing in broadband has helped boost productivity. A further 64% of respondents identified a direct link between broadband use and increased profits.

For Guernsey, as a small island economy, the availability of inexpensive broadband can also reduce the costs associated with doing business with our core markets. Reliable and cost-efficient communication can also play a vital role in facilitating inward investment.

However investment in broadband must also be sustainable. The purpose of this report is therefore to look at the economics of broadband in Guernsey, the range of offerings available and what factors may need to be further considered to increase the range of offerings or reduce the costs to end-users.

The study, which was carried out April this year, compares the broadband services on offer at that time in a number of countries and their cost to the end-user. The report (which is published as an annex to this information note) and its findings do provide very useful information, will inform the work of the OUR going forward.

The key conclusions reached by the consultants are:

- An apparent margin squeeze on residential services;
- High business oriented prices; and
- A lack of flexibility for ISPs to introduce distinctive services.

In order to address these issues the consultants have identified a number of actions as being worthy of further consideration. These are:

- Conduct an investigation into a potential margin squeeze on residential broadband services. This would require C&WG to produce a business plan showing the profitability of servicing residential customers.
- Conduct a further cost accounting analysis of the costs of providing broadband services and the allocation of these costs between business and residential customers and between the wholesale ADSL component and the ISP component.
- Investigate whether it is technically and operationally feasible to introduce wholesale services which give ISPs greater flexibility in specifying the end user service.

Next Steps

The DG is anxious that consumers in Guernsey – both residential and business – gain maximum value and benefit from broadband. The issues identified by this report highlight that there are certain issues with the broadband market that warrant further attention if this goal is to be realised.

A copy of this report has been sent to each ISP and the DG would like to thank all ISPs for their assistance in the compilation of this report. The OUR is currently considering the findings of the study and will look to work with the sector to ensure that the broadband market can continue to grow in a healthy, sustainable way going forward.

Broadband Audit
Final Report

Martin Duckworth
Director – GOS Consulting Limited

June 2005

GOS Consulting Limited
www.gos-consulting.com

1 Executive Summary and Recommendation

1.1 Summary of Findings

- The cost of a **basic residential service** offered in Guernsey is generally more expensive than the services in the other jurisdictions, but compared to other small jurisdictions the cost to the end user is similar.
- The **lack of higher bandwidth services** aimed at **residential users** means that it is prohibitively expensive for residential customers to get a service that offers more the 512 kbit/s bandwidth. This issue should be largely addressed by the upgrade to a 1Mbit/s service by C&WG.
- The costs of **services aimed at business customers** are consistently above the costs in other jurisdictions, including those which are likely to have a similar cost base to Guernsey. This issue should be addressed by the upgrading of the downstream bandwidth offered to business customers.
- The **wholesale ADSL agreement** is well structured and complete. The wholesale service appears to operate effectively, with the main Internet Service Provider (ISP) criticisms being the fault reporting mechanism. C&WG stated in our interview that it believed that it had an efficient fault management process where line tests were carried out for every fault reported, as set out in the agreement. This appears to be an implementation issue rather than an issue with the agreement itself or the service.
- **Margins** for the ISP element of **residential services are very low**, and appear to show that provision of these services by ISPs is unprofitable. The move to a higher bandwidth residential service, with consequently higher traffic levels and thus costs for the ISPs, could further reduce the profitability of serving residential customers.
- **Margins** for the ISP element of **business services are higher** than comparable jurisdictions. These high margins are the result of the high retail prices with wholesale costs in line with those in other jurisdictions.
- The independent ISPs would like to develop distinctive products but at the moment are restricted to offering similar products to C&WG due to the **inflexibility of the wholesale services**.

1.2 Recommendations

The key issues identified in the analysis are:

1. An apparent margin squeeze on residential services;
2. High business oriented prices;
3. A lack of flexibility for ISPs to introduce distinctive services.

In order to address these issues we suggest the following actions be taken:

- Conduct an investigation into a potential margin squeeze on residential broadband services. This would require C&WG to produce a business plan showing the profitability of servicing residential customers.
- Conduct a further cost accounting analysis of the costs of providing broadband services and the allocation of these costs between business and residential customers and between the wholesale ADSL component and the ISP component.

- Investigate whether it is technically and operationally feasible to introduce wholesale services which give ISPs greater flexibility in specifying the end user service.

2 Scope and Methodology

2.1 Scope

The scope of this study is restricted to ADSL services used to provide broadband Internet access. Other Internet access products, such as private circuit access or SDSL services, which may compete with ADSL, have not been addressed.

2.2 Methodology

The main sources of information from the study were:

- Publicly available information, typically taken from operators' and service providers' web sites;
- Interviews with the Internet Service Providers (ISPs) offering ADSL services in Guernsey, including C&WG as both a provider of ADSL services and an ISP;
- A questionnaire sent to the ISPs (although only C&WG responded)

The study is, by its nature, backwards looking. Given the rapid developments in the market, some of the publicly available information may be out of date, with rapid evolution in the retail services being offered in markets such as the UK. In addition the study is based on the existing services offered in Guernsey, not the upgraded services due to be introduced by C&WG.

2.3 Benchmark Countries Selected

The countries selected for benchmark purposes fall into two groups:

- Other small jurisdictions in the British Isles;
- Larger European jurisdictions.

The small jurisdictions selected were Jersey and the Isle of Man, both of which are of similar size.

The larger jurisdictions selected were the UK, Ireland and Belgium. The UK forms a clear reference for Guernsey as Guernsey customers are exposed to UK advertising on television and in newspapers. Ireland is another reference point due to its cultural and geographic proximity. Belgium was chosen as the third reference point due to its relatively high broadband penetration.

The following table sets out the broadband penetration in Guernsey and each of the larger benchmark countries.

Broadband subscribers per 100 inhabitants	2001	2002	2003	2004
Guernsey	0.0	1.4	4.5	8.4
United Kingdom	0.6	2.3	5.4	10.5
Ireland	0.0	0.3	0.8	3.4
Belgium	4.4	8.7	11.7	15.6

In two of the benchmark countries – the UK and Belgium – a significant proportion of broadband customers take service from cable TV operators. In Ireland a very small number of broadband subscribers take service from cable TV operators. This greater level of competition could result in lower prices for ADSL services, in the absence of regulatory intervention (alternatively it could be argued that the

existence of two access operators increases costs through duplication of networks and reduced economies of scale).

In addition there is a range of other potential access methods such as Fixed Wireless Access or Satellite access, but these typically have very low penetration, being used for niches, such as areas not covered by wire line networks.

The following chart illustrates the split between broadband services provided over ADSL and those provided by other access methods.

Broadband Subscribers per 100 inhabitants	DSL	Cable	Other	Total
Guernsey	8.4	0.0	0.0	8.4
United Kingdom	7.1	3.4	0.0	10.5
Ireland	2.9	0.2	0.3	3.4
Belgium	9.6	6.0	0.0	15.6

In each of the benchmark jurisdictions the service offering of the incumbent telecom operator and one other ISP was chosen. The other ISP was selected based on two criteria, that the ISP was relatively large in terms of number of subscribers and that it offered services to both business and residential customers.

The following sets out the countries and ISPs selected.

Country	ISPs
UK	BT Tiscali
Ireland	Eircom BT Ireland (Esat)
Belgium	Belgacom Scarlett
Isle of Man	Manxnet (Manx Telecom) Mannet
Jersey	Jersey Telecom LocalDial
Guernsey	C&WG Newtel Guernseynet

3 Retail Offers

3.1 Guernsey

3.1.1 C&WG Retail Offer

C&WG offers both bundled ADSL and Internet access retail broadband services based on the "wires only" wholesale offer and an unbundled retail "Connect" service which provides retail ADSL connectivity to an ISP (similar to the ADSL services offered by Manx Telecom). However, the pricing of the total package of "Connect" services makes this an uncompetitive option compared to the "wires only" wholesale service (even allowing for the inclusion of an installation service in the "Connect" service). Thus only the services based on the "wires only" service are considered in this report.

C&WG has a single offer aimed at residential users. This service offers higher contention than the business oriented services, and offers a relatively low peak bandwidth.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP zero VAT)
Broadband Select 500	512/256	40	Unlimited	26.99

C&WG offers three services target at business users. The services offer lower contention than the residential service and three different downstream bandwidth rates.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP zero VAT)
Broadband Select Pro 500	512/256	20	Unlimited	89.99
Broadband Select Pro 1000	1024/256	20	Unlimited	149.99
Broadband Select Pro 2000	2048/256	20	Unlimited	189.99

C&WG offer business services on both a "wires only" basis or in a package with installation and a managed router.

3.1.2 Itex

Itex offers ADSL services bundled as part of integrated offers to customers. It does not commercialise ADSL services as a standalone service. Thus we have not considered Itex services in the rest of this report.

3.1.3 Guernseynet

Guernseynet's services mirror those of C&WG.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP zero VAT)
Self Install	512/256	40	Unlimited	26.49
Broadband Business 500 Self Install	512/256	20	Unlimited	89.49
Broadband Business 1000 Self Install	1024/256	20	Unlimited	164.49
Broadband Business 2000 Self Install	2048/256	20	Unlimited	219.49

3.1.4 Newtel

Newtel's service offering mirrors that of C&WG.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP zero VAT)
Xband	512/256	40	Unlimited	25.99
Xband Pro 512	512/256	20	Unlimited	88.99
Xband Pro 1024	1024/256	20	Unlimited	163.99
Xband Pro 2048	2048/256	20	Unlimited	218.99

3.2 Jersey

3.2.1 Jersey Telecom Retail Offer

Jersey Telecom offers six retail broadband ADSL services combining three levels of download speed (2048, 1024 and 512 Mbit/s) with two levels of contention (40:1 and 20:1). No capacity limits are placed on the services. The lower contention services offer a fixed IP address and a Jersey Telecom managed router. The higher download speed services offer marginally increased upload bandwidth.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP zero VAT)
Rapid - Option 1	512/256	40	Unlimited	24.99
Rapid - Option 2	1024/384	40	Unlimited	44.99
Rapid - Option 3	2048/384	40	Unlimited	84.99
Rapid Business - Option 1	512/256	20	Unlimited	50
Rapid Business - Option 2	1024/384	20	Unlimited	90
Rapid Business - Option 3	2048/384	20	Unlimited	150

3.2.2 Localdial Retail Offer

Localdial is owned by Guernseynet. Localdial's services mirror those provided by Jersey Telecom.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP zero VAT)
Rapid - Option 1	512/256	40	Unlimited	24.49
Rapid - Option 2	1024/384	40	Unlimited	44.49
Rapid - Option 3	2048/384	40	Unlimited	84.49
Rapid Business - Option 1	512/256	20	Unlimited	57.99
Rapid Business - Option 2	1024/384	20	Unlimited	89.99
Rapid Business - Option 3	2048/384	20	Unlimited	149.99

3.3 Isle of Man

3.3.1 Manxnet (Manx Telecom)

The Manx Telecom ADSL services are unbundled retail services with ISP services purchased separately, Manxnet offering six corresponding ISP services (prices shown combine both the ADSL and ISP part).

For residential services there are three possible download speeds:

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP inc. VAT)
Manxnet Broadband 500	512/256	50	Unlimited	29.23
Manxnet Broadband 1000	1024/256	50	Unlimited	49.99
Manxnet Broadband 2000	2048/256	50	Unlimited	89.99

Business services offer the same download speeds, but with lower contention and also include a managed router at the clients site.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP exc. VAT)
Manxnet Silver	512/256	20	Unlimited	75
Manxnet Gold	1024/256	20	Unlimited	115
Manxnet Premier	2048/256	20	Unlimited	179

3.3.2 Mannet Retail Offer

Mannet's residential ISP services mirror the ADSL services provided by Manxnet, with the exception that Mannet does not offer a 2 Mbit/s wires only service.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP inc. VAT)
Residential 512	512/256	50	Unlimited	28.2
Residential 1M	1024/256	50	Unlimited	49.35

Mannet offers the same range of services to business customers as

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Total Monthly rental (GBP exc. VAT)
Business 512	512/256	20	Unlimited	74
Business 1M	1024/256	20	Unlimited	116
Business 2M	2048/256	20	Unlimited	188

3.4 United Kingdom

3.4.1 BT Retail Offer

BT offers services to both business and residential customers. The key differentiator between the offers is that the residential offers place a cap on the volume of data that can be downloaded or uploaded, while the business oriented offers allow unlimited usage. Peak bandwidth is not used as a differentiator with the residential solutions offering higher bandwidth than the (more expensive) low end business products. BT also offers high contention services to business users (SoHo) for connection of a single PC.

There are four residential offers, with differentiation being based on a combination of the download cap, bandwidth and the availability of exclusive content from Yahoo!.

Of particular interest is the "Broadband Starter" package which provides an entry level package suitable for light users at a comparatively low cost, with the option to buy extra capacity where necessary. This contrasts with the other packages which are intended to provide sufficient capacity for reasonable use.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (GBP inc. VAT)
BT Broadband Basic	1024/256	50	1	17.99
BT Broadband	2048/256	50	15	24.99
BT Yahoo! Broadband	2048/256	50	15	26.99
BT Yahoo! Broadband	2048/256	50	30	29.99

In terms of business oriented offers, there are two dimensions of differentiation – the download bandwidth and the level of contention. The single user products differ from the residential products in that there are no limits on bandwidth. The higher speed "network" products also offer Service Level Agreements.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (GBP exc. VAT)
Single 500	512/256	50	Unlimited	29.99
Single 1000	1024/256	50	Unlimited	45
Share 500	512/256	20	Unlimited	45
Network 1000	1024/256	20	Unlimited	65
Network 2000	2048/256	20	Unlimited	100

3.4.2 Tiscali

Tiscali offers services to both business and residential customers. Similarly to BT, Tiscali differentiates between business and residential offers by applying a capacity cap of the residential offers.

Tiscali has three residential offers. Differentiation between the offers is based on both capacity and bandwidth with the two lower priced offers offering a trade off

between speed and capacity at the same price, while the more expensive option offers both the higher bandwidth and a reasonable amount of capacity.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (GBP inc. VAT)
Broadband x10	512/256	50	30	15.99
Broadband x20 2GB	1024/256	50	2	15.99
Broadband x20 15GB	1024/256	50	15	19.99

Tiscali's business oriented offers offer unlimited bandwidth at a range of speeds. The prices of Tiscali's business oriented services are significantly lower than BT's services with an equivalent peak bandwidth, but have higher contention ratios, meaning that the average bandwidth available to each customer is lower than the equivalent BT offer. In addition Tiscali's services do not offer an SLA. Thus it appears that Tiscali does not attempt to serve high end customers.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (GBP exc. VAT)
Business 250	256/256	50	Unlimited	15.99
Business 500	512/256	50	Unlimited	19.99
Business 1000	1024/256	50	Unlimited	29.99

3.5 Ireland

3.5.1 Eircom Retail Offer

Eircom has a relatively simple ADSL offer with a choice of four packages. The bottom package is a low speed offer with a relatively small capacity cap. This "starter" package is aimed at light residential users. The next package offers the same peak bandwidth, but lower contention and double the capacity. This package is aimed at both residential users and small businesses.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR inc. VAT)
broadband home starter	512/128	48	4	39.99
broadband home plus/broadband business starter	512/128	24	8	54.45

The next two packages offer higher bandwidth and the lower contention rate with the lower speed package having a slightly higher capacity cap with the highest speed options offering unlimited usage and an SLA.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR exc. VAT)
Broadband business plus	1024/256	24	12	89
broadband business enhanced	2048/256	24	Unlimited	169

3.5.2 Esat Retail Offer

Esat offers services for both residential and business customers. The key differentiator between business and residential packages is that the business packages offer unlimited usage while the residential offers have capacity caps. While Esat offers standalone ADSL services, it appears that the main market thrust is to bundle ADSL services with fixed voice services, with bundles offering considerable savings over buying the two services separately.

The two residential services differ in terms of the peak bandwidth offered, contention and capacity.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR inc. VAT)
IOL Broadband	1024/256	48	8	39
IOL Broadband plus	2048/256	24	16	47

Esat's business offers all offer unlimited capacity with the two offers differing in bandwidth available.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR exc. VAT)
ADSL 1M/256K	1024/256	20	Unlimited	90
ADSL 2M/256K	2048/256	20	Unlimited	175

3.6 Belgium

3.6.1 Belgacom Retail

Belgacom has four packages aimed at residential customers. Unusually it offers a timed service, with a very low monthly rental (which includes two hours of use) with users paying per minute for use. This package is clearly aimed at current dial-up subscribers who both wish to have a low fixed cost and are also familiar with paying for time online.

The next package offers a low entry price with a low capacity cap – with only very light users likely to stay within the capacity cap. Users of this package can buy additional capacity in bundles, although at a rather high price.

Finally there are two packages offering much higher peak bandwidth and capacity caps which should be sufficient for all but very heavy users. These two packages

are also marketed to small businesses. In addition there is a range of add on subscription packages available for the standard "ADSL Go" package which allows extra functionality such as the ability to connect multiple PCs, higher upload speeds and higher capacity limits.

Belgacom does not state target contention levels for any of its services. This may be due to the structure of the underlying wholesale ADSL offer which has the ADSL access component fully unbundled from the (ATM) transport service.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR inc. VAT)
ADSL Light	512/128	not stated	0.4	29.95
ADSL Time	512/128	not stated	2 hours time	4.95
ADSL Go	4096/192	not stated	10	39.95
ADSL Go + Power	4096/400	not stated	15	48.85
ADSL Plus	4096/256	not stated	30	54.95

Belgacom has a range of products aimed at businesses operating a network. These packages are offered with a managed router provided by Belgacom. The packages offer similar peak downstream bandwidth, differing in terms of the number of PCs that can be attached to the network, the upstream bandwidth and for the lower end products capacity caps imposed. The high end package offers guaranteed bandwidth through an SLA.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR exc. VAT)
ADSL Pro Compact (M)	4600/384	not stated	15	99
ADSL Pro Compact (L)	4600/448	not stated	20	142
ADSL Office	4600/512	not stated		223.79
ADSL Office (XL)	4600/640	not stated		249.79
ADSL Office (XXL)	4600/640	not stated		419.79

3.6.2 Scarlet

Scarlet is an established ISP in Belgium which recently took over the Belgian subsidiary of Tiscali, becoming the second largest ISP in Belgium. Scarlet uses BROBA 2 to offer services and also resells a wholesale ADSL service to other ISPs.

Scarlet has a straightforward offer, with three packages. All three packages offer the same peak download and upload bandwidth. As with Belgacom, Scarlet do not state contention levels for their services.

The lowest package, targeted at residential users, offers a low capacity cap, with additional usages being charged at a relatively high unit cost. The middle package, marketed to both residential and business customers, offer a capacity cap that is likely to be sufficient for the average users. The final package offers unlimited capacity.

	Bandwidth (kbit/s - down/up)	Contention	Capacity included (Gb/month)	Monthly rental (EUR inc. VAT)
ADSL GO	3300/384	not stated	0.25	24.9
ADSL Plus	3300/384	not stated	15	39.49
ADSL Xtreme	3300/384	not stated		185 (exc. VAT)

3.7 Conclusions

Range of Offers

ADSL offers can be broadly segmented into those offers aimed at residential users and those aimed at business users although there is some overlap for services which can be used by heavy residential users or by SoHo business users.

Residential Users

Cable & Wireless Guernsey's base retail offering is similar to those for other smaller jurisdictions – Jersey and the Isle of Man – offering a 512/256 service with relatively high contention but no limits of capacity. While in the other two jurisdictions the incumbents offer higher bandwidth services to residential users (1Mbit/s and 2 Mbit/s), the relatively high premium charged for these services are unlikely to make them attractive except for a small minority of users such as IT enthusiasts or home office users.

As in the other small jurisdictions, there is little differentiation in the services provided by the incumbent operator and the independent ISPs.

In the larger jurisdiction the incumbents offer a range of services targeted at residential users – 2 in Ireland, 4 in the UK and 4 in Belgium (with a number of further options being available in Belgium). These different offers allow residential users to better tailor their expenditure to their usage of the Internet.

The larger jurisdictions also offer peak bandwidths significantly higher than in Guernsey but with the imposition of a limit on the amount of data downloaded/uploaded, while the offers in Guernsey offer unlimited bandwidth. It should be noted that in the larger jurisdictions the higher bandwidth is a maximum with the service being "rate adaptive" with the bandwidth dependent on the length and quality of the copper loop to the user. Thus some users will consistently receive a lower peak data rate than that advertised, for example if their home is more than a certain distance from the exchange. If such rate adaptive services were to be offered in Guernsey, the majority of customers would get the advertised bandwidth. However, C&WG stated that there were a few locations where it was not currently able to offer the higher speed (business) ADSL services due to a combination of distance from the exchange and the condition of the line (with the nominal maximum line length for a 2Mbit/s service being 3 miles).

Customers' preference for higher bandwidth vs. unlimited usage will depend on the usage patterns of the customer. Users who download large files may find unlimited usage more attractive (even if it takes longer to download the files), while lighter users, whose usage falls within the bandwidth cap, are likely to find higher bandwidth more attractive.

The introduction of capacity limits gives ISPs a third dimension with which to segment the market (bandwidth, contention and capacity) allowing them to introduce packages such as low cost entry level packages.

From the supply side point of view the introduction of capacity limits aligns end user costs more closely with the cost of supply. This reduces the risk that a small number of users may make disproportionate usage of the services, for example through the use of file-sharing programs, reducing the quality of service for others who share network infrastructure.

With the increase in penetration, marginal users are increasingly likely to be relatively low users who find higher bandwidth more attractive than unlimited capacity. Thus the higher bandwidth, restricted capacity services should lead to higher penetration.

Business Users

The services offered to business users are similar in all of the jurisdictions except Belgium with the incumbent typically offering lower contention, unlimited capacity and a range of bandwidth options (in Belgium, services are differentiated by capacity, with only the most expensive services offering unlimited capacity).

Lower contention is attractive for business users as most businesses will use ADSL to serve a network resulting in the contention for an individual user being a multiple of the contention on the ADSL line. For example if there are five users sharing the ADSL connection, and the contention of the ADSL connection is 20:1, the level of contention for the end users will be the equivalent of 100:1. BT also offers two services with the same level of contention as "residential" services but unlimited usage for single users – for example SoHo users.

Business users are typically less interested in high bandwidth services such as video streaming. Thus the motivation for buying higher bandwidth services is generally to provide an acceptable level of bandwidth for individual users, rather than making high bandwidth services available to these individual users. For example with a 2 Mbit/s connection, if 4 users on the local area network are accessing the Internet simultaneously, they potentially have an average of 512 kbit/s bandwidth each.

Unlimited bandwidth is attractive to business users as it means that their costs are fixed. From the supply side perspective, business users are less likely to "abuse" the unlimited capacity, for example downloading pirated movies using filesharing programs, as such "abuse" will impact on their own users.

Diversity of Competing Offers

In the smaller jurisdictions, there is no differentiation in the underlying services between the ISPs with competition being on price or other non-network attributes such as customer service or Customer Premises Equipment (CPE).

In the larger jurisdiction, independent ISPs differentiate by offering different combinations of bandwidth, capacity limits and contention to the incumbents.

4 Analysis of Value for Money

4.1 Methodology

For the smaller jurisdictions it is possible to directly compare the cost of service offers with those in the other jurisdictions (with the exception of minor difference in contention and upload speed).

Given the divergence between the services offered in the larger jurisdictions, such direct comparisons are not possible. In this case some form of normalisation is required. One method of normalisation is to calculate common metrics to compare the offers, such as the cost per Mbit/s. However, this can produce misleading results as the value to the customer is unlikely to be linear, with the initial connectivity likely to be more valuable than an equivalent increment of bandwidth for an existing customer.

Our approach instead is to calculate the minimum cost to the customer for a given set of requirements. These requirements are defined in terms of:

- Typical usage in Gbytes per month. This is important when comparing offers with a usage limit.
- Minimum download bandwidth.
- Maximum contention.
- Inclusion of a fixed IP address. Some offers include a fixed IP address (or addresses) while for other offers an additional charge is required and for some no fixed IP option is available.
- Installation included. Some offers include installation, some require an additional charge and some are self-install only.

Clearly the comparison made will not be perfect in that some of the packages compared will provide greater functionality than others. However, given the limited number of data points and the lack of supporting market research, it is not possible to accurately assess the value of this extra functionality.

4.1.1 Total Cost of Ownership

Different offers have a different structure in terms of one off charges, subscription fees and any charges for downloads. In addition some services, such as static IP addresses or installation may be bundled with some services and charged separately for others.

In order to calculate the cost to the user on a comparable basis we calculate the Total Cost of Ownership (TCO) to meet the requirements. The cost of ownership has been calculated as the marginal cost of adding broadband to an existing (analogue) telephone line (i.e. the TCO excludes telephone line rental and connection charges). The cost is calculated over a 3 year period, which is the converted to a monthly cost. This effectively amortises any one time costs over three years.

All prices in Euros (in Ireland and Belgium) were converted to pounds sterling at a rate of 1.45 Euro/GBP.

Many providers have “special offers” on certain packages. These offers typically include reduced or no connection charge, inclusion of ADSL modems, or reduced subscription.

The calculation of TCO allows these offers to be included or excluded from the calculation. We have chosen to include these offers as they appear to be “semi-

permanent", typically being extended and rarely being withdrawn once introduced.

4.2 User Requirements used for Comparison

While the model developed for this evaluation can be used to cost any set of requirements, for ease of analysis we have decided to define a set of six requirements: three for residential users and three for business users. These are described in the table below:

Requirement	Monthly Usage (Gbytes)	Minimum download speed (kbit/s)	Maximum contention	Fixed IP?	Instal-lation
Residential Minimum Service	0	500	50	No	No
Residential 5 GB, 500 kbit/s	5	500	50	No	No
Residential 15 GB, 1000 kbit/s	15	1000	50	No	No
Business 20 GB, 500 kbit/s	20	500	25	Yes	Yes
Business 30 GB, 1000 kbit/s	30	1000	25	Yes	Yes
Business 50 GB, 2000 kbit/s	50	2000	25	Yes	Yes

The key differentiator between the business and residential requirements is the level of contention (for Belgium where the ISPs surveyed do not publish contention levels we assumed that residential oriented offers had 50:1 contention and business offers 20:1). The residential requirements also typically have lower usage and bandwidth.

For comparison of the download bandwidth we have taken the bandwidth quoted in the providers' sales literature. Typically the quoted bandwidth is the speed of the IP connection, with the underlying (ATM) ADSL connection being higher, with the difference being due to the overhead in the ATM connection. In the case of C&WG for example the IP connection is 512 kbit/s while the ADSL connection is at 576 kbit/s.

For the residential requirements the comparison is carried out including VAT (where appropriate) as this is price paid by the consumer.

For business requirements the comparison is carried out excluding VAT, as this is the cost borne by the majority of businesses, who can reclaim the VAT paid. VAT rates in the jurisdictions surveyed are as follows:

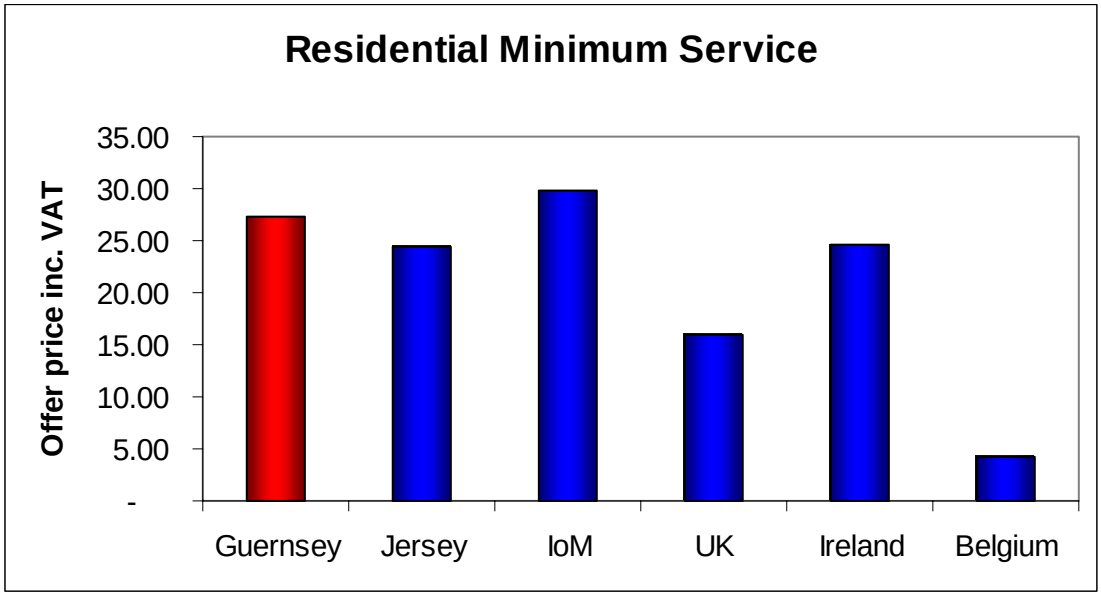
Jurisdiction	VAT?	VAT rate on Telecommunications
Guernsey	No	
Jersey	No	
Isle of Man	Yes	17.5%
UK	Yes	17.5%

Ireland	Yes	21%
Belgium	Yes	21%

In the comparisons below, the cost is for the lowest cost provider sampled. Given the limited sample it is likely that in the larger jurisdictions there will be a lower cost offer available from a provider not sampled. However, given that the incumbent in each market is usually the 'price leader', with the other providers priced at a small discount to its prices, it is unlikely that this will make a material difference to any of the comparisons.

4.2.1 Minimum Cost of Service

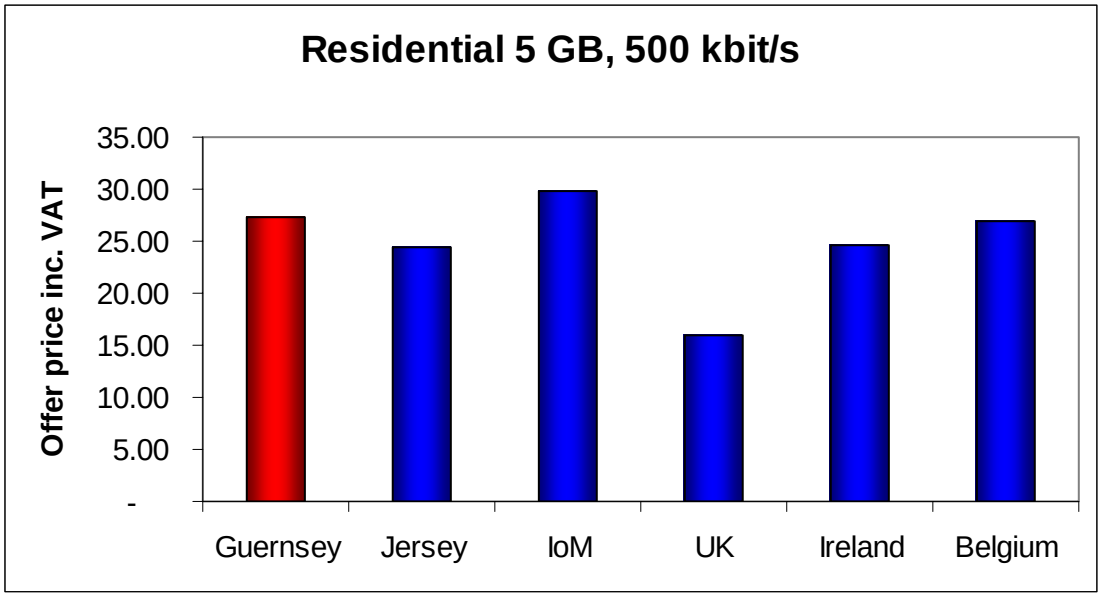
The minimum cost for ADSL services is an interesting measure as this shows the minimum entry cost for broadband, that is the minimum price that consumers have to pay to get a broadband service (defined as > 500kibit/s), irrespective of any restriction put on usage.



The entry cost in Guernsey is the second highest of the countries surveyed, with only the Isle of Man having higher prices (9% higher than in Guernsey). Prices are significantly lower in the UK, with Belgium having the lowest fixed cost (only 15% of that in Guernsey), due to the availability of a timed service.

4.2.2 Residential 5 GB, 500 kbit/s

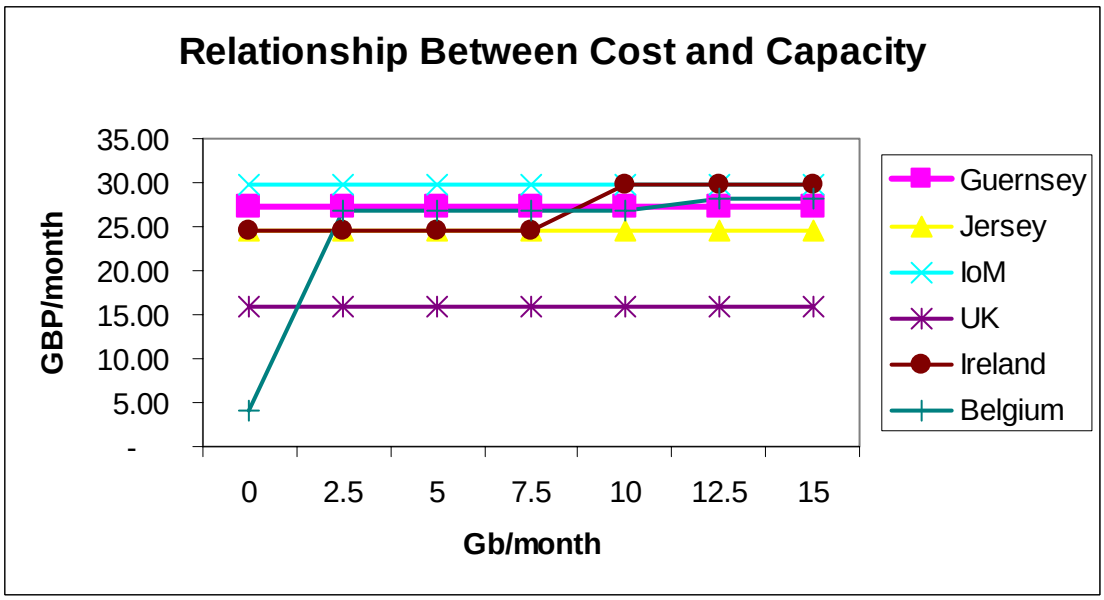
This set of requirements is consistent with average use of the Internet, but with no need for higher bandwidth services.



The pattern here is similar, with Guernsey being the second most expensive country, with prices in the Isle of Man being 9% higher. The cost of the lowest price services, from Tiscali in the UK, is 41% lower than in Guernsey. The cost in Belgium for even moderate use is similar to most of the other countries, as the usage charges for the timed service make it unattractive for even relatively light use.

The chart below shows the relationship between usage and cost. For the three smaller jurisdictions, which offer unlimited usage for the basis subscription, the relationship is flat. The relationship is also flat in the UK as the lowest priced service (offered by Tiscali) offers a relatively low peak bandwidth but high capacity limit.

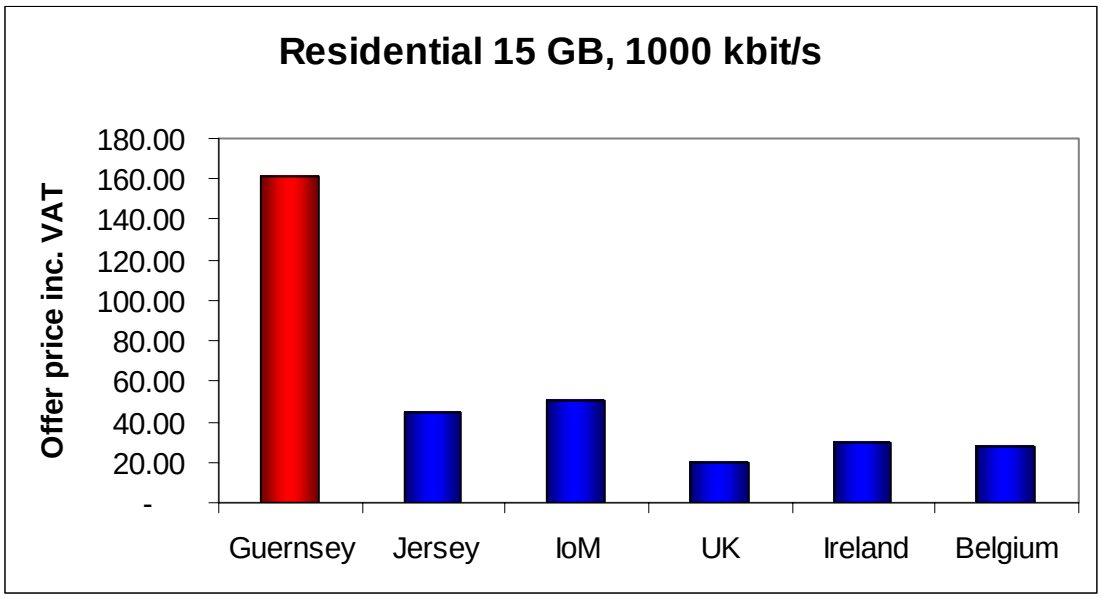
For Belgium the first part of the curve is steep, reflecting the high usage charges attached to the timed service. After this the rate of increase is relatively low. Similarly for Ireland the increase in cost for increased usage is relatively limited.



For usage greater than 10 GByte/month, the cost in Guernsey moves to the middle of the pack, with Jersey and the UK being cheaper, but costs being higher in the other three jurisdictions.

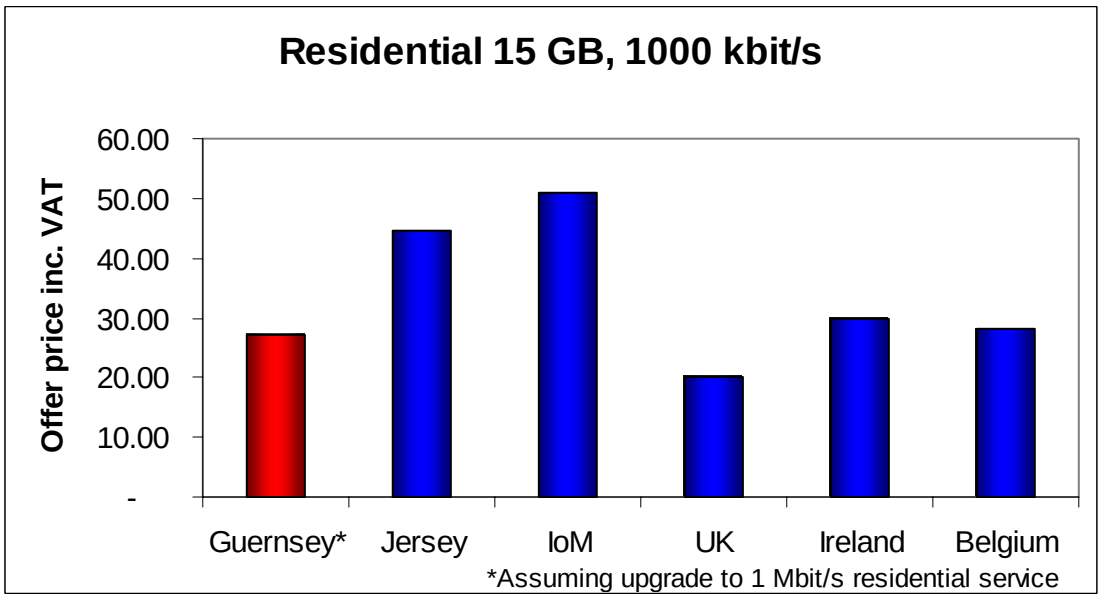
4.2.3 Residential 15 GB, 1000 kbit/s

This set of requirements corresponds to an "enthusiast's" use of the Internet, with relatively high usage and a requirement for higher download speeds.



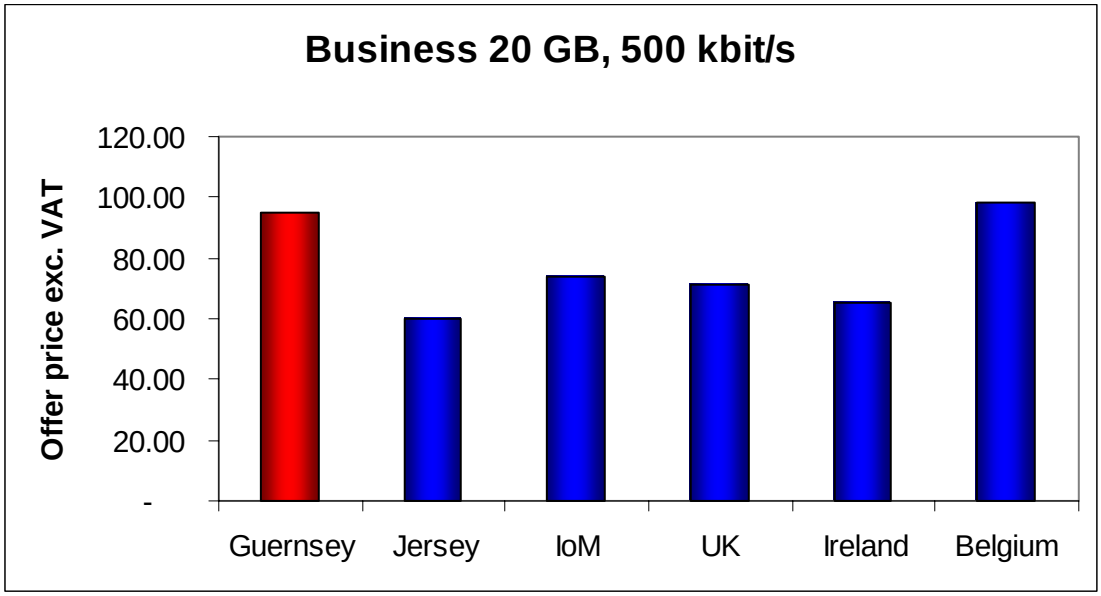
Here Guernsey is very uncompetitive due to the lack of a residential service offering 1 Mbit/s download speed, thus the minimum service that meets this requirement is the 1 Mbit/s business oriented service (which has a lower contention rate than the offers that it is being compared with). Costs in the next most expensive jurisdiction, the Isle of Man, are only 32% of the costs in Guernsey. In the larger jurisdictions, UK, Ireland and Belgium, mainstream services offered to residential customers offer 1 Mbit/s or higher download speeds, with a result that costs in these jurisdictions are relatively low.

Once C&WG introduces a residential 1 Mbit/s service, assuming the terms and conditions remain the same as the existing 512 kbit/s service, the offer in Guernsey will become competitive, with only the UK offering a lower cost service.



4.2.4 Business 20 GB, 500 kbit/s

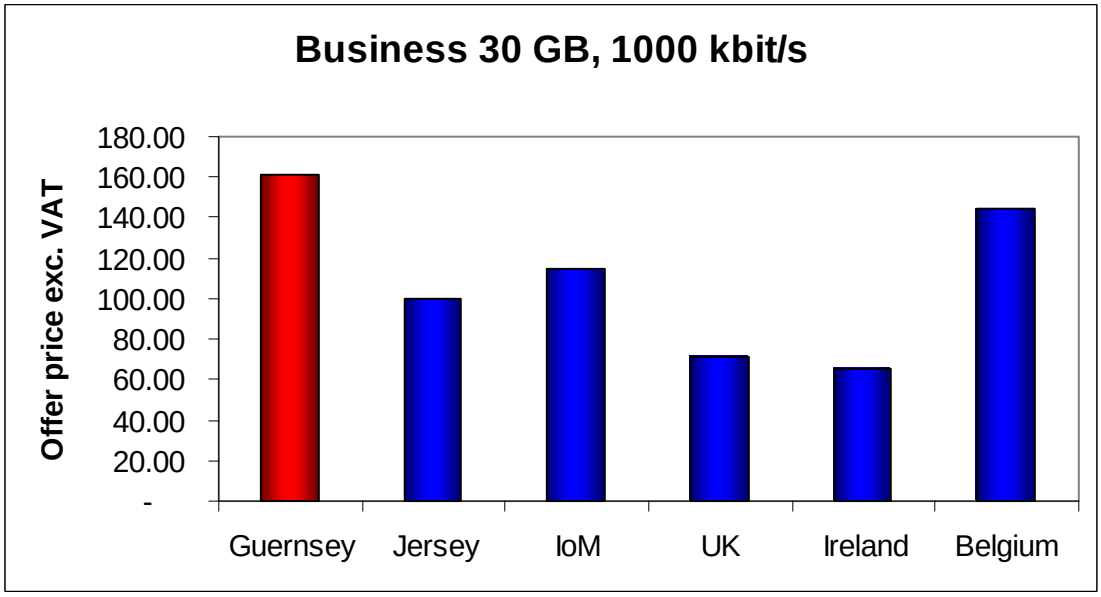
This set of requirements may be typical for a small office network (typically single PC SoHo users may find the residential oriented services are sufficient for their needs). With the connection being shared amongst a number of users, lower contention is needed and usage is likely to be higher. However, office applications will not generally require high bandwidth.



Guernsey is the second most expensive jurisdiction, with prices considerably above the other smaller jurisdictions, with costs in the next most expensive jurisdiction, the Isle of Man, being 22% lower (services and prices for Belgium are structured differently from the other jurisdictions affecting comparability).

4.2.5 Business 30 GB, 1000 kbit/s

This set of requirements corresponds to a larger office. The higher bandwidth is required to ensure that the individual user experience is reasonable, given that the connection is shared amongst a significant number of users.

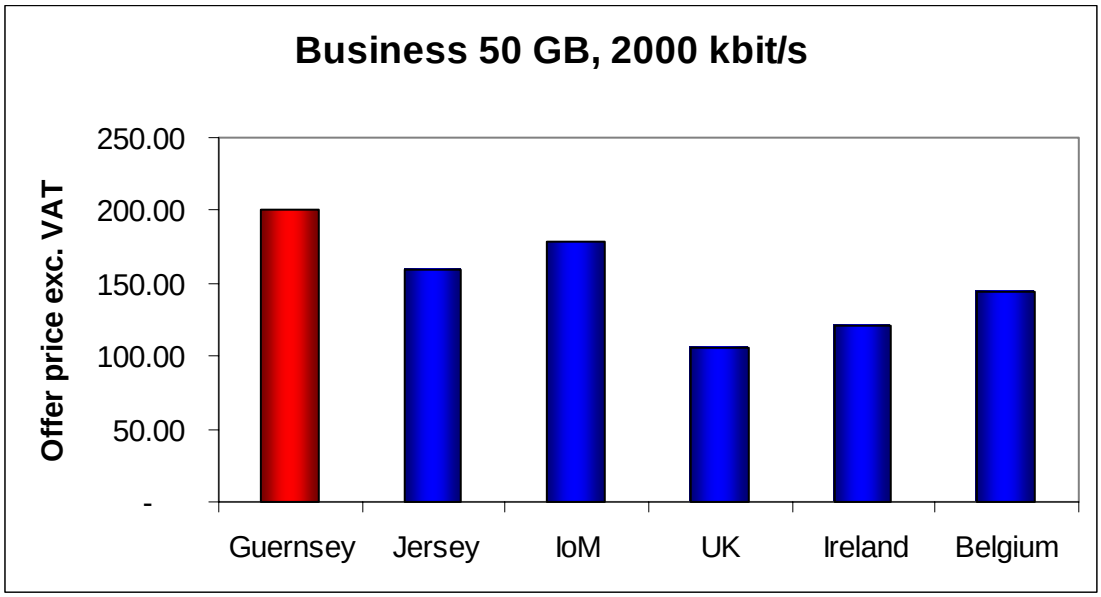


For this set of requirements, Guernsey is the most expensive jurisdiction, with costs 147% greater than in Ireland, the cheapest jurisdiction, and prices

significantly above the comparable, smaller jurisdictions, with costs in the Isle of Man, the next most expensive jurisdiction, 29% lower than in Guernsey.

4.2.6 Business 50 GB, 2000 kbit/s

This set of requirements corresponds to a larger office again. Again the higher bandwidth is required to ensure that the individual user experience is reasonable, given that the connection is shared amongst a significant number of users.



Again Guernsey is the most expensive jurisdiction, although the differences are proportionally smaller than the 1 Mbit/s service, with the Isle of Man being only 11% cheaper.

4.3 Conclusions

4.3.1 Residential services

For basic low bandwidth residential services, the offers in Guernsey, while amongst the most expensive, are not significantly out of line with those in the other jurisdictions (although the comparison is helped by the lack of VAT in Guernsey). Indeed for residential users whose requirements are for high usage, but without a need for high bandwidth, the offers in Guernsey are competitive.

For higher bandwidth residential services, the lack of offers in the market means that Guernsey is currently prohibitively expensive, although the announcement by C&WG of increased bandwidth for residential customers will address this issue, making the service competitive with other jurisdictions.

4.3.2 Business Services

For business services, the offers in Guernsey are consistently more expensive than in the other jurisdictions, with in some cases services being more than twice as expensive as in the UK. Prices are consistently above those for comparable small island jurisdictions. Again the upgrading (doubling) of the bandwidth offered for business oriented services will address this issue, bring prices broadly into line with that for other jurisdictions.

5 Wholesale and Unbundled Offers

5.1 Guernsey

5.1.1 Wires only wholesale product

C&WG's service offering consists of two parts:

- Connections from the DSLAM to the ISP's end users (Broadband Lite);
- A connection from C&WG's Broadband Network to the ISP's premises (Broadband SP Lite);

C&WG's wholesale offer defines four wholesale ADSL products for connecting end users combining three levels of download speed with two levels of contention, with the higher level of contention only being available for the lowest level of bandwidth:

Products offered under "Broadband Lite" are defined as:

Broadband Lite Services	Downstream ADSL Line Rate	Upstream ADSL Line Rate	End User Customer Interface	Maximum Contention
Broadband Home 500 Lite	576 kbit/s	288 kbit/s	G.992.1 (wires only) (G DMT)	40:1
Broadband Pro 500 Lite	576 kbit/s	288 kbit/s	G.992.1 (wires only) (G DMT)	20:1
Broadband Pro 1000 Lite	1152 kbit/s	288 kbit/s	G.992.1 (wires only) (G DMT)	20:1
Broadband Pro 2000 Lite	2272 kbit/s	288 kbit/s	G.992.1 (wires only) (G DMT)	20:1

To provide connection facilities between C&WG's network and the ISP,C&WG offers the SP Lite product. This service, based at an Ethernet level, allows ISPs to scale their connectivity from the initial offer of 512kbit/s (which allows 40 end-users connections at a 40:1 contention rate) up to 100Mbit/s services (which allows 900 end-user connections at a 40:1 contention rate).

Summary of C&WG Broadband SP Lite features:

Broadband SP Lite Service	Data Rate	Service Provider Interface	Maximum Connections 40:1/20:1	Authentication
Broadband SP 0.5M Lite	512 kbit/s	Ethernet 10 Base T	40/20	Radius
Broadband SP 1M Lite	1 Mbit/s	Ethernet 10 Base T	80/40*	Radius
Broadband SP 2M Lite	2 Mbit/s	Ethernet 10 Base T	160/80*	Radius
Broadband SP 10M Lite	10 Mbit/s	Ethernet 10 Base T	800/400*	Radius
Broadband SP 100M Lite	100 Mbit/s	Ethernet 10 Base Tx	900/900*	Radius

* These figures are based on 500 kbit/s Broadband Lite Services and will be reduced for higher speed services

Pricing for the services is as follows:

Description	Connection Charge £ (Non Recurring)	Quarterly Rental £ (Recurring)
Broadband Home 500 Lite	0.00	58.47
Broadband Pro 500 Lite	0.00	146.97
Broadband Pro 1000 Lite	0.00	221.97
Broadband Pro 2000 Lite	0.00	296.97

Description – Broadband SP Lite Services	Connection Charge £ (Non Recurring)	Quarterly Rental £ (Recurring)
Broadband SP 0.5M Lite (Within Central exchange area)	1,358.00	1,008.00
Broadband SP 1M Lite (Within Central exchange area)	1,358.00	1,134.00
Broadband SP 2M Lite (Within Central exchange area)	3,055.00	1,890.00
Broadband SP 10M Lite (Within Central exchange area)	9,233.00	3,528.00
Broadband SP 100M Lite (Within Central exchange area)	14,213.00	6,300.00
Broadband SP 0.5M Lite (Outside Central exchange area)	1,830.00	1,268.00
Broadband SP 1M Lite (Outside Central exchange area)	1,830.00	1,394.00
Broadband SP 2M Lite (Outside Central exchange area)	4,375.00	2,230.00
Broadband SP 10M Lite (Outside Central exchange area)	11,653.00	4,072.00
Broadband SP 100M Lite (Outside Central exchange area)	18,833.00	8,568.00

5.2 Jersey

JT's wholesale service offering consists of three parts:

- Connections from the DSLAM (Jersey Telecom DSL exchange equipment) to the Customer's end users (the Residential or Business Wholesale ADSL Lines);
- A Corporate Connect fibre link from Jersey Telecom's Broadband Network to the Customer's premises;

- The router at the Customer's end of the Corporate Connect fibre link.

The Corporate Connect service is the aggregated access link from the Jersey Telecom Broadband Network to the Service provider's network. It is a 155 Mbit/s OC3 single-mode fibre, and terminates on a router owned and maintained by Jersey Telecom (usually a Cisco 7204VXR).

The router will be set up to a mutually pre-agreed configuration, and read-only SNMP access will be available to allow ISPs to monitor bandwidth utilisation. Only one router will be sited at the ISP's premises or data centre.

As the Corporate Connect router is managed and owned by Jersey Telecom, access to the router is restricted to Jersey Telecom personnel only. Contention is applied by performing traffic shaping and policing on the Corporate Connect line.

There are two options for Corporate Connect, these being a 10Mbits or a 100Mbits service.

Jersey Telecom offers six wholesale broadband ADSL services combining three levels of download speed (2048, 1024 and 512 Mbit/s) with two levels of contention (40:1 and 20:1).

Service	Monthly Charge	Connection Charge
Residential Option 1, 512/256Kbit/s	£15.00	£45.00
Residential Option 2, 1024/384Kbit/s	£26.99	£45.00
Residential Option 3, 2048/384Kbit/s	£50.99	£45.00
Business Option 1, 512/256Kbit/s	£33.35	£45.00
Business Option 2, 1024/384Kbit/s	£54.00	£45.00
Business Option 3, 2048/384Kbit/s	£75.00	£45.00

Connection between the JT network and the ISP is via an Ethernet link (over fibre) presented as either a 10 baseT or 100 baseT connection.

Service	Monthly Charge	Connection Charge
Corporate Connect 10Mbit/s	£330.00	£6,250.00
Corporate Connect 100Mbit/s	£975.00	£9,875.00

5.3 Isle of Man

Manx Telecom do not offer a wholesale ADSL services, but instead offer an ADSL service for connection to an ISP, with the Internet access element being bought separately.

Manx Telecom offers six retail broadband ADSL services combining three levels of download speed (2048, 1024 and 512 Mbit/s) with two levels of contention (50:1 and 20:1). No capacity limits are placed on the services. The lower contention

services offer a fixed IP address and a Manx Telecom managed router while the higher contention services are a wires only service.

Pricing for the ADSL component is as follows:

Service	Monthly Charge	Connection Charge
Broadband Wires Only 512Kb/s	£13.00	£66.38
Broadband Wires Only 1Mb/s	£23.00	£66.38
Broadband Wires Only 2Mb/s	£33.00	£66.38
Business 500	£40.00	£290.00
Business 1000	£50.00	£290.00
Business 2000	£60.00	£290.00

5.4 United Kingdom

BT offers two wholesale ADSL services:

- IPStream, which provides IP services over ADSL;
- Datastream, which gives access to the underlying ATM transport layer.

We only consider the IPStream service in this report as it is broadly comparable with the wholesale service offered by C&WG.

BT's IPstream product enables wholesale customers to develop their own digital packages and deliver them to an unlimited number of end users via an IP-based data network. It can be used, for example by ISPs to connect their end users to the Internet.

The IPStream offer consists of two elements:

1. The end-user access ("IPStream")
2. The connection between BT's network and the ISP ("BT Central (Plus)")

5.4.1 End user access

IPStream is the link that goes from an End user premises via a dedicated DSL line to BT's local exchange, to a BT Broadband Access Server in the BT network. An End User Access can only be supported over a BT PSTN line. There are 5 BT IPstream end user options available:

- **BT IPstream 500** - Consumer focused ADSL service which includes the end user CPE (ADSL modem) and a BT engineer visit to install it.
- **BT IPstream Home** - Consumer focused wires only ADSL service, self installed by the end user. Available as BT IPstream Home 250; BT IPstream Home 500; BT IPstream Home 1000; BT IPstream Home 2000.
- **BT IPstream Office** - Business focused wires only ADSL service, self installed by the end user. Available as BT IPstream Office 500; BT IPstream Office1000; BT IPstream Office 2000.
- **BT IPstream S Series** - Business focused ADSL services, including end user CPE (ADSL modem and router) and a BT engineer visit on installation. Available as BT IPstream S 500; BT IPstream S 1000; BT IPstream S 2000.

- **BT IPstream Symmetric** – These are business focused SDSL services which offer the same upstream and downstream speeds and are available only in areas where BT has rolled out SHDSL exchange equipment. A separate copper line is required and PSTN service is not supported. Available as BT IPstream Symmetric 250; BT IPstream Symmetric 500; BT IPstream Symmetric 1000; BT IPstream Symmetric 2000.

The path across the Broadband network is shared, a maximum of 20:1 contention for the Business quality ADSL variants, BT IPstream S and Office Series, and a maximum of 50:1 contention for the consumer ADSL variants, BT IPstream 500 and Home.

5.4.2 Aggregate Access

The BT Central / BT Central Plus aggregate access is the aggregate link from the BT Broadband Access Server in the BT network to either the customer premises or to the Internet, depending on the option taken. The BT Central can be connected to any Point of Presence (POP) on the broadband network. There are two options:

- BT Central is an aggregate access link from the BT Broadband Access Server to the customer's hub server. This link is shared by the customer's End users and is used to back-haul the end user's traffic to the customer's site. The number and size of BT Centrals required will depend on the number of End users connected, the types of applications they are using and the quality of service the customer wants to provide to them. This option is aimed at customers who wish to allow end users access to their networks. The customer must provide its own Radius server used to authenticate End user session requests. PPP Sessions are opened by the end user through a web screen. This request reaches the Broadband Access Server where the destination customer connection (BT Central) is identified. The request is then tunneled through to the customer where the user is authenticated by their Radius server. If accepted an end to end IP connection is established.
- BT Central Plus offers an alternative method of back-hauling the end user traffic and provides an aggregate link straight onto the Internet. This option is aimed at Internet Service Providers who do not wish to operate their own IP infrastructure, but who wish to provide their end users with basic Internet connectivity. There is no requirement on customers taking the BT Central Plus option to provide their own customer Radius server. All authentication of the End User session requests id carried out within BT Broadband network.

A BT Central link can be connected to any Point of Presence on the broadband network.

5.4.3 Charging

BT offers three charging options for IPStream services:

- Standard;
- Capacity based;
- Usage based.

Charging is split into a per user charge (IPstream) and a charge for the connection with the ISP (BT Central). IPStream services are further divided into Home and Office products.

Standard Charging

The per user charges for the standard charge option effectively includes the total cost of the BT network up to (but not including) the connection to the ISP. The connection to the ISP is billed separately.

Charges are shown below:

Circuit bandwidth (transmission rate) downstream / upstream	Connection Charge (GBP exc. VAT)	Annual Rental (GBP exc. VAT)
BT IPstream Home 250 - Up to 250k/250k	50	147
BT IPstream Home 500 - Up to 500k/250k	50	156
BT IPstream Home 1000 - Up to 1M/250k	50	276
BT IPstream Home 2000 - Up to 2M/250k	50	456
BT IPstream Office 500 - Up to 500k/250k	50	242.04
BT IPstream Office 1000 - Up to 1M/250k	50	385.68
BT IPstream Office 2000 - Up to 2M/250k	50	672.84

Circuit bandwidth (transmission rate):	Connection Charge (GBP exc. VAT)	Annual Rental (GBP exc. VAT)
BT Central 2 Mbit/s	3000	9000
BT Central 10 Mbit/s	14000	17000
BT Central 34 Mbit/s	14000	21000
BT Central 155 Mbit/s	50000	45000
Per km charge above 40 kilometres (for all transmission rates except BT Central 622 Mbit/s options)		2000

Capacity Charging

Capacity based charging does not use fixed contention rates within BT's network and there is no difference in per user pricing by bandwidth, and the cost of the IPStream component is lower than under the "standard pricing". The price of the connection to the ISP effectively includes the cost of BT's network from the DSLAM to the ISP's network and hence the rental is higher than under the standard pricing. This option gives the ISP increased flexibility in managing the quality of service offered to its users as the ISP can effectively manage the level of contention over BT's network (assuming the bottleneck is in the connection between the ISP and BT's network, not within BT's network).

Charges are shown below:

Circuit bandwidth (transmission rate) downstream / upstream	Connection Charge (GBP exc. VAT)	Annual Rental (GBP exc. VAT)
BT IPstream Home 250 - Up to 250k/250k	50	100.8
BT IPstream Home 500 - Up to 500k/250k	50	100.8
BT IPstream Home 1000 - Up to 1M/250k	50	100.8
BT IPstream Home 2000 - Up to 2M/250k	50	100.8
BT IPstream Office 500 - Up to 500k/250k	50	148.8
BT IPstream Office 1000 - Up to 1M/250k	50	148.8
BT IPstream Office 2000 – Up to 2M/250k	50	148.8

Circuit bandwidth (transmission rate):	Connection Charge (GBP exc. VAT)	Annual Rental (GBP exc. VAT)
BT Central 2 Mbit/s	3000	12360
BT Central 10 Mbit/s	14000	35244
BT Central 34 Mbit/s	14000	81000
BT Central 155 Mbit/s	50000	347400
Per km charge above 40 kilometres (for all transmission rates except BT Central 622 Mbit/s options)		2000

Usage Based Charging

The final option separates the charge into three components: a per user charge; a charge for the connection between the ISP and BT's network; and a usage charge (per kbits averaged over the time period). In this case the usage charge covers the cost of BT's network between the DSLAM and the connection to the ISP. Thus the IPStream component is priced the same as under the capacity based charging and the connection to the ISP is charged at the same prices as the "standard charging".

Circuit bandwidth (transmission rate) downstream / upstream	Connection Charge (GBP exc. VAT)	Annual Rental (GBP exc. VAT)
BT IPstream Home 250 - Up to 250k/250k	50	100.8
BT IPstream Home 500 - Up to 500k/250k	50	100.8
BT IPstream Home 1000 - Up to 1M/250k	50	100.8
BT IPstream Home 2000 - Up to 2M/250k	50	100.8
BT IPstream Office 500 - Up to 500k/250k	50	148.8
BT IPstream Office 1000 - Up to 1M/250k	50	148.8
BT IPstream Office 2000 - Up to 2M/250k	50	148.8

Circuit bandwidth (transmission rate):	Connection Charge (GBP exc. VAT)	Annual Rental (GBP exc. VAT)
BT Central 2 Mbit/s	3000	9000
BT Central 10 Mbit/s	14000	17000
BT Central 34 Mbit/s	14000	21000
BT Central 155 Mbit/s	50000	45000
Per km charge above 40 kilometres (for all transmission rates except BT Central 622 Mbit/s options)		2000

	BT Central Usage Charge Per kbps per month (GBP exc. VAT)
Usage Charge Per kbps per month	0.41

Conclusions on Charging

The increased options for pricing offer linked advantages on both the supply and demand side:

- ISPs have increased flexibility for implementing different packages such as volume based pricing. These pricing schemes prevent a 'tragedy of the commons' situation possible under the standard pricing, where retail End Users have no incentive to limit their usage of the finite shared resource (in this case bandwidth) with the result that there is a strong risk of excessive use – for example peer-to-peer file-sharing – leading to an overall loss of utility;
- By unbundling the cost of the End User connection from the cost of BT's network, the prices better reflect the costs of provision. This cost information

then flows to the end user allowing more efficient retail pricing. For example the (incremental) cost of the end user ADSL connection is largely independent of the peak bandwidth speed. The variable costs relate to transport within BT's network, the connection between BT's network and the ISP and the ISP's onward connectivity to the Internet. Incremental costs are driven by the aggregate bandwidth used at peak times. In standard pricing this was controlled by limiting customers' aggregate download speeds (with aggregate download speed a combination of peak download speed and the degree of contention).

5.5 Ireland

Eircom's wholesale ADSL service includes both IP services and services which give access to the underlying ATM layer. The IP based services are considered in this report.

Eircom's IP bitstream offer is similar to BT's standard pricing with a limited number of bandwidth packages with fixed contention rates being made available with the pricing per user covering the costs of eircom's ATM network.

There are four defined products for the end user service with four speed levels and two levels of contention:

	Bandwidth (rate adaptive)	Contention	Connection charge (EUR exc. VAT)	Monthly Rental (EUR exc. VAT)
eircom Bitstream Expand IP	1024/128	24	60	115.00
eircom Bitstream Swift IP	2024/128	24	60	59.60
eircom Bitstream Express IP	3072/256	24	60	27.00
Eircom Bitstream Sonic IP	4096/256	48	60	20.10

In addition eircom provides an ADSL Bitstream Connection Service. The Bitstream Connection Service is provided to allow Bitstream Access Seekers ("access Seekers" being the ISPs) to connect to the eircom ADSL Bitstream Service.

Bitstream Connection Service provides access and transport services for Access Seekers from the eircom ADSL Regional POPs (i.e. handover points for the Bitstream service) to the Access Seeker's premises. Depending on the specific Bitstream products purchased, Access Seekers may have to access their Bitstream service at one or more eircom ADSL Regional POPs. For the Bitstream 1M/256K and 512K/128K products (with ATM interface) each eircom ADSL Regional POP will service particular exchanges associated with that POP, as defined in the Deployment Plan. Access Seeker traffic for these products will be handed over at each respective eircom ADSL regional POP. For the Bitstream 512K/128K Rate Adaptive product (with IP interface) each eircom ADSL Regional POP may service all exchanges within the ADSL rollout area. An Access Seeker may access their Bitstream traffic for this product for the entire ADSL rollout area from any one or more of the eircom ADSL Regional POPs.

The pricing for the connection consists of a connection fee and a distance based rental, priced on a project-by-project basis.

Conclusion

Eircom offers a quite limited set of products for IP based Bitstream products. However, the availability of unbundled local loop services and an ATM based Bitstream service gives ISPs opportunities to offer differentiated services.

5.6 Belgium

Belgacom Unbundled Offer

Belgacom has two wholesale ADSL offers.

Belgacom Reference Offer for Broadband Access (BROBA) I offers interconnection at the DSLAM level. This offer has not proven very popular due to the need for competing ISPs to build out Points of Presence at all exchanges where they wish to serve customers.

BROBA 2 offers a connectivity service from the end user to the ISPs POP. The offer only defines a single ADSL service, with two levels of pricing depending on whether the line is also being used to provide voice services (where the voice services will cover the majority of the line costs) or is used for ADSL only.

	Connection Fee (EUR exc. VAT)	Monthly Line Rental from reference unbundling offer (EUR exc. VAT)	Monthly ADSL Specific Costs (EUR exc. VAT)
Active loop shared with voice	72.14	1.64	6.78
Non-active loop	57.02	11.62	6.78

Differentiation in the end user offer is achieved by specifying the characteristics of the ATM transport component. The pricing for this element is complex (and is not shown in this report), in theory offering ISPs freedom to offer a wide range of combinations of bandwidth and contention.

Conclusion

Belgacom's Bitstream offer allows great flexibility by completely unbundling the access and transport elements. However, the lack of a set of IP based services imposes a higher barrier to entry for ISPs. As a result a secondary wholesale market has developed with larger ISPs such as Scarlet offering wholesale ADSL services to smaller ISPs.

5.7 Conclusions

The wholesale services offered in Guernsey and Jersey are similar, and effectively dictate the retail services that will be offered by ISPs, with the result that there is little differentiation in the services offered except on price, and non-network elements such as CPE.

In the Isle of Man the definition of a retail ADSL service also dictates the retail offers by ISPs, again leading to little differentiation between the ISPs offering.

In the larger jurisdictions a number of elements allow greater flexibility in ISPs prices:

- The availability of unbundled local loop services, which allows ISPs to bypass the incumbent's ADSL network entirely if they so choose;
- Availability of ATM based wholesale services instead of, or in addition to, IP based wholesale services;
- In the case of the UK, a range of charging options is available for the IP based service.

The independent ISPs in Guernsey expressed a clear interest in more flexibility in wholesale ADSL services, and such flexibility would appear to offer benefits to retail customers, who have a wider range of services to choose from in the larger jurisdiction. Clearly it would not be appropriate to require C&WG to match the range of wholesale products offered by say BT. However it may be possible for C&WG to offer a wider range of wholesale services than currently offered. Thus it appears appropriate to investigate whether there are any operational and economic constraints particular to smaller markets on the introduction of wholesale services which allow greater flexibility in the end user offer.

6 Wholesale Terms and Conditions

6.1 Analysis of C&WG T&Cs

The C&W Guernsey Wholesale Agreement – Broadband Lite (March 2003) provides a comprehensive wholesale product offering.

6.1.1 General Structure

The offer is in the format of the Agreement with a number of schedules, these schedules include:

Schedule 1: Interpretation

Schedule 2: Service Description

Schedule 3: Charges

Schedule 4: Service Level Agreement

Annex A – Service Provision Process

Annex B – Fault Management and Maintenance Processes

Annex C – Standard Templates

Annex D – Focal Points

Schedule 5: Technical Description

Schedule 6: Document History

In the following section of this report GOS Consulting will provide specific comments on areas of the agreement and schedules that we deem are pertinent to this audit.

6.1.2 The Agreement

The agreement takes the form of a typical legal framework between operators for the supply of wholesale products and contains clauses covering forecasting, ordering & provision, use of services, credit status, suspension of services as well as "standard" clauses for force majeure, intellectual property rights, etc.

While some of the ISPs expressed issues with the provisioning of end user connections, the agreement appears to cover this area:

> 3.4 within 5 Business Days of receipt of an Order from Telco, C&WG shall either:
> 3.4.1 inform Telco when C&WG will be able to provide a Ready for Service (RFS) Date to Telco; or
> 3.4.2 confirm a RFS Date to Telco (if it is possible to do so).

> 9.3 each Ordered Broadband Lite Service shall continue for an initial period of twelve months commencing on the relevant Hand Over date, subject to Acceptance specified in section of 3.3.6 of Schedule 4. Thereafter, the relevant Ordered Broadband Lite Service shall continue subject to termination by either Party of the relevant Ordered Broadband Lite Service or part thereof upon giving three (3) months' written notice to the other Party.

The agreement includes a framework for Dispute Resolution between the parties.

6.1.3 Schedule 2: Service Description

Broadband Lite is presented as a "Wire Only" service which terminates on a standard telephony master socket. This enables ISPs or Customers to provide their own ADSL modem or router and micro filter.

Broadband SP Lite provides connectivity from the C&WG Broadband Network to the ISP. The service offers routed symmetrical bandwidth and is provided via a Network Terminating Unit (NTU). Authentication of customers will be achieved using a Radius server. A C&WG Broadband Network Radius server will authenticate the service connection name inputted by the customer to determine the Telco or their Service Provider. The ISP's Radius server must authenticate the customer by user name and password.

The Service Description includes descriptions of the attributes that must be provided by the ISP when communicating with the C&WG Radius server and also the relevant standards and protocols that must be conformed to.

6.1.4 Schedule 4: Service Level Agreement

This Schedule includes specific information on Service Performance Reports (SPR), Forecasting, Service Provisioning, Ordering Processes, Cancellation, Disconnection, Service Change, Billing, Fault Management, Fault Priorities, Fault Escalations, Maintenance and Availability.

For Service Provisioning C&WG provide the following targets and service credits:

Product	Standard Provisioning Intervals	Service Credit Failure to meet RFS
Broadband Home and Pro Lite	95% within 10 Business Days	2% of the monthly recurring charge
Broadband SP Lite where suitable external line plant exists	95% within 30 Business Days	2% of the monthly recurring charge
Broadband SP Lite Services where suitable external line plant does not exist	95% within 60 Business Days	2% of the monthly recurring charge

For service outages Service Credits are applied up to a maximum of 50% of monthly Recurring Charges for an outage lasting 24 hours or more in excess of the Target Time to Repair.

6.1.5 Schedule 4: Annex A – Service Provisioning Process

This annex describes the detailed provisioning process for the Broadband Lite product range.

ISPs will order Broadband Lite Services by sending a written order to C&WG by either fax or email. The C&WG sales department will be responsible for processing orders. C&WG will perform a Single End line test to confirm that the analogue line is suitable for ADSL based services.

After a successful Bring Into Service (BIS) test, C&WG will send a written confirmation (via fax or email) including the BIS test results. The date of this confirmation will be considered to be the RFS Date for the calculation of the Provisioning Interval, unless the installation fails the Service Acceptance Testing.

6.1.6 Schedule 4: Annex B – Fault Management & Maintenance Process

This annex describes the detailed fault management and maintenance process for the Broadband Lite product range. This was a common concern of the ISPs.

Where C&WG detects service degradation or an Outage on a Broadband Lite Service, C&WG will open a Trouble Ticket without delay and immediately inform the ISP of the trouble ticket number. Where the ISP detects service degradation or an Outage on a Broadband Lite Service, the ISP will inform C&WG. C&WG will open a Trouble Ticket without delay, and immediately provide the Trouble Ticket number to the ISP.

6.1.7 Schedule 5: Technical Description

This schedule describes C&WG's ADSL delivered services and provides detailed information for the interworking and communication of both parties' networks including detailed information on the attributes for Radius authentication and ADSL line profile parameters.

6.2 Comparison with Structure of the Agreement in Benchmark Countries

6.2.1 Jersey

Jersey Telecom has a Wholesale ADSL Service Agreement. The document has the form of a legal agreement and schedules covering:

Schedule 1 - Definitions

Schedule 2 - Specifications

Schedule 3 - Charges

Schedule 4 - Ordering and Billing Processes

Schedule 5 - Service Levels

Schedule 6 - Fault Management and Maintenance Processes

Schedule 7 - Contact Points

6.2.2 United Kingdom

The terms and conditions for BT IPstream Service have the following contents:

1. Interpretation
2. Commencement and Duration of this Contract
3. Provision of the Service
4. Nominated Contacts
5. BT Equipment
6. Connection of Equipment to the Service
7. Access and Site Regulations
8. Use of the Service
9. Intellectual Property Rights
10. Intellectual Property Right Indemnities
11. Confidentiality
12. Marketing, Advertising Standards and Compliance

13. Charges and Deposits

14. Limitation of Liability

15. Matters Beyond the Reasonable Control of Either Party

16. Escalation and Dispute Resolution

17. Cancellation

18. Termination of this Contract by Notice

19. Breaches of this Contract

20. Changes to this Contract

21. Transfer of Rights and Obligations

22. Entire Agreement

23. Notices

24. Notice of Withdrawal of the Service

25. Severability

26. Law

SERVICE SCHEDULES

Schedule 1 Service Schedule

Schedule 2 Service Level Agreement

6.2.3 Ireland

eircom's bitstream agreement is structured as a standard agreement between both parties. In addition eircom have a bitstream agreement that is subject to a minimum term where a minimum term is defined as the minimum period during which the Access Seeker commits to keep and pay for a New Product Order on a Bitstream Port. This period shall commence on the date eircom starts billing for that Product on a Bitstream Port and shall continue for six months thereafter.

Supporting the standard agreement are:

- a product description;
- a Service Level Agreement; and
- a price list.

6.2.4 Belgium

Belgacom's Reference Offer for Bitstream Access (BROBA II ADSL) consists of a main body and well as a series of Annexes, these are:

Annex 1: Agreement

Annex 2: Technical Specification

Annex 3: Exchange of Information

Annex 4: Planning & Operations

Annex 5: Basic Service Level Agreement

Annex 6: Pricing & Billing

Annex 7: Operational Systems

Annex 8: Prepayment Terms & Conditions

Annex 9: Migrations

Annex 10: BROBA II ADSL and SDSL VP switching - Guaranteed Positions & related migration, concentration and pricing Rules.

In addition to these annexes there is a separate document for escalation procedures.

6.2.5 Conclusion

The structure of the C&WG offer is similar to other jurisdictions and it appears to be comprehensive and fit for purpose. The issues raised by the ISPs, such as fault reporting and provisioning, are adequately covered in the agreement. C&WG stated that they complied with the agreement in areas such as fault reporting and provisioning. Thus the problems appear to be the operational implementation of the agreement rather than the agreement itself.

7 Economic Analysis

7.1 Benchmarking Wholesale Prices

7.1.1 Methodological Issues

Benchmarking wholesale prices raises two issues which may affect comparability:

1. Variability in the structure of wholesale services and charges, makes it difficult to compare like with like. In particular the split between the costs covered as part of the "per user" charges and that covered by the connection between the incumbent's network and the ISPs may vary between operators;
2. Costs may differ from operator to operator. In particular costs will vary between the larger operators and the smaller operators due to a combination of any economies of scale and the greater transmission distance required in the larger networks.

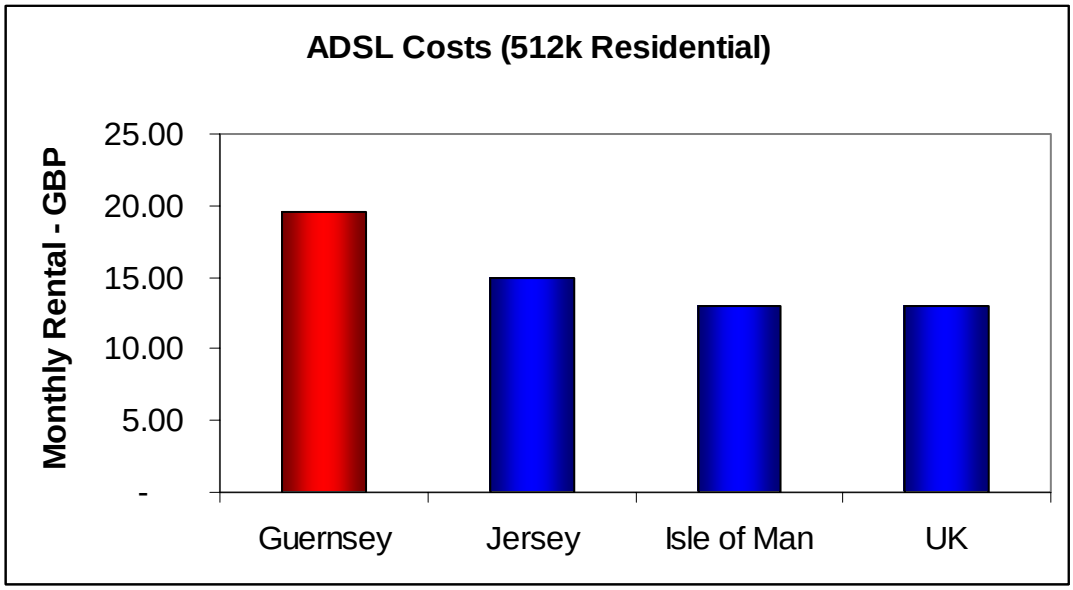
Variability in the structure of wholesale tariffs mean that we are are unable to calculate a "Total Cost of Ownership" for wholesale services. However, taking into account these caveats, we can benchmark the wholesale prices in Guernsey against prices in other jurisdictions:

- Jersey wholesale prices should be a relatively fair benchmark given the similarity in network size and structure and the similarity of the wholesale services and charging structure;
- Manx Telecom's ADSL service offers similar functionality to the broadband lite services and given the similar network size may form a reasonable benchmark;
- UK IPStream services with "standard" charging offer similar functionality to the Broadband lite services and form an interesting comparison, although the significant difference in network size mean that they will not form an appropriate benchmark.

eircom's end user services are not directly comparable with C&WG's services in terms of bandwidth and for this reason does not form a useful comparison. Belgacom's wholesale services are structured in a very different way form C&WG's services making comparisons difficult.

7.1.2 Results

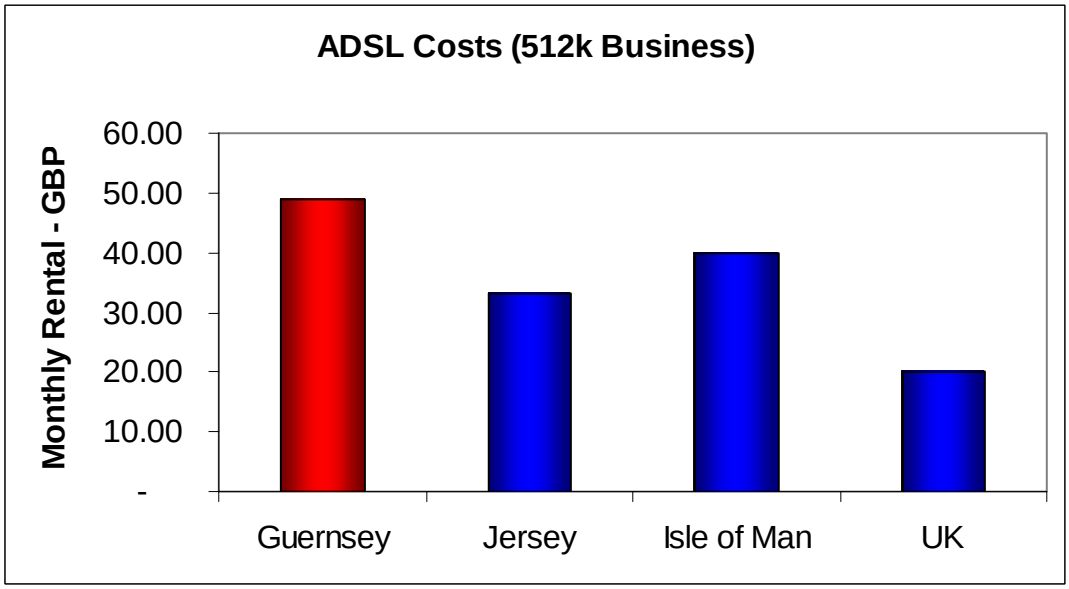
Residential 512kbit/service

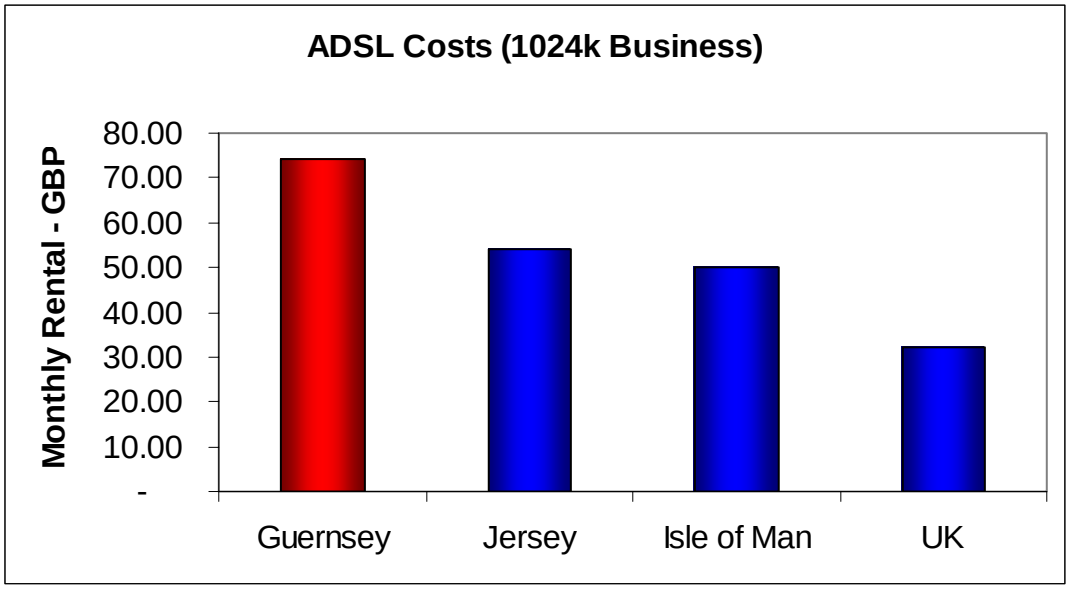


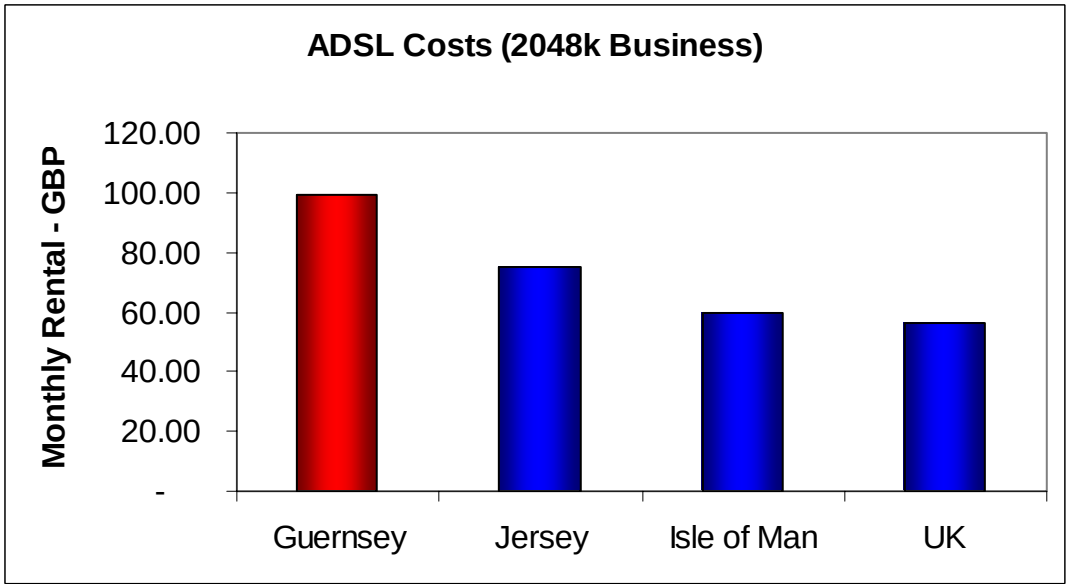
C&WG's wholesale charges for a residential ADSL service are the most expensive. Costs in Jersey are 23% less and in the Isle of Man and the UK 33% less. It is difficult to explain this difference through cost arguments alone.

Business Services

Comparisons were carried out for the three business oriented services offered by C&WG.

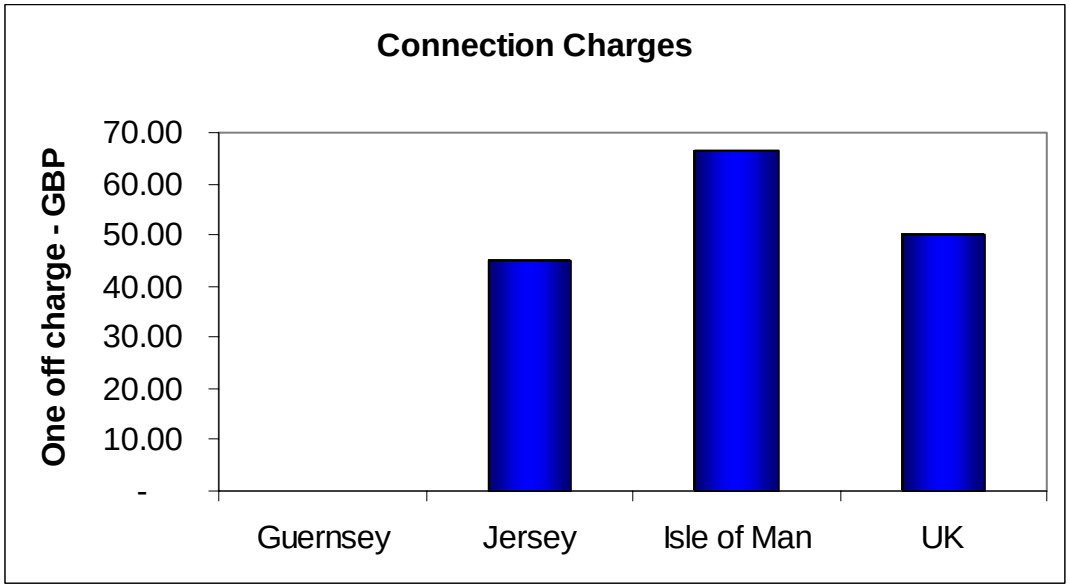






The pattern for each of the services is similar: Guernsey is consistently the most expensive, with prices in Jersey and the Isle of Man significantly cheaper (in Jersey between 24% and 32% cheaper and in the Isle of Man between 18% and 39% cheaper) with prices in the UK consistently the cheapest (between 43% and 59% cheaper).

Connection Charges



Connection charges have been set to zero in Guernsey from March 2005 which will lower the overall cost to the ISPs, when compared with the other jursidictions. Connection charges are similar in the other jurisdictions with the slightly higher cost in the Isle of Man possibly reflecting the extra retail costs associated with connecting customers.

7.1.3 Conclusion

When compared to the most obvious benchmark, that of Jersey Telecom, C&WG's wholesale rental prices are considerably higher for both residential services and business services. Prices of the comparable (retail) ADSL service in the Isle of Man are also considerably lower in all cases. Prices in the UK are significantly consistently the cheapest, perhaps reflecting economies of scale.

The doubling of downstream bandwidth for the wholesale offers will effectively reduce the price in Guernsey, making the business services more competitive and bringing the cost of residential services into line with comparable services in other jurisdictions.

7.2 Gross Margins

7.2.1 Methodological issues

Gross margins can be defined as revenues from customers less direct costs. Gross margins give the total net revenues from which the ISPs need to recover their costs.

In the context of an ADSL retail service, the direct costs of the service are the cost of the wholesale connection to the end user. While other costs are incremental, i.e. they will increase with a given increment of additional customers, there is not a direct relationship between adding an additional customer and the costs.

For each of the retail services offered by C&WG, we subtracted the monthly cost of the corresponding Broadband Lite end user service from the monthly revenues from the retail service to calculate the gross margin.

Similar calculations were carried out for the three other jurisdictions with comparable wholesale services/unbundled ADSL services. For each of the other

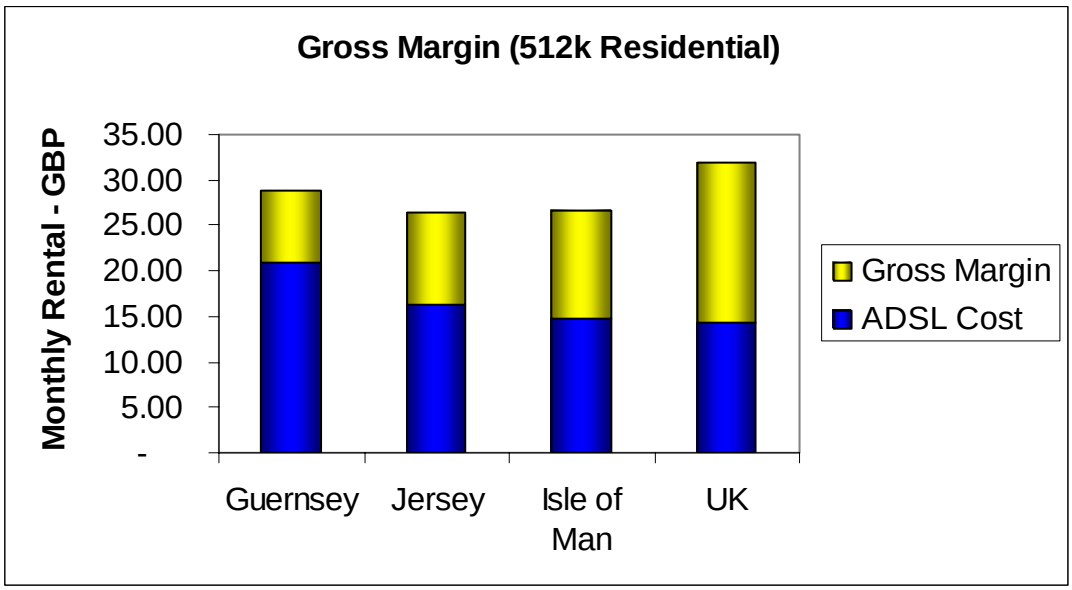
jurisdictions corresponding retail and wholesale services were selected. In the case of the Isle of Man, the retail ISP charge added to the retail ADSL charge, which is broadly equivalent to the gross margin, was used as a comparator. In the case of the UK, (business oriented) retail packages with no limits on capacity were used to ensure consistency.

Prices used were standard list prices, i.e. no account was taken of any offers of reduced subscription or activation charges. No allowance was made for any services such as installation, CPE or static IP addresses bundled in the retail offer.

In order to normalise for the effects of varying connection fees, we amortised connection fees over 36 months (i.e. monthly costs = monthly rental + connection_charge/36).

7.2.2 Results

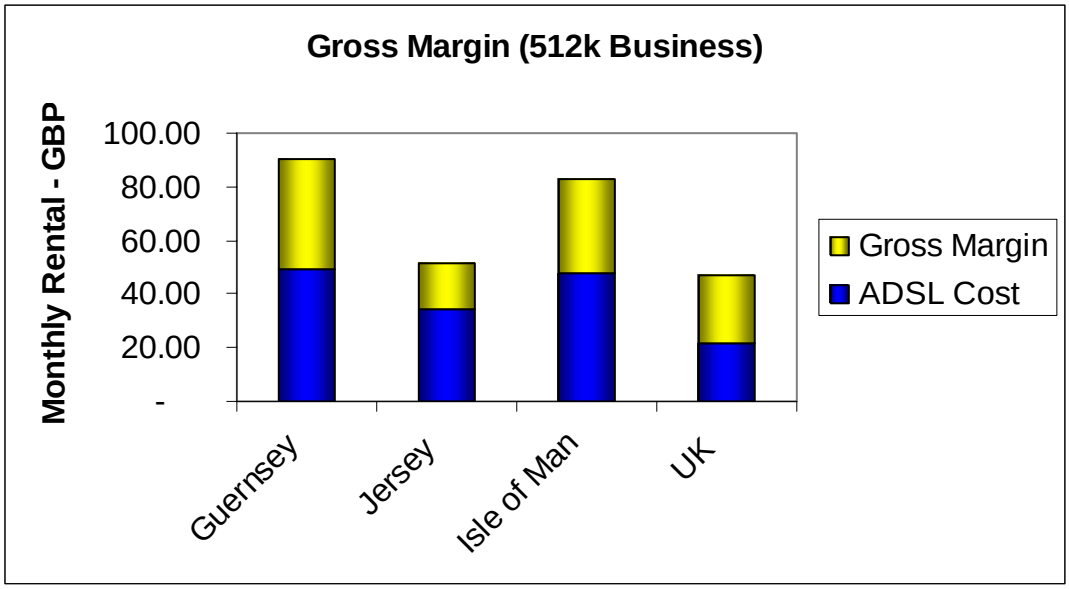
Residential 512kbit/service

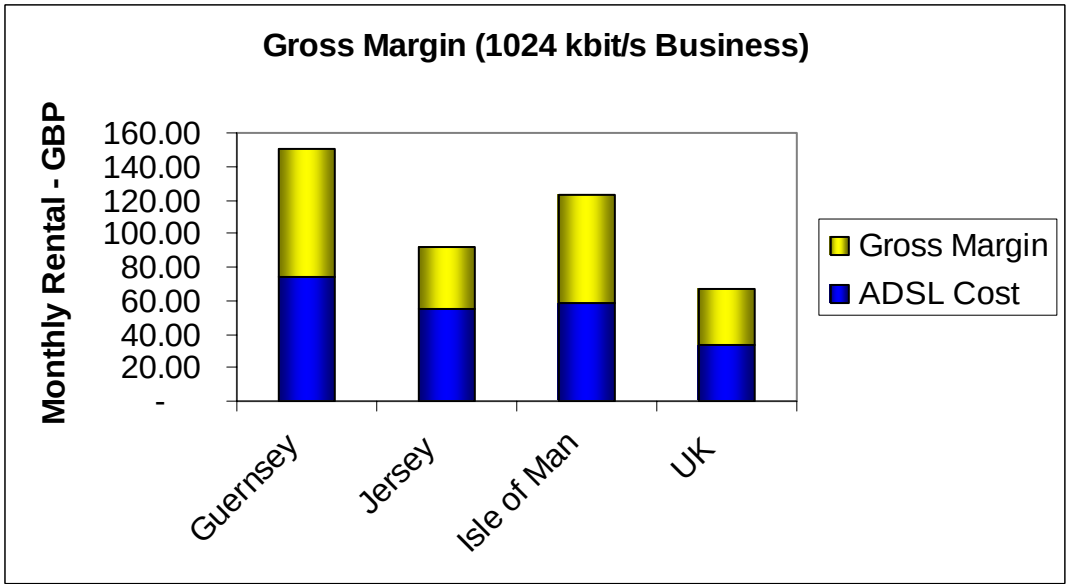


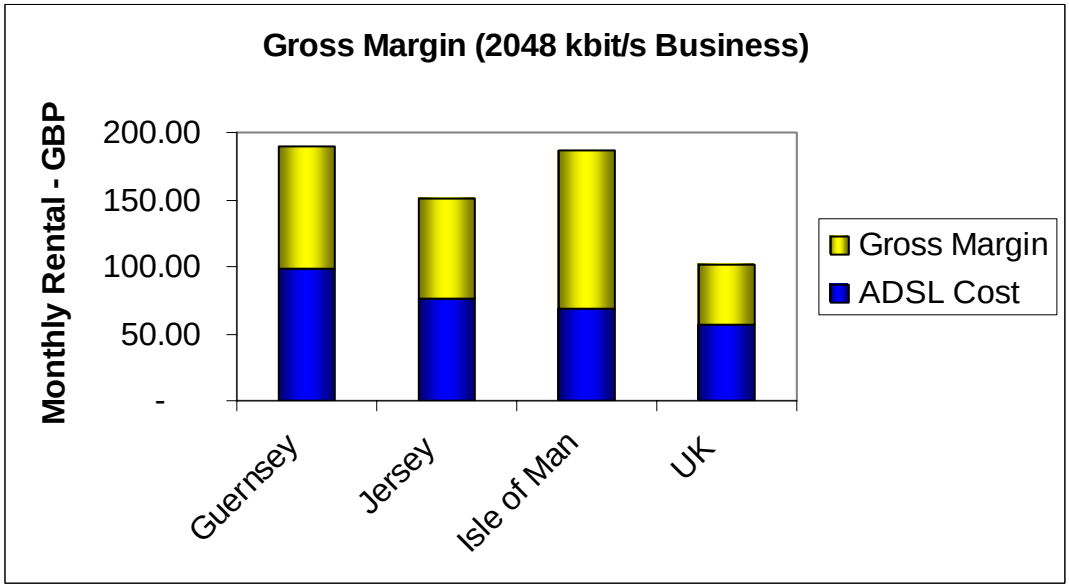
Margins for residential service are much lower in Guernsey than in comparable jurisdictions due to the wholesale ADSL service being comparatively expensive. The relatively high margin in the UK reflects the fact that the comparable service with no limits on traffic is a business oriented service ("Single 500").

Business Services

Comparisons were carried out for the three business oriented services offered by C&WG.


Gross Margin (512k Business)
Monthly Rental - GBP
100.00
80.00
60.00
40.00
20.00
-
Guernsey
Jersey
Isle of Man
UK
Gross Margin
ADSL Cost


Gross Margin (1024 kbit/s Business)
Monthly Rental - GBP
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
-
Guernsey
Jersey
Isle of Man
UK
Gross Margin
ADSL Cost


Gross Margin (2048 kbit/s Business)
Monthly Rental - GBP
200.00
150.00
100.00
50.00
-
Guernsey
Jersey
Isle of Man
UK
Gross Margin
ADSL Cost

Absolute gross margins for the business oriented services are relatively high in Guernsey, being consistently higher than in the UK and Jersey, and higher than in the Isle of Man for the two lower bandwidth services. While the higher margins than the UK are unsurprising, as ISP costs will be higher in Guernsey due to lack of economies of scale and the additional cost of off-island capacity, the cost base in Guernsey is likely to be similar to the two other islands.

7.2.3 Conclusion

When compared to the most obvious benchmark, that of Jersey Telecom, C&WG's margins are considerably lower for residential services and higher for business services. The pattern is similar when comparing margins in the UK and the Isle of Man.

7.3 Further Margin Analysis

7.3.1 Methodology

This section compares the wholesale and retail prices for the incumbent fixed operator. Given the existence of vertically integrated fixed incumbent operators, in most markets the fixed incumbent is both a (wholesale) supplier and a (retail) competitor for other operators in the market. In this case there is a risk that the incumbent may set the margin between wholesale prices and retail prices at a level below a competitive level – a "margin squeeze".

Costs included

The competitive level of net margin can be defined as incremental cost plus some mark up to recover common costs.

Given the scope of this project it is not possible to accurately ascertain all of the incremental costs of delivering service, nor make any judgement on the appropriateness of any recovery of common costs by C&WG. Our analysis focuses on the incremental network costs in delivering services as these can be readily identified and estimated. For Guernsey these costs are:

- The direct wholesale cost of the ADSL access to an individual customer;
- The cost of the Broadband SP Lite connection between C&WG's network and the ISP;
- The cost of bandwidth between Guernsey and the UK;
- The cost of Internet connectivity in the UK.

These costs are clearly incremental in that the addition of an increment of customers will require an increase in the purchases of all of these services to offer a constant quality of service.

Dimensioning the Network

For the wholesale ADSL connection there is a one-to-one relationship between the number of customers served and the number of wholesale connections purchased. For the other services a given increment of capacity will be shared between a number of customers.

One approach would be to calculate the unit cost when each network component is fully loaded, i.e. calculate the unit cost per customer as the cost for an increment of capacity divided by the maximum number of users that the increment of capacity could serve. However, in reality there are two offsetting effects:

- Not all users may be connected at once;

- Utilisation will be less than 100% in for a variety of reasons including: the need to have capacity ready for future demand growth; to cope with spikes of demand and; because capacity can only be increased in fixed increments.

The first effect may not be a factor for a given group of customers in ADSL networks if we assume that the point of maximum contention is the ADSL network and thus at peak times the average bandwidth per customer is equal to the peak bandwidth divided by the contention ratio independently of the number of simultaneous users. Only if there are distinct groups of users, such as business and residential users, whose peak use of the Internet does not overlap, do some savings become apparent. We have taken the "worst case" assumption that there are no synergies between different groups of customers.

The second effect can be modelled by making assumptions about the maximum utilisation possible. We have used an estimate of utilisation of 80%.

For the off-island component of the network we make the worst case assumption that all traffic transits via the UK (i.e. that the level of traffic that originates on the island, either on the network of the ISP or other ISPs directly connected to the ISP) is minimal. We have not made any allowance for any redundancy in the link, which would increase the cost.

Costing

Costs of the wholesale services are taken from C&WG wholesale agreement.

Costs of off-island links and Internet connectivity in the UK are taken from Cable and Wireless's response to the questionnaire.

7.3.2 Results

Results of the margin analysis are shown in the table below:

Analysis of C&WG Margins (GBP/month)[1]

	Broadband Select 500	Broadband Select Pro 500	Broadband Select Pro 1000	Broadband Select Pro 2000
Revenue per month				
Direct ADSL costs				
Gross Margin				
Connection to ISP				
Backhaul to UK				
Internet Connectivity				
Total Network Costs				
Net Margin				

[1] This data is confidential to C&WG

7.3.3 Conclusions

The analysis of the level of margins is based on a number of assumptions and simplifications and thus should be seen as only a broad estimate of the level of margins.

From the perspective of C&WG's profitability for the customers it services directly, the split between the wholesale "ADSL" element and the "ISP" element will have no impact, as the wholesale charges are a transfer payment that will net out. However, the level of margins will impact on the independent ISPs ability to compete.

The analysis appears to indicate that the provision of residential ISP services in Guernsey is structurally unprofitable, with the network costs alone greater than the margin between retail and wholesale costs. This will impact on the independent ISPs' ability to compete in this market.

The margins for business services are positive. The analysis gives no information on whether the margins are sufficient to recover the other costs of operating an ISP business. The varying level of margin may reflect a disproportionate recovery of costs between services (which in itself is not a problem) or may simply be an artefact generated by the relatively crude analysis.